MECHANICAL SERVICES SPECIFICATION

FOR

WOKINGHAM TOWN HALL BOILER REPLACEMENT WORKS 2019

TENDER ISSUE

ISSUE TRACKER

Wokingham Town Hall – Boiler Replacement Works 2019

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PSB Consulting Engineers (Oxford) Ltd

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Boiler Replacement Scheme

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1 Definitions

Installer - The contractor, or where a named installation not specified to be in the contract, the company, firm or person appointed to execute that installation.

Tenderer - Any company, firm or person invited to submit a tender for the contract works.

Works - Plant, materials to be provided and all work to be performed.

Contract Administrator - The person or persons appointed by the employer to inspect or monitor the progress of the works.

Clerk of Works - The person or persons appointed by the employer to act as his inspector.

Site - The land and/or buildings in which the works are to be executed.

Provide/Install - Obtain, deliver, fix into position, make all connections, test and commission, - unless any part of this is specifically excluded.

Equal or Equivalent - The equal as specified in all respects and, except where stated by tenderer at time of tender, only where approved - and approval will NOT normally be given.

Specified - As specified in this document and/or elsewhere in any other sub-contract document including where indicated on drawings.

Approved/for Approval - Submit for written approval from the supervising officer and, if not approved, submit such alternative as will obtain approval - which will not unreasonably be with-held.

Suitable/Agreed - Agree with the Contract Administrator on site and, where requested, submit for approval

Directed/Authorised - A written instruction. The name of the employer and any other contractual parties and their advisors are given in Part 2, Section 2.

2 Tender Conditions

Submit tenders for the Works by completing the form of tender and schedules all to instructions given on the forms and schedules and delivering these as stated in letter of invitation to tender.

Submission of tender will imply acceptance of all conditions, full knowledge of specification, drawings, all requirements, site and all local and existing conditions. Any other available and applicable document may be inspected by arrangement and should there be any matter which may be obscure written replies will be circulated to all written queries received not later than 7 days prior to tender submission date.

A tender not so submitted, signed and in all respects completed may not be considered and no subsequent claim for any alleged deficiency of description will be allowed.

No payment will be made for any expenses or losses incurred in a tender submission.

The lowest or any tender will not necessarily be accepted.

Tender to be **EXCLUSIVE** of Value Added Tax but INCLUSIVE of all other taxes, establishment charges, profit, fares and allowances, travelling time and any other charge, any provisional sum specified and for compliance with any applicable trade

and/or national agreements relating to employment including rates of pay, working hours and conditions of labour not less favourable than those established for the local trade or industry and including employment of workmen for more hours per week than the standard number of hours per week in order to recruit them.

3 Contract Conditions

The work to be carried out under this contract will be subject to the form of agreement and schedule of conditions in the tender documents.

The terms of the contract will be in terms equivalent to those stated in the JCT Form of Contract. If there is any conflict in this obtain direction but base tender price on this specification.

4 Contract Price Basis

The contract will be let on a fixed price basis.

5 Defects Liability Period

For a defects liability period of 12 months replace any part which is proved defective through bad workmanship or faulty materials.

The defects liability period will commence from the date of certification of Practical Completion of the main contract as a whole irrespective of whether the whole or any portion of the works have been completed prior to the completion of the main contract.

6 Incompetence

Upon receipt of direction that any representative of the Installer is guilty of misconduct, incompetence and/or negligence the Installer will take immediate measures to remove the basis of complaint.

7 Engineer

Reference to the engineer and/or Consulting Engineer will mean the person or persons acting in the capacity of authorised representative of the employer and/or his supervising officer in respect of the engineering services described in this specification.

8 CDM

It is not currently anticipated that this project will be notifiable to the HSE. Therefore the whole works are to be completed within 30 working days, exact programme to be agreed with the successful contractor.

Although the project is currently not deemed to be notifiable a written construction phase plan will be required and a health and safety file will need to be created. Furthermore, to comply with the Construction (Design and Management) Regulations 2015 a principle designer and principal contractor must be appointed. This shall be agreed with the client. The exact programme of works is to be agreed with the successful contractor.

9 Priced Schedule of Quantities

Upon being advised that your tender is receiving consideration, prepare and, within **2 working days**, submit in duplicate, priced schedules of quantities sub-divided as summary of tender to provide unit rate for each item to be provided showing make-up of tender price. Not more than two tenderers will be asked to do this. The rates will be used for pricing variations. Where there is no directly applicable rate, a rate having the same tender additions is to be produced with evidence to prove the method of calculation. The priced schedule of quantities will have no other use and no adjustment will be made to the tender price in respect of any alleged inaccuracies or exclusion in the priced schedules.

10 Standards

The works described within this specification and drawings shall be installed fully in accordance with the following standards.

a) Regulations under the Health and Safety at Work Act (including CDM, the Approved Code of Practice for the Prevention of Legionellosis and the Control of Legionellosis Disease (HS(G)70).
b) Electricity at Work Regulations.

c) BS 7671 IEE Wiring Regulations, 18th Edition.
d) Water Supply (Water Fittings) Regulations 1999.
The tenderer shall include for notifying the water supply company of the alterations to the water services, in accordance with clause 5 of the Regulations.
e) Water By-Laws and Local Authority Requirements.
f) Special Requirements of Local Electricity, Water and Gas Authorities.
g) CIBSE Regulations.
h) COSSH Regulations.
i) Relevant British Standards (including BS 8558 Design, Installation, Testing and Maintenance of Services Supplying Water).
j) PSA Standard Specifications M&E No. 1.
k) Heating, Hot and Cold Water, Steam and Gas Installations for Buildings, Specification 036 (formally PSA Standard Specification M&E No. 3).
l) Air Conditioning, Air Cooling and Mechanical Ventilation for Buildings, Specification 037 (formally PSA Standard Specification M&E No 100).
m) HVCA Standard Specifications for Ductwork Installations DW143, DW144.
n) HVCA Specification for Kitchen Ventilation Systems DW172.
o) All equipment must be millennium compatible to British Standard Definitions.
p) Control of Pollution Act.
q) Building Regulations.
r) CIBSE Technical Memorandum TM13 (Minimising the Risk of Legionnaires Disease).
s) All other Statutory Requirements.

11 Management of Works, Site Supervision and General Safety

The Contractor shall ensure that adequate supervision necessary for the satisfactory completion of the Works is provided. In particular, the Contractor shall include in his tender for suitably experienced management personnel to manage and direct the whole of the works in an appropriate and suitable manor. In addition it is a requirement that the Contractor must provide a full time person whose role will be to co-ordinate the works on site, and liaise directly with the Contract Administrator and the Client on day-to-day matters.

The foreman and management personnel will be empowered to accept instructions concerning all matters in connection with the Works.

12 Working Hours

The available working hours shall be as those stated in the pre-start meeting with the successful contractor. For the purpose of tender allow for normal working hours, 8.00am until 5.00pm Monday to Friday.

Any overtime necessary shall be arranged in agreement with the CA in advance of the works.

13 Progress Meetings

The Contractor's Project Engineer & Site Manager shall attend site progress meetings to be held on site as requested by the Consulting Engineer to report on work completed to date, works to be completed, issues arising and the like.

14 Restrictions and Security

The following restrictions will be imposed on the Contractor during the contract period:

4.1 No smoking within the building and grounds.

4.3 No radios or recorded music within the building and grounds.

4.4 There will be no parking facilities made available to the Contractor.

4.5 Access shall be limited to the areas of work within the building.

15 Temporary Electricity Supplies

Temporary electricity supplies to hand held appliances shall be at 110v 50Hz supplied by a transformer with the secondary winding centre tapped to earth. The 230V supply shall be protected by a residual current device with a tripping current not greater than 30mA.

Allow for temporary lighting and power supplies as necessary to facilitate the construction works detailed in this specification.

No use of electricity metered to the Employer will be permitted for any purpose prior to handover and connection to the permanent supply will only be made when final testing for handover has been accepted.

16 Storage Workshop and Offices

Provide safe and dry storage of all equipment, plant and materials and adequate temporary stores, workshops, office and other accommodation, each fully equipped with such lighting and heating as required and that may be needed. No equipment, plant, materials, etc., will be allowed to be deposited other than in the stores, etc., except as may be agreed. The stores, etc., are to be removed immediately the works are sufficiently completed, the site to be left clean to the satisfaction of the Engineer. The Contractor shall be responsible for the safe keeping of tools and equipment. All in accordance with the main contract preliminaries.

17 Existing Services

Avoid any action which will disrupt or otherwise effect any existing installations except:

Where any existing installations are made redundant by the new installations dismantle entirely and remove from the site the whole of the redundant installations except where otherwise later specified.

Where redundant installations cannot be removed due to being buried within structure or like reason cut back as far as possible, seal and make safe, and provide small labels as appropriate to describe the presence of redundant work.

Where any existing installations need to be modified, diverted or otherwise affected by the new installations and/or building works obtain approval to all such modifications, including from the Contract Administrator and/or appropriate statutory authority or any other organisation as may be affected.

In the event of existing installations or services being damaged or modified, other than as excepted, repair fully or reinstate as appropriate at no additional charge to approval including from the appropriate statutory authority or any other organisation as may be affected.

18 Delivery, Cases & Containers

Unpack all cases, containers, and such like in which materials are delivered to the site, and return empty such, cases, containers, etc., carriage paid. etc.

The Contractor shall arrange delivery in compliance with the main contract preliminaries. No charge for out of hour's delivery and administration.

19 Materials and Procurement

The Contractor shall be responsible for material procurement to meet the program. Late delivery of material does not justify delay to the Contract.

20 Cleanliness on Site

The site is at all times to be kept free from obstruction and all surplus materials, temporary works, packing cases, drums, etc., which are to be removed from the site as soon as they are no longer required. On completion the site is to be left in a thoroughly clean and tidy condition.

For the purpose of this clause, the word 'site' is to mean each and every building of the premises, yards, passage ways and any other means of access to or egress from the site.

21 Completion Procedure

On completion of the works, or any agreed section, notify in writing to this effect, and provide a list of any outstanding matters together with draft record documents. An examination will then be made and instructions issued for remedial action to such defects as are apparent.

Take remedial action as necessary, commission all sections of the installations not already in commission, fully adjust, regulate and test these as far as is possible and submit detailed test results.

When the Engineer is satisfied that the design performance has been obtained, he will advise the employer who may carry out a further examination, at which time all installations must be in fully regulated and adjusted operation. Any further defects becoming apparent will be made known for remedial action.

The Employer will not accept handover or provide any operating staff until the works are in full tested operation, which must therefore be before the completion date of the building or section of the building as a whole.

The Contractor shall submit detailed programmes covering:

a) Full test and inspection of electrical services to BS 7671 to include manufacturer's certification as appropriate.

b) Demonstration to Users of all equipment and services installations.

c) Record documents.

d) Final snagging inspections.

22 Completion Certificates

Where work is phased, as required in the programme produced by the Main Contractor, individual completion certificates shall be provided for each phase of the contract, e.g. one room or group of rooms. These shall be issued to the Contract Administrator representative before the handover date of that particular phase.

Practical completion will not be considered before the date when all the record documentation is approved and in place.

23 Handing Over

Immediately prior to handover of the works provide a completion certificate certifying the overall completion of the works in accordance with the specification, drawings and variation instructions.

This certificate should be provided on the date agreed upon for completion but, in the event of the Works not being complete on that date, a statement of outstanding work is to be provided, stating the date on which the Works will be completed and the completion certificate will be provided on the date that the Works are actually completed.

The completion certificate should state, wherever applicable, that the installations conform to the appropriate Regulations such as BS 7671 in the case of electrical installations.

1 Tender Drawings

The tender drawings to be read with this specification are listed in Part 2, Appendix 1 which also gives the basic symbols and abbreviations used.

The tender drawings are to some extent diagrammatic and will NOT give full installation details. Read with the specification, and other relevant drawings and documents. Obtain all detail of every description required to provide complete and operable systems.

The tender drawings comprise the engineering systems layout drawings (which are generally A1 size) and the A3/A4 sketch details and schedules.

Give written notice of any discrepancy discovered and take in order of precedence the details given in the specification, by figure dimension, by large scale and finally by small scale drawings.

For the engineering drawings the drawing numbers have particular significance in general:

M***: Mechanical Engineering Services.
E***: Electrical Engineering Services.
PH***: Public Health Engineering Services/Above Ground Drainage.

The NUMBER is a straight sequence number for the particular system and usually has no locational significance.

The ISSUE reference for the drawing will depend on the circumstances and will be one of:

P: Preliminary Issue for comment/approval.
T: Tender Issue for pricing.
Ct: Contract Issue.
Cn: Construction Issue.

Construction Issue revisions are then denoted Cn1, Cn2 etc., with details of the revisions given in the revisions column, although, there may be P1, T1 etc. issues where there is such as a second tender issue, and for each details are given in the revisions column.

2 Working Drawings

Provide detailed information to augment the tender drawings so that these together provide a set of working drawings and details adequate to provide all information needed to set out and effect installation of the works and to inform the Engineer of such installation parameters as he may reasonably require.

To prepare working drawings obtain at an early stage all necessary current details of the architectural, structural, other engineering systems parameters, and of any other items that will affect the engineering systems specified and read in conjunction with this specification and the tender drawings. Note that the tender drawings may not precisely agree with the current architectural and structural drawings owing to continuance of the detailing of these subsequent to finalisation of the tender drawings.

Provide detailed information in the form of working drawings for all shop fabricated components, major plant areas at a scale of not less than 1:20, equipment wiring diagrams, and as necessary to provide a complete set of working drawings not less in scope than the contract drawings plus the installation drawings.

Within 1 week of appointment submit a schedule listing the working drawings proposed annotated with dates for production for approval of each with details and

latest date for receipt of any further design information required. At the same time give written notice as to which of the contract drawings it is proposed to use as a working drawing so that negatives of these may be issued. Note that further drawings are NOT required where the information given on the available drawings is adequate for use as working information.

Check site dimensions and modify working drawings as may be required due to discrepancies, site tolerance and/or building layout and/or detail variation based on any modification design drawings issued showing that modification only.

Submit for acceptance in principle as directed 2x copies of each working drawing, allowing at least 2 weeks for comment. Note that acceptance in principle will not relieve the Contractor of any responsibility for accuracy in respect of errors or omissions on the working drawings.

Working drawings should include, but not be limited to:

- Plans showing all systems.
- Builder's work details.
- Mechanical Services distribution layout drawings.
- Detailed plantroom layout drawings.
- Details of mechanical service supports and fixings.
- Drawings to be co-ordinated between M&E and the building structure.

