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**COLAISTE EOIN
EMERGENCY WORKS**

**MECHANICAL SERVICES
CONTRACT SPECIFICATION**

T1

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1. INTRODUCTION

This Specification specifically relates to the Mechanical Building Services and must be read in conjunction with the Mechanical General Specifications, drawings and other Contract Document including Conditions of Contract, Preliminaries, Quality and general requirements, and other relevant sections of the Specification.

All costs arising from or in connection with the following are to be included in the tender.

1.1 Project, parties and consultants

1.1a Name of project

COLAISTE EOIN EMERGENCY WORKS

Nature of project

**Replacement of existing oil boilers with new gas fired boilers and associated works
 Replacement of existing LPG pipework to teaching spaces and associated pressure proving system**

Location of project

Hacketstown, Co Carlow

1.1b General description of the Works

The Works consist of

Replacement of existing boilers, flues, control panel, oil tank and pipework. Installation of new boilers, flues, heat exchanger, pumps, pipework insulation, controls, LPG tanks, gas compound, gas detection and associated electrical works.

Replacement of gas pressure proving systems in the school.

Labelling of external gas isolating valves.

1.1c Names and addresses of Employer and Consultants.

The Employer	Kilkenny Carlow ETB
Employer's Representative	Refer to Schedule
Architect	
Assigned Certifier	
Quantity Surveyor	
Structural Engineer	
Services Engineer	Ronan Meally Consulting Engineers
Other consultants	
The Employer may appoint others to the Design Team from time to time	

1.2 Description of site

1.2a The boundaries of the site are

as indicated in the documents in the contract and/or in any background information provided with this tender

1.2b Means of access to the site and position of the Works

as indicated in the documents in the contract and/or in any background information provided with this tender

1.2c Adjacent or abutting buildings
as indicated in the documents in the contract and/or in any background information provided with this tender

1.2d Existing services on, under or over the site
Services known to exist are
as indicated in the documents in the contract and/or in any background information provided with this tender

1.2e Visiting the site
The site may be inspected during the tender period by arrangement with the Employer.

1.3 Drawings and other documents

1.3a Drawings and other documents used for the preparation of the Pricing Document and issued to Tenderers
The following drawings and documents were issued to Tenderers
Refer to Schedule

1.3b Drawings and documents not forming part of the Contract
The following drawings and documents do not form part of the Contract
As listed (if any) in Appendix 3 of the Instruction to Tenderers (Information Pack)

1.3c Inspection of drawings and other documents not issued to Tenderers
Drawings and other documents not issued to Tenderers may be inspected at
Not applicable

2. CONTRACT

2.1 Form, type and Conditions of Contract

2.1a Form of Contract
The Form of Main Contract will be the 'Public Works Short Form of Contract' (PW-CF6) published on <http://constructionprocurement.gov.ie/contracts/> on the date 10 days before the latest date for submission of tenders (disregarding any amendments posted on that date).

2.1b Clause headings
Note: The clause headings of the Conditions of Contract are set out hereunder for pricing. Unless specifically itemised elsewhere in these Preliminaries, any costs for or in connection with any contractual requirements or obligations arising from these clauses should be included under these headings.

1. The Contract
2. The Site, starting and completing the Works
3. The Works
4. The Price and payment
5. Representation and communications
6. Contractor's Personnel

7. Pay and conditions of employment of workers
8. Loss of and damage to the Works
9. Indemnity for claims and damage
10. Insurance
11. Property
12. Termination
13. Ethics in Public Office
14. Project Supervisor for the Construction Stage
15. Law, jurisdiction and disputes

2.1c The Schedule (Including Employer's entries to the Schedule): Refer to completed Schedule.

Clause 1.1: Employers Representative

Clause 1.1: Time for completion

Clause 1.3: Other documents in the contract

Clause 2.6: Rate of liquidated damages

Clause 2.8: Weather station

Clause 3.15: Defects Certificate issued

Clause 4.1: Interim Payment

Clause 4.1: Percentage of price to be paid after Employer certifies the Works are substantially complete

Clause 4.2: Time for payment

Clause 10.3: Minimum indemnity limit for public liability insurance

Clause 10.3: Minimum indemnity limit for employer's liability insurance

Clause 10.4: Maximum levels of excess

Clause 12.3: Percentage of the unpaid portion of the price to be paid if Employer terminates

Clause 14: Project Supervisor for the Construction Stage

Clause 15.2: Body to appoint conciliator, if not agreed

Clause 15.3: Person to appoint adjudicator, if not agreed

2.2-4 (not used)

2.2 Contractor's liability

2.2a Contractor's liability for risk or injury to persons and property and for damage to the Works The Contractor shall, subject to any other provision in the contract, be liable for risk or injury to persons and property and for damage to the Works and shall indemnify the Employer in accordance with the Contract.

2.2b Requirement of Contractor to effect insurance Where required, the Contractor shall effect insurance in respect of the Contractor's liability for some/all of the above risks. The relevant particulars will be detailed in the Schedule

2.3 Local Authority Fees and Charges

2.3a Consents, notices, fees and charges

The Contractor shall pay all Local Authority fees and charges (including charges for connecting to services) in connection with the Works and any costs in connection with obtaining any consents or complying with any notices, other than those that the Employer undertakes to pay for and are listed in the contract documents.

2.4 Obligations and restrictions imposed by the Employer

2.4a Access to and possession or use of the site

The Contractor shall consult the convenience of anybody who may be affected by the work with regard to the approaches to be used, suitable times for making deliveries and all other matters affecting them.

Parking of Contractor’s and operatives’ cars and other vehicles will be at the discretion of the Contractor and any expense of same will be borne by the Contractor.

Specific requirements in relation to access to and use of the site:

None

2.4b Limitations of working space

The Contractor is to confine operations to within the site.

Specific requirements in relation to limitations of working space:

None

2.4c Limitations of working hours

Subject to any provision to the contrary contained in the Contract, no work shall be carried out during the night or on Sundays without the permission in writing of the Employer’s Representative save when the work is unavoidable or absolutely necessary for the saving of life or property or for the safety of the Works in which case the Contractor shall immediately advise the Employer’s Representative.

The Contractor shall comply with any restrictions imposed by the Planning Permission or the Law.

Specific requirements in relation to limitations of working hours:

None

2.4d Limitations on the operation of plant with respect to adjoining property

Noise, dust and pollution should be kept to a minimum.

Specific requirements in relation to operation of plant with respect to adjoining property:

None

2.4e The use or disposal of any material found on site

No materials found on the site may be re-used except those specifically listed here:

None listed

The Employer will retain title to the following materials from excavations and demolitions:

None listed

2.4f Hoardings, fences, screens, temporary roofs; temporary name boards and advertising rights
 The Contractor shall provide suitable secure hoardings and maintain them in a safe and proper manner.

Specific requirements in relation to hoardings:

None

The Contractor shall provide suitable secure hoardings and maintain them in a safe and proper manner. The Contractor shall erect information signage to outer perimeter to inform public of the works, design to be provided by the Architect. No other name-board(s) may be displayed on the site without the consent of the Employer who shall have absolute control and discretion as to size, specification and location, etc.

The Contractor shall not take photographs, write articles for publication or cause to be issued or displayed any advertisement about the Works or any product therein nor permit such acts by others, unless expressly authorised in writing by the Employer.

2.4g Maintenance and protection of existing services on, under or over the site

The Contractor shall do everything necessary to avoid damage to any services on, under or over the site, which are put at risk by the execution of the Works.

The Contractor shall protect and maintain all overground and underground services encountered during the execution of the Works. The Contractor is to make good any damage at their own expense and pay any costs or charges in connection therewith.

The Contractor shall formulate a contingency plan to ensure an immediate emergency response by the relevant bodies in the event that any services are damaged. The contingency plan must be approved in advance by the Employer's Representative and will include the names and contact numbers to effect immediate responses to restore and maintain services.

The Contractor will advise the relevant bodies, in advance of commencing excavation or opening up work, of the dates on which such service may be at risk. Where deemed necessary the Services Engineer, a representative of the relevant authority or an emergency crew as appropriate will be in attendance where any particular service is at risk.

2.4h Execution or completion of the work in any specific order or in sections or phases

The Works are to be carried out in a single phase unless otherwise stated here:

Not applicable

The order of execution of the Works is at the discretion of the Contractor unless otherwise stated here:

Not applicable

2.4i Maintenance of specific temperature and humidity levels

The Contractor shall control the humidity of the Works (see also item for 'Drying the Works', sub-section 4w below).

