SECTION FIVE

PARTICULAR SPECIFICATION

MECHANICAL & ELECTRICAL SERVICES INSTALLATION

PROJECT REVISION SHEET

Prepared by: Jan Enerson

Revision	Date	Details	Changes	Author	Checked
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Rev T1.0	Initial Issue
Rev T2.0	Amended Issue – Section on Comfort Cooling/Heat Pumps added

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5.1 INTRODUCTION

5.1.1 The Building

Glossop Fire Station is a two storey building situated in Glossop located at Whitfield Park, Glossop SK13 8LG.

This project is for the replacement of the complete heating system within the building.

The accommodation within the Fire Station comprises the following:-

Ground Floor:

This floor provides offices, locker room and showers, drying room, toilets, stores, staircases and corridors and the double height appliance bay.

First Floor:

The first floor provides mess room, 2 lecture rooms, kitchen, female locker room, staircases and corridors.

Boiler plantroom:

The plantroom is at ground floor level, accessed externally.

5.1.2 Mechanical Services

This project comprises the replacement of the existing heating system serving the Fire Station accommodation, as described above and will include, but not be limited to, new boilers, new flue system, complete new heating distribution pipework and heat emitters throughout, new CT connections to existing indirect hot water cylinder, new pressurisation & expansion system and new controls.

The existing heating system shall be completely stripped out by the contractor and disposed of in a safe & legal manner.

Careful planning and liaison / co-ordination is imperative to ensure that a quality and fully co-ordinated installation is achieved within the contract period to the entire satisfaction of the Client and also ensure that works are undertaken within specified time frames to reduce disruption during occupied hours. The Contractor shall make all allowances in this respect at the tender stage of the contract.

The Mechanical Contractor shall be aware that this specification is to be read fully in conjunction with all ESD tender drawings and schedules.

The project generally comprises of the strip out of existing equipment and installation of new gas fired condensing boilers, associated flue system, variable temperature circuit, pumps and valves and associated pipework and ancillaries. New controls, control panel, control wiring and associated electrical supplies shall be provided. Additionally the scope for installation includes new plant room lighting, controls, electrical supplies in connection with the mechanical installations, all and redecoration works in connection with the M&E installation including plant room decoration.

The Contractor shall obtain the latest copy of the asbestos R&D and Management reports from the Client prior to submitting their tender for the project. All asbestos removal works as identified within the reports shall be excluded from this tender for the works. **The Client shall liaise fully with the appointed Contractor and inform them of all Asbestos removal / encapsulation works prior to commencement on site for programming purposes**.

The Contractor's programme will be required following appointment, and shall be agreed with the Client prior to the commencement of the works.

In any event, the Contractor shall make all allowances necessary to ensure that a tightly controlled, well programmed, fully co-ordinated installation is made to the entire satisfaction of the Client.

The Contractor shall act as the Principal Contractor under CDM regulations 2015, responsible for the Mechanical, Electrical and builders work elements of the project.

Automatic Control system

Automatic controls in the form of a centralised Trend system will be provided to maintain control over the installed heating and domestic hot water system shall be installed. There shall be a common alarm linked to the controls to notify the staff of any faults.

5.1.3 Sustainability, Planning and Building Regulations

There are no requirements for additional onsite energy production or carbon reductions, over and above the requirements of the current Building regulations.

5.1.4 Overview of appointment and responsibilities

The Mechanical Contractor shall be appointed as the Principal Contractor under the JCT Minor Works with Contractor Design form of contract. The mechanical services installation contract will be let on a design and build basis. Refer to the Contract Preliminaries for further details including details relating to the proposed programming / any phasing of the works. The information provided in this specification is to be verified and co-ordinated by the Mechanical Contractor. The Mechanical Contractor shall issue co-ordinated drawings as part of their working drawings along with a full set of calculations.

The Contractor shall allow for full development of the design and verification within their tender submission.

5.2 EXTENT OF CONTRACT

The Mechanical Contractor shall be wholly responsible for the **design**, provision, installation, testing and commissioning of all necessary equipment, materials, fittings and labour necessary to complete the works as described in this Specification, and as depicted on the tender drawings.

The words **'to complete the works'** in the above shall mean not only the major items of plant and equipment covered by this Specification, but all the incidental sundry components and expendables necessary for the complete execution of the works and for the proper operation of the installation, with their labour charges, whether or not these sundry components and expendables are mentioned in detail in the Tender Documents issued in connection with this Contract.

The project Consultants are:

Jan Enerson

Engineering Services Design Limited
22 Nicholas Street
Chester
CH1 2NX

T: 01244 503 800
E: janenerson@estltd.co.uk

The Clients is:

Derbyshire Fire & Rescue Service
Old Hall
Burton Road
Derby
DE23 6EH

The Principal Designer (Pre Contract Award) is :-

Head of Property Department
Derbyshire Fire & Rescue Service
c/o Asset Department
Derbyshire Constabulary HQ
Butterley Hall
Ripley
Derbyshire, DE5 3RS

Contact : Steve Wild
Tel : 0300 122 8934
Email : swild@derbys-fire.gov.uk

The Principal Designer (Post Contract Award) is :-

The appointed contractor

The Contract Administrator is :-

Head of Property Department
Derbyshire Fire & Rescue Service
c/o Asset Department
Derbyshire Constabulary HQ
Butterley Hall
Ripley
Derbyshire, DE5 3RS

Contact : Steve Wild
Tel : 0300 122 8934
Email : swild@derbys-fire.gov.uk

5.3 TENDER DRAWINGS

The overall project requirements are illustrated on the drawings detailed within the drawing issue registers prepared by Engineering Services Design Limited, which in conjunction with this Specification and the Contract Preliminaries shall form the basis of the Tender offer:-

Refer to appendix B of this specification for a full list of tender drawings.

The Mechanical Contractor shall note that considerable effort has been made to produce M&E tender drawings that indicate in a clear and accurate manner, the extent of the Clients requirements. Whilst these drawings, in conjunction with the specification indicate the type of installation & quantities of equipment & accessories in sufficient details for tender, they are NOT detailed design drawings and shall be further developed / verified by the Contractor as determined under the terms of the JCT Minor Works with Contractor Design Contract.

5.4 VISITING THE SITE

The Contractor shall visit the site before submitting his tender in order to satisfy himself as to the nature and extent of the works to be carried out, and as to all details relating to labour, carriage, cartage, storage, unloading and positioning of plant and equipment, etc.

Site Address:

Whitfield Park,
Glossop
SK13 8LG
Under no circumstances will any allowance be made under claims arising from lack of information and site knowledge.

The Contractor may arrange to visit site by contacting

Steve Wild
Property Department, Derbyshire Fire & Rescue Service
T: 0300-122-8934
Email: swild@derbys-fire.gov.uk

5.5 FIRE PRECAUTIONS

The Contractor shall comply with the requirements of the Local Fire Authority, the Client's Fire Consultant and all documents pertinent to their requirements, including Fire Prevention on Construction Sites, Code of Practice (Loss Prevention Council).

All materials and surfaces incorporated in the construction of the development should have the requisite fire resistance, surface spread of flame and other relevant characteristics appropriate to their location and purpose, as specified by the above authorities and in accordance with current legislation.

5.6 CO-ORDINATION WITH OTHER TRADES

The Contractor shall be responsible for issuing information and co-ordinating their services with all other disciplines to ensure that the overall mechanical and electrical services installations are fully co-ordinated with each other and the building structure.

5.7 ASBESTOS

All matters relating to asbestos shall be directed through the Contract Administrator. Refer to Pre-Construction Information Pack for the Asbestos Management report.

The information within this section is under no circumstances to be assumed as the full extent of the asbestos present within the building.

The Client shall employ an asbestos surveying company to produce a full intrusive refurbishment and demolition asbestos report for the building prior to start on site. The contractor shall obtain a copy of the report from the Client and satisfy themselves that all asbestos within the areas of work are suitably identified and either removed or safely encapsulated.

All costs associated with the removal from site of all asbestos as identified within the asbestos reports shall be paid for directly by the Client.

The Contractor shall not start any works, including stripping out, until the Type 3 Asbestos survey has been undertaken and the Contractor has read the report and satisfied himself that it is safe to work.

Should any asbestos be discovered or disturbed during the works that has not already been identified during the surveys, the Contractor shall suspend all works on site in accordance with HSE asbestos guidelines.

The client will arrange for all additional asbestos surveys and any asbestos removal directly.

All operatives working on this project must be, as a minimum, asbestos awareness trained and this asbestos awareness training undertaken must include as a minimum the following topics:

- The properties of asbestos and its effects on health, including the increased risk of developing lung cancer for asbestos workers who smoke.
- Types, uses and likely occurrence of asbestos and asbestos materials in buildings and plant.
- General procedures to deal with an emergency, e.g. an uncontrolled release of asbestos dust into the workplace
- How to avoid the risk of exposure to asbestos.

Competency records of each operative and management staff employed by the Contractor to deliver this project must be presented to the Client prior to any works being undertaken.

The contractor must inform the Client of any changes made to the operational staff allocated to the project as soon as any changes are made.

5.8 SETTING OUT

The Contractor shall allow for setting out, pipework, trunking, conduits etc. around columns, beams and other obstructions and for co-ordinating with other services. Services in visually exposed conditions shall be installed to have the neatest practicable finish. Services generally shall follow the contour of the structure and vertical drops shall be plumb.

Services in visually exposed conditions shall be installed to have the neatest practicable finish, any surface installations (except plant room & in ceiling void areas) shall be agreed with the Services Consultant prior to installation.

Services generally shall follow the contour of the structure and vertical drops shall be plumb.

All services shall be so fixed as to allow proper installation and maintenance.

5.9 STANDARD WORKMANSHIP AND CONDITIONS

It is an implicit requirement that the workmanship carried out on the installation shall be of the highest standard and at the time of handover the condition of the installation shall be **as new**.

The Contract Administrator reserve the right to reject any part of the installation not complying with this requirement. The Mechanical Contractor shall carry out any necessary remedial work or replacement without delay to the completion date, at no cost to the contract.

No part of the installation is to be used before handover under conditions likely to cause deterioration.

5.10 REGULATIONS AND STANDARDS

The current requirements and recommendations of all relevant codes of practice, statutory regulations, bye-laws, commissioning codes and installation instructions shall be complied with during the execution of the works, including the following:

- The Health & Safety at Work Regulations
- Construction (Design & Management) Regulations 2015
- The COSHH Regulations
- The Clean Air Act
- The Environmental Protection Act
- The Public Health Act
- The Offices, Shops and Railway Premises Act
- Electricity at Work Regulations 1989
- British Standards Institution Publications and appropriate ISO or CEN/CENELEC Standard
- Requirements and recommendations of the local fire officer
- Requirements of any insurance companies concerned
- IEE Regulations for Electrical Installations – 17th Edition Wiring Regulations and all latest amendments including amendment 3
- The Electricity at Work Regulations
- British Standard Specification and Codes of Practice
- All Building Regulations with particular reference to the Building Regulations Part L2A and Part F: 2013 (or most recent updates)
- The Water Supply (Water Fittings) Regulations 1999
- The Gas Safety (Installation and Use) Regulations 1998
- The Institute of Gas Engineers Publications
- Institute of Plumbers Design Guide
- CIBSE Guides
- All BSRIA Application Guide AG2/93
- HVCA DW144.
- Pressure Systems Safety Regulations 2000
- F-Gas regulations (EC) 842/2006
- Local Planning Conditions in particular any Sustainability and Onsite energy contribution obligations.
- College of policing document Volume 1 – Range Management Policy, Responsibilities, Authorisation, Use, Maintenance and Inspection of Police Ranges
- College of policing document Volume 2 – Design, Construction and Maintenance of Small Arms Weapon System Ranges.
- Sound impact assessment provided by Cundalls

5.11 INSPECTION OF THE WORK

During the installation the works shall be inspected by the Contract Administrator representative to ensure the installation is in accordance with the contract documentation. Any works not in accordance shall be rectified and made good at the Mechanical Contractor's expense.

The Mechanical Contractor shall inform the Contract Administrator and the relevant inspection authority when sections of the installation are ready for inspection and approval and make necessary arrangements for the witnessing of tests.

Certificates confirming acceptance of tests shall be issued by the Mechanical Contractor with a copy to the employer.

5.12 PROGRAMME

The Mechanical Contractor must provide a detailed programme prepared in conjunction with the Client's project programme of works for this project including the continuity of any necessary existing services / supplies to the building.

The programme and tender shall make due allowances for working in an occupied building

The Mechanical Contractor shall also, at the most appropriate time during the contract, issue a separate day-by-day programme specifically for the testing and commissioning element of the works in order that the Contract Administrator is given adequate notice to be present to witness testing and operation of all systems at the commissioning stage.

5.13 IMPORTANT REQUIREMENTS

5.13.1 Defects

The Mechanical Contractor shall include for rectifying, at no cost to the Client, correctly reported defects identified during the first 12 months period following Practical Completion.

5.13.2 Attendance

The Mechanical Contractor shall include for attending site meetings throughout the Contract duration as deemed necessary by the Contract Administrator.

This should also include meetings relating to testing and commissioning, practical completion, and End User demonstrations of equipment/plant.

