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1999 - Oxley Park Community Centre
Shenley Church End Parish Council

Mechanical & Electrical Services Specification

July 2025

DOCUMENT HISTORY

ISSUE	REVISION	DATE	DETAILS	BY	CHKD
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02	T2	23/07/2025	Tender Issue	KG	EH
03	T3	02/10/2025	Tender Issue	KG	EH
04					
05					

CONTENTS

1 INTRODUCTION

All deviations from the requirements of this document shall be stated in the bid documentation. In the absence of such a statement, it shall be understood that all requirements of this specification are fulfilled without exception.

This document shall be read in conjunction with the tender drawings, selection data, schedules, lists, contractual documentation, letters, and any other information issued with or as an addendum to this tender package.

2 GENERAL CONDITIONS

2.1 General Particulars

Project Name: Oxley Park Community Centre, Renewables Upgrade

End Client: Shenley Church End Parish Council

Lead consultant and Principal Designer for CDM: Heaton Design & Engineering

Engineer: Heaton Design and Engineering Ltd
Telephone 01993 357337
www.heatonde.co.uk
Email Edward@heatonde.co.uk

2.2 Tender and Contract Documents

The tender documents with respects to the mechanical systems are detailed on the latest revision of Document Register.

2.3 The Site / Existing Building

Site Address: Oxley Park Community Centre, Redgrave Dr, Oxley Park, Milton Keynes MK4 4TA

2.4 SITE VISIT

Before submitting a quotation, the Contractor **MUST** visit site and fully acquaint themselves with all aspects of the building, its construction, access, the extent of the existing installation and the implications on deliveries and positioning of plant for the proposed project.

Tenderers are required to visit site during the tender period. Tenderers are to arrange to visit site by contacting: -

Jane Munn – Clerk@shenleychurchend-pc.gov.uk

Any claim for extra monies due to lack of all available information will not be accepted.

3 TECHNICAL SPECIFICATION

3.1 GENERAL

The works involved in this project consist of the replacement of the heating plant and general replacement of mechanical plant within the plant room. The heating plant consists of 3no. condensing units serving 3no. hyrdroboxes, a domestic hot water cylinder and pipes, pumps and ancillaries, protective cages, controls, insulation, valves, sensors etc. All to be installed at Oxley Park Community Centre, Redgrave Dr, Oxley Park, Milton Keynes MK4 4TA .

This document and the associated layout drawings outline the Client requirements and minimum standards which must be achieved.

The final installation shall provide for good access to provide easy maintenance and potential to remove and replace all plant. Plant should not be installed in locations where access is restricted or difficult.

There is vehicular access close to the plant room access point. It may be possible to park on site, but this will need to be agreed with the site representative.

Allow to include for all the BMS, electrical and builders work associated with the mechanical services contract and detailed in this specification and as shown on the drawings.

Electrical works are detailed within the this specification.

Installed and commissioned to latest issues of relevant British Standards, Water Regulations and Gas Safety Regulations.

3.2 ASBESTOS & HAZARDOUS MATERIAL

The building was constructed post 2000 and as such is deemed to contain no asbestos containing materials.

The Contractor must provide RAMS in relation to working with asbestos, including clearly setting out their procedures for following if ACMs or suspect ACMs are discovered during works.

If, against expectations ACMs are unexpectantly disturbed during the course of work the following actions must be taken:
(i) Stop work immediately
(ii) Follow the contractors own procedures as set out in the RAMS and then to contact their manager
(iii) Prevent anyone entering the area to avoid spreading asbestos fibres, remove any footwear or clothing contaminated with dust or debris and seal it in a plastic bag report the problem as soon as possible to the Contract Administrator and to the Principal Designer for CDM Edward Heaton, Heaton Design & Engineering Ltd, Edward@heatonde.co.uk.

3.3 DEFECTS LIABILITY

State dated period of warranty applicable for materials, equipment, plant, installation, and specialist attendance used in these works, unless otherwise stated and agreed the warranty period for all applicable elements and Contractors services shall be twelve months from the date of practical completion.

The contractor shall allow for a minimum of 1 year warranty on the new system.

3.4 PROVISION, CONTENT AND USE OF DOCUMENTS

3.4.1 Design Software

The contractor shall develop the construction phase drawings in electronic (dwg) format using the current architectural layout. As-built drawings shall be provided to the client as part of the O&M information upon completion of the project. The drawing outputs issued by the contractor (construction and as-built) shall be issued in pdf and dwg formats.

3.4.2 Contractors Obligations

The contractor is responsible for providing the following content or documentation as part of the project construction:

1. Develop the Stage 4 Tender Design into a fully co-ordinated Stage 5 Construction Documentation package
2. Check the provision for and accuracy of the builder's work information issued prior to the award of the contract
3. Detail the final or supplementary builders work information based on manufacturers or sub-contractors design or co-ordination information and provide fully dimensioned drawings.
4. Detail all access requirements, including access in false ceilings, for maintenance & cleaning and provide fully dimensioned and annotated drawings.
5. Design and undertake all acoustic and fire stopping required to facilitate the works
6. Ensure adequate pipework fall gradients are provided.
7. Ensure suitable access to all valve and plant locations for easy access of maintenance personnel.

8. Prepare detailed electrical wiring diagrams of all equipment supplied showing all interconnections between equipment to enable all wiring installations to be undertaken.
9. Ensure sizes indicated on the detailed design information are not invalidated by the selection of alternative routes during co-ordination or selection of alternative manufacturer's equipment.
10. Ensure all alternative proposals including value engineering exercises are fully designed before submitting for approval.
11. Note and advise the main contractor of all acoustic and fire stopping required to facilitate the works.
12. Any changes to the detailed design drawings and information required as part of a variation or change from specification post contract award shall be undertaken by the contractor and information issued to the CA for approval/comment.
13. Design, supply and install all rectangular builders work openings with both dimensions less than or equal to 200mm and all round builders work openings with a diameter of less than or equal to 200mm.