Specific requirements in relation to temperature and humidity levels:

None

2.4j Temporary accommodation and facilities for the use of the Employer

The Contractor shall provide suitable separate sanitary convenience for the Employer's Personnel in an appropriate place on the site and to the approval of the Employer's Representative. This shall be maintained by the Contractor at all times in a clean and hygienic condition and removed on completion of the Works, the site being made good and deodorised.

The Contractor shall provide a lockable office on the site for the Employer's Personnel (Clerk of Works, Resident Engineer or Supervisory Representative) not less than 4.5 x 3.5 x 2.2m, substantially made, weatherproof, draught-proof and with adequate ventilation and heating. The office shall be furnished with a table, a drawing bench, a lockable drawer, chairs, shelves and presses. On completion, the office shall be removed and the site made good.

The Contractor shall provide heating, lighting, furniture and attendance for the temporary accommodation.

Other accommodation required:

None

2.4k Provision of connections to temporary voice and data communications systems for use of the Employer

The Contractor shall include for the cost of the installation of and connections to temporary voice and data communications for the use of the Employer.

2.4l Periodic usage and access charges on voice and data communication systems for use of the Employer

The Contractor shall include for any periodic usage and access charges on voice and data communication systems for the use of the Employer and associated running costs.

2.4m Project Supervisor Construction Stage

The Contractor is to be appointed project supervisor for the construction stage, the Contractor shall include for all costs for and in connection therewith.

2.4n Quality Assurance Procedures

The Contractor shall include for any costs for or in connection with the following, as required by the Works Requirements:

inspections

- following quality assurance procedures
- items to be inspected or tested before delivery to the site
- tests to be carried out
- supplying and erecting samples

Specific requirements in relation to samples and/or tests:

None

2.4o Security Clearance

Site staff will be required to show their Safe-pass identity cards for access to the site.

The Contractor is to include for any specific requirements concerning security clearance of work-people as detailed below.

Specific requirements in relation to security clearance:

None

2.4p Building Control Act

The Contractor shall include for all costs in connection with complying with and carrying out any requirements of the Building Control Act 1990 and any Regulations and amendments to the Regulations

2.4q Performance Bond

A Performance Bond is not required

If a performance bond is required, the Contractor shall, before the Starting Date, give the Employer a performance bond in the form provided with the Invitation to Tender or, if there is none, in a form approved by the Employer. The performance bond shall be executed by the Contractor and by a surety approved by the Employer.

The amount of the performance bond (if required) shall be% (if not stated 12.5%) of the initial Contract Sum (including VAT) up to certification of Substantial Completion of the Works, and% (if not stated 6.25%) of the initial Contract Sum (including VAT) for the subsequent period stated in the form of bond in the documents in the contract. (If not stated, 15 months after Substantial Completion).

Note: The amount for Bond (if required) is to be identified separately in the submitted tender.

2.4r Any other obligations or restrictions imposed by the Employer

3. WORK BY SPECIALIST WORKS CONTRACTORS, WORK BY UTILITY PROVIDERS AND WORK BY OTHERS ENGAGED DIRECTLY BY THE EMPLOYER

3.1 Work to be carried out by Specialist Work Contractors

(not used)

3.2 (not used)

3.3 Work by Utility Providers

3.3a Work by Statutory Authority, Public Undertaking, Local Authority or Public or Private Utility Provider

The Contractor shall include for the cost of any work to be undertaken by a Statutory Authority, Public Undertaking, Local Authority or Public or Private Utility Provider (including charges for connecting to the services) in connection with the project other than those (if any) that the Employer undertakes to pay for in the contract documents.

3.4 Work by others Engaged Directly by the Employer

3.4a Others directly engaged by the Employer

The following works shall be carried out by others directly engaged by the Employer

Supply of Flogas tank

Obligations and forbearances required of the Contractor including attendances with respect to work by others engaged directly by the Employer
 Facilitate taking delivery of and temporary storage of all the above goods and /or materials (referred to in previous item) within the confines of the site. Allow use of welfare facilities. Provide for any additional insurance premium that may be required in connection with the foregoing works by others engaged directly by the Employer.

Specific requirements in relation to obligations and forbearances required of the Contractor including attendances with respect to work by others engaged directly by the Employer:

None

4. GENERAL FACILITIES AND OBLIGATIONS

4.1 Supervision and co-ordination of the Works

The Contractor shall provide for the entire supervision and the coordination of the works in accordance with the contract.

4.2 Plant, tools and vehicles

The Contractor shall bring to site, install and remove on completion all plant, tools and vehicles required for the Works.

The Contractor shall maintain all the foregoing plant, tools and vehicles for the duration of the Works.

4.3 Scaffolding

The Contractor shall bring to site, erect and remove on completion all scaffolding required for the Works.

The Contractor shall adjust and maintain all scaffolding on site for the duration of the works.

4.4 Site administration including the provision and keeping of all statutory records

The Contractor shall be responsible for the entire administration of the site and the Works.

The Contractor shall be responsible for the provision and keeping of all statutory records pertaining to the site and the Works.

4.5 Security

The Contractor shall provide for safeguarding the Works, materials and plant against damage and theft including providing all necessary watching and lighting for the security of the Works and the protection of the public, in accordance with all statutory requirements.

Specific requirements in relation to security

None

4.6 Provision of clearly identifiable site perimeters and surroundings

The Contractor shall provide clearly identifiable site perimeters and surroundings.

4.7 Provisions for the protection of the public from site operations and arrangements for protection of third parties and visitors to the site in accordance with all statutory requirements

The Contractor shall provide for the protection of the public from site operations and shall provide arrangements for the protection of third parties and visitors to the site in accordance with all statutory requirements.

4.8 Transport for work people

The Contractor shall provide transport to and from the site and in and about the Works as necessary.

4.9 Protecting the Works from inclement weather

The Contractor shall protect the Works against damage from inclement weather.

4.10 Water for the Works

The Contractor shall provide clean fresh water for use on the Works, and pay all costs and charges in connection therewith, provide all temporary storage and plumbing services and clear away and make good on completion.

4.11 Temporary lighting and power for the Works

The Contractor shall provide electricity for use on the Works and pay all costs and charges in connection therewith. All temporary installations are to be cleared away and made good on completion.

4.12 Temporary roads, hardstandings, crossing and similar items

The Contractor shall provide all necessary temporary roads, entrances and gates, hardstandings, crossings and the like, and shall maintain them during the course of the Contract and remove them and make good on completion.

4.13 Temporary accommodation for the use of the Contractor

The Contractor shall provide and maintain all necessary temporary office accommodation for their use including an office for the Foreman or Site Agent in charge of the Works, with data and telephone, and remove and make good on completion.

The Contractor shall provide suitable accommodation for the holding of site meetings with a table for up to 15 people and 15 chairs.

The Contractor shall clear away and remove from site on completion any temporary accommodation and make good any areas disturbed.

4.14 Temporary storage areas

The Contractor shall provide watertight storage and external storage areas for materials and tools, including suitable and separate storage for dangerous materials or substances, in positions to be agreed with the Project Supervisor Construction Stage.

The Contractor shall clear away and remove from site on completion any temporary storage facilities, make good any areas disturbed and deodorise the site where necessary.

4.15 Temporary telephones and data communications for the use of the Contractor

The Contractor shall provide temporary telephones and data communication facilities for their own use and so that they may be contacted on the site and pay all costs and charges in connection therewith.

4.16 Traffic Regulations

The Contractor shall ascertain and comply with any Traffic Regulations, Local Authority and or Garda Restrictions affecting the execution of the Works including any road closure, alternative route restrictions, the provision of signs and the effects of parking restrictions.

The Contractor shall pay all costs and charges in connection therewith.

4.17 Welfare facilities for work people

Welfare facilities for work people shall be in compliance with the Safety, Health and Welfare at Work (Construction) Regulations.

Toilets for the use of the work people and welfare accommodation shall be placed in positions approved by the Employer's Representative and the Contractor shall so manage them that they shall cause no nuisance. The Contractor shall remove on completion and deodorise and disinfect to the Employer's Representative's satisfaction.

4.18 Safety, Health and Welfare at Work provisions

The Contractor shall comply with all Health and Safety at Work provisions as required under the contract.

The Contractor shall provide for the following

- The operation of the requirements of the 'Safe Pass' and 'Construction Skills Certificates' schemes
- Safety officers and all safety supervisors, first-aiders, inspectors and certifiers required
- Tests and certificates on plant and equipment
- Safety signs and signals
- Provision of personal protective clothing and personal protective equipment
- Provision and maintenance of emergency routes and exits and designated personnel responsible for emergency procedures
- Energy distribution installations
- Temporary fire detection and fire fighting systems
- Maintenance of appropriate working conditions and work-stations

- Provision and maintenance of on-site traffic routes
- Provision of first aid equipment and first aid room as appropriate

The Contractor shall be responsible for the design of Temporary Works and for all costs in connection therewith.