5.13.3 Practical Completion

At Practical Completion the mechanical services installations shall be **'snag free'.**

The Contract Administrator will re-inspect previously recorded 'snag items' in conjunction with the Mechanical Contractor, the aim being to record the project as being complete in its entirety at Practical Completion.

Shortly before Practical Completion the Mechanical Contractor shall demonstrate to the End User the correct system/operation, this user tuition shall be video-recorded by the Mechanical Contractor and 2 copies made in a PAL DVD format to be handed to the Client as part of the final Operations & Maintenance Manuals.

At Practical Completion the Mechanical Contractor shall issue to the Contract Administrator **two final** physical copies of the Operating and Maintenance Manuals (Refer to Section1).

The entire Operation and Maintenance Manual including the As Fitted drawings and all manufacturers' manuals / documentation shall be supplied in an electronic format and shall be write protected and clearly labelled. All electronic documentation shall be provided in both its native format (ie: .docx, .dwg etc) and a duplicate in the latest release of Adobe Acrobat's portable document format (.pdf). All files shall be organised into a folder structure reflecting the layout of the physical Operations and Maintenance Manual.

One copy of the electronic documentation shall be affixed securely to the first Operations and Maintenance Manual folder (if there are multiple folders) and one copy handed to the Client at handover. Electronic documentation shall be accepted on any form of portable storage device that utilises a common interface with a personal computer.

A copy of all the As Fitted drawings and Operations and Maintenance manuals shall be submitted to the Contract Administrator a minimum of 2 weeks prior to completion for comment and review to allow sufficient time for modification of the drawings and manual prior to handover, all test and compliance certification must be reviewed by the Contract Administrator prior to the issue of a valid Completion Certificate.

5.13.4 Co-ordination of Trades

The Mechanical Contractor shall be responsible for the co-ordination between their own and all other trades on site and shall submit to the Contract Administrator, prior to starting on site, a fully detailed Method Statement for the works.

This document shall also indicate the extent and programme relevant to all other associated trades including builder's work/structural/ specialist sub-contractors etc.

5.13.5 Health and Safety (CDM Regulations 2015)

The Mechanical Contractor shall allow adequate costs and resources within the tender for undertaking the roles of Principal Contractor and Principal Designer under the Construction Design and Management Regulations 2015 and for adequate liaison with the Contract Administrator as necessary.

Include for the preparation of all associated risk assessments and provision of method statements to enable the safe execution & construction of the mechanical services works.

5.14 SCOPE OF WORKS

The Mechanical Contractor shall allow for the design, coordination, supply, delivery, off-loading, installation, setting to work, testing and commissioning of the following services to ensure a complete installation as detailed with the Specification, Mechanical and Electrical tender drawings.

- Issue of design calculations, design drawings and fabrication drawings / working drawings / builders work details / coordinated controls wiring diagrams / coordinated drawings, reflected ceiling specialist services drawings etc. in AutoCAD 2014 format and calculations prepared on approved industry software (i.e. Hevacomp).
- Removal of existing boilers and all associated equipment located within the plant room. **Do not remove HW cylinder.**
- Removal of existing heat emitters and distribution pipework throughout the station, including Appliance Bay.
- Flue lining of existing boiler flue to coincide with the installation of new plant and equipment.
- New gas fired boiler plant including permanent flues.
- New plant room LTHW distribution pipework, pump sets and ancillaries including insulation.
- New gas pipework within plantroom including new solenoid safety cut off valve, gas detection and heat detectors.
- New heat emitters & distribution pipework throughout the Fire Station & Appliance Bay.
- New automatic control system and all associated wiring, including remote monitoring/control via IP network.
- Interface a key switch to the existing fire alarm panel.
- New plantroom lighting/Emergency lighting.
- All Electrical services in association with the above.
- Testing and commissioning, and setting to work, of heating system.
- O&M manuals and 'As Fitted' drawings/ Building log book CIBSE TM31 Format. In addition the Mechanical Contractor shall provide two electronic copies (inc. all drawings, literature, schedules, etc.) on disk.
- Client user instruction and DVD recording.
- 12 months defects liability period.

The whole of the mechanical services installations shall conform to the current principles of good engineering practice, and shall be strictly in accordance with the requirements of all relevant Local Authority and Statutory and Regulations, all relevant British / European Standards and Codes of Practice and the current Building Regulations.

5.15 RELATED STANDARDS

The Contractor shall note in addition to the requirements in respect of compliance to the regulations those methods of construction, standards of workmanship, materials, components and the testing and commissioning of components and systems should, as a minimum, be in accordance with the recommendations set out in the latest edition of the following:

a) British Standard Specification and Codes of Practice
b) The CIBSE Guides, Codes and Technical Memoranda
c) Construction (Design and Management) Regulations 2015
d) Building Regulations including Parts L2A 2013 and F: 2010
e) BSRIA application guides AG2 and AG3

The detailed requirements identified in subsequent sections do not generally refer specifically to the above documents but there are exceptions where either a choice of standards exists, and Health & Safety requirements need to be

emphasised or where mention of a specific standard avoids the need for detailed description.

The detailed requirements identified in subsequent sections are, in all cases, additional to the minimum requirements of the above standards.

5.16 QUALITY ASSURANCE AND CERTIFICATION

The use of Quality Assured sub-contractors and suppliers shall be undertaken at all times. Products and materials should have Product Conformity Certification (e.g. BSI kite mark, BFI Safety Mark), or EU mark or Product Approval (e.g. British Board of Agreement Certificate).

5.17 DESIGN PHILOSOPHY / INSTALLATION LIFE

The installation must satisfy the requirements of the design criteria whilst being capable in all respects of providing an environment which is pleasant, environmentally friendly, energy conserving and maintenance minimised.

Emphasis should be placed wherever possible on adopting durable low maintenance materials and avoiding over-complicated design resource systems which are expensive to operate and maintain, and costly to replace.

The installation should be designed to operate effectively and efficiently throughout its design life and materials and components carefully selected with due consideration to their individual life cycles relative to the overall design life of thirty years.

In particular items should not be incorporated which require premature replacement by virtue of their dependence or relationship to other elements having a shorter design life.

The Mechanical Contractor should present a schedule indicating the anticipated life of the mechanical elements of the scheme based on them being regularly maintained in accordance with the procedures identified in the maintenance manual for the development.

5.18 ENVIRONMENTAL AIMS

The general policy is to provide a building which is environmentally friendly from the global, local external and internal aspects and which minimises the impact on the local community. The Mechanical Contractor's installation should therefore endeavour to ensure so far as is reasonably possible that the Building is designed to address the following:

- minimise any negative impact on the local environment and where possible improve it
- minimise the effect of Ozone depletion
- minimise the effect on global warming
- minimise water pollution
- minimise water consumption
- minimise rain forest depletion
- minimise non-renewable resource depletion
- avoid radon contamination

- minimise the risk of Legionnaires disease and the spread of Legionella
- minimise the effects of ionising and electro-magnetic radiation
- avoid the use of potential irritants and/or toxic substances
- avoid design features associated with Sick Building Syndrome
- maximise the opportunity for recycling
- Enable planned preventative maintenance regimes to be used to maintain optimum performance.

5.19 ENHANCED CAPITAL ALLOWANCE SCHEME

The Mechanical Contractor shall ensure all equipment selected falls where possible under the enhanced capital allowance scheme to allow the client to claim capital allowances. It will provide the client with enhanced tax relief for investments in equipment that meets published energy-saving criteria.

5.20 BASIS OF DESIGN

The Mechanical Contractor shall base the design of the mechanical services installation on the CIBSE guides, Technical Memorandum, Water Regulations, latest Building Regulations, all relevant British and European Standards, all current legislation and other applicable documents and good engineering practice and fully in accordance with the requirements of the room data sheets and associated drawings.

The following criteria shall apply.

External Design Conditions

Winter -5°C DB saturated

Summer 28°C DB / 19°C WB (only in areas with comfort cooling all other areas uncontrolled)

Internal Design Conditions

Offices	21°C +/- 2°C
Rest / Mess Room	21°C +/- 2°C
Lecture Room	21°C +/- 2°C
Corridors	18°C +/- 2°C
Locker Room	18°C +/- 2°C
Shower Room	21°C +/- 2°C
Muster Bay	18°C +/- 2°C
Appliance Bay	18°C +/- 2°C (when doors are closed)
Drying Room – normal	15°C +/- 2°C
Drying mode	26°C +/- 2°C

Infiltration Rates: CIBSE Guides

Thermal Transmittance

The below U-values are given for information only and the contractor shall verify U-values by calculation and issue to Engineer.

'U'-values for heat loss purposes shall be based on 1970's construction values as follows:

Walls	1.5 W/m^{2}K
Roof	1.1 W/m^{2}K
Floors	as per CIBSE Guide A 1986 Table A3.10
Windows	3.6 W/m^{2}K
Appliance Bay Doors	3.0 W/m^{2}K

Velocities

LTHW heating pipework	:	Minimum	0.75 m/s
		Maximum	1.5 m/s (steel) 1.0 m/s (copper)
Hot and cold water services pipework	:	Maximum	1.0 m/s
Minimum pipework size	:	15mm nominal bore	
Ductwork	:	supply / extract	
Branches	:	3.0 m/s	
Main runs	:	3-5 m/s	
Connections to grilles	:	2.5 m/s	

The above velocities should be considered as a maximum. Systems shall be designed using appropriate velocities to achieve the specified noise criteria.

Pressure Drops

LTHW heating pipework	:	120-240 Pa/m
Hot and cold water services pipework	:	to suit the system static head and available boosted pressure supplies.

System Temperatures

Heating flow/return distribution temperatures	:	60°C/40°C minimum
Primary hot water flow/ Return temperatures	:	70°C/50°C minimum

Ventilation Rates

Drying Room air change rate between 10 air changes per hour.

Noise Levels

Appliance Bay : NR40

Any room types not specifically mentioned shall be treated acoustically to meet the recommendations of the CIBSE technical guides.

External noise

In order to limit any increase in the background noise levels due to fixed mechanical plant a rating level of no greater than 5dB above the original environment levels shall be achieved. Predictions for plant noise transmission shall be corrected, for multiple source addition, distance, reflections, directivity and barrier effect where applicable and must include contributions from all appropriate sources.

Heat loss / gain calculations will be carried out by the Mechanical Contractor and submitted in a suitable format i.e. Hevacomp computer design package or equal for comment fully in accordance with the CIBSE Guides.

5.21 SUBMISSION OF DESIGN CALCULATIONS AND DRAWINGS

Full detailed design drawings, calculations including heat losses, pipe / duct sizing calculations and specifications shall be submitted to the employer's Consultant for comment prior to the completion of the working drawings to a programme to be agreed.

Working drawings and detailed specifications shall be submitted for approval prior to issue for construction.

All approved drawings shall be issued for construction at least two weeks prior to being required for work on site.

The employer's Consultant will consider the information submitted and comment where necessary within five working days.

It may be necessary, during the course of the contract, for the Mechanical Contractor to produce additional drawings and information to enhance that already included as part of the design drawings. The Mechanical Contractor shall be deemed to have made full allowance for these in his contract.

All design heat losses and pipe / duct sizes calculations associated with the mechanical services installation shall be submitted to the employer's Consultant in accordance with the computerised 'Hevacomp' design software programmes or equal.

Any manual calculations submitted shall be presented in a clear and logical form fully in accordance with the CIBSE.

Comment or approval of the calculations and drawings by the Consultant does not relieve the Contractor of his design responsibilities or liabilities under this contract.

5.22 STRIP-OUT WORKS

Refer to the Asbestos report in Appendix F.

No strip-out works are to be started until a full type 3 Asbestos survey has been undertaken and the results made available to the Contractor.

EXTENT OF CONTRACT

The Contractor shall be wholly responsible for the safe isolation, disconnection, removal and disposal away from the site in a safe manner of all the existing heating system and associated electrical services, as identified on the tender drawings and generally comprising of the following:

a) Heating System

- Gas fired boilers within plantroom.
- Redundant gas distribution pipework.
- Pipework, radiators, fan convectors and fittings.
- Boiler flue.
- Valves
- Pumps
- Boiler controls.
- Insulation.
- Supports/brackets etc.

NOTE. **The Contractor shall carefully strip out all pipework services, as necessary to facilitate the works indicated on the tender drawings, leaving sufficient length for re-connection of existing cold water distribution pipework. The indirect hot water cylinder shall be maintained and protected throughout the works. Disconnection of primary heating pipework shall be such to facilitate the new installation readily.**

b) Electrical Services

- Isolate and make safe mechanical equipment to enable strip-out works
- Isolate and strip-out redundant supplies to Fan convectors
- Isolate and strip-out lighting in Plantroom

NOTE. **The Contractor must NOT strip out the power supply from DB 'D' to Mechanical Control panel. The Contractor shall include for testing the state of the sub-main cable**

The above lists of equipment are for reference only. Under no circumstances should the list be considered exhaustive or complete. The Contractor shall be responsible for determining on site the full extent of the stripout works and the costs associated with removal.