3.4.3 Drawing Definitions

The definitions of technical terms associated with The Engineering services installations are those included in:

- CIBSE, IOP and BSRIA Technical Publications
- BS 7671 - Requirements for Electrical Installations (IEE Wiring Regulations)
- British Standards, including Codes of Practice
- Associated Statutory Acts

3.5 MANAGEMENT OF THE WORKS

3.5.1 Quality

The Engineer is providing a Clerk of the Works service to the client as part of this project to provide a collaborative arrangement to help with on-site co-ordination, installation quality, compliance with specification and effective commissioning of all MECHANICAL AND ELECTRICAL systems. To provide this service effectively collaborative working and communication with all trades regardless of contractual commitments is required. The Clerk of Works will make unannounced visits during the works and shall be given unimpeded and unsupervised access to all aspects of the works without prior notice or consent by the Main Contractor, Mechanical Contractor or any of their Sub-contractors.

3.5.2 Technical Management

Where the main contractor appoints a combined Mechanical & Electrical contractor to undertake the works detailed in this specification, the M&E contractor shall appoint a contracts manager to co-ordinate all M&E trades and be the Specific Point Of Contact (SPOC) for the client and consulting engineer during the works. No intermediary from the main contractor will be permitted under this arrangement.

Where the main contractor appoints separate Mechanical and Electrical contractors to undertake the works detailed in this specification, the main contractor shall appoint a competent technical services manager to co-ordinate all M&E trades and be the Specific Point Of Contact (SPOC) for the engineer during the works.

The engineer reserves the right to communicate (not instruct) directly with all trades working on any element of this project regardless of any contractual arrangements, any attempts by the main contractor to limit communication is not permitted. The engineer may request at any point for a direct representative from any trade to attend a design team meeting.

3.5.3 Commissioning

The Mechanical & Electrical contractor is responsible for commissioning the entire Mechanical & Electrical system in accordance with the CIBSE commissioning codes. This includes but is not limited to the following:

- Preparing a detailed schedule of commissioning items for each system
- Preparing a detailed commissioning programme
- Undertaking Pre-Commissioning Checks of the design
- Undertaking the commissioning of each item of equipment and system
- Co-ordinating all suppliers and trades to ensure commissioning is correctly sequenced

- Resolving all defects on all commissioning sheets, arranging for repeat visits as necessary to provide a defect free commissioning certificate for each item of equipment and system
- Undertaking end to end functionality testing of each item of equipment upon completion of the commissioning works
- Ensuring the systems are commissioned to achieve the design criteria detailed in section A13 of this specification
- Preparing a final set of commissioning testing information

3.5.4 Commissioning Management

The Client shall select and appoint a dedicated commissioning manager to work alongside the Mechanical & Electrical contractors to ensure the process is being undertaken in accordance with CIBSE commissioning codes and manufacturers recommendations.

The main contractor and Mechanical & Electrical contractor shall allow for all necessary commissioning meetings during the project and provide all information required by the CIBSE commissioning codes.

The contractor shall notify the CA and client of proposed commissioning dates so they can witness testing if desired.

3.6 STANDARDS

Ensure that adequate allowance is made for both completion of the installation and total commissioning of the whole of the works. All materials and items of plants shall be ordered bearing in mind completion date. Ensure compliance with:

- The Environmental Protection Act.
- The Health & Safety at Work Act. 1974.
- The Electricity at Work Act. 1988/1989.
- BS.7671:2008 Requirements for Electrical Installations, 18th Edition (incl. Current amendments), as produced by the Institution of Electrical Engineers. Refer also to IET Guidance Notes which shall be regarded as definitive about the interpretation/application of BS 7671 within the scope of this project.
- CDM Regulations.
- CIBSE (Chartered Institution of Building Services Engineers) Codes of Practice, Guides and Commissioning Codes.
- COSHH Regulations.
- All Relevant British Standards including BS 7671.
- The Water Regulations 1999.
- The Building Regulations.
- F-Gas Regulations.
- DW 144.

3.7 COMPETENT PERSONNEL

The Contractor shall ensure that they employ fully qualified personnel for all works. Electrical personnel shall be NICEIC or ECA registered.

3.8 PHASING OF WORKS

The works will be carried out in a single phase to reduce the impact on the building users. Work to commence between 08:00-17:00 TBC.

3.9 BUILDERS' WORK

It is the Contractor's responsibility to ensure that they carry out all required builders work in connection with mechanical and electrical building services is co-ordinated with and between all attending Contractors and sub-Contractors.

At the end of each working period the Contractor shall clean up and remove any rubbish or discarded materials associated with the services installation leaving the working area safe, accessible, and tidy.

3.10 HEATING PLANT

Supply and install in the position shown on the drawings 3No external condensers. The "package" shall comprise the ASHP's, hydroboxes, mounts, controllers, cylinder etc. Commissioning by Daikin engineers.

Manufacturer- Daikin
Contact - Adrian lewis
Tel: 07920 874017

3No Daikin ERLA11DV3 External Condensing Units.
3No Daikin EBBJ11D6V Hydrobox
1No Daikin EKHWSU300D3V3 Hot Water Cylinder

The new system shall be complete with a Daikin controls system.

The external units shall be protected by a new cage that shall enclose the units. Allow to dismantle and remove from site the existing wooden enclosure.

The ASHP arrangement shall be controlled via the BMS.

Allow for new heating pumps, new isolation valves, regulation and commissioning valves and new pump installations.

Allow to supply, install and commission the following new heating circulation pumps. Each pump shall have new isolation and non-return valves fitted where shown.