The Contractor shall include for all costs associated with the provision of a final draft Safety File in Hardcopy and Soft Copy formats. The final draft Safety File shall be submitted complete one month in advance of substantial completion/handover. The final draft Safety File shall be fully indexed and set out strictly as per the format specified in the appendix to the preliminary Safety & Health Plan, issued at tender.

4.19 Disbursements arising from the employment of workpeople

The Contractor shall comply with all the 'Pay and Conditions of Employment' clauses in the Form of Contract.

4.20 Maintenance of public and private roads

The Contractor shall record the condition of any public or private roads and footpaths adjacent to the site insofar as affected by the Works.

The Contractor shall repair and make good any of these roads and footpaths damaged as a result of the works.

4.21 Removing rubbish, protective casings and coverings and cleaning the Works on completion

The Contractor shall from time to time as it accumulates remove any rubbish, protective casings and coverings and the like, and on completion of the works remove all plant, surplus materials and rubbish from the premises and shall leave the premises in a clean and proper state throughout with floors and windows clean and with eaves, gutters and downpipes clear.

Skips shall be properly protected against wind dispersal of materials and be clearly marked to avoid creation of a hazard either by day or night. They shall be removed and replaced whenever filled.

4.22 Compliance with waste management statutory requirements

The Contractor shall include for complying with all waste management statutory requirements and shall include for all levies and charges in connection therewith.

Prior to commencement on site, the Contractor shall submit a Waste Management Plan for removal, disposal and management of all waste arising from demolitions (if any), for the written approval of the Employer's Representative.

Such plan shall include, inter alia: list of wastes and quantities likely to arise as a result of the demolition works, into the following categories: (1) Non-hazardous, non re-usable wastes, (2) Hazardous wastes, including asbestos, (3) Non-hazardous, recyclable / re-usable waste.

The Contractor shall supply the following

- (a) Details, including name and address of all proposed waste removal contractors, including a copy of each contractor's waste collection permit

- (b) Details (address) of disposal / recovery locations, authorised in accordance with the Waste Management Acts
- (c) A method statement for the removal and disposal of asbestos-containing materials, if any.

Producers and suppliers of all electrical equipment, fittings and accessories must be WEEE registered for handling and disposal of waste electrical materials. An up-to-date list of all such producers and suppliers may be found on the website www.weeeregister.ie/

4.23 Drying the Works

The Contractor shall provide for all equipment and fuel for drying and controlling the humidity of the building. The heating plant may be used for this purpose but if so used the Contractor shall pay for all fuel used and have the installation tested and recommissioned and shall hand it over in perfect condition on Substantial Completion of the work.

4.24 Temporary fencing, hoardings, gates, doors, screens, fans, planked footways, guardrails, gantries, floor, stair, roof edge protection, and protection of openings, safety nets and similar items

The Contractor shall provide all necessary items and remove on completion.

4.25 Control of noise, pollution and compliance with statutory obligations

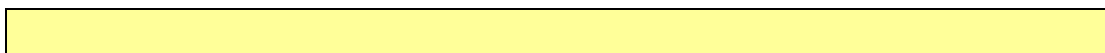
The Contractor shall comply with all statutory obligations in relation to the control of noise and pollution.

The Contractor shall take all necessary precautions to avoid the dispersal of dust and pollution to other areas within the property not directly involved with construction works. The Contractor is to install, maintain for the duration of the Works and remove on completion, all dust proof screens necessary or as required for the Works. The Contractor shall be deemed to have ascertained all local conditions and restrictions likely to affect the execution of the Works in this regard.

4.26 Protection of the Works

The Contractor shall provide for protecting the completed Works from any damage whatsoever including providing, maintaining and subsequently removing any necessary protective casings or the like and shall leave the Works clean, undamaged and fit for immediate occupation to the satisfaction of the Employer's Representative.

4.27 Any other general facilities and obligations



4.28 COVID-19

The tenderers shall allow in their tender for working on site in line with the CIF's Standard Operating Procedure (SOP) and allow in the tender, where indicated, for any additional time and cost incurred to accommodate the imposition of COVID-19 restrictions.

Ensure all directly and indirectly employed staff have undergone the CIF's COVID-19 Safety Induction Programme and have a digital card.

It should also be ensured that all staff follow the instructions of the main contractor's COVID-19 compliance officer at all times.

5. SCOPE OF WORKS

5.1 General

This works also includes the replacement of existing boiler, flue, oil tank, controls and associated pipe work.

This Specification, Documents and drawings detail the work to be carried out by the appointed Mechanical Contractor for this project.

- Pressure testing of existing heating pipework and provide a 24hr test report before any works commence.
- The draining down of the existing boiler plant and equipment.
- The strip out of the existing heating generation plant and equipment.
- The strip out of the existing obsolete pipework and controls installation
- The strip out and safe disposal of the existing electrical services control panel and controls and redundant cabling installation.
- The safe disposal of all redundant material off site
- The strip out of the existing concrete plinths (approx. 3m x 1m x 100mmx2)
- Make good existing floor subsequent to the plinth removal.
- Installation of new gas pipework Mild Steel to the new gas boilers.
- The installation of a new LPG Gas Fired wall mounted boilers and burners c/w Stainless Steel Heat Exchanger, air separator, dirt separator and dosing pots.
- Removal of existing oil tank, bund walls and oil pipework
- The installation of new LPHW Mild Steel Pipework, Pumps, Valves, fittings and controls and supports to existing structure.
- The installation of a new gas meter interfaced to the BMS.
- New gas detection and solenoid isolation valve, sensors and lockstop.
- The installation of a new Mechanical Services Controls installation.
- The installation of a new BMS Control system c/w remote boost and remote control panel in the main ground floor office
- Complete testing and commissioning
- Complete water inhibitor installation and complete two water laboratory tests.
- The completion of all builder's work , completing opes for gas and heating pipework, the provision of working at height equipment , making good the existing concrete plinth ,opening up the external wall for the purposes of installing a new flues, making good builder' s work OPES and painting plantroom floors and ceilings
- Creating level ground for installation of gas compound base for new LPG tank.
- Installation of new concrete base
- Installation of secure fencing and gates.
- The completion of all electrical installation work.
- Testing and Commissioning
- The completion of PSCS duties and responsibilities
- The provision of the operating and maintenance manuals, and record drawings shall also be included.

The Mechanical Contractor shall for the duration of the contract be the main contractor.

The appointed Mechanical Contractor shall be responsible for the supply and installation of all mechanical, electrical and builders work and equipment shown and / or described in this document, on the data sheets or on the drawings. The installation shall be in accordance with the general specification.

The Mechanical Contractor shall include for all supports, brackets, hangers, etc necessary for the above installation.

All mechanical motors and valves associated with the Mechanical Package shall be supplied and installed by the Mechanical Contractor.

The Mechanical Contractor shall supply the Electrical Sub-Contractor with all the necessary information as required to enable the Electrical Sub-Contractor to obtain suitable equipment and adequately cable the installation.

The Mechanical Contractor shall supply all necessary wiring diagrams of control equipment and all other plant supplied by him.

All works shall be carried out in accordance with This Document, the General Specification, Drawings and data sheets

Any discrepancies between the Specification and Drawings must be brought to the attention of the Engineer.

The Mechanical Contractor shall make no assumptions. Variations as a result of assumptions will not be paid. Requests for Information (RFI's) must be issued to the engineer.

The Mechanical Contractor shall be responsible for the complete controls installation associated with the Mechanical Package. The electrical work and cabling to equipment, plant, motors, etc. including local isolators to all relevant mechanical equipment shall be carried out by the Electrical Contractor.

The Mechanical Control Panel(s) shall be supplied and installed by the Mechanical Sub-Contractor.

The Mechanical Contractor shall supply and install valves etc. required to enable the Electrical Sub-Contractor to complete the electrical installation. The Mechanical Contractor shall install all mechanical controls equipment issued to him by the Controls Specialist.

The Controls Specialist shall supply all control related devices required to complete the controls installation. The Controls Specialist shall be a Sub-Contractor to the Mechanical Contractor.

The Electrical Sub-Contractor shall be responsible for making all final electrical wiring and control wiring terminations.

5.2 Mechanical Contractors Responsibilities

The tenderer must at the time of tender, state the manufacturers names and catalogue numbers of the equipment on which his tender is based.

It is not sufficient for the tenderer to state "materials as specified ", the information given must be adequate to identify the actual unit concerned without ambiguity.

The Mechanical Contractor shall study carefully the furniture layouts before commencing the marking out of installations in any room.