The Contractor shall issue a further 2x copies of the approved working drawings to the Engineer.

Within 7 days of the issue of an Engineer's Instruction the Contractor shall amend his working drawings and re-issue 2x copies. The Contractor shall maintain on site a set of working drawings which shall be kept updated to record all as installed details.

3 Record Drawings

The format, presentation and issue of the record drawings shall be as detailed below:

3.1 Format

- Mechanical systems - routes, sizes, locations and reference.
- Positions of fire barriers.
- Positions of all incoming services and supplies.
- Cross reference each drawing to the manual by stating "refer to the manual section 'x' for further information".

3.2 Presentation

- The drawings shall be prepared in AutoCAD version 2016 minimum.
- Dated and clearly marked 'As installed Drawing' with Contractor's title block.
- Each service shall be shown on a separate layout drawing i.e. Heating, ventilation, water services, external services etc. In addition a drawing showing the gas distribution is required in accordance with the Gas Safety (in use) Regulations.
- All layout drawings shall be A1 size.
- The drawings shall be neatly folded and each one contained within an A4 size transparent drawing wallet - Rexel NPR/A4 or equivalent and placed in the appropriate section of the manual.

3.3 Issue

A draft copy of the drawings shall be submitted to the Engineer for approval.

Upon approval of the draft record drawings the Contractor shall issue the following to the Engineer, Main Contract Preliminaries take precedence:

- 2x full size prints of each drawing - contained within the manual.
- 2x discs of the completed drawings in AutoCAD file compatible with AutoCAD 2016.

4 O&M Manual

The format, presentation and issue of the record drawings shall be as detailed below:

4.1 Contents of Operating and Maintenance Manual

The format of the manual shall be in accordance with the following sections after a preface and index.

1. Section 1 shall include an introduction, a general description of the System(s), safety matters, warning notices, etc.

2. Section 2 shall comprise a full description of the system together with the main plant components and locations, and the mode of the operation of automatic control systems associated with the system.

3. Section 3 shall comprise a schedule of the complete plant technical data of each item of mechanical and electrical equipment. Schedule details shall include the manufacturers name and address, type and size of the equipment, serial number, contractor's order number, bearing, pulley and belt details, motor details, equipment performance and duty details and location of the equipment.

4. Section 4 shall describe in detail the operating procedures necessary for starting up, running and shutting down the system. This shall include the control panel starter and selection facilities together with any alarm and safety interlocks as identified on the control panel/panels.

5. Section 5 shall comprise the recommended maintenance operations on a daily, weekly, monthly, etc. basis for each item of plant. The preparation of this section shall be carried out by obtaining from the manufacturer his advice and recommendations for lubrication, adjustment and routine maintenance.

6. Section 6 shall comprise the emergency procedures to be adopted by personnel engaged on the operation and maintenance of mechanical and electrical services, with respect to fire, first aid, general failures to water and electrical systems, gas lines, chiller refrigerant pipework, and call out procedures for the Contractor's maintenance personnel in working hours and out of working hours.

7. Section 7 shall comprise a recommended action on plant malfunction to assist both the user and maintenance engineer in the event of a fault developing in a system by indicating the nature of the fault and recommended action.

8. Section 8 shall comprise a List of Recommended Spares and Lubricants. The preparation of this section shall be carried out by obtaining the manufacturers' recommendations, and also incorporating the client's requirements regarding spares.

9. Section 9 shall comprise a schedule of the mechanical and electrical record drawings together with reduced copies (A4 size) of the record drawings in numerical order. The reduced copies of the record drawings shall be printed on good quality paper identical to the paper used for the remainder of the manual.

10. Section 10 shall comprise mechanical and electrical test certificates and commissioning reports.

11. Section 11 shall comprise a list of manufacturers including addresses and telephone numbers and equipment supplied. The manufacturers list shall be arranged in alphabetical order. The manufacturer's literature shall also be included within this section and arranged in alphabetical order to match the manufacturers list.

12. Section 12 shall consist of copies of all orders placed, if necessary with prices deleted.

13. Section 13 shall consist of chemical product data sheets where necessary for the Client to comply with his obligations under the Control of Substances Hazardous to Health Regulations.

4.2 Preparation of the Manual

1. The manuals shall be prepared within the contract and shall be particular to the mechanical/electrical services of the contract.

2. The manual shall be of A4 size and arranged with an index and referencing system.

3. The paper to be used in the final issue of the manual shall be good quality high white 120g/m², and the reproduction method shall be by dry photocopy.

4. The material of the manufacturer's literature shall be as supplied by the manufacturers and the number of sets shall be in accordance with the number of manuals required.

5. The covers shall be hard bound with a four post loose leaf system. A matching flysheet will give the name and address of the principles involved on the contract and agreed with the Client.

6. Numbered card dividers shall be inserted between sections.

4.3 Issue

A draft copy of the manual shall be submitted to the Engineer for approval. Upon approval of the draft manual the Contractor shall issue 3xcopies to the Client one week before Practical Completion.

The practical completion certificates will not be issued until the operating and maintenance manuals have been issued to the client.

5 Health & Safety File

The Contractor should allow to carry out CDM duties as the Principal Contractor which shall include the production of the Health & Safety File, as required under the CDM Regulations.

The contractor should ensure that 2x copies of all record drawings to are included within in the Health & Safety File.

1 Scope

Provide and demonstrate all materials, fittings, accessories, for complete working systems as specified including whole of plant, tackle, tools, instruments, scaffolding ladders, hoists, fencing, temporary guards and other equipment and labour, both skilled and unskilled, to unload, store, hoist ad fix all materials, including standing scaffolding and hoists where required.

Include any fitting or accessory obviously necessary for completion of the works always provided that there will be no responsibility for design discrepancies, errors or omissions.

2 Standard

The Contractor shall be responsible for ensuring that all materials used on the works comply in every respect with the relevant codes of practice and specifications issued by the British Standards Institution current at the date of Tender. The Contractor shall be held responsible for any consequence or expense resulting from his failure to comply therewith and shall be required to correct any such failure at this own cost.

Where alternatives are permitted by the BS and this Specification does not identify the option required, the most durable materials shall be used and the most onerous set of tests shall be applied.

3 Improvement

Make known any ideas of design or detail changes that may lead to improved performance, ease of installation and/or reduced cost.

4 Layout

Install materials neatly, unobtrusively and without interference with other items, with runs, equipment, etc., adjusted from the positions shown on drawings to suit final arrangement, room layouts, architectural features, etc., as shown on the current architects and/or structural engineer's drawings and/or as otherwise advised by the Engineer. Notify the Engineer of any difficulties.

Arrange to facilitate inspection, testing, cleaning and repairing, only excepting trunking or similar buried in building structure, in which case arrange for access, inspection, testing, replacement, etc. of all wiring.

Provide and submit for approval dimensioned layout drawings for all runs of cable, conduit, duct, trunking, cable tray, etc. not precisely detailed on the tender drawings and also to give details of all holes, chases, etc.

5 Regulations

5.1 The standards of workmanship, materials, equipment and concepts of installation employed within the Mechanical Works shall comply with:

5.1.1 Water Supply (Water Fittings) Regulations 1999.
The Tenderer shall include for notifying the Water Supply Company of the alterations to the water services, in accordance with clause 5 of the Regulations.

5.1.2 COSHH Regulations.

5.1.3 Applicable British Standards and Codes of Practice.

5.1.4 Health and Safety at Work Act 1974.

5.1.5 Statutory Rules and Regulations relating to the site to which the Employer is subject.

5.1.6 Electricity at Work Regulations: 1989, the Health and Safety Executive Memorandum and Statutory Instrument No. 635: 1989 relating thereto.

5.1.7 The IEE Wiring Regulations for Electrical Installations - 18th Edition (Including all current amendments thereto).

5.1.8 CIBSE commissioning codes.

6 Alternatives

Use materials, components and equipment that conform in every detail to the specified requirements which may be at variance with information lodged with certain manufacturers and suppliers in respect of particular items of plant and equipment, or, where not so specified, conform to the appropriate British Standard Specification.

Put forward in the tender, in the Alternatives Schedule or by separate letter, any specific alternative price required and any preferred alternative make by submitting full details of the alternatives and the associated variations to the tender price. It is stressed that the actual tender price must be based on the materials, components and equipment specified.

7 Information Notation

Provide to the recommendation of the Chartered Institution of Building Services on plant labels, instrument graduations, test certificates, as fitted drawings, etc., with both SI Metre, Kilogram, Second and Imperial Foot, Pound, Second units other than linear dimensions of plans, cables, etc., for which use SI only.

8 Identify

Identify all provided items, pipes, ducts, etc. except where use and connection is reasonably obvious for operation and maintenance, to BS 1710 with also direction of flow, with labels engraved with as applicable name, number, manufacture name, reference number and date, capacity, rating, speed, frequency, voltage, full load and starting current, phase (s) and all relevant details for operation and maintenance. Include all valves in plant rooms, crawlways and main ducts.

Labels to be 4mm thick clear plastic with 6mm high black filled letters on reverse side two screw fixed where an appropriate 'cold' surface, or 2mm thick brass with white filled letters on front side where surface is 'hot' or secured by brass chain where no suitable surface.

9 Painting and Corrosion Protection

All paints are to be suitable for their purpose, such as be heat resisting where necessary, and be of a colour approved prior to the commencement of painting.

Where a galvanised finish is specified and is found to be unobtainable within the time required obtain equipment of standard finish and galvanise or zinc spray. All equipment so treated is to be completely dismantled and afterwards re-assembled with special attention to earth contact surfaces to ensure metal contact without the intervention of the substance with which they have been treated.

Where dissimilar metals and/or materials are used together such further precautions are to be taken to avoid chemical or electrolytic action occurring. This particularly refers where copper with zinc and/or aluminium or aluminium alloys are used.

10 Equipment Connection

Connect equipment or apparatus not supplied as later specified or as may be later required as a variation during the currency of the contract and defects liability period. For all such equipment check thoroughly and test each item, and within 48 hours of delivery give written notification of the general results of the check and all tests made with a list of any parts missing or damaged or any other deficiency, after which the equipment will be deemed to have been accepted as complete and in good condition, subject only to any notified damage or efficiency and will then be considered as supplied under the Contract.

Where equipment to be connected is not complete with integral gas cock, governor, water stopcocks, etc., make final connections through suitable cocks, etc., all as necessary.

11 Works Tests

Test at works all items for which this is required by the appropriate British Standard Specification, by this Specification and otherwise as may be directed.

12 Test & Commission

Test and commission each section of the works as appropriate and/or specified and demonstrate that each section will operate as specified having controls correctly set and free in operation and all instruments correctly calibrated. The contractor is to allow for all testing and commissioning associated with any sectional completion as required.

Provide for testing all fuel, electricity, water, media and equipment, with instruments having calibration certificate from any approved body dated not more than 3 months prior to use.

Arrange for test and commission assistance from equipment and/or control manufacturers.

Provide all test connectors and facilities needed and leave as a permanent feature.

Procedure to include pressure test of each:

Water system at its normal operating temperature. Demonstrate rate of pressure loss is not excessive and all joints are watertight. Following successful test flush system through, sterilise by chlorine for drinking water, refill and put onto service.

Oil system as water but using kerosene.

Gas system as water but using nitrogen and brush joints with soap solution.

Test pressures to be as specified, or, where not specified the greater of twice the working pressure.

13 Test Notice & Record

Give 14 days' notice of each test giving time and place and arrange for witness as directed. Submit for approval within 7 days of each test, and, for Works Tests before delivery, 3 copies of a test record certificate signed by all witnesses and include a copy of each approved certificate in the Instruction manuals.

14 Operation & Instruction

When installation is in satisfactory working order and so notified in writing put into normal service for seven days and from the date of building or building section completion instruction under skilled supervision and attention during the hours of 9.00am to 6.00pm. During this period lubricate and maintain all moving parts and instruct the Employer's staff in the operation and indemnify against any damage or injury to the Works or to any person or to any property, and against all actions, suits, claims, demands, costs, charges and expenses arising in connection therewith occasioned by negligence, defective materials or workmanship, or by defective design, including the whole of the design.

The Employer may require to use any part of the installation which is suitable for use and, in the event of this involving additional attention and/or effecting defects liability, give detailed written notification and negotiate scales of charges and/or advise as to the reduction of defects liability period and the cost to effect a suitable insurance so as to avoid such reduction.

15 Instructions

Refer to Part 1 Section 5 for requirements.

16 Tools & Keys

Provide two sets of hardened black double ended spanners to fit all installed sizes of nuts and bolts, screwdrivers to fit all installed sizes of screws, keys to fit each type and size of installed emptying cock, air cock.

17 Welding & Brazing

All welding shall be undertaken to the requirements of HVCA code of practice TR/5. Welders shall hold current certificates of competency. Brazing shall be undertaken to the requirements of HVCA code of practice TR/3. Brazers shall hold current certificates of competency.

18 Foundation Bolts & Alignment

For each item of equipment supplied which has moving parts and wherever else specified and/or recommended by its manufacturer, provide, locate and supervise grouting in, approved foundation bolts of straight shank type threaded at each end with nut and square mild steel holding down plate at lower end with self-securing locknut at upper end, and align and level using steel shims as necessary.

19 Vibration Isolation

Mount and connect all pumps, fans, and other similar equipment containing rotating and/or reciprocating parts to avoid excessive transmission of vibration and connect no part of any item of vibrating equipment to the building structure other than through a resilient connection. The vibration isolation system is to comprise a suitable isolating base and/or isolating mountings of characteristics matched to the machine concerned together with flexibly arranged and/or supported connections.

Vibration isolating bases to comprise a concrete slab on a hardwood base all supported on a fibreglass slab enclosed in heavy gauge polythene sheet. The fibreglass slab to be retained by a brick or similar wall and to be turned up round the edges to separate fully the concrete slab from the wall. Provide details to construct.

Isolating mountings to be of the 'spring in compression' type made by Cementation (Muffelite) Ltd, Allaway Acoustics Ltd, or the 'rubber-in-shear type made by Dunlop Ltd. (Metalistik) or equal.

20 Guards

Provide guards to all moving parts including where no permanent means of access.

21 Pumps & Pump Drains

Pump capacities later specified have been calculated by aggregating the specified resistance of valves, equipment etc., with the pipe resistance calculated to the factors of the CIBSE Guide. Check the resistance of the installed system and provide pumps with duties as needed to produce the specified flow rate. Notify if revised calculations are required.