New secondary heating pumps to be single phase twin head Inverter driven -

P.01 - Grundfos Magna1 32-80
P.02 - Grundfos Magna1 25-60
P.03 – Grundfos UPS 15-50 N

Contractor to take care to ensure that the heating pumps are installed in the correct plane to ensure lubrication of the bearings/seals.

Allow to install all new flow and return sensor pockets and sensors in all the locations as indicated on the drawings. The sensors shall be used for monitoring and control purposes.

Replace the pressurisation unit and expansion vessel, add additional vessels as required to suit the increase in water content. Commission the Pressurisation unit and expansion vessel and place the relevant certificate in the O&M Manual.

The complete new installation shall be controlled from the new Trend Control panel.

Within the plantroom the contractor shall mount a new valve schedule which shall include duties. New numbered traffolyte or brass tags are to be fitted to all valves and these should correspond to the numbering system on the new valve chart.

3.11 CO-ORDINATION

Co-ordinate between services to be provided under this contract and installation to be provided by the Contractor.
Provide all necessary information and issue coordination drawings in due time, and provide assistance as required, for the accurate design, setting out, co-ordination and installation of such work to the Contract Administrator.

Be aware that high degrees of accuracy will be required in the setting out and co-ordination of services in ducts, voids etc.

Be aware that no extra costs will be allowed in consequent of any alteration, delay or temporary suspension of the work, which may arise due to non-compliance with instructions from the Contract Administrator regarding co-ordination.

3.12 POSITION OF PLANT AND EQUIPMENT AND INSTALLATION TO DRAWINGS

The Contractor shall:

- Note that drawings scheduled in the specification show the layout arrangement and equipment but may not detail the whole work involved and are diagrammatic in certain particulars.
- Notwithstanding the provision of the drawings, be responsible for taking dimensions and particulars from site for the work specified.
- Submit installation drawings to the SO for consideration at a reasonable time before work is commenced.
- Give due consideration to detailed co-ordination drawings where provided with the specification.
- Give due regard to the needs of inspection, efficient maintenance and replacement.

3.13 ELECTRICAL WIRING & CONTROLS

The supplies for the new ASHP are to be fed from the main intake from a MCCB panel to be installed by the electrical contractor.

The existing control system comprises an existing Trend controller serving the existing plant. The existing control panel is to be stripped out in its entirety and replaced with a new panel.

Allow for the required new input/output modules.

The existing power supply to the MCCP, is to be reused for the power supply to the new MCCP.

The Contractor shall provide the BMS description of operation, panel wiring diagrams, software PDFs and graphics for approval before the control panel manufacture.

Installation Details

General

The contractor shall supply, install, and commission a Trend IQ4E controller complete with a panel facia touch screen within a new control panel, with new wiring and sensors. The contractor shall supply, install, and commission the new controller and sensors.

The new panel shall have a Trend IQ4E controller and shall serve all new plant, existing plant and pick up all new sensors as required for a complete an operational system. These works shall ensure the control panel shall provide timed power and control circuits to the new condensers, new water heater, heating pumps, control and monitoring sensors, pressurisation unit and HP & LP switches, fault alarms etc.

The new Trend control panel and IQView4 touch screen shall generally serve the new plant as required for a complete and operational system.

Contractor to consider the limited space within the plant room. The contractor to measure the maximum size of the panel on site prior to manufacturer to make sure the proposed panel will fit within the existing space of the existing control panel.

Allow to install new sensors in the flow and return pipework– see drawing for sensor pocket/sensor locations.

Allow to remove existing room and external sensors and to supply and install all necessary new room and external control sensors to enable the full control system to function properly.

Allow to monitor the fault outputs from the new pumps and existing pumps to enable monitoring, fault condition and auto changeover (pumps).

The redundant electrical equipment shall be removed.

The new panel is to be linked back to the existing Trend Supervisor system. Allow to update head end graphics.

All wiring shall be carried out by the contractor.

The contractor shall note strap on sensors must **NOT** be used.

Control Panel

The control panel is to be a steel enclosure protected to IP54.

Control Panel Wiring

As required, screened cable must be used. The screening must be of non-ferrous material and connected to the earth terminal, at the outstation or controller. All screened cables are to be Type 16-2-4C to defense standard 61-12 part 5. This is PVC insulated (440v rated) PVC sheathed (440v) four core screened cable.

All wiring shall be carried out on the front surface of the mounting plate, in plastic cable trunking of ventilated type with clip-on covers and purpose made connector pieces and accessories.

All plastic trunking and plastic straps used shall be of a fire resistant, self-extinguishing type.

Cable conductor sizes must be rated taking into account all grouping, bunching and enclosing factors. Wiring outside the trunking or loom should be neatly set for connection to terminals or equipment.

When large wiring looms are carried onto a door/switch section a mechanical fixing device must be used; self-adhesive devices may only be used on small looms up to 10 cables.

Minimum cable size on all motor drives 1.5 sq. mm.

Minimum cable size on control circuits 0.75 sq. mm. Neutral cables are not to be shared. Every circuit will have its own circuit protective conductor which will be made off in sequence of order on a multiple earthing bar.

The edge of the door opening or the hinge assembly on the door, will contain a micro switch which will illuminate "panel alive" light when the panel door is open, and the main isolator is over- ridden. The actual position and type of switch will be such that the degree of protection IP54 is not impaired.

All cables within the panel are to be numbered to assist with any subsequent circuit tracing. Selector switches are to be “off”/” auto”/” hand”.

All indicator LEDs are to be of the transformer fed type with a lamp voltage no higher than 24v AC. Indicator LEDs are to be the following colours:

Green - mains healthy, plant run lights.
Red – ASHP fault, pump fault.
White- internal panel alive lamp

A common lamp test facility shall be provided with a lamp test button located on the control panel.

As required, screened cable must be used. The screening must be of non-ferrous material and connected to the earth terminal, at the outstation or controller. All screened cable is to be Belden 8761 NH or Belden 8723 NH PVC insulated (600v

rated) PVC sheathed (600v) four core screened cable.