Any obstructions to the proper positioning of the outlets shall be brought to the notice of the Engineer.

The Mechanical Contractor shall keep a competent supervisor constantly on the works at all times when the Contract Works are been carried out. The supervisor must be authorised to receive instructions on behalf of the Mechanical Contractor.

The Mechanical Contractor shall be entirely responsible for the Contract works, whether under construction or during testing and commissioning, until the Works have been accepted as been completed by the Engineer. The Engineer reserves the right to reject any workmanship and materials not conforming to the specification and instruct the Mechanical Contractor to carry out such alterations or replacements of materials at the Mechanical Contractor's expense.

When the installation has been completed in accordance with the Contract, a Completion Certificate will be issued certifying the date on which the installation was taken over and the commencement of the maintenance/ defects liability period.

5.3 Heating Installation

The mechanical contractor shall supply, install, test, chemically flush, certify and commission the complete LPHW distribution system as detailed on the drawings and in the specification.

All heating pipe-work shall be insulated using mineral fibre thermal insulation.

The mechanical sub-contractor shall make allowance for automatic air vents at all high points in the heating system.

Quarter turn isolating valves must be installed by the mechanical sub-contractor to allow all items of plant and equipment to be isolated for easy removal.

5.3.1 Pipework Pressure Testing

Prior to undertaking any works the contractor shall arrange a pressure test of existing pipework at a pressure of 1bar for 24hours and report back with the findings to the engineer.

5.3.2 Boiler

Two high efficiency gas condensing boilers and burners shall be provided as a primary heat source.

Only the following shall be considered.

- Hamworthy
- Stebel
- Ideal
- Rendamax
- Viessmann

The boiler shall be installed with all necessary safety/regulation valves and pipeline equipment.

The boiler flow temperature shall be 80°C and return temperature shall be 70°C. The boiler shall be controlled by a cascade kit and the new mechanical control panel.

Each boiler shall be fitted with condensate drains, safety valves, valves flow and return and valves gas connections.

The boilers shall be fitted with LPG kits.

Boiler shall have the following details:

- The boiler shall be a stainless steel, compact, modular boiler
- Heat Exchanger To be Stainless Steel
- 10-year warranty on heat exchanger
- Rated to 6 bar water pressure
Modulation range, down to a minimum of 20% capacity per module

- Integral master/slave cascade control
- Low NOx performance <39 mg / kWh
- Flue connection
- BMS compatible
- Full modulation control
- Boiler Annual Gross Efficiency of up to 98%
- Boiler to Be Fitted and tested in factory
- Boilers to be Manufactured in the European Union.
- Boilers must be certified to meet the requirements of the Erp directive (A rating) EC GasAppliance Directive, Boiler Efficiency Directive, EMC and Low Voltage Directive.
- Isolating butterfly valves for water flow and return connections on each boiler with locking plates to prevent accidental isolation
- Flow and Return Flexible connectors and tees
- Blanking flanges, gaskets and bolts for header ends.
- Adjustable levelling feet.
- Individual factory installed shunt pump per boiler.
 - Boiler(s) shall be suitable for use when firing on Natural Gas with automatic burner.
- Boilers shall be supplied with the following equipment:
 - Two safety valves as required.
 - Pressure gauge
 - Thermometer
 - Emptying drain cock or valve operated by removal key.
- Manufacturers name plate located on the side or top external casing, stating boiler series and type, serial number, rated output, design pressure, and date of manufacture.

5.3.3 Heat Exchanger

1No. 850kW Factory Insulated Heat Exchanger Unit Shall be installed. The plate heat exchanger shall comprise an assembly of stainless steel 316 plates. The profile of the EPDM seals between the plates ensures perfect sealing to allow an operating pressure of 10 bar. Removable insulation in 65 mm high-density glass wool covered with aluminium sheeting (1.0 mm on the outer surface and 0.5 mm on the inner surface) shall be installed.

The Heat Exchanger Unit shall be included with a dedicated Maintenance bypass Circuit with adequate isolation valves for ease of maintenance.

5.3.4 Flues

Existing flue connections off the existing boilers, connecting into the chimney is to be removed.

Replace this existing flue pipe arrangement with a new twin wall flue suitable for LPG Firing, twin wall stainless steel with 25 mm of insulation, connecting up the new flue connection to the main stack.

The main connection pieces off the boilers are connect into the common flue.

Existing Chimney shall be lined. Allow for the flue to rise externally 1 metre above the finished roof level

Install a new safety valves-one on each boiler –32 mm valve piped to 50 mm above FFL in GB

A new twin walled insulated flue shall be extended from each boiler to connect to a larger header flue which will connect back into the existing vertical flue rising from the plantroom.

These existing flue shall be lined.

The flue system shall be supply by the boiler manufacturer and installed with supports and locking bands in strict accordance with the manufacturers instructions.

A flue gas sampling point shall be provided at each boiler exit and in any common flue header arrangement. All joints shall be moisture and gas tight.

5.3.5 Flue Liner

The Contractor shall employ a specialist to supply and install a Glass - Fibre Reinforced Thermosetting Resin chimney lining to the existing chimney stack rising from the boiler house to the chimney termination point.

Approx. 20 metres.

The mechanical contractor shall supply all working at height equipment including scaffolding/MEWP to ensure that the work is completed as per Health and Safety Guidelines for working at height

The lining shall be compliant with the following designation and approvals: CE certification, EN 1443:2003, T200 P1 W 04 O (BSRIA UK), T200 P1 W 2 O (BSRIA UK), EN 1443:2003 T400 N1 D 2 G

The chimney lining tube shall consist of three different layers:

- Internal layer: 120-micron thick polyethylene hose (only necessary for installation)
- Middle layer: 2-4 layers of resin matrix impregnated fibre glass textile
- External layer: thin polyester textile cover

The labels on the lining product must contain the information that is most important for users: besides the information about the producer and the customer there should also be the production No.

There should be no hazard from chemical materials during the installation.

The Liner must have a 25 Year Guarantee and an optional Insurance Backed 25 Year Guarantee.

The liner must be installed by a qualified technician and approved agent of the manufacturer who has the latest refresher training certificates.

Site engineered flues shall comply with BS EN 1993 -2 & 3:2006 and / or BS 5854:1980 as applicable. Jointing materials shall be heat resisting. Stainless steel drain sockets shall be fitted as required. The flue system shall be provided with a sufficient number of suitably sized cleaning doors. Cleaning doors shall be mounted clear of the flue installation on purpose made flanged spigots and shall be bolted to the flanges with an insulating gasket to seal the joint

A flue gas sampling point shall be provided at each boiler exit and in any common flue header arrangement. All joints shall be moisture and gas-tight. Chimneys shall be provided complete with manufacturer's support system components necessary for the particular form of construction. Earth bonding terminals and lightning protection devices shall be provided where applicable. All chimneys shall have a drainage outlet connection. Flue duct branch entries into chimneys (stacks) shall be slip-jointed through chimney walls and at building walls penetrations in 5mm thickness mild steel sleeves. The annular space shall be made gas-tight with aluminosilicate rope or equivalent caulking and prevent heat and vibration transmission. All penetrations of external surfaces shall be made good and finished watertight.

Chimneys shall be tested to BS EN 1859: 2009. Horizontal flues shall be supported in cradle type pedestal supports of standard tube and plate, with welded floor plates bolted down. The design of supports shall accommodate the expansion forces.

Option to include a price of use of a flexible composite flue that inflates to fit flush in existing chimney

5.3.6 Draught Diverter

A Draught Diverter shall be installed as per the manufacturer’s recommendations.

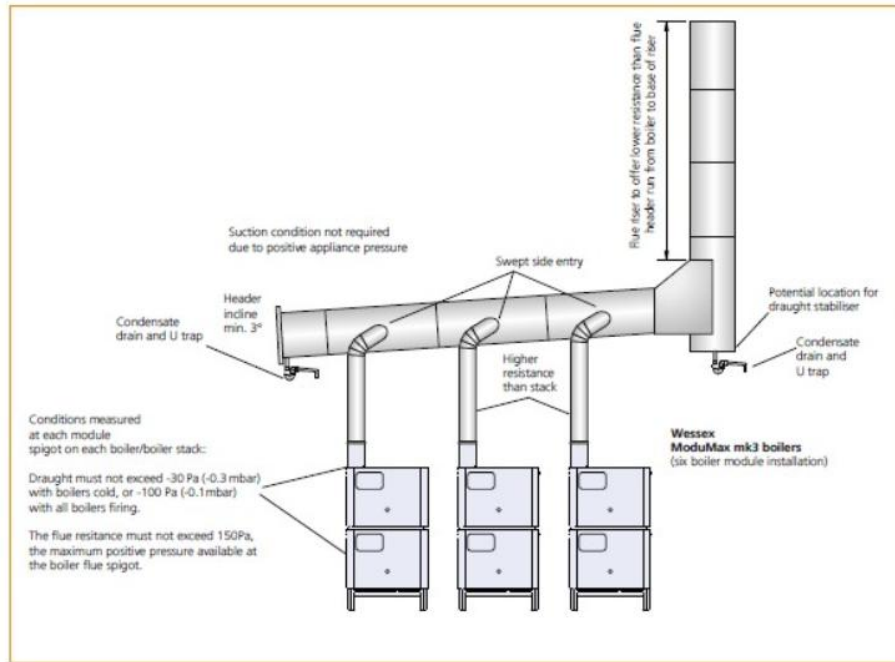


Figure16: Typical flue layout example – Not for construction

A draught diverter shall be fitted on the main horizontal (c/w 3degree inclination) as per the Manufacturer’s recommendations.