5.23 DAMAGE TO OTHER SERVICES

The Mechanical Contractor shall take care not to damage any existing services not covered by this contract. Should any service be damaged by the Mechanical Contractor then the Contract Administrator should be informed immediately. The Mechanical Contractor will be required to make good any damage at his own expense.

5.24 CARE OF FLOORS

All precautions must be taken to avoid damage to floor surfaces. Pipework threading or soldering must be carried out on a ply or hardboard base and care taken to ensure swarf from the threading process is not trodden into the floor surfaces. The Mechanical Contractor shall be held responsible for any floor damage caused by not observing these precautions.

5.25 BUILDER'S WORK

5.25.1 GENERAL CONDITIONS

The Main Contractor shall be responsible for all builders' work associated with the works, including all necessary co-ordination, supervision and attendance necessary for the satisfactory execution of the Contract. The Contractor shall refer to the Asbestos Report prior to any works being undertaken.

5.25.2 BUILDERSWORK SCOPE OF WORKS

The builder's work shall generally include the following:

- Cutting holes, pockets, and chases and making good in walls, floors or ceilings to accommodate the mechanical installation and associated electrical services installation.
- Making good to the ground after removal/cutting-off of existing heating system pipework. All necessary access equipment required to complete the works to be included.
- Painting all Plant room walls, surface preparation, 2 coats vinyl matt emulsion. Provisional colour to be magnolia.
- Existing Plantroom ceiling to be made good. Painting to the ceiling, surface preparation and 2 coats vinyl matt emulsion. Provisional colour to be white.
- Painting of edges to plinths to be white, to minimise any hazard of tripping.
- Erection and removal after use of all external and internal scaffolding and associated lifting equipment, including all client and council liaison necessary.
- Removal /modification of / cleaning and chimney stack as required to accommodate flue.
- All boxing-in of pipework as noted on tender drawings.

- All general builders work associated with the stripping out and replacement of the heating systems.

In addition the Contractor shall provide, prior to commencement of builders work, all adequately detailed method statements for the proposed execution of the works as required by the Principle designer, under CDM Regulations

All possible measures to secure work areas, storage areas and excavations including the provision of covers barriers, signage and lighting of excavations etc., must be a high priority.

The Contractor shall be responsible for all associated builders work making good, painter's and decorator's work and any other builders work required for the completion of the works and as generally detailed in the builders work section of this specification.

Drilling plug holes in floors, walls, ceilings and roofs for securing services and equipment requiring screw or bolt fixings shall form part of the Contractors works. Approval shall be obtained for all fixings into concrete walls, floors, ceilings or roofs.

Any support fixings into the above structures shall be made using approved fixings such as Tapcon anchors, Excaliber screws etc. (approval of same to be obtained from the Contract Administrator.)

Fixings to steelwork shall be of the clamp type. No steelwork shall be cut, drilled or welded without written consent from the Contract Administrator.

Any penetrations made through the roof structure / chimney of the building shall be made water tight prior to completion of the works to avoid any risk of flooding to the plant room or any other area of the building.

5.26 GOOD PRACTICE

Where materials, products and workmanship are not fully detailed or specified they are to be:

- Of a standard appropriate to the works and suitable for the functions stated in or reasonably to be inferred from the project documents, and

- In accordance with good building practice.

5.27 GENERAL QUALITY OF PRODUCTS/MATERIALS

Products shall be new unless otherwise specified.

For products specified to a British or European Standard the Contractor shall obtain certificates of compliance from manufacturers when requested by the Clients representative.

Where a choice of manufacturer or source of supply is allowed for any particular product, the whole quantity required to complete the work must be of the same type, manufacture and/or source unless otherwise approved. The Contractor

shall produce written evidence of sources of supply when requested by the Clients representative.

The Contractor shall ensure that the whole quantity of each product required to complete the work is of consistent kind, size, quality and overall appearance.

Where consistency of appearance is desirable the Contractor shall ensure consistency of supply from the same source. Unless otherwise approved, different colour batches shall not be used where they can be seen together.

If materials are prone to deterioration or have a limited shelf life, the Contractor shall order in suitable quantities to programme and use in appropriate sequence. Materials shall not be used if there are signs of deterioration, setting or other unsatisfactory conditions.

5.28 PROPRIETARY PRODUCTS

The Contractor shall handle, store, prepare and use or fix each product in accordance with its manufacturer's current printed or written recommendations/instructions. The Contractor shall inform the Clients representative if these conflicts with any other specified requirement, and shall submit copies to the Clients representative when requested.

The tender will be deemed to be based on the products specified and recommendations on their use as described in the manufacturer's current literature.

The Contractor shall obtain confirmation from manufacturers that the products specified and recommendations on their use have not been changed since that time. Where such change has occurred, the Contractor shall inform the Clients representative and shall not place orders for or use the affected products without further instructions.

Where British Board of Agreement certified products are used, the Contractor shall comply with the limitations, recommendations and requirements of the relevant valid certificates.

5.29 CHECKING COMPLIANCE OF PRODUCTS

The Contractor shall check all delivery tickets, labels, identification marks and, where appropriate, the products themselves to ensure that all products comply with the project documents. Where different types of any product are specified, the Contractor shall check to ensure that the correct type is being used in each location. In particular, the Contractor shall check that:

- The sources, types, qualities, finishes and colours are correct, and match any approved samples.

- All accessories and fixings which should be supplied with the goods have been supplied.

- Sizes and dimensions are correct. Where tolerances of components are critical, measure a sufficient quantity to ensure compliance.

- The delivered quantities are correct, to ensure that shortages do not cause delays in the work.

- The products are clean, undamaged and otherwise in good condition.

- Any products which have a limited shelf life are not out of date.

5.30 PROTECTION OF PRODUCTS

The Contractor shall prevent over-stressing, distortion and any other type of physical damage to products.

The products shall be kept clean and free from contamination. The Contractor shall prevent staining, chipping, scratching or other disfigurement, particularly of products exposed to view in the finished work.

The Contractor shall keep all products dry and in a suitably low humidity atmosphere to prevent premature setting, moisture movement and similar defects. Where appropriate the products shall be stored off the ground to allow free air movement around and between stored products.

The Contractor shall prevent excessively high or low temperatures and rapid changes of temperature in the products.

The products shall be adequately protected from rain, damp, frost, sun and other elements as appropriate. The Contractor shall ensure that products are at a suitable temperature and moisture content at time of use.

Sheds and covers shall be of ample size, in good weatherproof condition and well secured.

The Contractor shall keep different types and grades of products separately and adequately identified.

So far as is possible, the products shall be kept in their original wrappings, packing or containers until immediately before they are used.

Wherever possible the protective wrappings shall be retained after fixing and until shortly before Practical Completion.

The Contractor shall ensure that protective measures are fully compatible with and not prejudicial to the products/materials.

5.31 SUITABILITY OF RELATED WORK AND CONDITIONS

The Contractor shall ensure that all trades are provided with necessary details of related types of work. Before starting each new type or section of work the Contractor shall ensure that:

- Previous, related work is appropriately complete, in accordance with the project documents, to a suitable standard and in a suitable condition to receive the new work.

- All necessary preparatory work has been carried out, including provision for services, openings, supports, fixings, damp proofing, priming and sealing.

- The environmental conditions are suitable, particularly that the building is suitably weather tight when internal components, services and finishes are installed.

5.32 GENERAL QUALITY OF WORKMANSHIP

Operatives must be appropriately skilled and experienced for the type and quality of work.

All necessary precautions shall be taken to prevent damage to the work from frost, rain and other hazards.

Components and products shall be carefully inspected before fixing or using, and any which are defective shall be rejected.

The Contractor shall ensure that all products and components are fixed or laid accurately and in alignment.

Where not specified otherwise, the Contractor shall select fixing and jointing methods and types, sizes and spacings of fastenings suitable for the purpose. Fastenings shall comply with relevant British Standards.

The Contractor shall provide suitable, tight packings at screwed and bolted fixing points to take up tolerances and prevent distortion. Fixings shall not be over tightened.

The location and fixing of components and products shall be adjusted so that joints which are to be finished with mortar or sealant or otherwise left open to view are even and regular.

The Contractor shall ensure that all moving parts operate properly and freely. Pre-finished components and products shall not be cut, ground or planed to remedy binding or poor fit without approval.

5.33 BS 8000: BASIC WORKMANSHIP

Where compliance with BS 8000 is specified, this is only to the extent that the recommendations therein define the quality of the finished work.

Where BS 8000 gives recommendations on particular working methods or other matters which are properly within the province and responsibility of the Contractor, compliance therewith will be deemed to be a matter of general industry good practice.

If there is any conflict or discrepancy between the recommendations of BS 8000 on the one hand and the project documents on the other, the latter will prevail.

5.34 APPROVAL OF PRODUCTS

Where approval of a product is specified the requirement for approval relates to a sample of the product and not to the product as used in the Works. The Contractor shall submit a sample or other evidence of suitability, and shall not confirm orders nor use the product until approval of the sample has been obtained.

The Contractor shall retain the approved sample in good, clean condition on site. Ensure that the product used in the works matches the approved sample.

5.35 SAMPLES OF FINISHED WORK

Where a sample of finished work is specified for approval, the requirement for approval relates to the sample itself (if approval of the finished work as a whole is required this is specified separately).

The Contractor shall obtain approval of the stated characteristic(s) of the sample before proceeding with the works. The approved sample shall be retained in good, clean condition on site.

The Contractor shall ensure that the relevant characteristic(s) of the works match the approved characteristic(s) of the sample.

Samples which are not part of the finished works shall be removed from site when no longer required.

5.36 APPEARANCE AND FIT

The setting out, erection, juxtaposition of components and application of finishes (working within the practical limits of the design and the specification) shall be arranged to ensure that there is satisfactory fit at junctions, that there are no practically or visually unacceptable changes in plane, line or level and that the finished work has a true and regular appearance.

Wherever satisfactory accuracy, fit and/or appearance of the work are likely to be critical or difficult to achieve, the Contractor shall obtain approval of proposals or of the appearance of the relevant aspects of the partially finished work as early as possible.

Without prejudice to the above and unless specified otherwise, tolerance will (where applicable) be not greater than those given in BS 5606, Tables 1 and 2.

5.37 DEFECTS IN EXISTING CONSTRUCTION

The Contractor shall report any such defects to the Clients representative without delay, and shall obtain instructions before proceeding with work which may:

- Cover up or otherwise hinder access to the defective construction, or
- Be rendered abortive by the carrying out of remedial work.

5.38 QUALITY CONTROL

The Contractor shall establish and maintain procedures to ensure that the works, including the work of all sub-contractors, comply with specified requirements.

The Contractor shall maintain full records, keep copies on site for inspection by the Clients representative, and submit copies of particular parts of the records on request. The records must include:

- Identification of the element, item, batch or lot including location in the works
- The nature and dates of inspections by the Contractor or Clients representative, tests and approvals
- The nature and extent of any non-conforming work found
- Details of any corrective action.

5.39 MOISTURE

The Contractor shall prevent the work from becoming wet or damp where this may cause damage.

The works shall be thoroughly dried out. The Contractor shall control the drying out and humidity of the works and the application of heat to prevent:

- Blistering and failure of adhesion
- Damage due to trapped moisture
- Excessive movement.

5.40 TENDER OFFER

Tender conditions are contained within the Invitation to Tender Document

In the interest of fairness **Tender offers must be priced on the basis of the specification, mechanical layout drawings**. However, the Mechanical Contractor is permitted and encouraged to exercise his commercial awareness and buying power to offer for approval, alternative manufacturers to those specified, the Mechanical Contractor may only proceed with any alternative specification if approval has been granted by the Client. Any alternative proposals shall be indicated on the tender submission. During the tender evaluation exercise, should approval not be granted, the specified equipment shall be provided.

The Mechanical Contractor shall be responsible for obtaining all technical data, performance data, construction data etc. for each alternative manufacturer offered and is to demonstrate that the proposals are equal in quality and performance to those specified.

Reductions offered by the Mechanical Contractor shall be considered by the Contract Administrator, however, their decision shall be binding as to whether the saving is to be implemented or not.

5.41 ORDERING OF MATERIALS

To avoid delays to non-delivery of materials and equipment the Mechanical Contractor shall place orders immediately instructions have been received by him to proceed with the work. Delay in the delivery of materials will not be accepted as a valid reason for extending the Contract Period.

Every effort shall be made by the Mechanical Contractor to obtain all materials and have them delivered to site so that they are available for installation when required.

5.42 BRACKETS & SUPPORTS

All ductwork and pipework shall be adequately supported by traditional support methods such as brackets clips, hangers, unistrut etc. as detailed within sections 2, 3 and 4 of the Specification.

5.43 SECONDARY SUPPORT SYSTEMS

The Mechanical Contractor shall be responsible for designing and providing all necessary secondary support systems associated with the support of pipework, ductwork, plant/equipment, etc. being provided and installed by himself.

Secondary support systems shall be priority systems such as unistrut (or similar) or by using suitably sized mild steel angle iron, channels etc. All mild steel supports shall be corrosion protected by two coats of red primer paint followed by a finishing coat of black gloss paint.