All wiring shall be carried out on the front surface of the mounting plate, in plastic cable trunking of ventilated type with clip-on covers and purpose made connector pieces and accessories.

All plastic trunking and plastic straps used shall be of a fire resistant, self-extinguishing type.

Cable conductor sizes must be rated considering all grouping, bunching and enclosing factors.

Earthing and Bonding

The controls sub-contractor is to check for the earthing facility at the school. The earthing should be in full accordance with BS7671:2018+A2:2022 and all subsequent amendments. If found not to be in full accordance with BS7671:2018+A2:2022 the Controls sub-contractor is to notify the contract administrator in writing.

The entire installation is to be effectively earthed and bonded in accordance with the BS7671:2018+A2:2022 and the Supply Authority requirements.

Provide supplementary bonding to meet the requirements of the BS7671:2018+A2:2022 as follows:

- Simultaneously accessible extraneous metal points including water, gas and similar pipe work, sinks, ductwork, ventilation, and exposed metalwork of the building structure. All connections are to be accessible.

- Simultaneously accessible exposed conductive parts.

Supplementary bonding conductors will be PVC insulated green/yellow single cables with stranded copper conductors of a minimum size of 4mm² and not less than half the cross-sectional area of the nearest associated protective conductor. Cables are to be low smoke, and fume insulated.

The locations of all bonding and supplementary bonding conductors are to be included on the Record Drawings when they are supplied at the end of the contract.

Provision is to be made to test all earthing and bonding for correct impedance to permit protective devices to operate within the correct time and to carry prospective fault current in safety and to prevent the establishment of dangerous potential under normal or abnormal conditions on exposed conductive surfaces.

Installation Details Boiler House

Control Panel

The new control panel is to be manufactured and mounted as indicated on the tender drawings. The new panel must fit into this space. The panel will be mounted at a height that enables the Trend IQ4view to be clearly read and accessed. The contractor is to allow for a site visit to gain an upload of the existing software and allow for any existing points within the control panel that are not shown below.

Door Interlocked Isolator Control Circuit
1– Live Lamp
1– Lamp test button
1 – Fault Reset Button

ASHP's

3 – Run Lamps

Underfloor Heating Pumps

3 – Hand / Off / Auto Switch
3 – Pump Run Lamp
3 – Pump Fault Lamp

Primary Heating Pumps

1 – Hand / Off / Auto Switch
1 – Pump 1 Run Lamp
1 – Pump 1 Fault Lamp

Pressurisation Unit

1 - Heathy Lamp
1 - Low Pressure Fault
1 - High Pressure Fault

Hot Water primary Pump

1 – Hand / Off / Auto Switch
1 – Pump 1 Run Lamp
1 – Pump 1 Fault Lamp

Hot Water Secondary Return Pump

1 – Hand / Off / Auto Switch
1 – Pump 1 Run Lamp
1 – Pump 1 Fault Lamp

Plant Room Wiring

All new wiring (including sensor wiring) will be low smoke and fume LSOH PVC insulated cables enclosed in steel conduit and galvanized trunking (installed on the surface).

Local Isolators

All equipment at voltages in excess of 24v AC mounted remote from the control panel will be provided with an isolator situated as close to the equipment which it serves as practicable subject to a maximum distance of 1000mm.

The isolators will be of the rotary type, to IP 65 with the main switches lockable in the off position. Each isolator shall have a combined commando socket outlet for equipment connection.

Final Connections

Final connections from local isolators to plant will be LSOH insulated cables enclosed in flexible conduit.

Incoming Services

Ensure that incoming gas and water services are suitably bonded and cross-bonded.

Wiring to Plant

All plant associated with the installation is to be connected to the new control panel.

Sensors

The contractor shall install compatible sensors and connect them back to the control panel in each case.

Allow to pick up existing domestic hot water cylinder, pumps and all ancillaries as required.

Allow all sensors as indicated on the drawing and as required for complete and operational system.

Outside air temperature sensor

The outside sensor is to be installed in a suitable external position away from solar influence.

Room temperature sensors

To be wall mounted within the correct zone.

Alarms

Pump fault indications.

Individual pump trip indication lamps are to be provided on the panel and a common pump fault signal input to the Trend controller.

ASHP fault indications

Individual ASHP fault indication lamps are to be provided on the panel and input to the Trend controller.

Pressurisation unit fault

Individual high- and low-pressure indication lamps are to be provided on the panel to indicate pressurization faults. A fault signal is to be input to the Trend controller.

Remote Interrogation

Use the IT point by the control panel for the connection to the site's Trend head end.

Onsite Interrogation

The contractor shall link the new panel to the existing Trend supervisor software on site. The contractor shall prepare bespoke graphics specific to the installation of the ASHP's, heating pumps, existing water heater and associated plant as well as the UFH manifolds.

3.14 OPERATING AND MAINTENANCE (O&M) MANUALS

At the end of the contract, the Contractor shall hand to the client a complete set of Operating and Maintenance Manuals including "As Installed" drawings. Drawings shall be on AutoCAD latest release and available on Digital Media and hard copy.

The record drawings must be completed within 14 days prior to practical completion and the following information shall be included:

(1) Accurate layout drawings of all mechanical services reflecting the installation (scale 1:100).

The Contractor shall also compile and hand to the PM two copies of a maintenance manual, which shall include:

a) The reference code of the as installed drawings, the manufacturer and model of all installed equipment

b) The manufacturer and type of all accessories used in the installation.

c) The installation and complete operating instructions and details of all equipment supplied and installed by the Contractor.

d) Copies of all completion and test certificates and commissioning certificates.

e) Recommendations for testing or maintenance of the installation or any other item of equipment used in the installation.

f) A list of vulnerable items of equipment together with the precautions that need to be taken to protect such items from damage.

h) The Contractor shall produce 'as installed' drawings using the current version of the Auto-CAD computer aided design package. Each manual shall come complete with a full set of electrical record drawings, complete with a hard copy set to A1 format and with electronic copies.