Figure17: Plant Room Flue example

5.3.7 Condensate Drain

A condensate drain installation shall be installed at each boiler flue connection to the main header as per the manufacturer's instructions and at the terminal locations of the vertical and horizontal flue connection.

The condensate drain shall be a minimum of 40 mm (Corrosion Resistant) and shall be routed to the foul drain location.



Figure18: Plant room Condensate Example

5.3.8 Gauges

The mechanical contractor shall fit two 50 mm temperature gauges in each boiler house on each of the flow and return pipes on the section of pipe between the pump and the low loss header. He shall fit a 100 mm pressure gauge on the flow pipe.

5.3.9 Pipe-work

Heating pipe-work shall be manufactured from **medium grade black mild steel tube to BS 1387 un-galvanised**. All pipe-work supports, guides and anchors to support and control the movement of the pipe-work, including expansion bellows, shall be supplied and installed by the mechanical contractor.

Generally for clarity, all isolating valves to plant, fixtures and equipment are not shown on the drawings, refer to general specification.

However, isolating valves and drain cocks shall be supplied and installed by the mechanical contractor in accordance with the specification and drawings.

The Mechanical Contractor shall include for the flushing and chemical cleaning of the complete LPHW Heating System. All chemical cleaning and heating system dosing to be witnessed by the Engineer.

A **DN 100 Spiro vent unit** shall be installed on the flow from the secondary side of the heat exchanger and fitted with an insulation jacket.

A **DN 100 Spiro Trap with magnet** shall be installed on the return to the secondary side of the heat exchanger. This shall be fitted with an insulation jacket.

A Boss dosing pot shall be supplied and installed on both the primary and secondary heating circuits as indicated on the drawings.

5.3.10 Pressurisation unit and Expansion.

The contractor shall supply and install a new Grundfos PHT A T225 pressurisation unit. This shall be installed as indicated on the drawings.

The heating system shall be a closed system with expansion of heating water accommodated by expansion vessels indicated on the drawings. Expansion vessels shall be installed in accordance with the manufacturer's instructions.

The following items must be supplied by the manufacturers of the fill/pressurisation unit.

- A non-return valve shall be installed in the discharge pipe-work from the pressurisation unit.
- Full bore air purger installed on the flow from the boiler and fitted with an automatic air vent.
- High and low pressure cut-out switches shall be fitted on the boiler flow

5.3.11 Pumps

The contractor shall supply and install pumps where indicated on the drawing and in accordance with the datasheets.

All pumps shall be manufactured by either Grundfos or Wilo.

All pumps shall be fitted with insulation covers.

5.3.12 Gas

A new gas supply shall be installed to the plantroom by the contractor.

The new gas pipework shall be routed as outlined on the drawing.

This new connection shall service the new gas boilers and to existing pipework serving technical rooms.

A gas slam shut valve and detection system shall be fitted in the plantroom.

The gas services installation shall comply in full with IS 820 2019 Non Domestic Gas Installations or current edition.

The gas distribution pipe work shall be arranged, so that there is one single entry point for the building. First stage regulator to be fitted at the tank and second stage regulator at the packaged plantroom.

The gas pipes shall be finished in two coats of yellow paint and marked in each room and at 3 m intervals as gas distribution pipe.

Note that the gas pipe enters the boiler room above ground and the transition from PE to mild steel should be protected by covering with a protective cover.

All gas pipework shall be installed in Mild Steel above ground and shall be painted yellow throughout.

Gas isolating valves shall be installed adjacent to each gas appliance. A flexible pipe shall be used for final connection to each appliance.

A gas pressure regulating valve shall be installed on the branch to each gas service outlined above to allow gas pressures to be regulated to suit the appliance.

The contractor shall supply and install a BACnet compatible gas meter which shall be interfaced and monitored by the BMS.

5.3.13 Gas Detection

A gas detection system incorporating a gas slam shut off valve and lock stop button shall be installed on the gas main entering the boiler location. A gas detector shall also be installed by the mechanical sub-contractor in the vicinity of the gas boiler noted above.

An emergency lock stops shall also be provided in the boiler room to allow isolation of all power in the event of an emergency.

The gas detection system shall be interfaced with the fire alarm panel. The gas slam shut valve located as the gas enters the boiler area and as the gas enters the building.

The gas detection system shall include control panel, lock stop with manual reset, gas sensors and CO2 sensors.

5.4 Teaching Rooms LPG Works

5.4.1 External Gas Pipework

The contractor shall label all external LPG isolation valves. Locations are shown on drawing M-101.

5.4.2 Internal Gas Pipework

All for replacing gas valves where shown on the drawings. Joints shall be threaded where exposed and visible and welded where concealed.

Threaded joints using PTFE tape, Red Staf, Slicite or Red Foliac. Do not use adjustable die stocks for threading pipe but only block dies, to avoid having inconsistent thread sizes and pipes "bottoming" into fittings with the high risk of a later leak.

Hemp, Boss White and red lead are not allowed.

Access should be provided to joints where concealed.

All pipework to be painted in Yellow Ochre paint (BS colour ref 08 C 35). If non galvanised pipework is used it should be wire brushed before painting.

Galvanised brackets must be used with all pipework.

All pipework passing through load-bearing wall or cavity walls, foundations or solid floors or ceiling must be sleeved in rigid plastic or galvanised steel pipework.

The pipe should be sealed to the sleeve with mastic at each end, and the sleeve sealed to the wall with grout or mortar.

For floors/ceiling the sleeve must project at least 25mm above the floors.

There must be no joint located in or between the mastic at each end of the sleeve.

All pipework must be securely bracketed at 2m horizontally and 1.2m vertically.

Allow for replacement of 10No. flexible gas hoses. Location to be agreed on site.

5.4.3 Pressure testing

The contractor shall make provision for subsequent testing by fitting a tee after the first stage regulator (ie close to the outlet of the first stage regulator) and after each second stage regulator (in a similar position). The spare leg of the tee must be plugged. Note that from a general point of view, a pipework must never be left open-

ended (not even temporarily) it must always be plugged. (A valve turned off and on open pipe end will not suffice. The valve must be plugged.

5.4.4 Valves and fittings

All valves and fittings must be suitable for use with L.P.G. (from a reputable supplier). All valves must be mark on then how to turn them on and off.

Nearly all requirement commonly used for plumbing water is definitely unsuitable and usually breaks down or will not seal after a relatively short period of use with LPG. Gate valves in particular will not shut off LPG.

All outlets shall be provided with ¼ turn lockable line ball valves.

The existing gas slam shut valve shall be retained but a new interface to the fire detection and alarm system shall be installed.

Each space using gases shall be provided with multi gas detection shall be supplied and fitted with a gas pressure proving system which shall also incorporate gas and carbon monoxide detection. This will require the installation gas slam shut valves on all pipework feeding into each teaching space and wired to its corresponding panel.

The Medem SEC-elite programmable proving and detection system shall be installed to monitor gas with separate detectors from a single panel in each teaching space. An additional CO and CO2 sensor shall be fitted in each space using gas which shall be connected to the SEC-elite panel.

The gas services installation shall comply in full with IS 820 Non Domestic Gas Installations current edition.

The gas distribution pipe work shall be arranged, so that there is one single entry point for the new building

The gas pipes shall be finished in two coats of yellow paint and marked in each room and at 3 m intervals as natural gas distribution pipe.

5.5 Pressure Testing:

Following the completion of the works, the pipelines will be pressure tested and a Test Certificate shall be issued.

The new pipelines will be protected by Gas Safety Relief Valve assemblies. The pipework will be identified with gas specific identification tapes. A wall plate with the Test Data and maximum working pressure and suggested re-testing date to be erected at the manifolds.