The Mechanical Contractor shall be responsible for sizing/designing all secondary support systems to suit site conditions and the Mechanical Contractors arrangement of services. All fixings associated with the secondary support systems shall be provided by the Mechanical Contractor, proposed details of same are to be issued by the Mechanical Contractor for comment by the Engineer/Structural Engineer.

Secondary support systems provided by the Main Contractor for suspended ceilings, lighting installations etc. **shall not** be used by the Mechanical Contractor for supporting items of mechanical equipment/plant that vibrate.

5.44 EXISTING SERVICES

It shall be the Main Contractor's responsibility to ascertain details of all existing services in and around the site which may be affected by the proposed works.

The Mechanical Contractor shall arrange for respective services to be isolated prior to disturbing or commencing any works on these services.

5.45 LTHW HEATING

5.45.1 General

The Mechanical Contractor shall design, supply, install, set to work, test and commission the whole of the LTHW heating system as described in this specification, tender drawings in order to comply with the performance criteria requirements of this specification and generally as detailed herewith:

i) LPHW gas-fired floor standing condensing boiler plant located within plantroom.
ii) LTHW primary pipework including individual boiler shunt pumps within plantroom.
iii) Combined dirt and air separator.
iv) Pressurisation unit and automatic dosing unit.
v) Low loss header
vi) Primary DH heating circuit
vii) VT LTHW heating circuit to serve the radiators and unit heaters throughout the building.
viii) Valves, test points, commissioning sets and generally pipework ancillaries.
ix) A proprietary permanent flue system.
x) Pipework insulation.
xi) Controls system.

The following sub-clauses are particular items of work/plant/equipment associated with the project. Items of work or plant/equipment not specifically mentioned within this section or described elsewhere shall be provided by the Contractor in accordance with the standard Sections 1, 2, 3 & 4 of this Specification.

5.45.2 Pipework

The heating installation shall be carried out in pipework as scheduled below and as detailed within the standard pipework specification:

i) Black steel medium pipe to BS EN 10255 within the plant room. Provide dielectric couplings when transforming to copper. All pipework to be fully insulated and protected in aluminium cladding.

ii) All LTHW heating distribution pipework shall be carried out in copper tube to BS EN 1057-R250 and protected by the Contractor where exposed and deemed a risk from abuse / damage from the building operation / maintenance operations throughout the life of the building. Soldering to all fittings used shall be lead free soldered to BS EN 1245-1-1998. End feed fittings will not be accepted.

All new heating pipework/fittings shall be in accordance with Section 2 of this Specification.

Note: No carbon steel pipework will be accepted.

5.45.3 Pipework Routes and Drops

The Mechanical Contractor shall give care and attention to the routing and location of all pipework drops throughout the Building.

All pipework valves and fittings etc. shall be fully accessible within voids and boxings/risers for future maintenance.

Pipework drops shall be within dedicated service risers/boxings. Any exposed pipework drops shall generally be discreetly sited within corners of rooms and fully co-ordinated to minimise the number of drops in any one area.

Any copper distribution pipework shall be clipped to the building fabric with brass or equal clips. **Under no circumstances will plastic pipework clips be accepted on metal pipework.**

Note: The Mechanical Contractor shall obtain approval of all proposed pipework routes and any dropper positions from the Client prior to commencement of the work.

5.45.4 Valves

Valves shall be installed fully in accordance with Valve schedule in Appendix D. The Mechanical Contractor shall supply and install all isolation/regulating valves, commissioning sets, differential pressure control valves and pressure independent control valves, drain cocks, automatic and manual air vents as necessary for the recommended control/isolation of the LTHW heating system.

Service / regulation valves for each main branch shall be installed within the ceiling directly and within main branches accessed via a ceiling mounted hatch for ease of maintenance without disturbing the occupants.

Commissioning sets shall be installed, fully in accordance with the valve manufacturers' recommendations and instructions, on each main sub-circuit i.e.

i. Constant temperature circuits
ii. Main distribution branches

5.45.5 Thermal Insulation

Thermal pipework insulation shall be installed fully in accordance with the Standard Specification and generally to comprise:

Distribution Pipework
(Ceiling voids/roof space/ducts/floor voids/boxings/plant room etc)

All LTHW pipework (including valves, flanges, unions etc in the plantroom), shall be thermally insulated using Rockwool Rocklap 800 H&V pipe sections or rigid phenolic foam sections as preferred by the Mechanical Contractor on commercial grounds, having a nominal density not less than 120 kg/m3 with a factory applied facing which is a laminate of close mesh

reinforcement between two layers of foil including integral lap for fixing. The whole installation shall comply with BS 5422:2009(Table 1) and BS 5970:2012 water vapour permeance and Building Regulations Class O definition.

All valves, flanges, unions etc. in the plantroom shall be insulated with proprietary valve bags c/w with Velcro ties.

Thermal conductivity at 50°C mean temperature shall be 0.037w/mK or better.

Thermal insulation shall be installed in strict accordance with the manufacturer's recommendations, thickness of insulation being in accordance with Section 3 of the standard Specification.

All insulated pipework within the plant room at ground floor level shall be further protected with stucco embossed aluminium cladding as per Section 3.

Thermal insulation shall be installed in strict accordance with the manufacturer's recommendations.

All pipework shall have identification banding provided in accordance with BS 1710 and wrapped with metallic marker tape or wire behind plasterboard walls for ID purposes where plastic pipework is installed.

5.45.6 VALVES AND COCKS – SERVICE SELECTION

Valves shall be as described the valve schedule contained in Appendix D or equal and approved. (Such approval must be obtained from the Engineer in writing before the equipment is obtained).

All valves shall be suitable for the system medium and test pressure.

5.45.7 Valves for Air Release

All high points on heating and hot water systems shall be provided with one of the following means of venting:-

Automatic Air Valve of aluminium bronze construction with nickel alloy valve and seat and stainless steel float (as Winn type A). A lockshield pattern gate valve shall be fitted immediately before each A.A.V. and a 10mm copper drip pipe shall be run from the eliminator outlet to discharge in an approved position.

Up to and including 50mm nom bore, a full bore air bottle shall be formed by means of an equal square tee with an 80mm long space nipple terminating in a cap with a 10mm vent pipe taken from the top of the cap in terminate in an agreed position 1.5m above floor level in a 10mm bronze needle valve (as Hattersley 5N) fitted with a square headed bronze plug into the open end.

On pipework above 50mm nom bore, the air bottle bore shall be maintained at 50mm.

5.45.8 Boiler Plant

The Mechanical Contractor shall provide 2No. gas-fired floor standing stainless steel condensing boilers.

The Mechanical Contractor shall include for the boiler manufacturer to commission and set to work the boilers. A certificate of conformity shall be issued by the Mechanical Contractor.

All boilers shall be installed strictly in accordance with the manufacturer's recommendations and instructions so as not to infringe or curtail the makers guarantee.

The Mechanical Contractor shall liaise as necessary with the boiler manufacturer during the tender period to ensure that all items are included within the Mechanical Contractors tender.

The Contractor shall note that the boiler plant layout and associated permanent flue, all pipework and fittings etc. as indicated on the tender drawings represents an indicative layout only and is for guidance / tender purposes.

Each boiler shall be fitted with the following mountings:

- Safety valve and a copper discharge pipe run to terminate 150mm above finished floor level with birds beak to tundish and common copper drain to gulley position. Safety valve setting to be set at final system pressure plus 10%.
- Thermometer.
- Pressure gauge with cock.
- Drain cock.
- Condense drain to tundish.

The boilers shall incorporate ABS condense drains which shall be discharged via a tundish to a suitable drain point taking into consideration peak temperatures and acidity content before running to convenient external discharge position. A simple drain run through the external wall will not be acceptable as this will have a detrimental effect on the existing brickwork and mortar. **All internal and external condensate and safety discharge pipework shall be fully insulated to avoid any potential freezing.**

The boilers selected shall have stainless steel heat exchangers.

The new boilers shall be as manufactured by:

Potterton (Baxi) Commercial Division
Wood Lane Erdington
Birmingham
B24 9QP

Or Equal and Approved

5.45.9 Flue System

The Mechanical Contractor shall engage a flue specialist to design, supply, install, test and commission a new boiler flue system with condensate drainage at system low points and at each individual connection. The flue shall comprise of purpose made flue pipework and fittings. In all cases, supports shall be arranged such that no flue weight is taken on any of the appliances.

Flue pipework shall be twin wall, 316 grade stainless steel, with insulated annulars and flanged with a 'V' band and casing connected with a wide clampband.

The flue system shall have a pressure resistance capability of up to 60" WG.

Clean out doors shall be provided within the common header to enable efficient maintenance and inspection of the plant to be carried out.

Care shall be taken in laying out and grading flue pipework to ensure the removal of internal moisture. The flue installations shall incorporate a drain tee from the vertical riser with trapped uPVC drain tube run to a convenient discharge position. There shall be a condense trap and drain on connection to main header off the biomass boiler.

The flue pipework bracketing shall be made for expansion / movement. Brackets fitted in internal locations shall be painted gloss black external bracketing shall be either stainless steel or galvanised finish. Care shall be taken in layout and grading flue pipework to ensure the removal of moisture. The flue installation shall incorporate a drain routed to the boiler house gulley position.

All flues passing through the compartment divisions shall be fitted with the manufacturer's purpose made fire strip closure plates.

The Contractor shall employ the services of a chimney / flue specialist for the design, supply and installation of the boiler flue system.

At roof penetrations the contractor shall provide all necessary soaker sheets, weather aprons, approved cowl etc.

Exposed flue above roof level shall be factory stove enamelled to a RAL colour to be agreed with the architect.

The flue system shall satisfy the requirements of the Clean Air Act and Building Regulations Approved Document Part J and IGE guides.

The Mechanical Contractor shall allow for the production of all working drawings to gain approval prior to commencement of the works.

The Contractor shall visit the site prior to ordering / commencement of the works to ascertain scaffolding requirements for the strip-out and installation of the new flue. Costs for the external scaffold as required to gain access to the roof flue termination point shall be incorporated within the Contractors tender where required.

It shall be the Contractors responsibility to undertake a full risk assessment paying attention to the requirements of the CDM regulations and shall notify any relevant local authority / adjacent property owners in relation to any closures, disruption or restriction to access in the surrounding area.

The flue system manufacturer shall be:

Sigram Flue Systems Limited
Unit 8,
Shepley Industrial Estate South,
Shepley Road,
Audenshawe,
Manchester,
M34 5DW

Or equal & approved.

5.45.10 Pressurisation Unit & Automatic Dosing System

The Contractor shall design, supply, install, test and commission 1 No. sealed system dosing device c/w expansion vessel and WRAS Category 5 water protection for filling of commercial heating systems within the plantroom.

The pressurisation unit shall be of an electronic sealed system device together with a remote expansion vessel with diaphragm separation of system water and fixed volume air cushion.

The system shall also include an automatic dosing unit which shall inject into the heating system 0.50L of chemical inhibitor after it has detected that the appropriate quantity of water has been admitted into the system.

During the commissioning it shall be the responsibility of the Contractor to ensure that the correct total system water volume and appropriate percentage inhibitor is input into the control panel for the dose & fill unit.

The controls package shall include a control fault relay to flag a general alarm the full details of the alarm shall be displayed on the dose and fill units front display.

The link line from the unit to the system shall include a tee connection to the expansion vessel and a 2 metre high anti-gravity loop with auto air vent at high point and isolating stop valve at the system connection.

The LTHW system served by the pressurisation unit shall incorporate the following:-

- Full bore air purger with auto air vent, fitted into main system flow pipe.
- The quick-fill facility shall be provided via the electronic filling device.

The Fill unit shall be as manufactured by Mikrofill;

Nick Bailey

Mikrofill
11 Merse road
North Moons Moat
Redditch
B98 9HL

T: 03452 606 020
M: 07787803782
E: nbailey@mikrofill.com

Or equal and approved

5.45.11 Circulating Pumps

The Mechanical Contractor shall select, supply, and install, test and commission all heating pumps as follows:

- Single head boiler shunt pumps
- Inverter driven twin head CT secondary pump for heating distribution circuit
- Inverter driven twin head CT primary DHW pump

The circulating pumps shall be installed such that it does not impart any mechanical vibration to either the fabric of the building or to the relevant pipework systems.

The pipeline mounted pumps shall be supported on purpose-made steel brackets incorporating suitable anti-vibration material or mountings to all manufacturers' recommendations.

Purpose-made flanged or screwed anti-vibration bellows shall be fitted on the suction and discharge side of each individual pump set.
Anti-vibration bellows shall be flexible reinforced rubber type suitable for reducing noise and vibration. All Anti-Vibration bellows shall have a maximum working pressure of 16 bar g.

The Mechanical Contractor shall:-

i) Be responsible for selecting the correct size and grade of flexible bellows to suit the service.
ii) Connect to items of plant in such a way that no stress is placed on the pump or bellows.
iii) Support service pipework independently so that no load is placed on the bellows.
iv) Install the flexible bellows fully in accordance with the manufacturer's recommendations and instructions.
v) Install the flexible bellows between items of identical diameter. No bushing or other reductions shall be made at bellow positions.
vi) Ensure that the maximum movement of the flexible bellows do not exceed those stated by the manufacturer.
vii) Ensure that the base of the mating flanges match the base of the flexible bellow.