3.15 TESTING AND COMMISSIONING

Allow to commission and balance the flow rate through the new system on completion of the installation.

The Contractor shall complete testing, balancing, and commissioning of the new mechanical/electrical services systems including the provision of Operation and Maintenance documentation and the provision of all materials and equipment necessary to satisfy stated requirements.

The Contractor is responsible for the full co-ordination, commissioning, testing and operation of the plant. During commissioning the Contractor shall be required to ensure and demonstrate all services are in compliance with all applicable documents.

All services and controls are to be fully commissioned in accordance with the requirements of the CIBSE Commissioning Codes.

The Contractor is responsible for the demonstration of the operation of all parts of the installation to the building users prior to handover.

3.16 COMMISSIONING OF SPECIALIST AND PACKAGED EQUIPMENT

Specialist and packaged equipment shall be commissioned by the manufacturer. The Contractor shall co-ordinate the activities of the manufacturers.

3.17 TRAINING

The Contractor shall fully train applicable maintenance and operational staff in the operation of the services and controls installed within this contract during the commissioning stage and before hand over, this to be concurrent with the handover of the draft operation and maintenance manuals and the draft record drawings.

3.18 MANUFACTURER'S RECOMMENDATIONS

Generally, unless specified otherwise all plant and equipment shall be installed strictly in accordance with the manufacturers recommendations.

4 ELECTRICAL WORKS

4.1.1 Incoming Supply

The incoming electrical supply at Oxley Park community Centre is supplied from the main MCCB panel within Oxley Park Academy next door to the Community Centre. It is supplied via an underground SWA 35mm² 4 core CPC sub-main cable and separate 35mm². The cable is protected by a 3P 100A MCCB. This supply is metered within the Academy via a digital meter with meter serial number 09109254. This meter is used to bill the Community Centre.

The sub-main cable enters the external plant room of the community centre from underground and it is made off into a 100A main switch of to supply a 24-way TP distribution board which serves the Community Centre. The 24-way distribution board has integral metering located next to the main switch, there are 2No. meters. 1No. meter records the left-hand side of the distribution board which is the small power section of the board and the other meter records the right-hand side of the board which is the lighting section of the board. These meters are sub-meters and can be used by the Community Centre to check figures against the billing meter.

The Community Centre could look to have a new supply installed by the DNO, have a new meter fitted and be billed directly by the electricity provider, this would bring a higher project cost to the Community Centre.

The Contractor shall allow to price for the complete removal of the existing sub-main supply from the school main distribution including all cabling, protection, metering, etc. The Contractor shall allow, as part of the upgrade of the National Grid Electricity supply, in their Tender submission all necessary works for a new separate incoming DNO supply upgrade to Oxley Community Centre. The total costs for the complete supply upgrade, including all trenching, cabling, external enclosure (if required) and adaptations to the existing electrical services shall be within the tender cost as a separate item for the client to make an informed decision to include this in the project.

A National Grid Electricity Distribution supply upgrade application for a quote has been made as the National Grid Electricity Distribution quotation reference 5455334.

The client will need to review this information and make a decision on how to progress in regards to a new DNO supply solely for the Community Centre.

4.1.2 Mechanical Plant Supplies

The Contractor shall wire to and connect items of equipment associated with the mechanical services contract.

The Hydro boxes and new water heater and controls will be provided and fixed in position under the mechanical Services Contract. The existing power supplies for the indoor units shall be isolated, disconnected and made safe to enable the existing units to be removed, these supplies shall be reused for connection to the new indoor units.

The existing supply feeding the outdoor condenser shall be isolated disconnected and made safe to enable the existing unit to be removed. The existing wiring shall be fully stripped out back to the DB.

The equipment to be wired shall be provided and fixed in position under the mechanical services contract. In each case and unless specifically advised otherwise the Contractor shall assume that the existing dedicated supplies are to be reused including the existing local isolation to each individual item of equipment.

The wiring of the controls associated with any of the mechanical equipment will be carried out under the mechanical services contract.

Following completion of the mechanical services wiring installation the Contractor shall energise the individual items of equipment only after confirmation has been received from the Mechanical Contractor that it is safe to do so.

New circuits for the outdoor condensers shall be wired in the existing way from the DB in SWA/LSF cable with the circuit protection being adequality sized for the new condenser. The isolator will be of the rotary type, to IP65 with the main switch lockable in the off position and adequality sized for the circuit.

The existing containment shall be reused for the installation of the new supply to the outdoor condenser.

Old power and control conduit and cables that have been made redundant by the new installation shall be removed from site. Furthermore, all existing bonding and conduit etc. shall be visually checked to ensure it is up to latest standards and upgraded/replaced where necessary.

4.1.3 Earthing & Bonding

The Contractor shall supply and install a main earth bonding system and a complete earthing and bonding network system in accordance with BS 7671: Requirements for Electrical Installations - IET Wiring Regulations latest edition, BS 7430: Code of Practice for Earthing and all other applicable regulations and standards as required.

The Contractor shall ensure earth continuity is maintained throughout the installation from each item of equipment to an earthing point in the distribution board.

The Contractor shall ensure that all service carriers which are conductive are electrically continuous throughout their length including the plant to which they connect.

The Contractor shall ensure that electrical continuity does not depend on section to section fixing such as bolts, screws etc., but utilises earth links, copper braided straps and the like to ensure continuity. Examples of installations where particular care should be taken to ensure continuity are pipework/ductwork with rubber seals, flexible joints, loose flanges etc.

Bonding conductors shall be LSZH insulated green/yellow with copper conductors' minimum size shall be 4mm2 or larger if regulations require.