All of the above installation and components to be installed, tested and commissioned in accordance with BCGA Guidelines and MIPS ISO 9001 procedures.

5.5.1 Thermal Insulation

After all hydraulic tests have been carried out on the services installations the system shall be fully insulated.

As a minimum all pipe-work will be insulated using mineral fibre wool and shall be finished in foil.

The thickness of insulation shall be in accordance with BS 5422; declared thermal conductivity of insulation material shall not be less than 0.045 W/mK at 100°C.

Where heating pipe work is not being used as a useful heating surface, insulation of appropriate thickness and quality shall be applied. The insulation shall be of preformed sections of rigid mineral wool incorporating an aluminium foil laminate cover and fitted in accordance with the manufacturer's instructions. The insulation shall also be applied to all connections, bends, tees and valves.

Proprietary jackets with Velcro fixings shall be used on all valves.

Additional taping every 2 m shall be provided on the insulation within the heating centre plant room.

5.5.2 Pipe-work Identification

All isolating and control valves shall be fitted with a propriety made identification label. A Schematic drawing of A3 size shall be erected within the boiler room detailing corresponding valve numbers. Drawing to be protected by frame with transparent Perspex glass.

After the pipe-work insulation is complete, appropriate colour and direction identification labels shall be fitted at every change of direction etc to comply with BS 1710.

5.5.3 Fire Systems

The mechanical contractor shall design, supply, install, test, certify, commission and set to work the complete fire services installation which will include all fire extinguishers, blankets, etc.

Allow for a 01 no. 9KG Co2 fire extinguisher c/w wall bracket and signage

Allow for a 01 no. 9KG Water extinguisher c/w wall bracket and signage

One dry power extinguisher shall be installed above each boiler. These shall be fixed to a bracket mounted from the ceiling.

Manual fire fighting equipment shall comply with IS:290 & IS:291 for the siting, inspection and maintenance of extinguishers and all portable extinguishers Electrical works

5.5.4 Controls

The contractor shall allow for installing a new BMS plantroom. The system shall include Tridium controls. The BMS shall be supplied and installed by a Control Specialist, Sygma.

The controls system shall comprise self learning optimum start/ stop control, flow temperature compensation based on internal, external temperatures, motorised valved zone control, maximum internal and external temperature automatic cut out and automatic frost protection.

The panel shall be fitted with an iTouch screen controller. A remote touchscreen controller shall also be installed. Refer to the drawings for location and details.



All wording on the control panels shall be agreed with the Client beforehand. Use of terminology such as zone 1, zone 2 on its own shall not be acceptable. The actual zone shall be defined on a colour coded A3 drawing, which shall be laminated, framed and fixed on, or immediately adjacent to the panel on a timber backing screwed to the wall. No abbreviations are to be used on the panel without an explanation in full provided on the drawing.

The remote control panel shall include a manual override with a selective switch of up to 3 hour run on timer so that heating zones are available for occasional out of hours use.

The controls system shall comprise of optimum start / stop control and automatic two-stage frost protection and so arranged as to activate the circulation pump at internal temperatures below 5 degrees Celsius and fire the boiler burner when the system return temperature drops to 2 degrees Celsius. The frost protection system shall be independent of the optimum start controllers. All motorised valves shall be controlled to open for frost protection.

The **Complete control system** including sensors, panels and cabling etc. shall be supplied and installed by the **Mechanical Sub-Contractor/Controls Specialist**.

The **Controls Specialist** shall be **Sub-Contracted** to the **Mechanical Sub-Contractor**.

The control panel will house all time scheduling clocks, starters and protective gear. All sensing and monitoring devices shall be installed by the controls specialist and shall be wired by the electrical sub-contractor.

Full training shall be given to an appointed member(s) of staff, by the controls specialist. Please allow two separate training sessions.

5.5.5 Low Temperature Hot Water

The control system shall allow full time scheduling for the new mixing controlled heating circuit:

The heating circuit shall be controlled by a Multi Zone 7-day 24-hour time clock. The time scheduling shall allow the user to input various daily on and off times on an annual calendar. Three two port valves for each circuit shall be supplied and installed by the mechanical contractor. The actuator(s) shall be supplied and installed by the controls specialist. Three and two port valves to have manual control handles.

The BMS shall control the following heating zones and circuits.

- Circuit 1
- Circuit 2
- Circuit 3
- Circuit 4

Zones shall be independently time and temperature controlled.

5.5.6 Indication on the Panel

The following shall be indicated on the front of the control panel:

The following is to be read in conjunction with the drawings, specifications and points lists.

Boiler 1	-	Run/Trip	Hand/Off/Auto Switch
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Boiler 2	-	Run/Trip	Hand/Off/Auto Switch
Boiler 3	-	Run/Trip	Hand/Off/Auto Switch
Secondary pump			
Pump A	-	Run/Trip	Hand/Off/Auto Switch
Pump B	-	Run/Trip	Hand/Off/Auto Switch
Circuit 1			
Pump A	-	Run/Trip	Hand/Off/Auto Switch
Pump B	-	Run/Trip	Hand/Off/Auto Switch
Circuit 2			
Pump A	-	Run/Trip	Hand/Off/Auto Switch
Pump B	-	Run/Trip	Hand/Off/Auto Switch
Circuit 3			
Pump A	-	Run/Trip	Hand/Off/Auto Switch
Pump B	-	Run/Trip	Hand/Off/Auto Switch
Circuit 4			
Pump A	-	Run/Trip	Hand/Off/Auto Switch
Pump B	-	Run/Trip	Hand/Off/Auto Switch

The BMS shall be interfaced with the fire detection and alarm system.

The new gas meter shall be monitored by the BMS. The gas meter is BACnet compatible.

5.5.7 Electrical Works

All electrical works shall be completed in accordance with IS 10101: 2020 and amendments.

Work on live electrical equipment is strictly prohibited.

The work at the main electrical switchboard must be planned in advance with a two-week lead time given to the local Sergeant to advise of any power outage.

The existing fire detection and alarm system shall be re commissioned by the incumbent fire specialist upon completion of the fire alarm i/o and fire alarm devices.

All cabling shall be installed in galvanised trunking and conduit.

Power Cabling shall be in PVC copper singles installed in surface mounted galvanised conduit and trunking. Controls cabling shall be complete with a dedicated galvanised containment installation.

Final Connections to all mechanical equipment shall be by means of 20 Amp 230Volt IP54 **Katco** Isolation Units. Isolators shall be surface mounted on a Unistrut fabrication.

Final Connections to motive equipment shall be installed in flexible conduit and heat resistant cabling.

Controls cabling shall be Beldon Screened 9402.

Note all Controls cabling shall be approved by the control's specialist prior to ordering.

The electrical installation shall include the following

- Re-use the existing sub-mains feeding the current MCC panel and extend the to new BMS panel to include a BS88 63 Amp ,400Volt Switch Fuse. This work shall be completed out of normal working hours.
- Gas Detection Installation
- One gas detection control panel 20 Amp 230Volt
- Two No of gas detection units (LPG and CO2)
- The gas detection panel shall be complete with Fire Alarm Interface
- One gas solenoid automatic slam shut valve. ((230Volt) 65 mm integrated to gas detection Panel and the emergency Manual Gas Off Button
- One no of 50mm LPG gas metre interfaced to BMS.
- One Mechanical Services Control Panel 400 Volt
- One No remote-control panel in the main building
- One Pressurisation Unit 230 Volt 20 Amp c/w IP54 Isolation Unitsx2
- 2no of 230-volt burners 230 Volt 20 Amp c/w IP54 Isolation Unitsx2
- 2 no Shunt Pumps 230 Volt 20 Amp c/w IP54 Isolation Unitsx2
- 4 duty/standby secondary circulation pumps
- All circulation pumps shall be complete with contactor control

Controls Cabling Schedule

- 3 Boiler Thermostat, 3 No of Beldon Screened 9402
- 2 external frost stat, Beldon Screened 9402
- 1 external control thermostat Beldon Screened 9402
- 8 no of flow thermostats 3 No of Beldon Screened 9402
- 8 no of return thermostats 3 No of Beldon Screened 9402
- 1 No of Pressurisation Unit Control Beldon Screened 9402
- 1 No off of Beldon Screened 9402 to heat dissipation thermostat
- 1 No off of Beldon Screened 9402 to gas valve to monitor gas consumption
- 4 No no of motorised valves Weather Compensation Beldon Screened 9402
- 3 No of Cascade Control cables Beldon Screened 9402
- 1 No of Beldo Screened to Gas Meter
- Install fire alarm interface to the gas detection installation

Data Cabling

- New CAT6a cable between plantroom and main building for remote control panel in main building

• BUILDERS WORK AND PROTECTION

The Mechanical Contractor shall be responsible for the protection of all equipment specified in this specification and on the drawings and data sheets, from adverse weather conditions or any other damages that may occur during the construction period.