Where the pump connections differ, purpose made taper pieces shall be provided at the pump connection. All surrounding valves, strainers etc. shall be to pipeline, not connections size.

The pumps shall be fitted with either flanged or union joints to enable individual removal and replacement. Drain valves shall be provided between pump isolation valves to enable pump replacement without system draining.

The suction and discharge connections to each pump shall each be provided with a pressure gauge with loose red pointer and gauge cock.

Care shall be taken to ensure that the shaft orientation of the glandless pumps conforms with the relevant manufacturer's recommendations.

All new pumps shall be as manufactured by:

Grundfos Pumps Ltd.
Grovebury Road
Leighton Buzzard
Bedfordshire
LU7 4TL

T: 01525 850 000
E: grundfosuk@grundfos.com

Or equal & approved.

5.45.12 Combined Air & Dirt Separator

The Contractor shall supply and install a single air/dirt separator to the LTHW heating system as indicated on the tender drawings.

The air & dirt separator shall be provided by:

Spirotech UK Ltd
PO Box 818
Altrincham,
Cheshire,
WA15 5GZ

T: 02084 513 344
F: 02084 513 366
E: info@spirotech.co.uk

Or equal and approved.

The air & dirt separator shall be installed in accordance with the manufactures recommendations.

5.45.13 Radiators

The Mechanical Contractor shall size, select, supply and install radiators throughtout the building as indicated on the tender drawings.

The Mechanical Contractor shall give due consideration to the setting out and full co-ordination with the building fabric, fixtures, fittings and other services.

The Mechanical Contractor shall ensure that the final positions of all radiators are fully co-ordinated with the furniture layouts and approved by the Client prior to commencement of the works.

In general, within the building, radiators shall be centralised under windows where practicable.

All radiators shall be factory self-finished in gloss white with protective wrap which shall be retained until the final builder's clean and commissioning.

All radiators shall be fitted with vandal proof thermostatic radiator valves on the flow connections and chrome lockshield valves on the return connections.

The Mechanical Contractor shall provide a sample of the thermostatic radiator valve for approval by the client and his representatives prior to placing an order for the equipment.

All radiators shall be piped in accordance with the **TBOE configuration**.

The Mechanical Contractor shall ensure that a bypass with a pressure relief valve is installed within the VT heating systems, to ensure that if all TRVs are shut, the system pressure does not exceed the recommended / maximum operating levels.

5.45.14 Unit Heaters

The Mechanical Contractor shall design, select, supply and install LTHW unit heaters serving the Appliance Bay. The Contractor shall give due consideration to the setting out and full co-ordination with the building fabric, fixtures, fittings and other services and ensure that the required clearances for moving vehicles are maintained.

The Contractor shall ensure that the final positions of all unit heaters are fully co-ordinated with the furniture/equipment layouts, including mounting heights and protrusions of the units and must be approved by the Client prior to commencement of the works.

The unit heaters shall be factory self-finished in gloss white with protective wrap which shall be retained until the final clean and commissioning.

The units shall be supplied with local remote on/off, 4 speed fan control and room thermostats.

The Mechanical Contractor will be responsible for procuring the controllers and wiring diagrams and shall free issue this information / equipment to the controls specialist contractor who will be responsible for all final control wiring. All power supplies shall be provided by the Electrical Contractor.

The unit heaters shall be provided by:

Powermatic Ltd
Hort Bridge
Ilminster
Somerset,
TA19 9PS

T: 01460 53535
F: 01460 52341
E: info@powermatic.co.uk

Or equal and approved.

The air & dirt separator shall be installed in accordance with the manufactures recommendations.

5.45.15 Automatic Air Vents

The Mechanical Contractor shall select, supply and install, at all system high points, automatic air vents as Model 'B' manufactured by Brownall or equal and approved.

The vents shall be installed with copper discharge pipes run to the most convenient position to enable the water to discharge to drain or externally to atmosphere.

5.45.16 Pre-Commission Cleaning

Following successful pipework pressure testing (Refer to Section 2) the pipework installation shall be thoroughly flushed by the Mechanical Contractor, following which system strainers are to be cleaned. Following flushing works the Mechanical Contractor shall pre-commission clean the whole of the LTHW pipework installation.

The Mechanical Contractor shall employ a Water Treatment Specialist Contractor to carry out the above treatment works, who shall use a suitable non-toxic industrial cleaning agent that is compatible with all materials installed throughout the installation. Method statements and chemical COSHH sheets shall be provided by the Mechanical Contractor prior to carrying out the works.

The Mechanical Contractor shall provide a detailed pre-commission clean certificate upon completion of the works clearly stating all equipment, chemicals, methods etc. used.

Locations for necessary system flushing and drain points are to be determined by the Mechanical Contractor following consultations with the Specialist Water Treatment Contractor.

5.45.17 Corrosion Inhibitor

The Mechanical Contractor shall treat the LTHW installation with a suitable non-toxic corrosion inhibitor to concentration levels as recommended by the inhibitor.

The Mechanical Contractor shall ensure that the corrosion inhibitor used shall be in accordance with the biomass boiler manufacturer's requirements.

Provide identification labels/tags at the biomass boiler and at the sealed system device advising the presence of the inhibitor, type used and concentration.

The Mechanical Contractor shall produce a method statement for the above works together with details of all chemicals to be used and their associated COSHH sheets.

Upon completion of the flushing and water treatment, the Specialist shall take samples and obtain laboratory tests to check the water quality; further test shall be carried out after 6 and 12 months. All results shall be issued to the Engineer and included in the Operating & Maintenance Manuals.

The Mechanical Contractor shall provide all necessary inhibitor certification for inclusion within the Operating & Maintenance Manuals.

5.45.18 Fire Sleeves

The Mechanical Contractor shall install fire sleeves to all LTHW heating pipework passing through floors & walls.

A steel sleeve with an internal diameter approximately 15mm larger than the outside diameter of the respective pipe shall be fitted on the pipe and secured into the structure.

The pipe and pipe sleeve shall be sealed using a mastic as approved by the local fire officer/building control.

5.45.19 Pipework Expansion Devices

The Mechanical Contractor shall, design, select, supply and install suitably sized expansion bellows or loops complete with guides and anchors. The Mechanical Contractor shall be responsible for determining where expansion will take place and to ensure the correct measures are provided by providing expansion bellows and loops.

5.45.20 Pressure/Temperature Gauges

The Mechanical Contractor shall supply and install the following gauges:

All gauges shall be 80mm diameter with brass case and brass bezel complete with 3/8" BSP connector and gauge cocks.

Temperature gauges shall be calibrated in degrees Celsius and be complete with brass pocket for pipework installation.

The Mechanical Contractor shall make provision, if necessary, with special tee fittings to accommodate the pockets and ensure that:

i) The temperature gauge is positioned such that the pocket is fully immersed.

ii) The pockets and length are suitable for each individual application before ordering any specified instruments.

Pressure gauges shall be calibrated in metres and feet and be complete with gunmetal cocks and syphon tubes.

Each gauge shall be selected so that where possible, the normal operating condition is indicated by a mid-point deflection.

Each gauge shall be complete with an adjustable red pointer set to indicate normal operating conditions.

Location of gauges

a) Pressure Gauges

Variable temperature heating pumps, suction and delivery
Constant temperature heating pumps, suction and delivery
Boiler primary shunt pumps, suction and delivery

b) Temperature Gauges

Constant temperature heating pumps, suction and delivery
Primary circulation pumps heating circuit, flow and return

5.45.21 Test Points

The Mechanical Contractor shall select, supply and fix within the pipework installations mechanical seal type test points in the following locations to facilitate the measuring of pressure and temperatures during commissioning and future maintenance.

a) Across all strainers.

b) At each port of each motorised valve

c) Each circuit.

5.45.22 Commissioning Valves

The commissioning valves shall comprise of a close-coupled double regulating valve and flow measurement device (fixed orifice) conforming to BS 7350.

The regulating hand wheels shall incorporate a means of indicating the number of hand wheel turns from fully closed to the fully open position.

Pressure test pots shall have extended stems to allow valves to be fully insulated without the test valves being covered. Test points shall have coloured cap ties, red to high and blue for low pressure tappings.

Valves up to and including 50mm shall be screwed, above 50mm flanged.

Prior to ordering any commissioning valves, the Mechanical Contractor shall submit to the Engineer, for comment, a schedule indicating pressure drops across valves when 25% open and maximum pressure drop when 100% open.

Commissioning Valve Ref:

CS/*/* ____ Valve No.
|_____ Service 1 - heating (C.T.)
2 - heating (V.T.)

5.45.23 Anti-Vibration Connectors

Flexible anti-vibration connectors shall be installed to the inlet and outlet of all circulating pumps where deemed appropriate by the pump manufacturers as detailed in the following particulars.

Type

Flexible reinforced rubber connectors suitable for reducing noise and vibration. The connectors shall have a maximum working pressure of 16 bar and require no tie bars.

The Contractor shall:

a) Be responsible for selecting the correct size and grade of flexible connector to suit the service.

b) Connect to items of plant in such a way that no stress is placed on the pumps or connectors.

c) Support service pipework independently so that no load is placed on the connector.

d) Install flexible connectors in full accordance with the manufacturer's recommendations and instructions.

e) Install flexible connectors between items of identical diameter. No bushing or other reductions shall be made at connector positions.

f) Ensure that the maximum movement of the flexible connectors do not exceed those stated by the manufacturer.

g) Ensure that the base of the mating flanges match the base of the flexible connector.

5.45.24 Testing and Commissioning

The Mechanical Contractor shall allow for the testing and commissioning of the whole LTHW heating system fully in accordance with the CIBSE Commissioning Code W for Water Distribution Systems and the standard Specification.

The commissioning process will ensure that all equipment is programmed, tested and security sealed with the appropriate commissioning data recorded and reported to the client including opening meter readings for billing purposes.

5.46 GAS PIPEWORK

5.46.1 General

The Contractor shall supply, install, set to work and commission the whole of the internal natural gas installation as described in this Specification.

The new gas supply pipework shall connect into the existing incoming supply as indicated on the tender drawings.

The installation and components shall comply with the requirements of:

i) The Gas Act, 1995.
ii) IGE/UP/1 and 1A Soundness testing and purging of industrial and commercial gas installations.

iii) IGE/UP/2 Gas installation pipework, boosters and compressors on industrial and commercial premises.

iv) IGE/UP/4 Commissioning of gas fired plant on industrial and commercial premises.

v) IGE/UP/10 Installation of gas appliances in industrial and commercial premises.

vi) The Gas Safety (Installation and Use) Regulation 1998.

vii) BS 6400: 1985 CP331.

viii) Building Regulations

ix) Electricity at Work Regulations 1989.

i) IEE Regulations.

5.46.2 Pipework

The whole of the above ground pipework installation shall be carried out in Black steel heavy grade pipework with welded fittings on all pipework sizes in accordance with all current Gas Safety Regulations and installed to gas safe Standards by approved and registered operatives.

5.46.3 Valves

The installation of valves and cocks shall comply with the recommendations contained in IGE/UP/2 Gas installation pipework, boosters and compressors on industrial and commercial premises. and shall be of the following types;

Valves up to and including 65mm size shall have screwed ends to BS 21 and over 65mm size shall have flanged ends to BS 4504.

Ball valves shall be British Gas approved type incorporating blow-out proof stems, lever operation and ends screwed to BS 21.

Gate valves of 40mm size and above shall be to BS 5150 with cast iron bodies, gun-metal working parts, P.T.F.E. wedge inserts, special gland packings to suit natural gas and flanges to BS 4504.

Purge points shall be fitted at the end of pipe runs and at other suitable positions to facilitate the correct purging of pipes with nitrogen (IGE/UP/1 and 1A Soundness testing and purging of industrial and commercial gas installations).

Each purge point shall be fitted with a valve and either a plug or cap.

Gun-metal unions shall be fitted at each connection to all gas points. All valves shall be fitted in accessible positions.

All valves utilised on the project shall be in compliance with section **Error! Reference source not found.**

5.46.4 Painting

The Contractor shall paint with two coats of red oxide, all pipework, fittings, welded joints, brackets etc. In all places the pipework shall have an undercoat and finishing coat of yellow ochre paint applied. All existing pipework and new pipework in the gas meter room and plant room shall have the yellow ochre paint applied.

5.46.5 Testing

The Contractor shall include for carrying out all necessary tests and for the necessary instruments, plant, equipment, supervision and labour required for the tests.

The standard brass pressure test nipple is suitable for pressures up to a maximum of 350mm bar (5 psi). For higher pressures a suitable test point may consist of either:

i) A purpose designed self-sealing nipple

or

ii) A small bore valve fitted with a plug or cap when not in use.

A pressure test point should be fitted at the outlet of each section isolating valve.

installation shall be tested for soundness on completion in accordance with the following instructions and to the requirements of IGE/UP/1 and 1A Soundness testing and purging of industrial and commercial gas installations. All tests shall be carried out in the presence of the Consultant and test certificates submitted to them in duplicate.

The accuracy of the Contractor's instruments shall be demonstrated if required.