Provide to each pumping set, except those fitted with mechanical seals, an open tundish to take gland leakage, approximately 150mm across the top, 225mm long and made from 1.25mm thick galvanised sheet steel with 20mm discharge pipe taken to nearest gully. A larger bore bus drain may be used to collect drains for several pumps adjacent to each other.

Drain pipework to be galvanised medium quality to BS 1387 with screwed joints. Provide upstream of each pump a 'Y' type strainer having gunmetal body and perforated stainless steel screen, and valves to isolate pump and strainer.

22 Vessel & Fittings

Provide all appropriate mountings and fittings to each hot water boiler, calorifier, indirect cylinder or any other similar vessel including one each of:

Safety valve, spring loaded enclosed type of a pattern approved by the National Boiler Insurance Company, 'NABIC' with padlock and two keys with discharge of the same bore taken in galvanised medium grade tubing to within 150mm of the floor and terminated in a splayed end, except where less than 225 litres capacity and to which an open vent is fitted.

Altitude gauge graduated so that the maximum graduation is not more than twice the working head.

Thermometer with rigid stem and separable pocket, straight or angle as required, graduated with a suitable range, to be not less than 0-105°C installed in the main flow or so as to provide a true flow temperature indication.

Draw-off cock with hose union to each low point.

23 Altitude Gauges & Valves

Provide to all main flow and return pipes in plant rooms and to hydraulic equipment where specified, altitude gauges having a red line marked on to the scale at the normal safety static head value.

Where safety valves are specified to be provided in hydraulic systems the valves are to be of an approved type and to be set to relieve all pressure in excess of 0.9 bar more than the normal working head.

Determine heads by site measurement prior to setting altitude gauges and safety valves.

24 Thermometers

Provide to all mixed temperature flow pipes and to all main return pipes in plant rooms and wherever else later specified, suitably graduated dial thermometers made by Rototherm Limited, and fitted with separable bronze pockets.

25 Electric Motors

Provide electric motor drives and starters for all fans, pumps, etc.

Unless otherwise specified to be screen protected, fan cooled, squirrel cage, super silent machines with ring or wick lubricated roller or ball bearings, or, where needed to meet the requirements in respect of noise, sleeve bearings, constructed to the dimensions of BS 2960 or 2048 as applicable, wound for the electricity supply available complete with all necessary supporting rails, brackets, bolts, etc. and a substantial terminal box arranged for not less than 20mm flexible conduit, fixed into position ready for electrical connection.

Generally the electricity supply will be three phase but check before placing orders. Base tender on three phase except as later specified.

Motor speeds are not to exceed 24.2 rev/s (1450 rpm) and the nominal continuous rating is not to be less than 10% or more than 20% greater than the maximum brake H.P. demand of the driven appliance and as given in BS 2613.

Provide to the Electrical Installer with 1 copy as directed, a schedule of motors listing type, number of phases, horse power, starting and running current and methods of starting.

26 Motor Starters

Provide for each electric motor a suitable starter of common manufacture made by the MTE Ltd, or other equal. Except where otherwise specified, to be of the air break contractor type with facilities for the separate excitation of the operating coil by external connection to terminals with local push button control, two auxiliary contacts, in addition to any maintaining contact, one normally open and one normally closed, equipped with integral on-load isolating switch having a separate pole for each phase way and a neutral link, with method of starting:-

Up to 5.6 kW (7.5 HP) - direct on line.
5.6 to 11.2 kW (7.5 to 15 HP) - automatic start.

Provide and set ambient temperature compensated overload protection device incorporating single phasing prevention and undervoltage release. Dashpots, where supplied, to be filled with oil or silicone fluid to the manufacturers recommendations.

Electric motor starters to include steel dust proof cases with adequate labelled terminal for each connection and front cover label giving details of the motor controlled, and conduit standard for mounting singly adjacent to the motor. Where standards are impracticable or undesirable the starters are to be for wall mounting.

Provide the Electrical Installer, against signed receipt, all local starters for erection and electrical connection.

Where specified to be accommodated in control panels starters to be suitable for logical accommodation in the panel and as later specified. Starters accommodated in control panels or otherwise grouped together, are each to be equipped with one green 'Motor Run' lamp and one red 'Overload Tripped' lamp.

Where the motor starter is fixed at a distance of more than 1.8m from the motor arrange with the Electrical Installer to fix and connect a suitable 'Lock Off' isolator immediately adjacent to the motor.

27 Electrical Equipment & Wiring

Provide, supply only or supply and erect only, electrical equipment and wiring as specified and provide details and equipment co-operate with the electrical installer who will provide all other electrical equipment and wiring.

Provide equipment specified in a single casing or panel in a works fabricated and tested mild steel rolled section frame with mild steel plates to cover face, sides, back, top and bottom, except omit any panel, particularly bottom and rear, where total enclosure is given by adjoining structural surface. Arrange one panel, to access interior, hinged with lockable handle, others removable as needed for occasional access, stiffeners as needed to produce a stable construction and finished stoved enamel to approved colour and texture with stainless steel angle strips to cover all edges, or as specified or approved alternative construction, access and finish.

Lamps, pushbuttons, instruments, etc. to be suitably coloured, matched one with another, labelled as to function and connected with internal equipment by 1.0mm² minimum coloured PVC insulated wires with outgoing circuits to a labelled terminal strip at a point to suit external connections behind a 3mm mild steel plate to accept conduits or similar.

Provide panel distribution circuitry with HRC fuse for each power and control circuit and 25% spare and 'on load' rotary isolator interlocked with access door with contacts to break all panel 'line' connections, power and control backfeeds, EXCEPT where panel isolation would cause a device connected to another panel to activate for which provide protective shields and warning label. Where the maximum current exceeds 30 amps panel circuitry to be rated to withstand a fault level of 15 MVA for one second by measures such as mounting fuses onto PVC taped and phase colour identified copper busbars on 'Tufnol' supports.

Provide on each panel 25 volt switched socket outlet with double wound centre tapped transformer and 15 Watt woven wire protected hand lamp, 20 metres of tough rubber flexible cable and rubberplug.

Connect equipment to give 'fail safe' as reasonably possible with alarm circuitry to panel bell cancel push and warning light (not cancelled by push) with facility to connect to a remote alarm point.

Submit for approval panel face and interior arrangement drawings, power and control, line AND connection diagram to BS 3939 sequence left or right and top to bottom showing all electrical, pneumatic and hydraulic circuitry, both external to and within panels and equipment, giving types, capacities and sizes of cables, pipes, switches, contractors, fuses, etc. and terminal numbers mutually consistent between drawings. Provide one copy of each diagram under perspex on inside of

panel access door and with each set of 'as fitted' drawings.

Provide all wiring specified to the electrical specification.

28 Pipework

Install of specified type pipe runs rectilinear to adjacent surfaces of clean bore through-out free of excessive tool marks, distortion of section and other defects and with straight runs incorporating full random delivered lengths and having no short cuttings or long screw connectors and backnuts, having continuous gradients not less than 1 in 480 for pipes of 50mm bore and over and 1 in 240 for pipes of smaller bore for all runs of normal operating temperature exceeding 40°C and 1 in 720 for all other runs.

Fabricate pipe assemblies on bench wherever possible and make available any assembly for inspection. Pipe jointing to be non-toxic with minimum of hemp or tape and all surplus jointing cleaned off threads and fittings. Reducing pieces to be eccentric unless otherwise specified. Ream all pipe ends before fixing to remove burr.

Fit purpose made metal screwed caps, formed wood plugs or blank counter flanges only to open ends of pipework during erection. Under no circumstances fit plugs of rough wood or waste to prevent rubbish entry.

Fix pipework to be insulated to leave 25mm between the insulation of one pipe and the covering of another and to permit subsequent access without disturbing other pipes etc. and without joints in the thickness of walls, floors or ceilings or in vertical ducts without permanent access, and for finished surface to clear ceilings and floors by 75mm, walls by 25mm and any electrical conduit or appliance by at least 150mm.

Provide means to enable sections of pipework to be subsequently dismantled and refixed without disturbing the building fabric and in any event at intervals not exceeding 12m on straight runs. To be unions in screwed and soldered pipework of 50mm bore and under and flanges in pipework of 65mm bore and over and in flanged pipework.

29 Pipe Protection

All tubes to be delivered with one coat of an approved preservative only. Store on site in covered racks to prevent rusting. No installed tubing showing evidence of corrosion will be permitted to be put into service.

30 Pipe Supports

Support pipes, at points which will not obstruct access to valves etc., within 150mm on each side of all changes in direction and, for all pipes exposed at low level at intervals not exceeding 1.2 metres, for pipes up to 20mm bore, 1.8m for pipes over 20mm bore, otherwise:

1 Mild Steel Pipes

Pipe Bore (mm)	Horizontally (metres)	Vertically (metres)
15	2.0	2.5
20 - 32	2.5	3.0
40 - 50	3.0	3.5
65 -100	3.5	4.5
125	4.0	6.0
150	4.5	6.5
175 & over	5.0	7.0

2 Copper Pipes

Pipe Bore (mm)	Horizontally (metres)	Vertically (metres)
15	1.40	1.80
20 - 25	1.50	2.00
32 - 50	1.75	2.25
65 - 100	2.00	3.50
125 & over	3.00	4.00

3 Polythene, Pipe Etc.

Pipes of polythene and similar high plasticity material to be continuously supported unless otherwise specified.

4 Support Details

Support pipes of 75mm bore and under operating at 90°C or less, running singly or in pairs, vertically or horizontally, on built-in type brackets of the long shank type, or, where this is impracticable, on screw-on type fixed by at least two screws, in wither case with single screw secured top 'half hoop' fixed to give clearance for free axial movement and, for pairs, 'in line' on both pipes at centres for the smaller pipe.

Materials to be, for mild steel pipes, malleable iron, galvanised for galvanised pipes and chrome plated for chromed pipes, and for copper pipes, cast (not stamped) brass, polished where exposed, or, for light gauge up to 25mm bore not exposed, approved plastic.

Supports for pipes exceeding 75mm bore and all multiple runs at spacing's for smallest pipe and dimensions for largest pipe to be fabricated from mild steel rolled sections, flats and rods as needed arranged as specified, or where not specified to approved detail, of sizes needed to give adequate support but not less than, in millimetres:

Pipe Bore	Angle Bearers	Sections Vertical	Flats	Rod Ø
35 or less	35x25x4	50x35x4	45x6	10
36 -65	50x25x4	75x50x8	50x8	12
66 -80	65x50x6	100x75x8	65x10	16
81 -110	75x50x8	125x75x10	65x12	18
111 -160	75x50x12	125x75x12	75x11	20
161 - 210	100x75x16	150x75x12	100x12	25

Provide guide to each pipe at each support with rod 'U' bolt giving l.5mm clearance to pipe secured by nuts to threaded ends.

Provide support at base of all vertical pipes or as specified or needed to avoid weight being carried by branches.

For pipes of 75mm bore and over, and multiple runs, where hung below concrete, take support rods through to top of slab and fix to 100 x 100 x 12mm mild steel back plate by nuts to threaded end.

For pipes operating in excess of 90°C provide also means to permit free expansion at supports - case iron or fabricated mild steel chain and roller beneath pipe or as specified or approved.

Alternatively support from any concrete inserts specified to be provided by others or, where not so specified, provided under this section subject to approval, and provide all needed purpose made nuts, springs, supporting rods, etc. as

appropriate to support from concrete inserts.

For all supports provide non-animal based soft pads as needed to eliminate movement noises and risk of electrolytic action such as between copper and steel.

31 Pipe Sleeves & Cover Plates

Individual pipe sleeves shall be provided and securely built in at all points where pipes pass through walls, ceilings and floors including where pipework is in voids.

The pipe sleeves shall be the same material and finish as the pipe and shall leave a clearance of 1.5 mm to 3 mm between the pipe and the pipe sleeve and shall be cut to finish flush with the finished surface of the building fabric. The space between the pipe and the pipe sleeve shall be lightly caulked with a malleable material.

All sleeves shall allow pipes to pass freely and allow for expansion. The successful contractor shall be responsible for any damage caused to the building or the apparatus through leakage etc., due to neglect of this.

Pipes passing through sleeves in external walls of buildings, ducts sub-ways etc., shall be caulked between pipe and sleeve with an approved material such as lead wool, to form an effective vermin and weather proof seal. Where a water seal is required in external walls a puddle flange shall be provided.

Pipes passing through floors and fire compartment walls/partitions shall be packed with 3 rings of suitable material to reduce fire risk and water penetration.

The contractor shall be responsible for ensuring that all pipe sleeves are located correctly both before and after building-in by the building contractor

Where pipes pass through walls, floors, ceilings and fixed room fittings and are normally visible, they shall be fitted with zinc alloy die cast, polished aluminium finish wall, floor or ceiling plates. All floor and ceiling plates shall be attached to the pipe by means of spring clips and not set-screws.

Provide where sleeve ends exposed in user areas approved polished chromium plated set-screw fixed plates.

32 Pipe Air Release & Draining

Provide at all high points, and wherever air may collect or water runs, air release unit or 'bottle' comprising tee of line bore and 75mm vertical with 6mm tube to an air cock accessibly located, or, where specified, an automatic float type air release valve (not wooden float) with lockshield isolating valve, discharging to the nearest drain or to atmosphere, through 15mm drip pipe terminated with mitred end.

Provide drain valve to BS 2879, type A bronze gland cock with hose union, l5mm bore, except in plant rooms 25mm bore, at all low points downstream of all isolating valves and wherever else specified or required so that all sections which may be isolated may also be drained.

33 Pipe Expansion & Anchoring

Provide means for thermal expansion in pipework of any service likely to operate at 40°C or over, as specified, or where not so specified by change of direction or installation a loop or joint at intervals of not more than 24m in any internal run, as necessary for any external run.

Provide loops and joints of solid drawn seamless tubes of the same metal, gauge, and finish as the piping in which they are inserted and, between provide free guided movement with static points arranged by the installation of anchors, by:

1 Expansion at changes of direction - bends to be opened during erection to the full extent of their cold draw and where expansion is to take place through a change in the direction omit guides as needed to permit lateral movement.

2 Expansion joints - to be of the corrugated stainless steel bellows type having outer sliding sleeves and ends flanged to the appropriate BS Table, made by the Power Flexible tubing Company Limited, Derby Works, Vale Road, London N.4., Teeding Aircraft Controls Limited, or other equal opened during erection the full extent of their cold draw. Provide guides on each side to ensure expansion takes place in correct alignment and install to maker's instructions especially for the hydraulic testing.