Bonding cables shall be concealed wherever possible.

The cables shall emanate as close as possible to the bonding connection the exact position to be agreed on site with the PM.

The cable outlet shall consist of a moulded white blank cover plate with a hole to suit the cable diameter, fixed to a flush conduit box.

For systems i.e., heating, HWS, ventilation, etc. one conductor shall run as described above from the earthing terminal of each service where it enters the area served by that distribution board.

Connections to pipes shall be made with BS951 clamps otherwise connections shall be made with tinned copper ring type crimping sockets and brass bolts, nuts and washers.

4.1.4 Labelling

General

In addition to the labelling requirements of the client and BS 7671 the following labelling shall be implemented:

Label all isolation switches to indicate which item of equipment it feeds.

Sub-main Cables – Indicating what it is feeding using ferrules labels.

Final circuit cables shall be labelled with ferrules labels.

Include for providing ferrule labels to new final circuit cables identify phase (L1, L2, L3) and neutral (N) conductors, in compliance with BS7671 and NICEIC guidance notes.

4.2 ACCESS FOR MAINTENANCE ETC

It is essential that a clear space is provided around all plant that meets the manufacturers minimum requirements.

The Contractor is required to lay out in advance of installation all major items of plant to show that the maximum use of available space is being provided.

Proposed installation drawings will need to be prepared by the Contractor prior to ordering equipment.

4.3 DRAWINGS

The drawings accompanying this specification have been prepared to show all reasonable details of the intended works and are as follows: -

1999-HDE-XX-SC-M-01201-T1 PROPOSED MECHANICAL SERVICES LAYOUT AND SCHEMATIC

The Contractor shall prepare his own working drawings and include any additional details deemed not to be included within the tender package, they shall be submitted for approval prior to general issue and before implementation.

4.4 BUILDERS' WORK

The main items of builders' work associated with the works include:-

- All holes through walls, ceilings, slabs etc. as required to facilitate the proposed installations.
- Sealing and making good redundant openings in the structure.
- New base for the new condensing unit
- Protection of floor and roof finishes.
- Any other specific items as found necessary.

The Contractor may propose their own choice of builder to complete the installations. The proposed builder who is to complete the works shall be named as part of the Contractor's tender submission.

The successful contractor will be required to instruct the builder to provide all necessary details, programme works within the overall contract period and be fully responsible for payment.

4.5 DISPOSAL OF REDUNDANT MATERIALS

All redundant materials are to be removed from site on a daily basis or stored in a skip. Removed redundant materials shall be removed from site on a daily basis – preferably early in the morning or at the end of the day – to minimise inconvenience for the staff.

The Contractor will be responsible for providing adequate protection to all surfaces of the building to prevent damage. Such protection must be in place before removal of any plant and be accepted by a representative of the client.

An inspection shall be made before the start and after the completion of the project and any damage caused by the Contractor or any of his sub-contractors must be repaired at no cost to the client. Photographic records must be made prior to the removal works.

4.6 AIR CONDITIONING SYSTEMS PERFORMANCE SPECIFICATION

The Mechanical Contractor is responsible for developing the tender design through to completion and procurement, installation, testing, commissioning and certifying of suitable and effective air-conditioning systems that meet the practical needs of the client as indicated in the tender documents listed in the latest revision of Document Register.

The Mechanical Contractor is also responsible to prepare and submit asphyxiation and flammability risk assessments for all relevant spaces for review and approval by The Engineer.

Air-conditioning and refrigeration systems are designed, installed, tested, commissioned and certified in accordance with the current editions of The Building Regulations, BS EN 378-2, CIBSE Guide B3, BESA TR70 and the BESA Guide To Good Practice: Supports & Fixings, CIBSE Commissioning Guide CCR and all other applicable guidance, codes & standards and manufacturer's instructions in an aesthetically pleasing way and to the satisfaction of the Clerk of Works.

Refer to the materials and equipment specification document for further information.

The air conditioning equipment must be manufactured by Daikin.

4.7 ELECTRICAL WIRING & CONTROLS PERFORMANCE SPECIFICATION

The Mechanical Contractor is responsible for developing the tender design through to completion and procurement, installation, testing and commissioning of suitable and effective control systems that meet the practical needs of the client as indicated in the tender documents listed in the latest revision of the Document Register.

The Contractor shall provide the description of operation, wiring diagrams, for approval.

Installation Details

General

The new Daikin VRF systems shall be connected to local controllers as indicated on the drawings and also, the existing Daikin central controller, which is located on the control panel within the plantroom, this is to be done using the following cable requirements. The 2-Pipe DX system shall be complete with the following controls.

Cable Specifications

- Cable type: 2-core vinyl-insulated vinyl-sheathed cable/vinyl cabtyre cable or 2-core shielded cable
- Core thickness: 0.75mm² - 1.25mm²
- Terminal treatment: Use a round crimp-type terminal (M3.5) with insulating sleeve

Precautions

- Do not use multicore cables with three or more cores.
- When using a shielded cable, connect only one end of each shield wire to the ground.
- The maximum wire distance must be kept to 1000 meters or less. The total wire length must be limited to 2000 meters, except when using a shielded cable whose total wire length must be kept to 1500 meters or less.

Touch Screen Central Controller

iTM is an advanced central controller operated by using a 10.4" touch panel. It allows you to easily monitor as well as operate air conditioners and generic equipment connected to the iTM from the touch panel.

Features

- Back-up and Restore
- Customisable appearance
- Multi-language preference

- Alarm Settings
- Unit setup, status and inhibit.
- Programmable time and date events

The redundant electrical equipment shall be removed.

All wiring shall be carried out by the contractor.