<u>New Installations</u>:

Test on completion by air under pressure to maintain a column of water 500mm high (gauge pressure 50 mbar), or 1.5 times the maximum working pressure or

the maximum pressure likely to occur under fault conditions, whichever is the greatest.

The Contractor shall provide a gas schematic for the site to be framed and installed in a location to be agreed on site. A further copy will be incorporated within the O & M manual.

The Contractor shall be responsible for ensuring that the incoming gas supply is adequate for the building's usage.

The Contractor shall allow for all necessary liaison and attendance with the supply authority to ensure a co-ordinated installation is carried out to the satisfaction of the Engineer.

The gas pipework installation shall be implemented in accordance with the current Institute of Gas Engineers Utilisation Procedures and carried out by an ACOPs approved Specialist Contractor.

Internal Gas Pipework

All internal gas pipework/fittings shall be black heavyweight quality mild steel tube to BS1387 all in accordance with Section 2.

5.46.6 Electric Solenoid Gas Shut Off Valve

The Contractor shall provide and install 1 No. electro-hydraulically operated 2 way Class 1 gas safety solenoid shut-off valve, generally as shown on the tender drawings. The valve shall be mounted in line directly after the meter within the plant room and shall serve the gas service to the gas fired LTHW boilers.

The valve shall be complete with an auxiliary switch so able to provide a closed position indicator signal to the BEMS (eg Blacks series 668 Powerseat or equal and approved).

The gas solenoid valve shall have a pressure drop of no more than 0.5mbar at the rate design flow of 25m^3/hr.

Heat detectors shall be mounted over each boiler.

1 no. gas detector in the plant room

1 No. push-button knock-off switch shall be mounted at the access location.

5.47 DOMESTIC WATER SERVICES INSTALLATION

5.47.1 General

The Mechanical Contractor shall design, modify and set to work the mains cold water installation within the plantroom, to facilitate the removal of the existing heating plant & the installation of new, including a new supply to the new pressurisation system, as indicated on the tender drawings.

There should be no works to the domestic hot water system, other than insulating pipework within the plantroom.

The following sub-clauses are particular items of works/plant/equipment associated with the project. Items of work or plant/equipment not specifically mentioned within this section, or described elsewhere shall be provided by the Contractor in accordance with Sections 1, 2, 3 and 4 of the standards Specification.

5.47.2 Pipework

The internal cold water services modifications shall be carried out in copper tube to BS EN 1057-R250, as detailed within the standard pipework specification. Soldering to all fittings used shall be lead free soldered to BS EN 1245-1-1998. **End feed fittings will not be accepted**.

Only metal pipe clips will be accepted and under no circumstances shall plastic clips be used anywhere within the installation. Drain cocks will be fitted to all system low points.

Valves shall be in accordance with Clause 5.30.6

Note: No carbon steel pipework will be accepted.

5.47.3 Thermal Insulation

All domestic hot and cold water services pipework within the plantroom**,** shall be thermally insulated using Rockwool Rocklap 800 H & V pipe sections, having a nominal density not less than 120 kg/m3 with a factory applied facing which is a laminate of close mesh reinforcement between two layers of foil including integral lap for fixing. All to comply with BS5422 (Table 1) and BS5970 water vapour permeance and Building Regulations Class O definition.

All valves, flanges, unions etc. in the plantroom shall be insulated with proprietary valve bags c/w with Velcro ties.

Thermal conductivity at 50°C mean temperature shall be 0.037w/mK or better.

Thermal insulation shall be installed in strict accordance with the manufacturer's recommendations, thickness of insulation being in accordance with Section 3 of this Specification.

All insulated pipework within the plant room shall be further protected with stucco embossed aluminium cladding as per Section 3.

All valves, flanges, unions etc. in the plantroom shall be insulated with proprietary valve bags c/w with Velcro ties.

All pipework shall have identification banding provided in accordance with BS 1710 and wrapped with metallic marker tape or wire behind plasterboard walls for ID purposes where plastic pipework installed.

5.47.4 Valves

Valves shall be fitted in pipework lines to provide suitable isolation and regulation. The valves shall be fully in accordance with the Standard Specification, be WRC approved and installed in accordance with the local water byelaws.

Valves shall be in accordance with Clause 5.31.6.

5.47.5 Chlorination

The chlorination of the domestic water systems shall be carried in accordance with HS G (70), BS EN 937:2009 & L8.

Inhibiting chemicals shall be of proprietary manufacture and used in accordance with the manufacturer's safety instructions.

The sterilisation process shall be carried out by specialists in this field of work who shall submit signed certificates to warrant that the systems have been properly disinfected in accordance with the stated standards.

On completion of sterilisation of the systems all shall be thoroughly and totally flushed out twice with clean water before any water is used for domestic purposes.

The Mechanical Contractor shall allow in his tender for the taking of two sets of water samples from the sterilised system, one set immediately after sterilisation and one set immediately prior to handover. The method of obtaining samples, sampling point etc., shall be recorded by the Mechanical Contractor and witnessed and certified by the Engineer. The Mechanical Contractor shall allow for the samples to have tests carried out an independent certified testing laboratory to confirm that water from the installation is suitable for human consumption and free from harmful Legionellae, bacteria, coliforms, pseudomonas or chemicals. Two copies of the test reports shall be forwarded to the Engineer. The methods used to test the samples shall be in accordance with those laid down in 'Analysis of raw, potable and waste waters' published by the Department of the Environment, HMSO 1972 or any method approved and employed by the Environmental Health Department at the time of the tests.

A 'clean water' certificate is to be issued by the Mechanical Contractor prior to Practical Completion.

5.47.6 Testing and Commissioning

The Mechanical Contractor shall allow for the testing and commissioning of the whole domestic water services installation fully in accordance with the CIBSE Commissioning Code W for Water Distribution Systems and the Standard Specification.

5.48 VENTILATION SYSTEMS

5.48.1 General

The Mechanical Contractor shall design, supply and install and commission an extract ventilation system for the drying room on the Ground floor.

Drying Room Extract Ventilation & Dehumidification

The drying room has a wall mounted extract fan which is non-operational.

The Contractor shall calculate the extract flow rate for this fan and install a new fan and controller in this room. The fan shall be direct drive with a speed controller.

Dehumidification will also be provided to this room by a dedicated dehumidifier with integral controls. There shall be dedicated local controller provided for within the drying room with the controllers to be operated locally when the room is in operation. The dehumidifier shall remove the moisture from the air helping to prevent problems with excess moisture and eliminate condensation build up.

The extract fan & dehumidifier within the drying room shall be monitored by the control panel for fault.

The Electrical sub-contractor shall be responsible for all electrical works associated with the removal of the old and the installation of the new fan.

5.49 AUTOMATIC CONTROLS INSTALLATION

5.49.1 Overview

A new Trend control system shall be designed, installed, tested, commissioned and set to work to control and provide monitoring of the systems as highlighted in the scope of works below. The Trend system shall consist of a central control panel located in the plantroom which shall provide control of the heating system.

Impact Controls
9 Tapton Way
Wavertree Business Village
Liverpool
L13 1DA

T: 01512 542 658
F: 01512 542 659

Or equal and approved.

The Controls Specialist shall be responsible for the complete design, supply, configuration, documentation and commissioning of the controls including all hardware, software and supply of all field-mounted loose controls equipment, to include:

- System design.
- Supply and configuration of all controls equipment.
- Supply and commissioning of control panels.
- Free issue of mechanical field items, for installation by others.
- Provision of control panel wiring diagram, fascia layouts, panel layouts for approval.
- System engineering and commissioning.
- Controls system description of operation, user guide for inclusion in Operations and Maintenance manuals plus one copy affixed to inside of control panel door.
- Full client tuition / training on the use and operation of the panel at handover.

5.49.2 Mechanical Electrical Supplies

The controls specialist shall allow for within their cost to provide,

a) Primary & secondary containment within the plant room for all mechanical power & control wiring associated with the mechanical installation.

b) Dedicated Controls Secondary containment outside of the plant room (i.e. not to be run on electrical containment)

c) Power & control wiring of all mechanical equipment within the plant room from the control panel to various plant downstream.

The controls specialist shall be responsible for all final power and control wiring in relation to the mechanical services installations including final connections to mechanical plant. The mechanical contractor shall provide all wiring diagrams to the controls specialist so they can ascertain all the information required. The Electrical Contractor shall provide power supplies to the unit heaters in the Appliance Bay. These units shall be enabled through the automatic controls system.

5.49.3 System Expansion

The system shall be set that future expansion can be easily accommodated. All control panels shall be provided with 20% space for future additions. The controllers shall be selected to provide 20% spare capacity. The front end PC shall be licensed to provide an additional 200 points above the required total points for this contract.

5.49.4 Control Panels

A Control panel shall be provided by the controls specialist and manufactured to Integrated Building Management Systems/ESD standards. The control panel shall house all necessary relays, contactors, lamps and switches to provide the control functions as detailed in the attached pages. The control panels shall house Trend IQ4 controllers within each plantroom. The control panel shall be prewired and fully numbered to an outgoing DIN rail terminal system. All cables shall be suitably rated for the equipment it is serving. All motors shall be

protected by MCB's. HRC fuses will not be accepted. Lamp test facility shall be provided on the control panel fascia.

5.49.5 Approved Controls Equipment

Controllers	-	Trend IQ4
Display	-	Trend IQ view 8
Temperature Sensors	-	Trend
Differential Pressure Switch	-	Trend
Frost Thermostat	-	Trend
Control Valves	-	Trend
Actuator	-	Trend
Inverter Drives	-	Danfoss /ABB

5.49.6 MCP1 Plantroom

The Controls Specialist shall provide the following loose controls

General Controls

1No Outside Air Temperature Sensor
5No Space Temperature Sensor – Appliance Bay (2 No.), Locker Room, GF Lobby, FF Corridor)

Hot Water Controls

1No Immersion Temperature Sensor c/w Pocket (existing to be reconnected)
1No Water Differential Pressure Switch (existing to be reconnected)

Control Valves

1No. 3 Port CT Control Valve c/w Actuator
2No. 2 Port CT Control Valves c/w Actuator

The following lamps shall be provided on the control panel fascia as a minimum

- Power On
- Control Circuit Failed
- Fire Alarm Activation
- System Pressurisation Fault
- Boiler 1
- Boiler 2
- CT Heating Pump Enabled & Fault
- DHW Heating Pump Enabled & Fault
- DHW Secondary Pump Run & Trip
- Dehumidifier within drying room.
- Extract fan in drying room

230Vac/400Vac MCB Supplies & DOL Starters shall be provided as follows

- Boiler shunt pumps
- CT Heating Pump sets
- DHW Secondary Pump

Controllers

The Trend controllers and associated devices shall be sized to meet the analogue and digital, inputs and outputs of the system, with approximately 15% spare capacity (depending upon point type).

The following analogue/digital inputs shall be monitored at the controllers

General

- Outside Air Temperature Sensor
- Fire Alarm Activated
- Pressurisation Unit Fault

VT Circuit – Heating to Radiators & unit heaters convectors

- Pumpset Flow Fail
- VT Circuit Flow Temperature Sensors
- VT Circuit Return Temperature Sensors
- VT Circuit Space Temperature Sensors
- Auto changeover

CT Circuit – Primary Hot water

- Pumpset Flow Fail
- CT Circuit Flow Temperature Sensors
- CT Circuit Return Temperature Sensors
- HW cylinder Temperature Sensors
- Auto changeover

DHW System – Communal Areas

- DHW Flow Temperature Sensor
- DHW Return Temperature Sensor
- DHW Secondary Pump Trip
- High temperature alarm

5.49.7 Description of Systems

Plantroom Gas Safety Controls

The boiler plantroom shall be provided with a gas safety circuit.

The system comprises of a panic button (push to activate and twist to reset) positioned at the exit door, thermal links (above each boiler), an incoming gas valve and plantroom gas valve feeding the boilers.

On system start up the following will occur:

- Energise the gas valve solenoids.
- De-illuminate the boiler gas valves closed lamp on the panel fascia.

The following safety circuits are hard wired to close the gas valve:

- Either panic button being pushed or
- A heat detector is activated or
- The Gas detector is activated or
- The fire alarm interlock to the control panel is activated.

In addition to the gas valve closing, the following will occur:

- Illuminate the gas valve CLOSED lamp on the panel fascia
- Disable the boilers through hard wired interlocks
- Generate an alarm.

The gas systems are reset automatically, once the reason for the closure has been resolved (fire alarm cleared panic button reset).

System Pressure Interlocks

The heating system is fed from an electronic filling and automatic dosing device.

Should there be a pressure loss within the system, the following will occur:

- Illuminate a FAULT lamp on the panel fascia
- Switch off the heating pumps and boilers through hard wired interlocks
- Generate an alarm.

Fire Alarm

A fire alarm interlock shall be provided at the control panel from the buildings fire alarm system.

This hard wired interlock when activated will:

- Switch off the all the plant controlled from this control panel through hard wired interlock
- Generate an alarm at the panel

Once the system has been reset to the plant will restart and clear the alarm.

The fire alarm system should be provided with a test facility to allow full testing of the fire alarm system without any of the above events occurring.