3 Expansion loops - to comprise straight lengths of pipe and bends of the depths and widths specified or, where not specified:

Pipe Size (mm)	Width (metres)	Depth (metres)
Up to 50	1.20	1.80
65	1.35	2.10
75	1.60	2.40
100	1.95	3.00
125	2.25	3.45
150	2.65	4.35
175	3.60	5.50

Install opened to full extend cold draw and where occurring in multiple pipe runs form loops with equal spacings between the pipes arranged so that the pipe having the largest expansion loops is correct, provided no loop is smaller than specified.

4 Anchors - to be similar to pipe brackets specified with, in addition, a small piece of RS channel shorter in length than the diameter of the pipe and cut to the radius of the outside surface of the pipe fixed to the bracket and clamped in position with locknuts on 'U' bolts or both otherwise anchored as may be approved.

34 Mild Steel Pipework

Install in quality tubing with joints later specified except that all concealed pipework and pipework in subways and service areas is to be welded throughout unless otherwise specified.

Screwed joints to be made with approved graphite compound and fine threaded hemp or with PTFE-tape. Red lead will not be allowed.

Flanged joints to be made by screwing on screwed pipework or welding on welded pipework mild steel drilled flanges turned on edge full across fitted flush with pipe ends and mild steel bolted with Klingerite or other approved jointing material, full faced, especially stamped and cut from sheets on site.

For screwed pipework fix malleable iron long and easy sweep, beaded or banded fittings. Square tees will not be used except where open vents are taken off and for non-circulatory branches in the hot water supply services. Unions to comprise two screwed halves, with ground spherical faced joints, one to be bronze.

For welded pipework fix fittings generally as for screwed pipework except:

Tee branches of smaller bore than the main to be welded on site, otherwise to be prefabricated with ends for butt welding.

Bends to be purpose made seamless of same grade as line with ends for butt welding. Springs and sets to be purpose made on site, cold drawn to a radius not less than six times the nominal bore to pipes of 50mm bore and under, and hot bent to a radius not less than three times nominal bore if 65mm or over. In pipes of 75mm bore and under seams to be on the sides of the springs and sets where possible, or where not possible along the inside radii.

Reducing pieces may be either prefabricated or cut, swaged and welded on site, in either case butt welded into the lines.

For galvanised pipework no heat is to be employed to effect bends, sets or joints.

35 Copper Pipework

Install in quality of tubing with joints as later specified.

Screwed joints to be made similarly to mild steel pipework with gunmetal sockets.

Flanged joints to be made with brass bolts to flanges fixed by screwing and brazing or by bronze welding copper alloy flanged to pipe ends - otherwise as for steel flanged joints.

Joints in pipes of 50mm bore and over may be made by bronze welded butt joints if suitable skilled work person available. Bends, sets and springs to be either prefabricated or cold drawn on site by machine to a radius of not less than six times the nominal pipe bore, with branches connected to gunmetal tees.

All bends whether prefabricated or made on site to be annealed before fixing.

Where light gauge copper tube to EN 1057 – R250 is specified the tube to be of de-oxidised non-arsenic copper to BS EN 1254 - 1.

Fittings for light gauge tube to be to BS 864 of the "Yorkshire" capillary type having an internal solder ring, and additional tinned tapered ring as necessary or be "Securex" compression fittings made by J H Lamont & Co. Ltd. as later specified.

Light gauge copper tubes and fittings to be installed in accordance with the manufacturer's directions using any special tools or fluxes, etc. recommended.

No old or re-drawn copper tube may be used.

Where light gauge tube connects to iron or gunmetal valve or apparatus, use straight through adaptor, where screwed, or flanged adaptor where flanged.

36 Anti-Electrolytic Couplings

Fix between any copper pipe and all galvanised steel and steel plate vessels non-ferrous couplings of an approved type to prevent electrolytic action. If connecting to an existing installation check existing will not be affected by new, particularly that there are no galvanised sections in a system to which copper sections are to be connected.

37 Underground Pipes

Except as later specified or directed lay underground pipes for 750mm minimum cover with even gradients to follow ground contours having continuous support and, where passing through structural foundations, below hard surfaces or would be subjected to superimposed load, run through sleeves or equal, of adequate strength and clearance so that no structural movement is transmitted to the pipe. Temporary supports of brick piles or similar may NOT be used but, to facilitate making joints, may be run on concrete blocks, resting on the excavated bottom and located behind each socket or joint or at not more than 2700mm intervals, provided that concrete is then poured around and compacted to the underside of the pipe.

Pipe trench excavations to be bottom lined with 75mm of gravel or equal (max 20mm) except the lining is to be concrete where in hardcore, fill or soft ground.

Test underground pipes in sections and arrange cover as soon as practicable with fill of minimum bas and cover of 300mm gravel or equal (max 20mm) followed by excavated material all well compacted.

Provide anchor at all changes of direction in water and similar pressure mains by a mild steel rod loop clamp bolted pipes to a rolled steel channel section (of dimensions as bearers, clause 30.4) set into a concrete block, the whole arranged to withstand a thrust force equal to the pipe cross-sectional area x the test pressure x configuration factor (tee = 8, blank end = 8, 90°C bend = 12, 45°C set = 6) or as recommended by the pipe fitting manufacturer

All pipes, supports anchors, etc. are to be protected against corrosion attack by wrapping with 'Denso' or equal tape or, where not appropriate, by an approved bituminous covering.

Part 2 **Technical Specification**
Section 1 **Outline of Works**

1 Location

The proposed works are to take place at Wokingham Town Hall, Market Place, Wokingham, Berkshire, RG40 1AS.

2 Contract Preliminaries

Comply with all contract particulars and preliminaries as set down by the Client or their representative.

The Contractor is to make allowance for their own welfare and WC provision.

3 Builder's Work

Precisely locate all holes, bases, chases and builders work in connection with the proposed works on to builder's work drawings and submit such for comment as specified, making due allowance for the time required within the programme.

4 Programme Particular Requirements

It is proposed that the works are to take place during the Summer of 2019, with the anticipated contract period being 6 weeks. As part of their tender submission the contractor is to submit a draft programme of works covering all elements of the proposed project.

The contractor is to note that the proposed works will be carried out within a working restaurant/office environment. As a consequence the contractor is to allow to work closely with the Client with regards to phasing of the works, delivery of plant and materials etc.

5 Extent of Works

The works covered under this specification consist of the provision of mechanical and electrical services to the proposed work areas. The works generally comprise but are not limited to the following:

- Stripping out and removal of all redundant services.
- Extending of the incoming gas service.
- Modification to incoming cold water service.
- Gas fired boiler plant, associated pressurisation plant and circulating pumps.
- New complete flue installation.
- Environmental controls.
- Associated electrical works.
- Associated builderswork.
- Thermal insulation.
- Testing and commissioning.
- Record documentation.

6 Co-ordination of Services

In order that the best use can be made of the space available for the disposition of services, it is of the utmost importance that the Contractor shall co-ordinate his work with the work of others carrying out installation works on the site.

The Contractor will be required to prepare such detailed drawings of the proposed positioning of plant and equipment as may be required to enable his work to be co-ordinated in the general construction of the building and to attend any meetings that may be called for this purpose.

The Contractor shall be responsible for final co-ordination of the services with other trades and building site constraints.

All works shall be installed so as to cause no delay or hindrance to other trades.

7 Setting Out of Works

The drawings are indicative of the design intent. The Contractor shall verify, take measurement on site as necessary, taking into consideration existing site constraints for the setting out of works and adjust proposals accordingly.

8 Health and Safety at Work Act and General Safety Standards	The Contractor shall maintain as required on site competent personnel who shall be responsible for directing all site operations and ensuring that standards of safety and workmanship are being satisfied. The Contractor is to liaise on a daily basis with the building users providing an update on the works that have been completed and are to be completed within the immediate programme.
9 Fire Stops	All penetrations through walls/floors shall be made good to maintain the integrity of the fire barriers.
10 Site Visit	Arrangements to visit the site should be made via the Client. No claims arising from lack of site visit at the time of tender shall be entertained.
11 Programme	To be agreed with the successful Contractor, generally the works are to be completed during the Summer of 2019.

Part 2 **Technical Specification**
Section 2 **Schedule of Mechanical Services Work**

1.0 Method

The schedule of work which follows shall be read in conjunction with the rest of this specification and tender drawings.

Unless otherwise stated allow in each item for providing facilities described or for supply, erecting, connecting and testing the goods and materials specified.

Include for everything necessary for the proper and satisfactory execution of the work to the approval of the Contract Administrator and true intent of the specification and drawings.

2.0 Stripping Out & Services Diversions

The Contractor shall allow to isolate, carefully disconnect and remove all items of plant and equipment that becomes redundant as a result of the works. This includes the removal of boiler plant, flues, circulating pumps, pipework, valves etc. both within the plant room and external to the plant as necessary as indicated on the drawings.

The contractor is to note the requirement to keep a record of all existing heating circuits that are stripped out from the Boiler Room. The Contractor shall keep a hard copy drawing on site which shall be marked up as the works progress identifying the heating circuits which have been removed and which area/s of the building each particular circuit serves.

The Contractor shall allow to isolate existing services in the adjacent areas of the building as required to facilitate the works.

All shutdowns shall be carried out outside of office and restaurant hours and be agreed with the Client at least 3x working days in advance of any proposed shutdown.

3.0 General Description

The project comprises the replacement of the existing gas fired boiler plant with new gas fired boiler plant as well as the provision of new flues and all associated circulating pumps, pressurisation plant etc. General builderswork is to be allowed for to give complete and operational installations.

Refer to the drawings for further information of the proposed works. The works are to take place on an office and restaurant site and as such the contractor is to note the restricted access.

4.0 Incoming Services

4.1 Incoming Water Main

The Contractor is to allow for modifying the existing incoming mains cold water supply as generally indicated on the drawings.

The Contractor is to allow to connect onto the existing incoming mains cold water supply to serve the proposed bib tap outlet and heating pressurisation plant as indicated on the drawings.

Prior to commencement of the works the Contractor is to take pressure and flow readings at the proposed connection point to existing mains cold water supply. The results of these readings are to be made known to the Client and Consulting Engineer.

4.2 Incoming Gas Main

The Contractor is to allow for modifying and extending the existing gas supply from the meter cupboard located within the Restaurant to the Boiler Room to serve the new boiler plant, ensuring it complies with current regulations, all generally as indicated on the drawings and detailed within this specification.

Prior to commencing any works on site the Contractor is to verify the total existing gas loading serving the building and advise the Client and Consulting Engineer of the results prior to placing the orders for any plant and equipment.

All pipework within the plantroom to each draw off point is to be installed using mild steel tube to BS 1387. All joints and fittings for gas pipework shall be in accordance with IGE Utilisation Procedure IGE/UP/2. The number of joints is to be kept to a minimum.

The gas solenoid valve shall be linked the fire alarm, emergency knock off button and gas sniffer as indicated on the drawings.

Prior to commencement of the works the Contractor is to take a pressure reading of the existing gas supply at the proposed connection point within the meter cupboard. The result of this reading is to be made known to the Client and Consulting Engineer.

5.0 Natural Gas Installation

5.1 Introduction

The Contractor shall provide to extend the gas service to serve each of the outlets as indicated on the drawings.

The natural gas installation shall be installed in accordance with the British Gas Regulations and in particular, with the recommendations contained in the following publications:

(a) IM/2 – Purging Procedures for Non-Domestic Gas Installations.
(b) IM/5 – Soundness Testing Procedures for Industrial and Commercial Gas Installations.
(c) IM/15 – Manual Valves – A Guide to Selection for Industrial and Commercial Gas Installations.
(d) IM/16 – Guidance Notes on the Installation of Gas Pipework, Boosters and Compressors in Customers Premises.

The installation comprises a low pressure natural gas supply as follows:

(a) Working Pressure: Up to 35 mbar.
(b) Soundness Testing: See IM/5.
(c) Purging Procedure: See IM/2.

The proposed natural gas installation is to be installed by a competent Gas Safe Registered gas fitter.

The Contractor shall ensure that the modification of the existing gas supply is not carried with any detrimental effect on the existing buildings' operation. Upon entry to the plant room the gas supply must be run in a sleeved pipe to allow free ventilation to the gas which may inadvertently escape from the supply line.

The Contractor is to allow for a pulsed output from the gas meter which is to be monitored via the BMS.

The Contractor is to allow for a Medem gas detection system located within the plant room which is to be monitored via the BMS. The gas detection system is to comprise, as a minimum of an AGDS-4 panel and gas detector.

For low pressure gas supplies metered at 21 mbar the maximum allowable pressure drop of 1mbar from the meter to the appliance isolation valve. If the low pressure gas supply is metered above 21 mbar then the total allowable pressure drop should not exceed 10% of the pressure at the meter.

5.2 Steel Pipelines

Pipes
Distribution pipelines located inside the building shall be black heavy quality mild steel to BS 1387.

Fittings
Fittings shall be BS 143 and BS 1256 malleable threaded castings. Use bends, square tees, reducing sockets and union connectors.

5.3 Supports

Exposed pipes on walls in occupied areas shall be fixed using a malleable split ring, steel pipe stem, malleable backplate and steel screws. Alternatively, the pipe stem may be built into the wall.

Pipes must be supported from non-combustible material.

5.4 Valves

Manual isolating valves shall comply with the recommendations of British Gas publication IM/15.

Valves for Pipelines Inside the Building
A bronze ball type isolating valve with quarter turn lever for copper pipelines sizes 15 and 22mm diameter. Crane Fig D171C with compression ends to BS 864 Part 2 or other approved.

A brass ball valve type isolating valve with quarter turn lever for steel pipelines sizes 15 to 50mm diameter. Crane Fig D191 threaded BS 21 or other approved.

A cast iron butterfly regulating/isolating valve with quarter turn lever for steel pipelines sizes 65 to 150mm diameter. Crane Fig f611 or other approved with plain ends for use with flanges.

Flexible Connector
Braided aluminium for natural gas. BSPT connections.

5.5 Ancillaries

Vent Points
Vent points comprising a 20mm diameter isolating valve shall be installed at the end of each pipeline branch to assist purging procedures. On completion each valve shall be suitably plugged.

Test Points
Brass pressure test point nipple. BSPT. Sperryn Fig 6134 or other approved. Drawing reference TP.

Commissioning
Upon completion of the installation the contractor shall carry out soundness testing of the installation in accordance with British Gas Publication IM/5.

Carry out purging procedures for non-domestic gas installations in accordance with British Gas Publication IM/2/IGE recommendations.