In the event of such damage occurring to such equipment, then the Mechanical Subcontractor shall be responsible for making good the repairs to it.

The Mechanical Contractor shall allow for co-ordination with all existing site services and all other trades on site during the works. This shall include provision of "Builders Works" details/schedules and supervision of all said works.

Additional to builders works required for the completion of the works the contractor shall also allow for undertaking the following works.

- Painting of white emulsion paint to walls and ceiling (three coats)
- Painting of the floor using anthracite grey floor paint

Builders works shall be undertaken by building contractors included on the list of approved builders. This list has been included with the tender documents.

6. HANDOVER/ OPERATION AND MAINTENANCE DOCUMENTATION

The Mechanical Contractor shall handover all other vendor supplied documentation relating to the mechanical installation of this project.

This shall include, but not limited to the following: -

- A full set of "as built" mechanical services drawings.
- Operating and Maintenance manuals.
- Installation Manuals.
- Spare Parts List.
- Calibration/Test Sheets.
- Calculations.
- Commissioning Certificates.
- Completion Certificates.

The Mechanical Sub-Contractor shall include in the contract sum for the issue of three number copies of all the above drawings/documentation.

For details on the preparation of this documentation please refer to the General Specification

7. 1 YEAR MAINTENANCE AND SERVICING

The Tenderer shall include in the tender a cost to provide 12 months of maintenance and servicing of the completed installation to include all plant and equipment.

DATA SHEETS

The contractor shall submit full details of all proposed equipment prior to placing an order.

Data Sheets have been provided to control the quality of the installation.

The Mechanical Sub-Contractor must price the equipment listed in the Datasheets and identify in the Tender Return.

For Alternatives refer to the section on Alternatives.

TECHNICAL DATASHEET NO: 1 PIPING AND INSULATION

Service	Nominal Pipe Size	Location	Material	Material Standard	Paint Finish	Insulation Type	Insulation Thickness
Heating System	15-35mm	Internal	Mild Steel	BS1387 Medium	Primed and Painted RAL9101	Foil Backed Fibreglass	25
Heating System	42mm +	Internal	Mild Steel	BS1387 Medium	Primed and Painted RAL9101	Foil Backed Fibreglass	25
Cold Water	15-35mm	Internal	Copper	IS 238	N/A	Foil Backed Fibreglass	25
Cold Water	42mm +	Internal	Copper	IS 238	N/A	Foil Backed Fibreglass	25
Hot Water	15-35mm	Internal	Copper	IS 238	N/A	Foil Backed Fibreglass	25
Hot Water	42mm +	Internal	Copper	IS 238	N/A	Foil Backed Fibreglass	25
Gas	15-50mm	Internal	Mild Steel	BS1387 Heavy	Yellow		
Gas	50mm	External	Polyethylene		Yellow		
Cold Water	65mm	External	Polyethylene		N/A		
Chilled Water	15-35mm	Internal	Mild Steel	BS1387 Medium	Primed and Painted RAL9101	Foil Backed Fibreglass, Vapour Sealed	25
Chilled Water	42mm +	Internal	Mild Steel	BS1387 Medium	Primed and Painted RAL9101	Foil Backed Fibreglass, Vapour Sealed	25

Notes:

1. All external exposed pipe-work and internal plant room pipe-work to be insulated in with foil backed fibreglass and shall be aluminium hammer clad

TECHNICAL DATASHEET NO: 2 VALVES

PRODUCT / APPLICATION	SIZE		WATER CHILLED WATER	L.P.H.W.	M.T.H.W.	COOLING WATER	GAS
ISOLATING VALVE	1/2" - 2" 2 1/2" +	B'FLY GATE	Ball Valves INTERAPP D3 M.P. F105	Ball Valves INTERAPP D3 M.P. F105	Ball Valves INTERAPP D3	Ball Valves INTERAPP D3 M.P. F105	RIV 7163 INTERAPP D3N
NON-RETURN VALVE	1/2" - 2" 2 1/2" +		WATTS 1461 M.P. F170	WATTS 1461 M.P. F170	HOLMES 1461 M.P. F170 HT	WATTS 1461 M.P. F170	
STRAINER	1/2" - 2" 2 1/2" +		WATTS 1471 M.P. F185	WATTS 1471 M.P. F185	HOLMES 1471 M.P. F185	WATTS 1471 M.P. F185	
DOUBLE REGULATING VALVE (DRV)	1/2" - 2" 2 1/2" +		HOLMES BV301 HOLMES BV203	HOLMES BV301 HOLMES BV203	HOLMES BV301 HOLMES BV203	HOLMES BV301 HOLMES BV203	
VARIABLE ORIFICE DRV	1/2" - 2" 2 1/2" +		HOLMES BV321 HOLMES BV223	HOLMES BV321 HOLMES BV223	HOLMES BV321 HOLMES BV223	HOLMES BV321 HOLMES BV223	
COMMISSIONING SET	1/2" - 2" 2 1/2" +		HOLMES BV611 HOLMES BV614	HOLMES BV611 HOLMES BV614	HOLMES BV611 HOLMES BV614	HOLMES BV611 HOLMES BV614	
EXPANSION JOINT	1/2" - 2" 2 1/2" +		THERMOSEL TRB/120 THERMOSEL TRB/121	THERMOSEL TRB/120 THERMOSEL TRB/121	THERMOSEL APS/001 THERMOSEL SAF/002	THERMOSEL TRB/120 THERMOSEL TRB/121	
DIRT & AIR SEPERATOR	3/4" - 1 1/2" 2" - 12"		PNEUMATEX VGA/10 PNEUMATEX VFA/10	PNEUMATEX VGA/10 PNEUMATEX VFA/10	PNEUMATEX VGA/10 PNEUMATEX VFA/10	PNEUMATEX VGA/10 PNEUMATEX VFA/10	
DRAIN-OFF COCK	1/2" - 2"		HOLMES 1481	HOLMES 1481	HOLMES 1481	HOLMES 1481	
DRAIN TAP	1/2"		HOLMES 1482	HOLMES 1482	HOLMES 1482	HOLMES 1482	
LOCKSHIELD VALVE	1/2" - 2"		CIM 70BSL	CIM 70BSL	CIM 70BSL	CIM 70BSL	
AUTOMATIC AIR VENT	10mm		HOLMES 1489	HOLMES 1489	HOLMES 1489	HOLMES 1489	
PRESSURE REDUCING VALVE	1/2" - 2" 2 1/2" +		MALGORANI FIG.143 WATTS DRVD	MALGORANIFIG.143 WATTS DRVD	MALGORANI FIG.143 WATTS DRVD	MALGORANI FIG.143 WATTS DRVD	

R600 EVO		R604 EVO
Nominal heat output at 80/60 °C	kW	285,7
Minimum heat output at 80/60 °C	kW	56,5
Nominal heat output at 50/30 °C	kW	300,3
Minimum heat output at 50/30 °C	kW	63,6
Nominal heat input Hi full load	kW	291,0
Minimum heat input Hi min. load	kW	58,2
Efficiency at 80/60 °C full load	%	98,2
Efficiency at 50/30 °C min. load	%	109,4
Efficiency at 40/30 °C min. load	%	110,3
Annual efficiency (NNG 40/30 °C)	%	110,4
NOx level (EN15502)	mg/kWh	27
Flue gas temperature at 80/60 °C full load	°C	75
Max. permissible flue resistance	Pa	160
Water pressure max./min.	bar	8/1
Maximum temperature setpoint	°C	90
Water flow at ΔT=10K	m³/h	24,4
Hydraulic resistance at ΔT=10K	kPa	48
Water flow at ΔT=20K	m³/h	12,2
Hydraulic resistance at ΔT=20K	kPa	12
Water flow at ΔT=30K	m³/h	8,1
Hydraulic resistance at ΔT=30K	kPa	5
Electrical connection	V	230/400
Electrical power consumption (excl. pump)	W	230
Noise level	dB(A)	70,3
Water content	l	61,0
Weight (empty)	kg	434
Dimensions		
Water connections (W1/W2)	-	DN65 PN16
Gas connection (G)	-	R1½"
Flue gas connection (D)	mm	200
Air intake connection (A) (for room sealed use)	mm	130
Condensate connection (S)	mm	32
Boiler length with water connection (L1)	mm	1348
Boiler length without water connection (L2)	mm	1152

ADDITIONAL REQUIREMENTS

- Boilers to be as manufactured by Rendamax as specified or equal and approved

- Boiler to be condensing gas boiler
- Flue to be balanced and supplied with the boiler
- Commissioning by boiler manufacturer