Boilers

The boilers operate based on a demand signal from one of the following:

- Demand from heating system (VT pumps activation)
- Demand from the hot water system
- Frost condition

The boilers are inhibited from operation by:

- Gas Safety Circuit
- Pressurisation Switch

- Fire Alarm
- Pump failure

A common fault alarm is monitored from each boiler. In the event of an alarm the following shall occur;

- Illuminate the FAULT lamp on the panel fascia

The boilers are electrically supplied from the control Panel.

In addition, HAND/OFF/AUTO selector switches and ENABLED indication lamps are provided on the control panel fascia for each boiler. The Hand position allows the boiler to be run manually.

The controller shall be provided to sequence the boilers to meet the heating demand. The lead and lag boilers will be rotated on a weekly basis to give even run hours.

Frost Protection

The frost control shall be configured for the building as follows:

1st Stage

If the outside air temperature, as sensed on the external temperature sensor, falls below a pre-determined temperature set point (nominally 0ºC) and the plant is not operating under normal occupancy control all duty circulation pumps will be started.

The program will switch off if the outside air temperature rises above a pre-determined temperature set point (nominally 2ºC) or the plant is required for normal occupancy.

2nd Stage

If the temperature on any immersion temperature sensor within the plantroom falls below a pre-determined temperature setpoint (nominally 10ºC) and the plant is not operating under normal occupancy, the 1st stage of frost control is activated along with the energising of the boiler system, on a background temperature setpoint of 25ºC

On a rise in temperature on the return flow sensors above a pre-determined temperature setpoint (nominally 20ºC), the 1st stage frost protection switches off or the plant starts for normal occupancy, this stage will switch off.

3rd Stage

If the temperature on any space temperature sensor within the building falls below a pre-determined temperature set point (nominally 12ºC) and the plant is not operating under normal occupancy, the 1st stage of frost control is activated along with the energising of the boiler system, on a background temperature set point of 12ºC

On a rise in temperature on the space temperature sensors above a pre-determined temperature set point (nominally 14ºC), the 1st stage frost protection switches off or the plant starts for normal occupancy, this stage will switch off.

Circulation Pumps

All pumps shall be powered and controlled from the control panel. All pumps shall be provided with a differential pressure switch which shall monitor flow failed across each pump.

DHW Systems

The cylinder temperature shall be fully controlled by the control panel.

The primary pump shall be activated by the controls to maintain the cylinder at temperature. Provide a fixed start/stop time programme to enable the unit. Pumps shall be monitored for a fault status at the control panel.

The secondary pump shall be controlled by the control panel and operate in line with the DHW time control programme.

Pressurisation Unit

Provide a common alarm from the unit.

Dehumifier (Drying Room)

Provide a common alarm from the unit.

Extract Fan (Drying Room)

Provide a common alarm from the unit.

Unit Heaters / Fan Convectors

Provide a common alarm from each heater.

Control Set Points

The menus for all programmed set points for the control of mechanical systems shall only be access via passwords or PIN codes.

Time Control & Programming

Controllers shall include optimised start/stop facilities as well as control of the secondary circuits.
Provide clock and calendar programmed with periods of normal operation for 2 heating zones and DHWS separately.
Automatically change between GMT and British summer time, allow for leap years and allow for programming of bank holidays.

The Mechanical Contractor will be responsible for procuring the controllers and wiring diagrams and shall free issue this information /

equipment to the controls specialist contractor who will be responsible for all final control wiring to thermostats, actuators, CO sensors etc. All power supplies shall be provided by the Electrical Contractor.

5.49.8 Commissioning and testing

The Controls Specialist shall be responsible for the full operational commissioning of their system and any other controls equipment supplied to them. All safety interlocks, overrides and fail-safe conditions are to be operational prior to starting the plant and demonstrated to the satisfaction of the Engineer prior to placing plant in auto-mode.

Fault conditions for all critical alarms, safety devices and controls interlocks shall be simulated and proved effective as soon as practical. Commissioning documentation and schedules shall be submitted for approval during the design phase showing each plant, point, interlock and control algorithms and the stages of checks and commissioning required.

Completed copies shall be available to the Engineer prior to acceptance testing. A complete set of the commissioning documentation is to form part of the system documentation.

The Controls Specialist shall give seven days' notice to the Engineer of their intention to provide the acceptance demonstrations once the commissioning is complete.

The operation of all safety interlocks shall be tested and 20% of all other points shall be selected by the Engineer and demonstrated for operation/accuracy. Should there be an unacceptable failure, a further 20% may be selected. If there is another unacceptable failure, the Engineer may, at their discretion, demand a 100% demonstration. All testing shall be included in the tender sum. All points that fail a test shall be rectified and re-tested to the Engineer's satisfaction.

Testing shall also incorporate an audit of the wiring and hardware installation, demonstration of safety interlocks, start of system from power-down and review of time schedules and alarm levels, grouping and selected control parameters. Trend graphs will be provided to demonstrate the stable control of plant, if requested.

5.49.9 System handover

The Controls Specialist shall ensure the following are completed prior to practical completion:

- Any snagging to be documented and an agreed date determined for clearance
- All password/PIN numbers, levels and operators recorded
- Electronic copies of all system and data files supplied
- Proprietary software manuals and disks supplied
- All equipment access keys supplied

- Complete set of O & M manuals with any agreed amendments/ additions required to be documented and a target date for the completion agreed
- Training/instruction of Engineers and operators.
- Controls system description of operation, user guide for inclusion in Operations and Maintenance manuals plus one copy affixed to inside of control panel door.

5.49.10 Documentation

System manuals shall comprise the following information as a minimum:

- Details of site name, date, controls specialist details, telephone numbers, contacts, controller addresses etc.
- Diagrams showing the full schematic and physical layout of the system and components
- Controller software diagrams detailing the configuration of all control and monitoring strategies
- Equipment schedules identifying manufacturers, suppliers, recommended spares, part references, contact numbers/addresses
- Motor control panel wiring diagrams showing the connection to each item of field device or equipment
- Data sheets and maintenance instructions shall be provided for each item of equipment. Copies will not be acceptable.
- Record drawings of the installation on marked-up mechanical/architectural layout drawings
- Safety requirements.
- Simplified easy to follow user guide.

All drawings relating to the system shall be supplied on A3/A4 sized bound into A4 binders, with electronic copies supplied in both their native format (.docx, .dwg etc.) and in Adobe's Portable Document Format (.pdf).

Back-up copies of the system configuration files and master proprietary software disks / executable files shall be provided. All system and data files shall be current at the handover date, electronic copies of files / software shall be suitably identified and virus / malware checked all directories and files and software shall be cross-referenced in the maintenance manuals.

The storage unit and key shall be handed to the Client's representative at practical completion or handover.

5.49.11 Post Handover Attendance

The Controls Specialist shall include in their tender an allowance for system tuning via auto-dial or visit to check correct operation of all plant which may exhibit changes in stability due to settling in or seasonal conditions. **This shall be based on 3 No. visits to site and shall be used at the discretion of the Client during the warranty period.**

5.49.12 Warranty

The warranty period shall run for twelve months following handover, during which time the following facilities shall be available to the Client at no extra costs:

- Call out or remote interrogation during normal working hours within 24 hours
- Replacement of equipment and labour for defective parts
- Fault diagnosis and rectification.

5.50 SCOPE OF ELECTRICAL WORKS SPECIFICATION

The Electrical Contractor shall allow for the supply, delivery, off-loading, installation connecting, testing and commissioning of all specified electrical services in order to ensure a complete installation is provided, generally as detailed within this Particular Specification and indicated on the tender drawings.

The proposed works shall generally be as follows:

- Strip out of existing and Supply and Installation of New radial supply to new mechanical control panel in existing boiler plantroom.
- Isolation and strip out of radial supplies to existing fan Convector units in Muster Bay, Entrance Lobby and Appliance bay
- Supply installation and testing of radial supply to new 3kW fan convector In drying room
- Supply installation and testing of radial supply to new dehumidifier in drying room
- Isolation and removal of existing extract fan in drying room, and installation of new, reusing existing single phase radial circuit
- Isolation of existing and rewiring 3 No. fan convectors/unit heaters in appliance Bay, reusing existing single phase supplies.
- Electrical cable containment systems for new fan convectors, dehumidifier and extract fan and controller.
- Supply & installation of a key switch adjacent to Fire Alarm panel for isolation of gas solenoid valve during testing procedures.
- Earthing of all new services.
- All builders work and the making good associated with the new electrical services installation.
- Installation of new General and emergency lighting in existing boiler plantroom
- Testing and commissioning.
- Operations and Maintenance Manuals.
- As Fitted Drawings, including electronic copies.
- Building log book in accordance with building regulations L2B the log book shall take the format from CIBSE TM31.
- User tuition and full operating instruction.
- 12 months defects liability period.

All of the above shall be carried out under an agreed program of works and method statements as set out by the Mechanical / Main contractor.

The electrical installation for the mechanical services shall be completed in accordance with current good practice and to the satisfaction of the Services Consultant or his/her representative. The works shall meet the Requirements for Electrical Installations **BS 7671:2008+A3:2015** and all associated amendments

The electrical installations within all designated plant room areas shall be completed in LSF insulated, 6242B twin and earth cables enclosed within a continuous galvanised steel conduit and trunking system, sized to accommodate the volume of cables + 25% spare wiring capacity. The existing trunking system can be reused if practical (other circuits installed within containment).

The new installations shall be surface-fixed.

On completion, all additional wiring circuits shall be fully tested in accordance with BS 7671 17th Edition. All testing/commissioning shall be witnessed by the Services Consultant or his/her representative.

The installations shall be fully documented and handed to the Engineer, forming part of the Contract Operating and Maintenance Manuals/As-fitted Drawings. Test results and associated completion certificates shall be enclosed within the manuals.

Power and control wiring and containment within the plantroom and field areas to remote plant sensors and other plant control devices shall be completed by the controls specialist requirements.

5.51 DRYING ROOM FAN CONVECTOR/PANEL HEATER

The Electrical Contractor shall design, supply, install, test & set to work a new 3kW electrical fan convector/panel heater with integral thermostat. The unit shall be suitable for mounting in the humid environment of a drying room. The unit shall be wall mounted. The Contractor must submit proposals for approval by the client and his representatives prior to placing an order for the equipment.

The Electrical Contractor shall supply install and test a new 20 radial supply to the new 3kW fan convector/panel heater located in the existing drying room. The new supply shall originate at Existing Distribution board 'B' located in the existing electrical switch room as indicated on the project drawing. The radial circuit shall be wired in 2.5mm2 6242B XLPE/LSOH twin and earth cables contained in existing containment, where existing containment cannot be used the Electrical Contractor shall install surface mounted conduit in order to match existing. The new radial circuit shall be protected by a 20 Amp Type B RCBO and installed into a spare single phase way within the existing Schneider 16 way TP&N distribution board ref 'B'

5.52 DRYING ROOM DE–HUMIDIFIER

The Electrical Contractor shall supply install and test a new 20 radial supply to the new de-humidifier located in the existing drying room. The new supply shall originate at Existing Distribution board 'B' located in the existing electrical switch room as indicated on the project drawing. The radial circuit shall be wired in 2.5mm2 6242B XLPE/LSOH twin and earth cables contained in existing containment, where existing containment cannot be used the Electrical Contractor shall install surface mounted conduit in order to match existing. The new radial circuit shall be protected by a 20 Amp Type B RCBO and installed into a spare single phase way within the existing Schneider 16 way TP&N distribution board ref 'B'

5.53 DRYING ROOM EXTRACT FAN

The Electrical Contractor shall isolate, 'prove dead' and strip out in its entirety the existing Drying room Extract fan and associated Controller. The Mechanical

Contractor shall then supply and install a new extract fan and controller in the same location as existing. On completion by the Mechanical Contractor, the Electrical Contractor shall test and reconnect existing wiring to the new fan and its associated controller.

5.54 NEW MECHANICAL CONTROL PANEL SUPPLY

Presently the existing Mechanical control panel is protected by a 32 amp Type 2 MCB located within a Crabtree 4 way TP&N MCB distribution board, which it is suspected, has an age in excess of 25 years

Prior to the installation of the new sub-main the Electrical contractor shall verify if spare/replacement MCB's can be obtained for the existing distribution board, if production of spares and MCB's has been discontinued then a new Schneider 4 way TP&N distribution board shall be installed in the same location as existing. All expenditures for this installation being set against the provisional sum as referred to in the tender schedule.

Also the Electrical Contractor shall re-connect all existing circuits back into the new Distribution Board. The Electrical Contractor shall also agree isolation/downtime with the client prior to commencement of the re-diversion works.

The Electrical contractor shall provide install and test a new sub-main to the new mechanical control panel which is to be installed in the existing boiler plantroom. The new sub-main shall be installed between the new control panel and MCB Distribution Board Ref 'D'

The new sub-main shall comprise of a new 6mm^2 3C XLPE/SWA/LSF cable installed on MDRF cable tray and protected by a 32A MCB located in the New/Existing distribution board. these sizes shall be verified by the contractor following receipt of final electrical details of the mechanical control panel.

All supplies to plant shall emanate from the mechanical control panel. All power supplies and control wiring to the plant shall be installed by the controls specialist.