All pipework installed shall be suitably identified with labels and/or painting.

5.6 Plantroom

The Contractor shall install a gas solenoid valve as indicated on the drawings linked to the fire alarm. An emergency knock off button shall be provided immediately adjacent to the exit door, in addition detectors shall be provided above each of the boilers.

Allow for a 13amp fuse connection via a 6amp MCB to the gas solenoid valve.

6.0 Boiler Plant & Heating Systems

6.1 Introduction

The Boiler Room is to be provided with new gas fired boiler plant, pressurisation plant, circulating pumps, controls etc. generally as indicated on the drawings to serve the building.

6.2 Boiler Plant

The Contractor shall supply, deliver and install boiler plant to serve the building as indicated on the drawings and as scheduled in Appendix Two – Schedule of Equipment towards the rear of this specification. Refer also to Vaillant Ltd's latest Quotation Number: SL-C1549, contact Mr Steve Lingham on 07802 673746.

The boiler plant shall be gas fired fully condensing mounted in a cascade arrangement with frame set and pipework rig (as supplied by the boiler manufacturer) and be located in the position as indicated on the drawings.

Each boiler is to be complete with the manufacturers pump kit as indicated on the drawings and noted in Vaillant Ltd's quotation.

Each boiler module is to be complete with an individual expansion kit to allow full compliance with BS 6644.

The boilers shall include all necessary interlocks, valves and safety devices etc., and be connected in such an arrangement as indicated upon the drawings.

Allow for the supply and installation of a plate heat exchanger (to be sized and selected by the boiler manufacturer) as indicated on the drawings.

Include dial temperature gauges on the flow and return header pipework.

The boiler plant shall be installed strictly in accordance with the manufacturer's instructions, allowing for all access as recommended by the manufacturer around the boilers for future maintenance, servicing etc. The manufacturer shall fully commission the boiler plant upon completion of the works.

The boiler plant overall control is to be by the BMS installation, please refer to Section 8.0 of this specification for further information.

The Contractor is to allow to supply and install a NABIC fig. 500 safety valve to the flow connection of each boiler allowing to discharge to the plantroom floor.

The Contractor is to allow to run the boiler plant condensate to the sump pump pit via a suitably sized trap. In addition the boiler condensate is to pass through a suitably sized neutraliser prior to discharging into the gulley, as selected and manufactured by Mommertz Ltd, Tel: 0208 367 5316.

6.3 Boiler Flue System

A complete new flue installation is to be provided from the Ground Floor Boiler Room through the building terminating to above the building's roof level. The flue is to be generally installed to the route as indicated on the drawings utilising the existing route

which will be left upon strip out of the existing boiler flue installation. Allow for condensate traps, flue liner, termination cowl etc. all as required to give a complete and operational installation.

The flue installation shall be designed, installed, tested and commissioned by Chimflue Ltd, contact Mr Dylan Kennedy on 07747 512285.

6.4 Pressurisation Unit & Expansion Vessel

The Contractor is to supply, deliver and install in the locations as indicated on the drawings packaged pressurisation units and associated expansion vessels to match the heating system water content as scheduled in Appendix Two – Schedule of Equipment towards the rear of this specification.

The Contractor is to note the requirement for two set of pressurisation plant, i.e. one set of plant on the boiler side of the plate heat exchanger and the second set of plant on the system side of the plate heat exchanger, all as generally indicated on the drawings.

The pressurisation unit plant is to be complete system high/low pressure switches and common volt free contacts.

The manufacturer shall fully commission the pressurisation units upon completion of the works.

It is the responsibility of the contractor to check the capacity of the specified expansion vessels upon completion of the working drawings to ensure they have sufficient capacity to take up the expansion in the modified system.

6.5 Heating Pumps

The Contractor is to allow to provide heating circulating pumps as indicated on the drawings and as scheduled in Appendix Two – Schedule of Equipment towards the rear of this specification.

The heating variable temperature circulating pump is to be twin head (with automatic change over) and be invertor driven to match the heating demand. Overall control of the heating pump is to be via the BMS installation.

The heating variable temperature circulating pump is to be complete with differential pressure switches.

All circulating pumps are to include inlet and discharge altitude gauges, flexible connections and be supplied and installed in accordance with Appendix Two – Schedule of Equipment towards the rear of this specification.

The Contractor shall be responsible for checking the system resistances on completion of the working drawings prior to ordering the circulating pump.

The circulating pumps shall be installed strictly in accordance with the manufacturer's instructions. The manufacturer/accredited supplier shall fully commission the pump on completion.

6.6 Mains Distribution Pipework & Valves

The extent of the heating system is generally as indicated on the drawings and as detailed in Section 6.1 above. All main distribution heating pipework shall be to the routes and sizes as indicated on the drawings. Pipework shall be installed in black mild steel heavy grade to BS 1387 with all joints outside of the boiler room being screwed taper thread to BS21. All joints inside of the boiler room shall be screwed taper thread to BS21. All brackets shall be back plates and Munsun rings.

All pipework passing through walls shall be sleeved.

The Contractor shall provide and install in the primary return circuit a MagnaClean CP1 device as supplied by JTM Plumbing (Tel: 01325 488588) or equal and approved.

The Contractor shall provide isolating valves at all branch heating pipework, these shall be of the quarter turn ball valve as manufactured by Hattersley Ltd. Provide commissioning valves of double regulating type with measuring station at all branch heating pipework as manufactured by Hattersley Ltd.

Provide air vents at all high points and drain cocks at all low points to facilitate complete draining and venting of the system.

All commissioning stations on return main branches are to be complete with orifice plate measuring devices.

The heating system is generally as indicated on the tender drawings, however, tenderers shall allow for additional bends and sets as required for the actual installation to account for building constraints and local services.

7.0 Domestic Cold Water Service

7.1 Introduction

The Contractor is to allow to modify the existing mains cold water service systems as indicated on the drawings to serve the plant and equipment as generally indicated on the drawings.

7.2 Cold Water Pipework, Valves & Fittings

The Contractor shall include to install all hot and cold water pipework to the routes and sizes as indicated on the drawings.

Water Supply (Water Fittings) Regulations 1999.
The Contractor shall include for notifying the water supply company of the alterations to the water services, in accordance with clause 5 of the Regulations.

The systems shall be installed in accordance with BS 8558.

All distribution pipework and final connections to draw off points shall be run in copper tube to EN1057-R250.

All pipework and fittings shall be suitably kitemarked and be WRC approved for wholesome water.

All fittings 54mm and below shall be capillary type solder ring (lead free) to BS EN1254-01 dezincification resistant.
Allow for the installation of:

- Drain cocks at all low points.
- Air vents at all high points.
- Thermal insulation to be installed on all pipework.
- Pipe sleeves - Where pipes pass through wall floors and ceilings compatible pipe sleeves shall be provided. After installation pack both ends with mineral fibre and sealed with fire retardant mastic.

Isolating valves/stopcocks/drain cocks shall be of Hattersley manufacture or equivalent.

The cold water systems are generally indicated on the tender drawings, however, tenderers shall allow for additional bends and sets as required for the actual installation to account for building constraints and local services.

7.3 Commissioning

The Contractor is to allow to hydraulically pressure test the installed systems to 1.5 times the normal working pressure.

On completing the installation of the cold water pipework the contractor shall chlorinate the system in accordance with BS 8558.

The systems shall be flushed by using a disinfecting agent as manufactured by a specialist. This shall be circulated through the pipework systems for a period recommended by the specialist, then the system drained. The systems shall then be flushed until the water quality is within the following parameters:

- Total dissolved solids equivalent to the incoming water main.
- Iron in solution, below 10ppm or equivalent to the incoming water whichever is greater.
- That the water is visibly clear and bright and free from suspended solids.

These readings shall be witnessed by the Engineer.

Upon completion the Contractor shall carry out a complete Legionellosis Risk assessment to the requirements of HASAWA, COSHH, ACOPL8, HSG70 and provide the necessary documentation prior to handover.

The complete installation shall be commissioned and tested by the Contractor and set to work to the satisfaction of the Engineer.

8.0 Automatic Controls

8.1 Introduction

As noted in Section 6.2 of this specification the proposed boiler plant and ancillary equipment within the plant room is to be controlled and powered via the proposed Trend BMS installation.

The Contractor is to allow for employing the boiler manufacturer to fully commission the boiler plant prior to handover.

8.2 Performance Objectives

The Contractor will use a Specialist Controls Supplier to develop the design of the controls system from the performance requirements outlined in this specification and indicated on the drawings. The contractor should approach the following BMS controls specialists during the tender period in order to obtain their proposals and associated costs:

- RV Controls Ltd, Tel: 01934 834366.
- AES Control Systems Ltd, Tel: 01604 790606.

The Contractor may wish to approach their own preferred BMS controls specialist. The contractor must advise of the details of the BMS controls specialist they have included for as part of their tender submission.

The Specialist Controls Supplier will be responsible for engineering the design, supply, software development, graphics development, testing and commissioning of the whole automatic control system together with the supply of control panels, user interface, and all control equipment to allow each system to operate in accordance with the design intent. All wiring to the field controllers/sensing devices in general all components deemed to constitute an integral part of the control installation must be priced and installed by the control specialist.

The Specialist Controls Supplier shall:

- Submit complete production information to the Main Contractor for review and comment prior to manufacture.

- Carry out any software development and software configuration.
- Produce internal and field wiring diagrams (power and controls) plus cross referenced field cable & containment layout drawings.
- Prepare a final detailed point's schedule.

The Specialist Controls Supplier will include for all necessary points to allow the system to operate efficiently and correctly in accordance with the operational descriptions. If additional points are required over and above those indicated in the performance design information, these shall be deemed to be included.

The Specialist Controls Supplier will be responsible for all motor/drive selections, control valve selections, all wiring details, adjustment of cable sizes and electrical equipment to suit, and for defining any interfacing components such as relays, contactors, etc.

The automatic controls system serving the building shall be kept as simple as possible and control items of plant and equipment as described in this section.

Where it is has been indicated in the specification or in the drawings all mechanical items of plant communicating with the control panel or other independent field instrument, such as fire alarm system and gas detection system must be supplied, installed and commissioned by the control specialist. A reference should be made to other sections in this document for details of specific items of plant which will be interacting with the control system or are being controlled to ensure a completely functional system on hand over.

The Contractor is to note that the control panel is to be complete with iQ3 Excite and iQView4 touch screen display.

9.0 Electrical Services & Fire Alarm Installations

9.1 Introduction

The Contractor is to carry out the electrical services work generally as indicated on the drawings and detailed within this specification.

The Contractor is to approach the following electrical contractors to provide a price for the electrical works associated with this project:

- N&M Electrical Ltd, 9A The Old Shed, Gathorne Road, Headington, Oxford, OX3 8NF.
  Contact: Mr Matthew Phillips, Tel: 01865 767884.
- IA Glenister Electrical, 4 Tamarisk Way, Weston Turville, Aylesbury, Buckinghamshire, HP22 5ZB.
  Contact: Mr Dave Kester, Tel: 01296 612111.

The Contractor may propose an alternative electrical contractor to complete the installations. The proposed electrical contractor who is to complete the works shall be named as part of the Contractor's tender submission.

The Contractor is to approach the following fire alarm specialist to provide a price the fire alarm works associated with this project:

- Westronics Ltd, 11/12 Marcus Close, Reading, Berkshire, RG30 4EA.
  Contact: Mr Andrew Munday, Tel: 0118 942 6726.

9.2 Small Power

The Contractor is to allow for the replacement of the existing electrical distribution board within the Boiler Room with a new suitably sized board. The new distribution board is to have adequate capacity to serve all existing and proposed supplies whilst providing 25% spare capacity for future connection.

Include for the supply and installation of power supplies to the following items of equipment:

- Mechanical Control/BMS Panel.
- 1x Gas Solenoid Valve.

The supply to the new Mechanical Control/BMS Panel shall be derived from the existing isolator located in the plant room. The new BMS panel is to be located in the position as indicated on the drawings. Install XLPE/LSF Cu singles cables in conduit from the isolator terminating within the isolator integral to the BMS panel.

Allow to test the whole circuit from source i.e. local distribution board to final connection point.

Final connection to the equipment shall via fused connections units using heat resistant multi-core cabling.

Allow to test new circuits and all parts of the installation modified as part of the works in accordance with BS 7617.

9.3 Lighting Installation

Include for undertaking the modifications and additions to the existing lighting system as detailed on the drawings and within this specification.

The existing lighting shall be stripped out and removed with the existing lighting circuit modified to serve the new lighting.

Include for the installation of the new luminaries as indicated on the drawings, the new luminaires shall be as follows:

Type A – 2x35watt IP66 linear fluorescent luminaire complete with High frequency control gear and prismatic diffuser as Cooper Lighting Tufflite TFW.
Type AE – As 'Type A' above but with integral 3 hour duration emergency conversion.

Include for the installation of uni-strut channel support as required to provide a support frame for fixing of luminaires.

Allow to install a new one way metal clad (MK Metalclad plus) switch within the plant room and a further new one way metal clad (MK Metalclad plus) switch within the new sore area to control the new lighting as indicated on the drawings. Also include for the installation of an emergency key test switch as required installed within the local switch gang.

Allow to test the existing lighting circuit following modifications and installation of the new luminaires.

Test the new emergency lighting in accordance with the requirements of BS5266.

9.4 Fire Alarm

Allow to adapt and extend the existing fire alarm system as indicated on the drawings and detailed within this specification.

Allow to extend the existing system to connect to the new interface unit associated with the BMS panel, as indicated on the drawings.

Allow to extend the system using fire rated multi-core cabling 1.5mm² as Draka FT30 or equal and approved. Cabling shall be installed on metal cable tray where running horizontally and within steel conduits for vertical drops down walls.

All works shall be undertaken in accordance with BS 7671 and BS 5839.

Allow to test and commission the modifications to the system following the works.

Test the lighting in accordance with the requirements of BS 5266.

10.0 Builderswork

As part of the works the Contractor is to allow as a minimum for the following buildersworks elements:

- All holes through walls, ceilings, slabs etc. as required to facilitate the proposed installations.
- Removal of all existing slabs and bases within the Boiler Room.
- Upon removal of all redundant plant, slabs and bases within the Boiler Room fully prepare the existing floor slab and apply 3x coats of suitable heavy duty floor paint. Colour to be agreed.
- Upon removal of all redundant plant from the Boiler Room fully prepare the existing walls & ceilings and apply 3x coats of suitable matt paint. Colour to be agreed.
- All new slabs as required within the plant room for mounting the proposed plant, generally as indicated on the drawings.
- Cutting of new holes within the existing Boiler Room door to facilitate the fitting of the door transfer grilles.
- Scaffolding and full access to roof area to facilitate the installation of the new flue system.