Local Wired Remote Controllers

The remote controller(s) shall be surface mounted and hard wired to the indoor unit*(s)* via the P1&P2 connections, to provide the user with either local individual control of the air-conditioned space, or group control of up to 8 indoor units. The controller shall be manufactured in ABS plastic with a new liquid crystal display (LCD) with backlight. A temperature sensor is to be incorporated within the casing to allow the user to set the sensing point at the controller, or at the indoor unit. The controller shall enable the user to interrogate the system and display an alphanumeric fault code in the event of system malfunction.

Earthing and Bonding

The controls sub-contractor is to check for the earthing facility at the school. The earthing should be in full accordance with BS7671:2018+A2:2022 and all subsequent amendments. If found not to be in full accordance with BS7671:2018+A2:2022 the Controls sub-contractor is to notify the contract administrator in writing.

The entire installation is to be effectively earthed and bonded in accordance with the BS7671:2018+A2:2022 and the Supply Authority requirements.

Provide supplementary bonding to meet the requirements of the BS7671:2018+A2:2022 as follows:

- Simultaneously accessible extraneous metal points including water, gas and similar pipe work, sinks, ductwork, ventilation, and exposed metalwork of the building structure. All connections are to be accessible.

- Simultaneously accessible exposed conductive parts.

Supplementary bonding conductors will be PVC insulated green/yellow single cables with stranded copper conductors of a minimum size of 4mm² and not less than half the cross-sectional area of the nearest associated protective conductor. Cables are to be low smoke, and fume insulated.

The locations of all bonding and supplementary bonding conductors are to be included on the Record Drawings when they are supplied at the end of the contract.

Provision is to be made to test all earthing and bonding for correct impedance to permit protective devices to operate within the correct time and to carry prospective fault current in safety and to prevent the establishment of dangerous potential under normal or abnormal conditions on exposed conductive surfaces.

Installation Details

All new wiring (including sensor wiring) will be low smoke and fume LSOH PVC insulated cables.

General

The Specialist AC Contractor shall install, set up and commission the new Daikin controls.
The redundant controls and electrical equipment shall be removed.
All wiring shall be carried out by the Contractor.

Local Isolators

All equipment at voltages in excess of 24v AC mounted remote from the control panel will be provided with an isolator situated as close to the equipment which it serves as practicable subject to a maximum distance of 1000mm.

The isolators will be of the rotary type, to IP 65 with the main switches lockable in the off position.

Final Connections

Final connections from local isolators to the plant will be SWA/LSF insulated cables.
Final connections on indoor units to be 3core 1.5mm² LSF flex.
The controls shall be fully commissioned once all works are complete.

Incoming Services

Ensure that incoming gas and water services are suitably bonded and cross-bonded.

Wiring to Plant

All plant associated with the installation is to be connected to the existing Daikin central controller.

Site Heating & Cooling

Confirm with Site Manager the site requirements for time schedules and occupancy periods to set optimized start/stop for each Zone.

The redundant electrical equipment shall be removed.

4.7.1 Workmanship & Materials

Control systems are to be installed, tested and commissioned in harmony with all applicable codes, regulations, standards and manufacturer's instructions in an aesthetically pleasing way and to the satisfaction of the Clerk of Works.

Refer to the materials and equipment specification document and specialist designs for further information.

4.8 PIPEWORK INSTALLATION

Condensate pipework

Gravity condensate pipework shall be extended from all the indoor fan-coil units to drain. All condensate pipework shall be uPVC or copper tube with solder-ring fittings.

Where gravity drainage cannot be achieved proprietary condensate pumps shall lift the condensate to the system and all pipework shall gravity-fall connections to the soil system shall be via a HEPVO dry trap.

Final connections to indoor units to be in accordance with manufacturers recommendations.

Refrigerant Pipework

The contractor shall allow to extend the existing refrigeration pipework to the location of the new condensing unit positions. All pipework shall be manufactured using de-oxidised, refrigerant quality copper to BS EN 1057:1996, and must be heat-treated as follows:

6.4mm (1/4") OD to 15.9mm (5/8") OD - Soft, Half Hard or Hard Tempered
19.1mm (3/4") OD to 41.3mm (1 5/8") OD - Half Hard or Hard Tempered

When 15/8" tube is used, it must be 16 gauge.

The length/height difference parameters and outside diameter of all piping is to be in accordance with the appropriate manufacturers manuals.

All pipe work will be purged with oxygen-free nitrogen when brazing and capped at all other times. The system will be leak tested with oxygen-free nitrogen at a pressure of between 490 and 540 psig for a period of at least 8 hours. The oil balance pipe (if used) will be pressurised separately. The system will be de-hydrated by creating a vacuum deeper than 4 Torr – before the vacuum pump is isolated for a period of no less than 30 minutes. If the vacuum falls during this time, oxygen free nitrogen will be added and the dehydration process repeated until the vacuum is maintained for 30 minutes. Virgin refrigerant will be added in liquid form in accordance with the manufacturers requirements.

4.9 PIPE SUPPORTS

Refrigerant pipework to be installed on medium duty return edge cable tray which supported by Unistrut and drop rods fixed to the building structure.

All pipework shall be supported in accordance with current BS EN 378.

Pipes shall be supported via adjustable brackets or hangers rawl bolted or coach screwed to the wall. Note – ceiling fixings will not be allowed. Where possible proprietary support systems are preferred.

Plastic clip type pipe supports/brackets must not be used on this contract.

All new refrigerant pipework shall be run on either existing or new tray supported by Unistrut across the roof. The new pipework support system shall be mounted on suitable big foot or flexi-foot system.

4.10 CLEANING AND TESTING

To be in accordance with manufacturers installation literature and BS EN 378. Provide pressure test certificates within the O&M Manual.

4.11 INSULATION

Thermal insulation shall be applied to all new pipework and existing refrigerant pipework

New insulation shall comply with the requirements of current editions of BS EN 378.
All pipework (suction and liquid lines) to be insulated with slip on close cell elastomeric pipe insulation (as manufactured by Armaflex or equal and approved) with a fire performance class “0” of the 1985 building regulations.