TECHNICAL DATASHEET NO: 4 AIR SEPARATOR

Quantity:	2
Location:	Refer to M-100
Unit Model:	SpiroVent 6" 108m3/hr
Flow Rate:	20kgs/s
Connection size:	150mm
Working Temperature Range:	-10°C to 110°C
Maximum working pressure:	10bar

Ancillaries needed:

- Unit to be supplied by Eurogas
- To be fitted with insulated jacket

TECHNICAL DATASHEET NO: 5 DIRT SEPARATOR

Quantity:	1
Location:	Refer to M-100
Unit Model:	SpiroTrap
Flow Rate:	20kg/s
Connection size:	DN150
Working Temperature Range:	-10°C to 110°C
Maximum working pressure:	10bar

Ancillaries needed:

- Unit to be supplied by Eurogas

TECHNICAL DATASHEET NO: 6 PRESSURISATION UNIT

Quantity: 1
 Location: Refer to M-100
 Unit Model: Grundfos PHT A T225
 Pump Qty: 2
 Mounting: Floor
 Max Cold Fill Pressure: 2.5bar
 Power: 0.41kW
 Full Load Amps: 1.83
 Ancillaries needed:

- BACnet communications via CIM to BMS

Dosing Pot

Ref: DP 01
 Quantity: 1
 Location: Refer to M-100
 Unit Model: Grundfos FC D POT 11

Notes:
 Unit to be supplied by Grundfos

TECHNICAL DATASHEET NO: 7

CIRCULATING PUMPS

Pump Ref	Circuit Name	Flow Rate, l/s	External Pressure, kPA	Model No	Notes
	Primary Pump				Boiler integrated
P-01	Secondary Pump	20	70		Twin Head Variable Speed
P-02	Circuit 1			Stratos MAXO-D 50/0,5-16 PN 6/10	Twin Head Variable Speed
P-03	Circuit 1			Stratos MAXO-D 50/0,5-16 PN 6/10	Twin Head Variable Speed
P-04	Circuit 1			Stratos MAXO-D 50/0,5-16 PN 6/10	Twin Head Variable Speed
P-05	Circuit 1			Stratos MAXO-D 50/0,5-16 PN 6/10	Twin Head Variable Speed

Notes:

1. Pumps are to be as Grundfos or Wilo.
2. Pump Head to be checked by contractor prior to ordering and approved by Consulting Engineer.
3. Pump to be selected in mid-range of curve.
4. Pump to be fitted with service valves.

TECHNICAL DATASHEET NO 8: GAS DETECTION UNIT

Gas Detection Model No: Four Channel Detector

Quantity: 1

Make: Gas Sense GA-300,
 GS300-A LPG Gas Sensor,
 GS300-A-CO Carbon Monoxide sensor
 2 1/2" Auto resetting 230V gas slam shut valve
 Emergency Stop button

Location: Plant Room

Comment: The contractor shall include for the supply and installation of a Euro Gas, gas detection panel capable of controlling up to one gas sensor, one slam shut valve, and control panel. The gas detection system shall include the following features:

- Microprocessor Control: Capable of accurately processing sensor signal for a range of combustible gases only in 0-100% LEL on its digital display.
- Automatic Self-Test: Capable of carrying out comprehensive self-test routine to continuously monitor the
- Programmable a1, & a2 alarms: for gas presence indication
- On site calibration: allows for accurate setting of gas sensors along with sensor drift reset facility.
- Master Reset & Accept Button: Built in to allow for alarm cancellation and system reset
- Each Sensor shall be of the thermo-catalytic type with a fast response time and shall be easily calibrated with low drift and temperature compensation.

Units to come complete with one combustible gas sensors, gas monitor, alarm sounder and battery back-up c/w two emergency stop button located in the boiler house. One automatic resetting solenoid gas slam shut valve shall be installed by the mechanical sub-contractor on the incoming gas pipe.

SENSORS

Quantity	Location	Serv(s)
One LPG Gas Sensor	Plantroom	Gas Boilers
One CO2 sensor		



Supplier:

Eurogas Ltd:

TECHNICAL DATASHEET NO 9: HEAT METER

Quantity: 1
Make: Sontex
Location: Plant Room
Model: Supercal 531
Comms: BACnet, ModBus and LON
Flow meter: Superstatic 440
Connection Size: DN150

TECHNICAL DATASHEET NO: 10 PRESSURE VESSELS

Primary side of HEX

Quantity: 1
 Location: Refer to M-100
 Unit Model: Grundfos GT-HR-200
 Mounting: Floor
 Max Cold Fill Pressure: 2.5bar
 Volume: 200litres

Secondary side of HEX

Quantity: 1
 Location: Refer to M-100
 Unit Model: Grundfos GT-HR-800
 Mounting: Floor
 Max Cold Fill Pressure: 2.5bar
 Volume: 800litres

TECHNICAL DATASHEET NO 11: PLATE HEAT EXCHANGER

Quantity: 1
 Make: Cipriani
 Location: Plant Room
 Heat Exchanged: 850kW

OPERATING CONDITION		COLD SIDE		HOT SIDE	
Fluids		Water		Water	
Inlet flow rates	l/s	17.32		13.88	l/s
INLET temperatures	°C	68.0		85.0	°C
OUTLET temperatures	°C	80.0		70.0	°C
Pressure drop (calc.)	kPa	18.16		11.94	kPa
Operating pressure	bar G	5.000		5.000	bar G
Capacity	kW		850.00		
Total oversizing	%		0.62		

FLUID PROPERTIES

Density	kg/m ³	975.66		973.56	
Specific heat capacity	J/(kg K)	4191		4194	
Thermal conductivity	W/(m K)	0.666		0.669	
Dynamic viscosity	cP	0.3829		0.3859	

PRODUCT CONFIGURATION

Product code	SE#0455+077M05PNPV0AA11				
Frame material	Carbon steel				
Plates (material / thickness)	AISI 316L (EN 1.4404) / 0.4 mm				
Gaskets (material / type)	NBR / Glue-free Plug-In® design				
Connections size	DN100		DN100		
Connections type	Studded ports EN		Studded ports EN		
Connections material	Rubber lining		Rubber lining		
Fluids position (inlet -> outlet)	F3 -> F4		F1 -> F2		
No. of passes	1		1		
Relative directions of fluids	Counter Current				
Max. number of plates allowed on frame	101				

DESIGN

Design standard	PED 2014/68/EU				
PED risk category	Art. 4.3 (Gr. 2 - L) / -				
Pressure (design / test)	bar	10 / 15			
Temperature (min / design)	°C	0 / 85			
Volume	l	39.8	39.8		
Specific compliance and certification	-				

DIMENSIONS AND WEIGHT

Overall dimensions (width x height x length)	mm	530 x 1569 x 941			
Weight (empty / operating)	kg	621 / 699			

Accessories:

To be supplied with insulated jacket and fitted when assembled. Jacket is 45mm non-flammable mineral wool with 0.05mm aluminium foil liner (u-value of 0.55W/m²K and heat loss of 17.1W/m²). Jacket fixed with plastic rivets.
 To be installed on 1mm galvanised steel drip tray.

TECHNICAL DATASHEET NO: 12 GAS PROVING SYSTEM

Manufacturer:	Medem
Model No:	SEC-Elite (6 to be installed)
Gas system:	LPG
Interfaces:	Gas Slam Shut Valves and Gas Detectors

The gas system shall include the following features:

- Microprocessor Control: Capable of accurately processing sensor signal for a range of combustible gases only in 0-100% LEL on its digital display.
- Automatic Self Test: Capable of carrying out comprehensive self test routine to continuously monitor the systems performance.
- Programmable a1, & a2 alarms: for gas presence indication
- On site calibration: allows for accurate setting of gas sensors along with sensor drift reset facility.
- Master Reset & Accept Button: Built in to allow for alarm cancellation and system reset
- Each Sensor shall be of the thermo-catalytic type with a fast response time and shall be easily calibrated with low drift and temperature compensation.

Units to come complete with two gas sensors, gas monitor, alarm sounder and battery back-up c/w two emergency stop button located in science room and the science prep room. One automatic resetting solenoid gas slam shut valve shall be installed by the mechanical sub-contractor on the incoming supply. The slam shut valve shall also be wired to a 7 day time clock to allow after hours isolation of gas.

ISSUE REGISTRATION:

Project Title: COLAISTE EOIN

Project No: 26K13

Rev	Date	Purpose of Issue/Nature of Revision	Prepared by	Issue Authorised by
T1	19-06-26	Tender	RM	RM

This document takes into account the particular instructions and requirements of our Client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

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