The above buildersworks list is not exhaustive and the Contractor is to allow for all buildersworks elements as may be required to facilitate the proposed installations.

The Contractor is to employ a suitably qualified sub-contractor/s to complete all buildersworks elements. The proposed building contractor who is to complete the builderswork elements of the project shall be named as part of the Contractor's tender submission.

11.0 Thermal Insulation

11.1 Introduction

All insulation works shall be carried out by skilled workmen employed by a specialist firm which is a member of the Thermal Insulation Contractors Association (TICA).

The contractor is to note the requirement for applying thermal insulation to all pipework services within the plant room, both new heating pipework and existing domestic water services pipework runs.

Do not apply thermal insulation until the system has been fully tested, all joints proved sound and the surface to be insulated.

Thermal insulation materials and installation methods shall be strictly in accordance with the relevant sections of the following British Standard Specifications and Codes of Practice:

Terminology:	BS 3533 – Glossary of thermal insulation terms.
Performance Standards:	BS 5422 (2001) – Method for specifying thermal insulating materials on pipes, ductwork and equipment (in the temperature range -40°C to 700°C).
Materials Specification:	BS 3927 – Specification for rigid phenolic foam (PF) for thermal insulation in the form of slabs and profiled sections. BS 3958 – Thermal insulating materials. Part 3: Metal mesh faced man-made mineral fibre mattresses. Part 4: Bonded preformed man-made mineral fibre pipe sections.

	Part 5: Specification for bonded man-made mineral fibre slabs.
Application Methods:	BS 5970 – Code of Practice for thermal insulation of pipework and equipment (in the temperature range -100°C to 870°C).
Material Testing:	BS 476 – Fire tests on building materials and structures. Part 4: Non-combustibility test for materials. Part 6: Method of test for fire propagation for products. Part 7: Surface spread of flame tests for materials. Part 12: Method of testing for ignitability of products by direct flame impingement (superseded Part 5).

11.2 General

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

Insulating materials, coverings and coatings shall be of a uniform thickness throughout.

The insulation shall have a smooth lineable finished surface and rigid sections shall be concentric and accurately matched. The Engineer will not accept insulation sections having damaged ends or edges or irregularities in the thickness of materials. To ensure that the correct thickness has been applied the Engineer reserves the right to cut our specimen sections of each type of duct or pipe insulation for inspection. If the inspection reveals that the insulation is not in accordance with this specification all insulation shall be stripped off and reinstated at the Contractors expense.

Each pipe shall be insulated separately so that adjacent parallel pipes are not married together in one insulation covering. There shall be a minimum clearance of 25mm between adjacent insulation surfaces.

11.3 Ductwork Insulation

The contractor is to note that all supply and extract heat recovery ventilation ductwork is to be fully insulated in accordance with this clause.

Material Specification

Insulation Material:	Kooltherm Phenolic Foam duct insulation.
Thickness:	In accordance with BS 5422:2001 table 11.
Density:	40kg/m^3.
Thermal Conductivity:	0.020 W/m K @ 20°C.
Manufacturer:	Kingspan Insulation Ltd or other approved.

Where support pins/hangers puncture the foil they shall be cropped back to the washers and sealed using an aluminium foil tape to maintain the vapour barrier.

On the exposed edges of the slab, e.g. corners, provision shall be made to carry the aluminium foil to the adjoining slab to maintain the integrity of the vapour barrier.

11.4 Pipework Insulation

The system is to be fully insulated in accordance with the appropriate sections of BS 5422:2001 according to the type of mechanical service installation (e.g. heating, hot water supply, cold water supply etc.)

(a) Type of Insulant/Manufacturer

The insulation shall be Kooltherm pre-formed bore-coated sections of rigid phenolic foam with a factory applied reinforced aluminium foil jacket. As manufactured by Kingspan Insulation Ltd or equal and approved.

(b) Thickness of Insulation
Insulation thicknesses shall be in accordance with BS 5422:2001.

(c) Method of Application
To be applied in accordance with the manufacturer's recommendations. All joints to be close butted and sealed with 500mm wide aluminium foil adhesive tape, Idenden T303 or equal. Each section of preformed insulation shall be firmly secured to the pipe by two additional circumferential bands of 50mm wide aluminium foil adhesive tape. On chilled and cold water pipes the vapour barrier to be fully sealed at all joints, terminations and protrusions through the insulation. Kooltherm high density insulation insets to be installed at pipe supports to facilitate the provision of a continuous vapour barrier.

(d) Finish
Insulations hall be finished in a rigid plastic Isogenopak casing in the plantroom only. Insulation elsewhere shall be factory applied aluminium foil finish.

(e) Labelling
All pipework shall be labelled with colour coding and directional arrows.

11.5 Thickness Tables In Accordance With BS 5422:2001

11.5.1 Heating Installations
Environmental thickness of insulation to control heat loss in accordance with BS 5422:2001 - Table 12.

Steel Pipe Size (mm) NB	Hot Face Temperature of Installation +75°C Thickness of Phenolic Foam Insulation (mm)
15	15
20	15
25	20
32	20
40	20
50	20
65	25
80	25
100	25

11.5.2 Domestic Cold Water Installations
Thickness of insulation to prevent condensation on a low emissivity outer surface with ambient air conditions of 25°C and 80% RH in accordance with BS 5422:2001 - Table 8.

Copper Pipe Size (mm)		Hot Face Temperature of Installation +10°C Thickness of Phenolic Foam Insulation (mm)
NB	OD	
15	15	15
20	22	15
25	28	15
32	35	15
40	42	15
50	54	15
65	67	20

11.5.3 Domestic Hot Water Installations

Environmental thickness of insulation in accordance with BS 5422:2001 - Table 13.

Steel Pipe Size (mm)		Water Temperature of 60°C Thickness of Phenolic Foam Insulation (mm)
NB	OD	
15	15	15
20	22	15
25	28	20
32	35	20
40	42	20
50	54	20
65	67	25

11.5.4 Ventilation Ductwork Carrying Warm Air

The contractor is to note the requirement for all supply and extract heat recovery ventilation ductwork to be fully insulated in accordance with this clause.

Environmental thickness of insulation in accordance with BS 5422:2001 - Table 11.

Temperature Difference Between Air Inside Ductwork & Ambient Air 10°C
Environmental Thickness of Phenolic Foam Insulation (mm)
20

12.0 Testing and Commission

12.1 Introduction

This section of the Specification includes:

- Works prior to commissioning.
- Commissioning.
- Performance testing.

The CIBSE and BSRIA publications referred to are as follows:

CIBSE Commissioning Codes:

- Series A – Air Distribution.
- Series B – Heat Sources.
- Series C – Automatic Controls.
- Series R – Comfort Cooling.
- Series W – Water Distribution.

BISRIA Application Guides:

- Manual for Regulating Air Conditioning Installations.
- Manual for Regulating Water Systems.

The following definitions shall apply to the activities associated with the Commissioning of the Works.

12.2 Pre-Commissioning

Pre-commissioning is the phase of work which takes into account the activities necessary to advance an installation from static completion to the commissioning phase.

12.3 Commissioning

In accordance with the Commissioning Codes, commissioning is defined as 'the advancement of an installation from static completion to full working order to specified requirements'. Commissioning includes the setting to work and regulation of an

installation. Commissioning is deemed to be complete when all regulation work has been completed.

12.4 Performance Testing

Performance testing is the evaluation of a system which has been commissioned to ensure that it is operating within the tolerances as set out in the Specification and the relevant Commissioning Codes and Guides.

13.5 Scope of Works

The scope of the commissioning works includes the provision of all labour, apparatus, instruments, materials, tools, plant and equipment required to carry out and record the commissioning and performance testing of all systems and all associated electrical and automatic controls systems. The mechanical services installation shall be commissioned in accordance with the relevant Commissioning Codes, Guides and this specification.

12.6 Additional Tests

The Engineer will have powers to instruct tests at site or at the supplier's premises on all or any of the plant and equipment intended to be used in the Works in any manner he may deem necessary to demonstrate conformity with this Specification. The results of such tests or any other tests will in no way relieve the Contractor of his responsibilities to ensure that all plant and equipment installed in the Works are entirely suitable for the application and conditions of operation.
Any defects or other irregularities which become apparent during commissioning and performance testing must be rectified and the exercise repeated until the installation is proved complete and in accordance with the specified requirements.

12.7 Copies of Codes

One copy of the relevant CIBSE Commissioning Codes and BSRIA Application Guides shall be provided by the contractor and be made available on site for the sole use of the Engineer.

12.8 Exchange Pulleys and Belts

The Contractor shall include for one set of exchange pulleys and belt drives for each belt driven fan and pump installed in the building. Pulleys and drives shall be sized and fitted as determined by test results at the time of commissioning in order to satisfy the specified performance criteria.

12.9 Works Prior to Commissioning

12.9.1 Tests

Commissioning and performance testing shall only be carried out after the installation has been tested and certified as detailed elsewhere in this Specification. This includes:

(a) Hydraulic pressure testing of pipework
(b) Works testing of plant items
(c) Air leakage tests of ductwork

12.9.2 Pre-Commissioning Checks

Pre-commissioning checks shall be carried out to ensure that all system components are correctly installed. Cleanliness of air and water distribution system is essential.

All statically complete systems shall be correct with regard to the details indicated on the drawings and as described in this specification and clean and safe to operate.

To ensure that each system is in a satisfactory and safe condition before start-up carry out the checks in accordance with the recommendations in the relevant CIBSE Commissioning Codes.

Where a defect has a bearing on the commissioning of a system or systems it shall be rectified prior to commissioning.

12.9.3 Pre-Commissioning Work

All hydraulic systems shall be thoroughly flushed through to ensure removal of any debris in the pipeline systems.

When chemical cleaning is applied, procedures shall be implemented to ensure that all residual chemical deposits are removed from the system prior to commissioning.

All strainers shall be removed and cleaned during and after flushing and immediately prior to balancing of the system.

Advance notice shall be given to the Engineer prior to removal and cleaning of strainers.

Flushing and cleaning of the hydraulic systems shall continue until it can be demonstrated that the system has been cleared of all debris and contamination.
Flushing water shall be released and drained away in an approved manner as rapidly as possible through adequately sized drain valves.

No hydraulic system shall be left empty once the chemical cleaning and flushing procedures have been completed.

No solid or liquid polluting matter shall enter water courses, water supplies etc.

All ventilation systems shall be completely clear of any obstructions, debris and superfluous matter prior to commissioning. Ensure that all fire dampers are secured in the open position.

All control panel wiring shall be checked for loose connections, correct terminations and compliance with the wiring diagrams.

Wiring terminations to control equipment and interlocks with other equipment shall be checked for compliance with the HVAC wiring diagrams.

Faults shall be rectified as soon as they are discovered unless associated with wiring carried out by others, in which case they shall be recorded and notified to the Main Contractor.

12.10 Personnel

Commissioning and performance tests shall be carried out using trained and experience Commissioning Engineers. The Supervising Commissioning Engineer must have a minimum of five years' experience in the commissioning and performance testing of mechanical services installations.

Commissioning and performance testing of major items of equipment including boilers, pressurisation units, air handling units, booster units and automatic controls systems etc. shall be carried out by the manufacturer's personnel.

The Contractor shall co-ordinate and supervise the manufacturer's commissioning engineers during the commissioning and performance testing of major items of equipment.

12.11 Instrumentation

12.11.1 Calibration

Current calibration certificates shall be submitted for all instruments that require periodic recalibration immediately prior to the beginning of measurement work on site.

12.11.2 Test Instrument Detail

The commissioning reports shall give details of the test instruments used indicating the manufacturer's name, model number, serial number, certificate of calibration and correction factors.

12.11.3 Commissioning

The Contractor shall commission the complete mechanical services installation and shall submit a programme of works for approval prior to commencement of commissioning. The programme shall be updated and amended as and when directed.

A commissioning method statement shall be submitted for each system to be commissioned.

All air and hydraulic systems shall be balanced to the tolerances detailed in the specification, commissioning codes and guides.

All distribution systems shall be balanced with due regard to noise generation.

Where system noise generation exceeds the acceptance levels specified the Contractor shall provide all relevant information to the Engineer.

All measurements and operational details shall be recorded as commissioning work proceeds and subsequently incorporated into the commissioning manual.

All air distribution system dampers shall be clearly marked in an approved manner when the individual system has been balanced.

All hydraulic regulating devices shall be locked in their final regulated position in an approved manner.

The final balance of all air and hydraulic systems shall be demonstrated to the Engineer.

System performance tests shall not proceed until the certified commissioning results have been submitted.

13.0 Demonstration

On completion of the works the contractor is to demonstrate the operation of all installed systems and the maintenance routines to the building users and site facilities personnel.

The contractor is to arrange for the BMS specialist to visit site and demonstrate their commissioned installation to the building users and site facilities personnel.

The contractor is to allow for 1x full day for the demonstration of the installed systems.

APPENDIX 1 - DRAWING SCHEDULE

Drawing Number	Drawing Title	Drawing Size	Drawing Scale
1362.01/M001	Proposed Boiler Room Layout	A1	1:20
1362.01/M002	Proposed Boiler Room Schematic	A1	NTS
1342.01/M003	Proposed BMS Automatic Controls Schematic	A3	NTS

APPENDIX 2 - SCHEDULE OF EQUIPMENT

Item	Specification	Manufacturer	Notes
Heating Boiler One (B.01)	EcoTEC 120 VU GB 1206/5-5 Cascade Mounted	Vaillant Ltd Tel: 0345 602 2922	Gas Consumption = 12.1m³/hr Output = 112.0kW (80°C/60°C) 480mm Wide x 960mm High x 603mm Deep
Heating Boiler Two (B.02)	EcoTEC 120 VU GB 1206/5-5 Cascade Mounted	Vaillant Ltd Tel: 0345 602 2922	Gas Consumption = 12.1m³/hr Output = 112.0kW (80°C/60°C) 480mm Wide x 960mm High x 603mm Deep
Pressurisation Unit - Boiler Side (PU.01)	Mikrofill 3	Mikrofill Ltd Tel: 03452 606020	To Have High/Low Level Pressure Alarm To Be Set In Factory At 1.0 Bar To Be Linked To BMS Panel
Expansion Vessel - Boiler Side (EV.01)	MikroPro 35/4	Mikrofill Ltd Tel: 03452 606020	Capacity = 35 Litres Dimensions: 404mmØ x 387mm high
Pressurisation Unit – System Side (PU.02)	Mikrofill 3	Mikrofill Ltd Tel: 03452 606020	To Have High/Low Level Pressure Alarm To Be Set In Factory At 1.0 Bar To Be Linked To BMS Panel
Expansion Vessel - System Side (EV.02)	MikroPro 300/6	Mikrofill Ltd Tel: 03452 606020	Capacity = 300 Litres Dimensions: 630mmØ x 1105mm high
Heating Variable Temperature Circulating Pump (P.01)	Magna3D 40-100	Grundfoss Ltd Tel: 01525 850000	Duty: 3.85l/s @ 29.7kPa Twin Head Pump Invertor Driven 230v/1ph/50hz

PART 3 TENDER DOCUMENTS – WOKINGHAM TOWN HALL

The following is an analysis of the quoted figure as entered on the Form of Tender and must be completed by the Tenderer at the time of Tender and must be arithmetically correct.