5.55 APPLIANCE BAY FAN CONVECTOR

The Electrical Contractor shall isolate, 'prove dead' and isolate final circuits serving 3 No. Fan convector units within the Appliance bay area, in positions as indicated on the project drawings

Once these Isolations have been verified by the Electrical Contractor, the Mechanical Contractor shall strip out existing and replace with new. On completion of the mechanical installation the Electrical Contractor shall test the existing final circuit and if satisfactory and in accordance with BS 7671 reconnect the existing isolation point and wiring to the new 3 No. fan convectors

5.56 FAN CONVECTOR STRIP OUT

The Electrical Contractor shall isolate, 'prove dead' and isolate final circuits serving 3 No. Fan convector units within the Appliance bay, Muster Bay and Entrance lobby all as indicated on the project drawings

Once these Isolations have been verified the Electrical Contractor shall remove in their entirety all isolation points, wiring and if appropriate containment back to their respective distribution boards; located in the main electrical switch room. All strip out shall be recorded on as installed drawings and Existing distribution board charts/schedules revised/updated as required.

5.57 BOILER PLANT ROOM LIGHTING AND HEAT DETECTION

Prior to the start of the project the client will employ a specialist Contractor to remove the Asbestos content which is present on the ceiling of the existing Boiler plantroom.

Prior to the start of the removal, the Electrical Contractor shall Isolate and 'prove dead' the existing lighting circuit, in order that the Specialist Contractor can remove all luminaires wiring and associated containment from the affected area.

On completion of the removal of all asbestos, The Electrical Contractor shall supply install and test new General and Emergency lighting to all areas of the existing Boiler plantroom generally as indicated on the project drawing.

The installation shall generally comprise of all wiring between Existing distribution board ref 'D' and the new lighting installation, surface mounted Galvanised steel conduit, New surface mounted grid switch for lighting and emergency lighting test purposes, final circuit protection provide by a 10 Amp Type B MCB Located in DB Ref 'D' and New IP65 rated General and Emergency lighting luminaires as manufactured by Dextra Lighting and as indicated on the project drawings.

The new installation shall be tested in accordance with BS 7671:2008+A3:2015 with a schedule of test results being included inside the cover of Distribution Board REF 'D'. Finally all Test certificates, schedules of inspections and schedule of test results shall be included in the final O&M manuals.

Also prior to Asbestos removal the Electrical Contractor shall Isolate the existing Ceiling mounted heat detector in order that the Specialist Contractor can remove both the Detector and cables from the affected area, the Specialist Contractor shall unclip and taken back to the internal wall and sealed in order to be reused on completion of the asbestos removal.

On completion of the removal of Asbestos the Electrical Contractor shall reinstall the Heat detector and rewire the detector reusing the existing FP200 wiring, Finally the existing heat detector shall be commissioned and tested to the satisfaction of the fire officer and engineer

APPENDIX A

TENDER SUMMARY

TENDER SUMMARY
FOR THE MECHANICAL AND ELECTRICAL SERVICES ASSOCIATED WITH THE BOILER AND HEATING REPLACEMENT WORKS AT GLOSSOP FIRE STATION

The Contractor shall present all of the associated tender summary sheets below such that all cost elements are completed in full, please note, failure to complete the summary in full may deem the tender void.

Item	Description	£
1.	Strip out and removal of redundant services	£
2.	LTHW Heating boiler, Pre-fabricated header kit and integral pump set	£
3	New Flue Liner	£
4	LTHW pumps	£
5	LTHW pressurisation unit	£
6	Noise and vibration isolation	£
7	LTHW heating pipework valves accessories etc.	£
8	Heat emitters throughout	£
9	LTHW electronic fill device	£
10	New Gas installation/modifications	£
11.	New MCWS Installation/modifications	£
12.	Thermal Insulation :	
	Heating installation	£
	Domestic hot and cold water installation	£
13	Flushing, cleaning and corrosion inhibitor for heating systems	£
14	Take samples and provide laboratory analysis for heating system water make up i.e. pH levels etc. Re-visit after 6 months and re-sample, provide report confirming pH levels in line with boiler manufacturer's requirements.	£
15.	Automatic Controls package including power and control wiring installation.	£
16.	Lighting installation replacement	£
17.	Fire alarm installation/modification	£

18.	Electrical testing and commissioning	£
19.	Earthing & bonding	£
20.	Builders Work	£
21.	Making good and painting of the boiler room walls and floor	£
22.	Contract Preliminaries	£
23	Testing and Commissioning the system	£
24	Working installation drawings	£
25	'As-Installed' Drawings	£
26.	O&M Manuals	£
27	Client Training	£
28	CDM Regulations	£
29.	Any item not specifically detailed in the specification but required in order to provide a complete mechanical services installation to be completed by the Contractor	£
	a)	£
	b)	£
	c)	£
30.	Provisional sums	
	1. Provisional Sum for contingency.	**£3,000**
	2. Additional work associated with unidentified Mechanical services	**£1,000**
	3. Upgrade of DB in plantroom	**£ 1200**

Glossop Fire Station - Boiler & Heating Replacement Works - Tender Sum to be carried forward to Form of Tender **£**

Please complete the following items. The percentages shall equally apply to work carried out on a day work basis and to work for which written quotations have been requested where a schedule of rates cannot be applied.

…… % for labour

…… % for materials

…… % for plant

Company…….. Position ……

….……..

APPENDIX B

MECHANICAL SERVICES

NOT USED

APPENDIX C

MECHANICAL SERVICES

DOCUMENT ISSUE SHEET

Engineering Services Design Ltd

22 Nicholas Street
Chester CH1 2NX
T 01244 503800
W www.esdltd.co.uk
E enquiries@esdltd.co.uk

Document Issue Register

Project: **Glossop Fire Station**

Project No.: **M2605**

Sheet No. 1 of 1

Day	30	14												
Month	06	07												
Year	16	16												

Drawing No.	Drawing Title	Size	Revision												
Mechanical Drawings															
M2605(50)001	Proposed Plantroom Layout - Ground Floor	A1	T1												
M2605(56)001	Proposed Heating Pipework Layout - Ground Floor	A1	T1												
M2605(56)002	Proposed Heating Pipework Layout - First Floor	A1	T1												
M2605(58)001	Proposed Boiler House Replacement Mechnical Services Schematic	A1	T1												
Electrical Drawings															
M2605(62)001	Proposed Electrical Works - Ground Floor Layout	A1	T1												
M2605(ME)Spec	Mechanical and Electrical specification	A4	T1	T2											

Preliminary														
Approval / Comment														
Tender														
Contract														

Distribution	No. of copies issued: 'E' = email 'D' = disk													
Derbyshire Fire & Rescue Service - Steve Wild	E	E												

APPENDIX D

VALVE SCHEDULE

VALVES AND COCKS - SERVICE SELECTION

GENERAL

Valves shall be as follows or equal and approved. (Such approval must be obtained from the Engineer in writing before the equipment is obtained).

All valves shall be suitable for the system medium and test pressure.

Service	**Description**	**Manufacturer**	**Fig. No.**
LTHW Heating, Chilled Water, Condensate, Oil	Ball valve 15mm to 50mm	Crane	D171A D171AEXS
	Wheel valve - Butterfly 65mm and above	Crane	F628
	Lockshield valve – Ball valve 15mm to 50mm	Crane	D171ALS
	Lockshield valve - Butterfly 65mm and above	Crane	F628
	Double regulating –Bronze 15mm to 50mm	Crane	D921
	Double regulating – Cast iron 65mm and above	Crane	DM921
	Commissioning 15mm to 50mm	Crane	D934 (low flow) D931
	Commissioning 65mm and above	Crane	DM941
	Check valves 15mm to 50mm	Crane	D138
LTHW Heating, Chilled Water,	Check valves 65mm and above	Crane	FM492
	Drain cocks on Equipment	Crane	D344.5
	Drain cocks on Pipework	Crane	D340
	Radiator/Convector Wheel Valve	Crane	W/H D885 WH
	Radiator/Convector Lockshield valve	Crane	L/S valve D887
	Radiator valves with thermic actuator	Oventrop	Series A Body 1012487 (240v) 1012466 (24v)

Service	Description	Manufacturer	Fig. No.
LTHW Heating, Chilled Water	Radiator valves Thermostatic	Crane	D885-TRV
	Radiator valves Thermostatic with remote capillary sensor	Crane	D889
	3 way vent cocks	Hattersley Nabic	85 175
	Motorised 2 Port Zone Valves up to 28mm.	Oventrop, Drayton, Honeywell	
	Motorised 3 Port diverter Valves up to 28mm	Honeywell	V4073
Natural Gas	Isolation of branch mains and appliances	Crane	D191
	Mains - screwed to 65mm	Crane	D191
	Mains - flanged to 65mm	Crane	F614
	Mains - flanged 80 and above	Crane	F614
Mains fed Hot and Cold Water (Copper Pipework)	Stopcocks-Mains/ branches 15mm to 54mm	Crane	D171AC
	Stopvalve – mains 67mm and above	Crane	F624 Cold F628 Hot 130oC
	Servicing valves (fitted to all draw offs)	Crane	D171 MHV
	Single check valves	Oventrop	44010 (Comp) 440 11 (Screwed)
	Double check valves	Oventrop	440 00 (Comp) 440 01 (Screwed)
	Drain cocks	Crane	D340
	Stopcocks-Mains/ branches 15mm to 54mm	Crane	D171AC
Mains fed Hot and Cold Water (Copper Pipework)	Stopvalve – mains 67mm and above	Crane	F624 Cold F628 Hot 130oC
	Servicing valves (fitted to all draw offs)	Crane	D171 MHV
	Single check valves	Oventrop	44010 (Comp) 440 11 (Screwed)
	Double check valves	Oventrop	440 00 (Comp) 440 01 (Screwed)
	Drain cocks	Crane	D340

APPENDIX E

DESIGNERS RISK ASSESSMENT

Project :	Glossop Fire Station			Designers Risk assessment	esd
Project Ref:	M2605	Date:	30/06/15		
Eng:	JE	Checked:			

Ref No.	Activity	Population at risk	Risk Rating			Activity at design stage	Re-assessment			Possible control options by Contractor	Re-assessment		
			Impact	Likelihood	Resultant risk		Impact	Likelihood	Resultant risk		Impact	Likelihood	Resultant risk
Demolition													
1.0	Removal of equipment from plantroom.	Workforce	High	High	Critical	Asbestos reports carried out, request asbestos awareness training of all operatives and request use of accreditied asbestos removal company to remove any asbestos found.	High	High	Critical	Employ approved asbestos removal company to safely remove away from site prior to works commencing. Provide asbestos awareness training to workforce.	Low	Low	Low
2.0	Removal of equipment from roof voids.	Workforce	High	High	Critical	Visit site assess ladders/scaffold needs	High	High	Critical	Working in confined space. Work to COSHH recommendations. Use appropriate protective clothing. Provide any temporary lighting as may be required.	Low	Low	Low
3.0	Removal of equipment from ground & first floor accommodation	Workforce & Operatives	Medium	Medium	Medium	Visit site assess safe access needs	High	High	Critical	Wear PPE, follow safe lifting techniques. Manual Handling Operating Regs.	Low	Low	Low
Construction													
1.0	Installation of new flue liner - working at height	Workforce	High	Medium	High	Visit site assess scaffolding needs etc.	High	Low	Medium	Employ scaffolder & ensure all restriants installed. Ensure all operatives trained in use of any lifting equipment employed and that it is correctly installed. Ensure defined method statements are followed by operatives.	Low	Low	Low
2.0	Installation of heat emitters at high level	Workforce	Medium	Medium	Medium	Visit site to assess access requirements etc. Provide details of expected method of access to into basements.	High	Medium	High	Wear PPE, follow safe lifting techniques. Manual Handling Operating Regs.	Low	Low	Low
3.0	Working on live site	Workforce & Operatives	High	Medium	High	Site Surveys undertaken at quiet times agreed with Client/end user	High	Low	Medium	Ensure safe access is maintenatined. Create a safe storage area away from pedestrian and vehicle routes. Provide safety barriers and fencing. Work within Noise at Work Regs	Low	Low	Low
Commssioning													
1.0	Working with plant or equipment mounted at height	Workforce	Medium	Medium	Medium	Visit site to assess access requirements etc. Provide details of expected method of access to high level.	High	Medium	High	Wear PPE, follow safe lifting techniques. Manual Handling Operating Regs.	Low	Low	Low
Maintenance													
1.0	Working with plant or equipment located at height	Workforce	Medium	Medium	Medium	Visit site to assess requirements for access and replacement of plant.	High	Medium	High	Ensure access is maintenatined. Provide training to building users.	Low	Low	Low

Project :	Glossop Fire Station			Designers Risk assessment	
Project Ref:	M2605	Date:	30/06/15		
Eng:	JE	Checked:			

Ref No.	Activity	Population at risk	Risk Rating			Activity at design stage	Re-assessment			Possible control options by Contractor	Re-assessment		
			Impact	Likelihood	Resultant risk		Impact	Likelihood	Resultant risk		Impact	Likelihood	Resultant risk