Contractor to paint external insulation to protect it from sun damage with a suitable UV protection paint.

The wall thickness of the insulation shall be a minimum of 13mm with a thermal conductivity of 0.037w/mK. The insulation shall have a Class 0 classification.

Thermal insulation shall be applied to **all new and existing** heating, mains cold and hot water pipework within the boiler room.

New insulation shall comply with the requirements of current editions of BS 3533, BS 5421, BS 3927 and BS 5970.

All insulation work shall be carried out by a reputable specialist contractor such as a member of the Thermal Insulation Contractors Association.

All materials delivered to site shall be new and dry and be maintained in good condition throughout the progress of the work.

The Client shall not accept poor quality, badly finished work or irregularities in the thickness of insulation or in the protective finish.

All pipework shall be insulated separately, and adjacent parallel runs of pipework shall not be married together in one insulation covering. All insulating materials and associated products shall be applied strictly in accordance with the manufacturer's recommendations and instructions, and work failing to comply with these will not be accepted by the consulting engineers.

All joints, surfaces, edges and overlaps shall be neatly finished and where possible overlaps shall be arranged to be on the blind side or on the water shedding side.

Where allowance has to be made for pipe expansion or contraction the insulation shall be finished in a neat and approved manner permitting easy access and disconnection or removable of items without disturbing the insulation.

No insulation shall be applied to any part of the work until that particular part has undergone successful inspection and pressure testing.

All pipework shall be insulated with Euroclass A2 or better **foil faced** plain, pre-formed pipe sections, close butted and secured with three self-adhesive tape bands per metre section. All insulation to be Phenolic Foam, CFC free as "Koolphen K" **or equivalent thickness** Rigid section Rockwool.

All pipework within the plant room shall be finished with Isogenopak finish complete with Isogenopak cap ends.

Identification bands shall be applied to all pipework in accordance with BS 1710.

Contractor to provide sample for approval before fixing.

Internal Pipework Insulation thickness as follows:
15mm to 28mm Dia pipe - 25mm thick
35mm to 54mm Dia pipe - 30mm thick
67mm to 114mm Dia pipe - 40mm thick
140mm to 200mm Dia pipe - 50mm thick

Allow to install proprietary flexible insulation covers to strainers, unions, valves, flanges etc. of **all** sizes.

4.12 COMMISSIONING

Allow to fully commission the systems in accordance with Daikin manufacturer and design requirements, the list includes but is not limited to:

- Check the connections, pressure test, complete full circuit and system.
- Tripple evacuation to ensure there is no moisture content
- Charge the system with refrigerant.
- Check electrically and electronically the control circuits to ensure its picking up all fan coil units.
- Controlled address
- Set all temperatures and modes on local and centralised controllers.
- Make a note of all readings for commissioning sheets.
- All electrical commissioning in accordance with BS7671.

The works shall include the provision of Operation and Maintenance documentation and the provision of all materials and equipment necessary to satisfy stated requirements.

The contractor is responsible for the full co-ordination, commissioning, testing and operation of the plant. During commissioning the contractor shall be required to ensure and demonstrate all services are in compliance with all applicable documents.

All services and controls are to be fully commissioned in accordance with the requirements of the CIBSE Commissioning Codes.

The contractor is responsible for the demonstration of the operation of all parts of the installation to the building users prior to handover.

4.13 CDM

It is not currently anticipated that this project will be notifiable to the HSE; however, to comply with the Construction (Design and Management) Regulations 2015 a principal designer and principal contractor must be appointed. Thus, the contractor shall allow to carry out duties as the Principal Contractor. The role of principal contractor includes but is not limited to creating a written construction phase plan.

Martin Spicer from Martin Spicer Consultancy Limited shall act as principal designer for the project and as such any questions regarding CDM should be raised with him in the first instance. Tel: 07897 874442 / martinspicerconsultancy@gmail.com.

4.14 OPERATING AND MAINTENANCE (O&M) MANUALS

A draft copy of the manual shall be submitted to the Engineer for approval. Upon approval of the draft manual the Contractor shall issue 1no. hard copy and an electronic copy to the Client one week before Practical Completion.

The preparation and supply of the Operating and Maintenance Manual shall be carried out by:

O&M Technical Services Ltd
28-31 The Stables Wrest Park
Silsoe
United Kingdom
MK45 4HR

Contact Daniel Biswell, daniel.biswell@oandmtechnicalservices.com

5 TENDER DOCUMENTS

5.1 TENDER SUMMARY

See attached spreadsheets.

5.2 TRADESPEOPLE, RATES & HOURS

State the various categories of tradespeople proposed to be employed, the actual hourly rates payable and as would be applicable for net daywork costs, the actual net hours the tradespeople would be engaged on the works unless specifically working outside normal hours, and the rates and hours applicable to authorised overtime. It will not be sufficient to state 'in accordance with national agreements', etc., unless a full copy of such agreement is submitted with the Tender.

The tradespeople are to include foremen, charge-hands, fitters, welders, electricians, joiners, mates, apprentices, labourers, etc.

Tradespeople Rate - £/hour

1 _____ _____

2 _____ _____

3 _____ _____

4 _____ _____

5 _____ _____

6 _____ _____

7 _____ _____

8 _____ _____

My/our tradespeople would normally be engaged on the works and would require additional payment for any authorised overtime I/we are instructed to work as follows:

Day	Monday - Thursday	Friday	Saturday	Sunday	Bank Holiday
Start					
Finish					

5.3 DETAILS

5.3.1 Sub Letting

The specialist firms that I/we propose to employ are:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

5.3.2 Site Electricity

The electricity supply that I/we wish to have made available is:

Number of phases: _____

Capacity-amps per phase: _____

Signature: _____

Date: _____

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