The Contractor shall note that if after receipt of tenders there is a shortfall of funding, various elements of the work will be omitted to comply with the funding limit. Accordingly the Contractor shall price each element of the work on the above basis including any loss of profitability consequent on a reduced contract value.

Each sum shall include for all work necessary to complete that particular section of work.

Wokingham Town Hall – Boiler Replacement Works 2019

1	Compliance with Preliminaries and Standard Specification	£
2	Stripping Out and Removal of Redundant Services	£
3	Gas Service	£
4	Boiler Plant, Pumps, Pressurisation Plant, Pipework & Valves	£
5	Boiler Flues	£
6	Domestic Cold Water Services	£
7	Electrical Services	£
8	Builderswork (Including Scaffolding)	£
9	Automatic Controls	£
10	Thermal Insulation	£
11	Testing and Commissioning	£
12	Demonstration	£
13	Record Documentation	£
14	Any other items not included but above but required to complete the contract, please list:	
	_____	£
	_____	£
15	Provisional Sum for Electrical Works	£ 2,000.00
16	Provisional Sum for Re-dosing Existing System	£ 1,000.00
17	Provisional Sum for BWIC with Flue Installation	£ 3,000.00
18	Provisional Sum for Contingency	£ 6,000.00

Total to be Carried Forward to the Main Contract Tender **£** _____

Signed: _____ Date: _____

Position: _____

Company: _____

Address: _____

Section 2 Daywork Details

State percentage additions to be added to the nett cost of variations carried out under daywork instructions inclusive of profit, overhead charges, insurance, supervision, employer's liability, provision of tools, plant and scaffolding and all other incidental expenses and "on costs" including all taxes and discounts, including that to the main contractor where appropriate.

Labour

For which the nett cost will be the actual nett sums paid to workpeople inclusive of guaranteed overtime travelling, holidays with pay and employer's contributions for National Insurance always provided that all such do not exceed the sums generally payable in the district concerned _____%

Materials

For which the nett cost will be the actual nett sum paid to supplies after deducting discounts other than that for early cash settlement _____%

Fares and Allowances

For which the nett cost will be the actual nett sums paid to workpeople _____%

Sub Contractors

For which the nett cost will be the actual nett sum paid to approved sub-contractors after deducting all discounts _____%

Note: Work people means all site and/or shop workers but excludes supervision, draughting, store, secretarial, and similar personnel who are to be included in the overhead charges.

Signature: _____

Date: _____

Section 3 Tradespeople, Rates & Hours

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

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

	Tradespeople	**Rate - £/hour**
1	_____	_____
2	_____	_____
3	_____	_____
4	_____	_____
5	_____	_____
6	_____	_____
7	_____	_____
8	_____	_____
9	_____	_____

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

Day	Monday - Thursday	Friday	Saturday	Sunday	Bank Holiday
Start					
Finish					

Section 4 Materials, Delivery Periods & Basic Prices

State details of all materials proposed to be employed, whether or not these are specified to a particular pattern and/or manufacture, with a note of the delivery period from date of order and, for variable price tender only, the basic price or reference to this. Materials not listed will not be considered for price fluctuation adjustment.

The delivery periods must be suitable to suit the installation programme and no change of specification will be allowed unless the tenderer makes suitable reservation at the time of tender.

Item	Manufacturer	Cat No or type	Delivery weeks	Basic price

Where there is inadequate space for all details to be inserted they may be given separately.

Signature: _____

Date: _____

Section 5 Alternatives

State any alternative material the tenderer would wish to put forward, the cost effect on his Tender, particularly for any items mentioned in this Section or elsewhere but is invited to mention any item that would lead to mutual advantage.

Item	Increase	Decrease

Signature: _____

Date: _____

Section 6 Details

Reservations

In the preparation of my/our tender the following is my/our interpretation of the information submitted to me/us and/or the reservations I/we have are:

_____

_____

_____

_____

Sub Letting

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

_____

_____

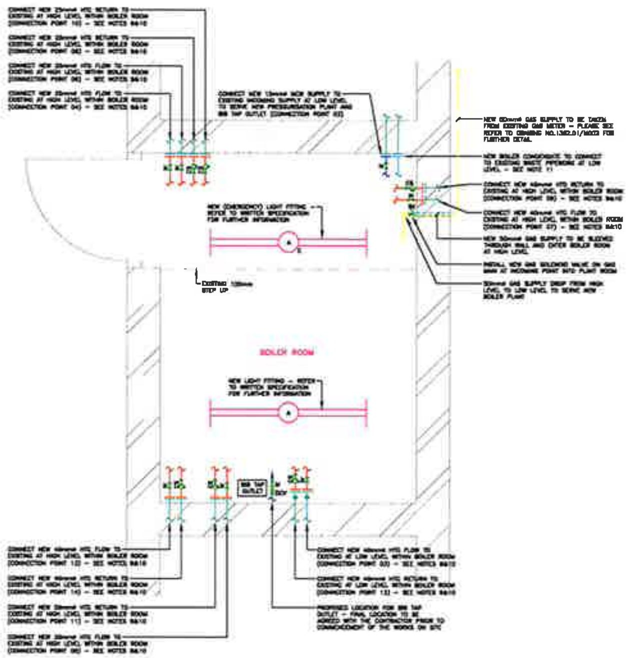
Site Electricity

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

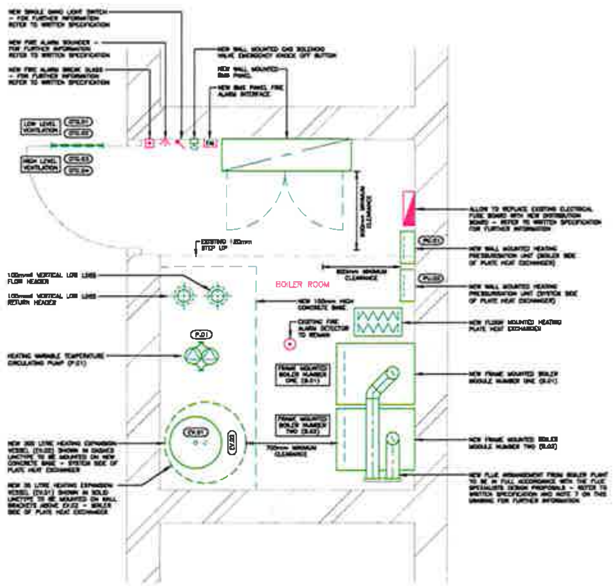
Number of phases: _____ Capacity-amps per phase: _____

Signature: _____

Date: _____



BOILER ROOM PROPOSED
GENERAL PIPEWORK ENTRY
& EXIT POINTS LAYOUT



BOILER ROOM PROPOSED
GENERAL PLANT LAYOUT

DOOR TRANSFER GRILLE SCHEDULE						
REF.	MOUNTING POSITION	MODEL	HEIGHT	WIDTH	DIAMETER	DUTY
DTG.01	LOW LEVEL VENTILATION	FB700	500mm	400mm	-	-
DTG.02	LOW LEVEL VENTILATION	FB700	500mm	400mm	-	-
DTG.03	HIGH LEVEL VENTILATION	FB700	500mm	250mm	-	-
DTG.04	HIGH LEVEL VENTILATION	FB700	500mm	250mm	-	-

DOOR TRANSFER GRILLE TO BE MANUFACTURED BY GILBERTS (BLACKPOOL) LTD.
DOOR TRANSFER GRILLE TO BE COMPLETE WITH INTUMESCENT BLOCK TO MAIN FIRE INTEGRITY OF THE DOOR.
ALLOW FOR 2x GRILLES TO BE FITTED – ONE ON INNER FACE OF DOOR AND ONE ON OUTER FACE OF DOOR.
FINAL DOOR TRANSFER GRILLE FINISH/COLOUR IS TO BE AGREED WITH THE CLIENT AND CONSULTING ENGINEER PRIOR TO ORDERING.

NOTES:

1. DO NOT SCALE FROM THE DRAWING
2. THE CONTRACTOR IS TO VERIFY ALL DIMENSIONS, TOLERANCES AND REFERENCES ON SITE PRIOR TO COMMENCEMENT OF THE WORKS.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION THE WRITTEN SPECIFICATION AND ALL OTHER PROJECT/ DESIGN DOCUMENTATION
4. FINAL LOCATIONS OF ALL THERMOSTATS AND SENSORS ARE TO BE AGREED ON SITE PRIOR TO COMMENCEMENT OF THE WORKS.
5. THE CONTRACTOR IS TO CONSULT THE ASBESTOS R&D SURVEY REPORT COMMISSIONED FOR THIS PROJECT AND ANY OTHER AVAILABLE ASBESTOS RELATED DOCUMENTATION PRIOR TO COMMENCEMENT OF THE WORKS ON SITE.
6. ALL PLANT AND EQUIPMENT THAT BECOMES REDUNDANT AS A CONSEQUENCE OF THESE WORKS IS TO BE MADE SAFE, STRIPPED OUT AND REMOVED FROM SITE. PRIOR TO DISPOSAL ALL PLANT AND EQUIPMENT IS TO BE OFFERED TO THE CLIENT.
7. THE BOILER FLUE INSTALLATION IS TO BE DESIGNED, INSTALLED, TESTED AND COMMISSIONED BY CHIMFLUE LTD. CONTACT MR DYLAN KENNEDY ON TEL: 07747 512285
8. FOR FURTHER DETAILS OF THE PROPOSED ELECTRICAL WORKS AND INSTALLATIONS REFER TO THE WRITTEN SPECIFICATION.
9. ALL CONNECTION POINTS TO EXISTING HEATING SERVICES ARE APPROXIMATE ONLY FOR TENDER PURPOSES. ALL FINAL PIPEWORK CONNECTION POINTS ARE TO BE CONFIRMED ON SITE WITH THE SUCCESSFUL TENDERER PRIOR TO COMMENCEMENT OF WORKS.
10. ALL PIPEWORK SIZES NOTED ON THE DRAWINGS ARE FOR TENDER PURPOSES ONLY. ALL FINAL PIPEWORK SIZES ARE TO BE CONFIRMED ON SITE WITH THE SUCCESSFUL TENDERER PRIOR TO COMMENCEMENT OF WORKS.
11. THE BOILER CONDENSATE IS TO PASS THROUGH A SUITABLY SIZED NEUTRALISER PRIOR TO DISCHARGING INTO THE ABOVE GROUND DRAINAGE SYSTEM AS SELECTED AND MANUFACTURED BY SCALEMASTER LTD. TEL: 01785 811636

REV	DATE	AMMENDMENTS	APP
1	20.09.18	TENDER ISSUE	PSB

PSB Consulting Engineers (Oxford) Ltd
ABINGDON
OXFORDSHIRE
OX14 5EG
TEL 01235 428625
EMAIL info@psbconsulting.co.uk
WWW. psbconsulting.co.uk

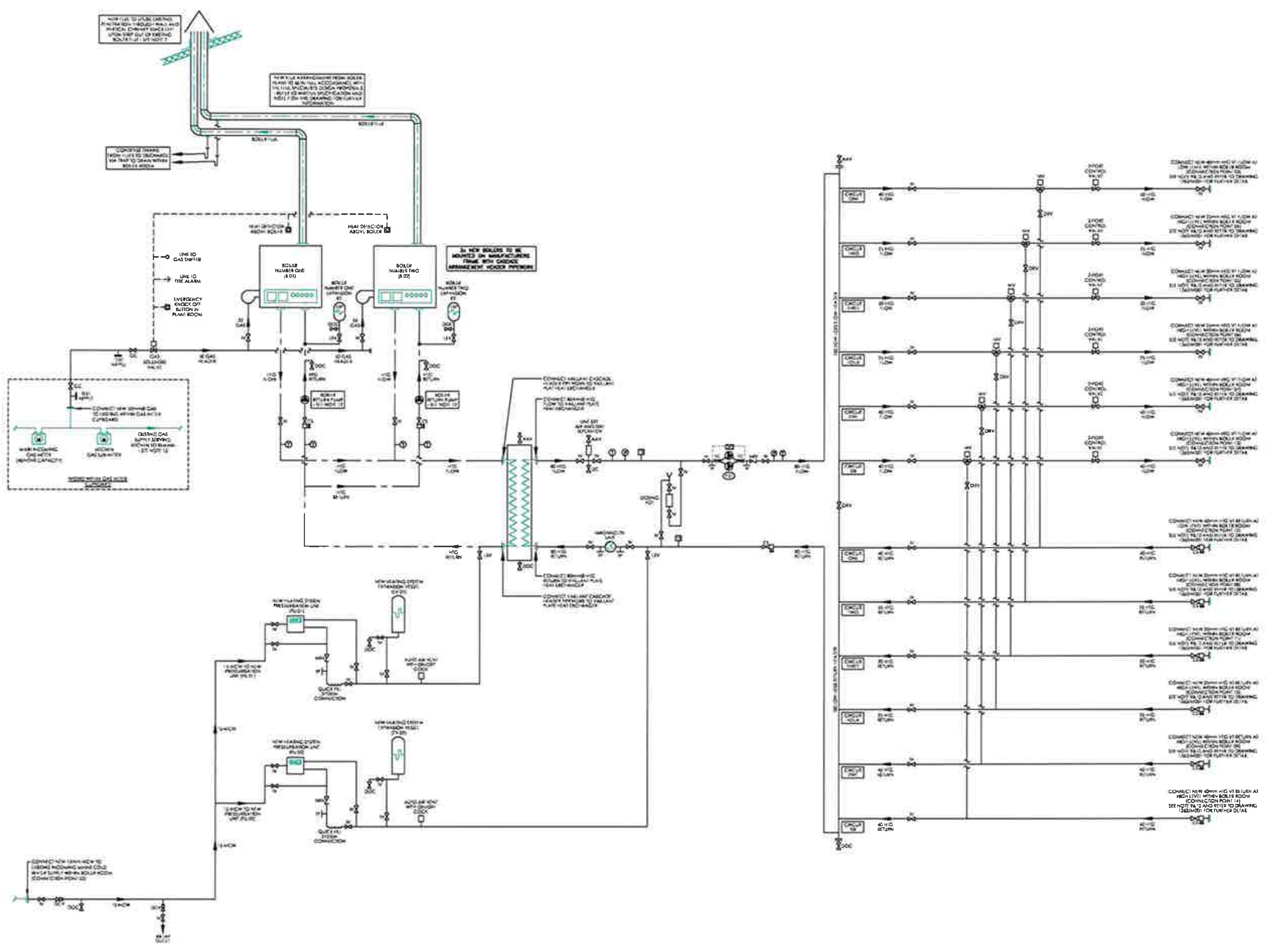
CLIENT: Wokingham Town Council

PROJECT: WOKINGHAM TOWN HALL
BOILER REPLACEMENT SCHEME

TITLE: PROPOSED BOILER
ROOM LAYOUT

DRAWING NUMBER: 1362.01/M001/1

SCALE	SIZE	DWN	CKD	APP	DATE	REV
1:20	A1	PB	JD	PB	20.09.2018	1



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4. FINAL LOCATIONS OF ALL THERMOSTATS AND SENSORS ARE TO BE AGREED ON SITE PRIOR TO COMMENCEMENT OF THE WORKS.
5. THE CONTRACTOR IS TO CONSULT THE ASBESTOS R&D SURVEY REPORT COMMISSIONED FOR THE PROJECT AND ANY OTHER AVAILABLE ASBESTOS RELATED DOCUMENTATION PRIOR TO COMMENCEMENT OF THE WORKS ON SITE.
6. ALL PLANT AND EQUIPMENT THAT BECOMES REDUNDANT AS A CONSEQUENCE OF THESE WORKS IS TO BE MADE SAFE, STRIPPED OUT AND REMOVED FROM SITE. PRIOR TO DISPOSAL ALL PLANT AND EQUIPMENT IS TO BE OFFERED TO THE CLIENT.
7. THE BOILER FLUE INSTALLATION IS TO BE DESIGNED, INSTALLED, TESTED AND COMMISSIONED BY CHIMFLUE LTD. CONTACT MR DYLAN KENNEDY ON TEL: 07747 512085.
8. FOR FURTHER DETAILS OF THE PROPOSED ELECTRICAL WORKS AND INSTALLATIONS REFER TO THE WRITTEN SPECIFICATION.
9. ALL CONNECTION POINTS TO EXISTING HEATING SERVICES ARE APPROXIMATE ONLY FOR TENDER PURPOSES. ALL FINAL PIPEWORK CONNECTION POINTS ARE TO BE CONFIRMED ON SITE WITH THE SUCCESSFUL TENDERER PRIOR TO COMMENCEMENT OF WORKS.
10. ALL PIPEWORK SIZES NOTED ON THE DRAWINGS ARE FOR TENDER PURPOSES ONLY. ALL FINAL PIPEWORK SIZES ARE TO BE CONFIRMED ON SITE WITH THE SUCCESSFUL TENDERER PRIOR TO COMMENCEMENT OF WORKS.
11. THE BOILER CONDENSATE IS TO PASS THROUGH A SUITABLY SIZED NEUTRALISER PRIOR TO DISCHARGING INTO THE ABOVE GROUND DRAINAGE SYSTEM AS SELECTED AND MANUFACTURED BY SCALEMASTER LTD, TEL: 01785 811636.
12. BOILER RETURN PUMP TO BE COMPLETE WITH ISOLATION VALVES, NON RETURN VALVE, CONTROLS ETC. AS SUPPLIED BY THE BOILER MANUFACTURER AS PART OF THEIR QUOTATION.
13. CONTRACTOR TO VERIFY EXISTING GAS LOADING SERVING THE BUILDING AND ADVISE THE CLIENT AND CONSULTING ENGINEER PRIOR TO ORDERING ANY PLANT AND EQUIPMENT AND COMMENCING ANY WORKS ON SITE.

VAILLANT BOILER CASCADE ARRANGEMENT PIPEWORK

LEGEND

- IV - ISOLATION VALVE
- NRV - NON RETURN VALVE
- DRV - DOUBLE REGULATING VALVE
- LSV - LOCK SHIELD VALVE
- DCV - DOUBLE CHECK VALVE
- SC - STOP COCK
- GC - GAS COCK
- DOC - DRAIN OFF COCK
- CS - COMMISSIONING STATION
- TEMPERATURE GAUGE
- PRESSURE GAUGE
- TEST POINT
- FC - FLEXIBLE CONNECTION
- MAGNACLEAN CPI (SEE NOTE ?)
- MOTORISED VALVE

REV	DATE	AMMENDMENTS	APP
1	20.09.18	TENDER ISSUE	PSB

PSB Consulting Engineers (Oxford) Ltd

SUITE 4 MORLAND HOUSE
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ABINGDON
OXFORDSHIRE
OX14 5EG
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EMAIL info@psbconsulting.co.uk
WWW psbconsulting.co.uk

CLIENT

Wokingham Town Council

PROJECT

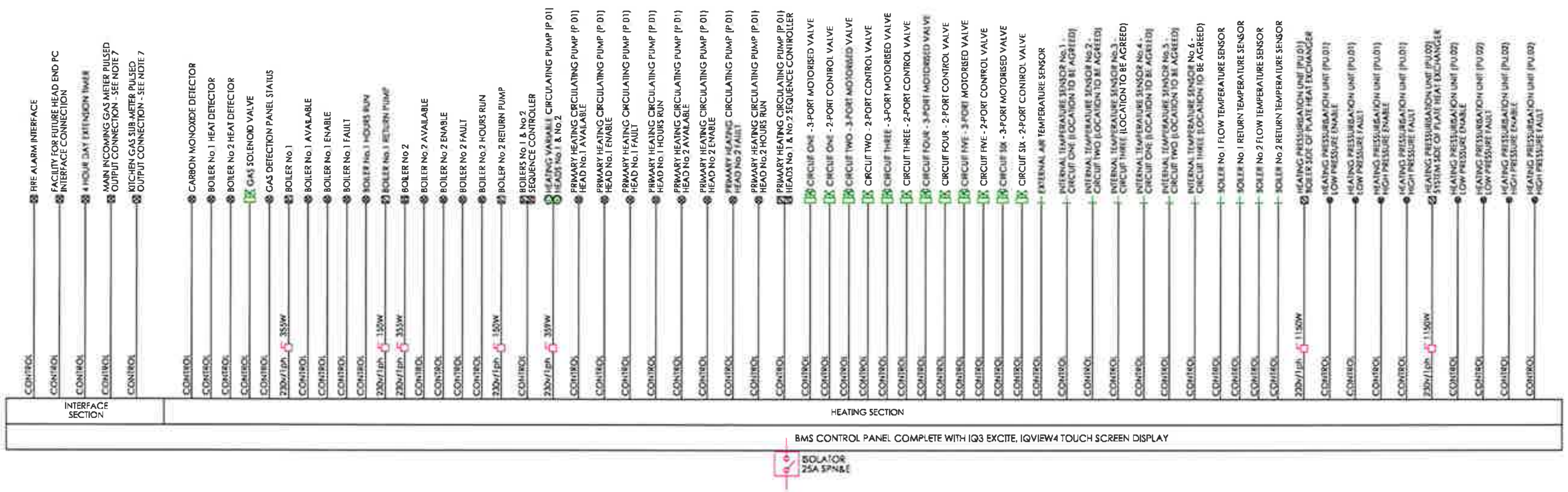
WOKINGHAM TOWN HALL
BOILER REPLACEMENT SCHEME

TITLE

PROPOSED BOILER ROOM
SCHEMATIC

DRAWING NUMBER: 1362.01/M002/1

SCALE	SIZE	DWN	CKD	APP	DATE	REV
NTS	A1	PB	JQ	PB	20.09.2018	1


FIRE ALARM INTERFACE
FACILITY FOR FUTURE HEAD END PC INTERFACE CONNECTION
4 HOUR DAY EXTENSION TIMER
MAIN INCOMING GAS METER PULSED OUTPUT CONNECTION - SEE NOTE 7
KITCHEN GAS SUB-METER PULSED OUTPUT CONNECTION - SEE NOTE 7
CARBON MONOXIDE DETECTOR
BOILER No 1 HEAT DETECTOR
BOILER No 2 HEAT DETECTOR
GAS SOLENOID VALVE
GAS DETECTION PANEL STATUS
BOILER No 1
BOILER No 1 AVAILABLE
BOILER No 1 ENABLE
BOILER No 1 FAULT
BOILER No 1 HOURS RUN
BOILER No 1 RETURN PUMP
BOILER No 2
BOILER No 2 AVAILABLE
BOILER No 2 ENABLE
BOILER No 2 FAULT
BOILER No 2 HOURS RUN
BOILER No 2 RETURN PUMP
BOILERS No 1 & No 2 SEQUENCE CONTROLLER
HEATING VARIABLE CIRCULATING PUMP (P 01) HEADS No 1 & No 2
PRIMARY HEATING CIRCULATING PUMP (P 01) HEAD No.1 AVAILABLE
PRIMARY HEATING CIRCULATING PUMP (P 01) HEAD No.1 ENABLE
PRIMARY HEATING CIRCULATING PUMP (P 01) HEAD No.1 FAULT
PRIMARY HEATING CIRCULATING PUMP (P 01) HEAD No.1 HOURS RUN
PRIMARY HEATING CIRCULATING PUMP (P 01) HEAD No.2 AVAILABLE
PRIMARY HEATING CIRCULATING PUMP (P 01) HEAD No.2 ENABLE
PRIMARY HEATING CIRCULATING PUMP (P 01) HEAD No.2 FAULT
PRIMARY HEATING CIRCULATING PUMP (P 01) HEAD No.2 HOURS RUN
PRIMARY HEATING CIRCULATING PUMP (P 01) HEADS No.1 & No 2 SEQUENCE CONTROLLER
CIRCUIT ONE - 3-PORT MOTORISED VALVE
CIRCUIT ONE - 2-PORT CONTROL VALVE
CIRCUIT TWO - 3-PORT MOTORISED VALVE
CIRCUIT TWO - 2-PORT CONTROL VALVE
CIRCUIT THREE - 3-PORT MOTORISED VALVE
CIRCUIT THREE - 2-PORT CONTROL VALVE
CIRCUIT FOUR - 3-PORT MOTORISED VALVE
CIRCUIT FOUR - 2-PORT CONTROL VALVE
CIRCUIT FIVE - 3-PORT MOTORISED VALVE
CIRCUIT FIVE - 2-PORT CONTROL VALVE
CIRCUIT SIX - 3-PORT MOTORISED VALVE
CIRCUIT SIX - 2-PORT CONTROL VALVE
EXTERNAL AIR TEMPERATURE SENSOR
INTERNAL TEMPERATURE SENSOR No.1 - CIRCUIT ONE (LOCATION TO BE AGREED)
INTERNAL TEMPERATURE SENSOR No.2 - CIRCUIT TWO (LOCATION TO BE AGREED)
INTERNAL TEMPERATURE SENSOR No.3 - CIRCUIT THREE (LOCATION TO BE AGREED)
INTERNAL TEMPERATURE SENSOR No.4 - CIRCUIT ONE (LOCATION TO BE AGREED)
INTERNAL TEMPERATURE SENSOR No.5 - CIRCUIT TWO (LOCATION TO BE AGREED)
INTERNAL TEMPERATURE SENSOR No.6 - CIRCUIT THREE (LOCATION TO BE AGREED)
BOILER No 1 FLOW TEMPERATURE SENSOR
BOILER No 1 RETURN TEMPERATURE SENSOR
BOILER No 2 FLOW TEMPERATURE SENSOR
BOILER No 2 RETURN TEMPERATURE SENSOR
HEATING PRESSURISATION UNIT (PU.01) BOILER SIDE OF PLATE HEAT EXCHANGER
HEATING PRESSURISATION UNIT (PU.01) LOW PRESSURE ENABLE
HEATING PRESSURISATION UNIT (PU.01) LOW PRESSURE FAULT
HEATING PRESSURISATION UNIT (PU.01) HIGH PRESSURE ENABLE
HEATING PRESSURISATION UNIT (PU.01) HIGH PRESSURE FAULT
HEATING PRESSURISATION UNIT (PU.02) SYSTEM SIDE OF PLATE HEAT EXCHANGER
HEATING PRESSURISATION UNIT (PU.02) LOW PRESSURE ENABLE
HEATING PRESSURISATION UNIT (PU.02) LOW PRESSURE FAULT
HEATING PRESSURISATION UNIT (PU.02) HIGH PRESSURE ENABLE
HEATING PRESSURISATION UNIT (PU.02) HIGH PRESSURE FAULT
CONTROL
230V/1ph 355W
230V/1ph 150W
230V/1ph 1150W
INTERFACE SECTION
HEATING SECTION
BMS CONTROL PANEL COMPLETE WITH IQ3 EXCITE, IQVIEW4 TOUCH SCREEN DISPLAY
ISOLATOR 25A SPN&E

NOTES:

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6. THE CONTRACTOR IS TO CONFIRM ALL ELECTRICAL LOADS TO THE BMS PANEL MANUFACTURER AT THE TIME OF ORDERING THE PLANT
7. PULSED OUTPUT CONNECTIONS TO EXISTING GAS METERS ARE TO BE PROVIDED AS REQUIRED AND AS EXISTING PROVISION GIVEN BY CURRENT GAS METER INSTALLATIONS.

REV	DATE	AMMENDMENTS	APP
T	20.09.18	TENDER ISSUE	PSB

PSB Consulting Engineers (Oxford) Ltd

CLIENT: Wokingham Town Council

PROJECT: WOKINGHAM TOWN HALL BOILER REPLACEMENT SCHEME

TITLE: PROPOSED BMS AUTOMATIC CONTROLS SCHEMATIC

DRAWING NUMBER: 1362-01/M003/T

SCALE	SIZE	DWN	CKD	APP	DATE	REV
NTS	A1	PB	JQ	PB	20.09.2018	T