HM Coastguard, Crosby

Mechanical and Public Health Specification

1752 S001-MP

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1.0 Introduction

1.1 General

This specification details the Mechanical Services works associated with the refurbishment of an existing HM Coastguard Building in Crosby, Liverpool.

The Contractor shall be responsible for the detailed design development, installation, testing and commissioning of Electrical services installation, in accordance with the requirements of this specification, CIBSE and BSRIA guides and manuals, and all relevant British and European Standards and codes of practice.

This specification shall be used to define the requirements for the buildings. The design of the project shall consider the environmental impact and where appropriate use energy efficient technology systems and materials from sustainable sources.

The Contractor shall be responsible for demonstrating and achieving Building Regulations compliance as part of the contract.

This specification is complimented by the Crookes Walker Consulting set of Standard Specifications which detail the quality of materials and workmanship.

In addition, this specification shall be read in conjunction with the main contract preliminaries.

The Contractor shall complete in its entirety the Tender Summary and return with his tender submission. Failure to do so will render the tender submission invalid and shall not be considered.

1.2 Design Drawings

The Contractor shall be responsible for the production of detailed design and working drawings, schedules, methodologies, etc. which accurately show the proposed services & shall include for updating these as necessary as the design is developed to ultimately turn working drawings into 'As Fitted' drawings.

1.3 Additional Information

The Contractor shall be responsible for procuring any additional architectural, structural or other information required to undertake the design, installation and co-ordination of services.

1.4 Site Visit

The Contractor is advised to visit the site to establish the full extent and nature of the works and site to fully acquaint themselves with the site conditions and the extent and routing of all the Electrical and Mechanical Services prior to submitting their tender. There shall be no variations to the contract due to lack of knowledge of the existing site and its condition.

The site address is Hall Road West, Crosby, Liverpool. L23 8SY.

Access shall be arranged through Hartnell Taylor Cook LLP.

1.5 M&E Obsolescence

The Contractor shall ensure all M&E equipment supplied for this project shall continue to be supported by the supplier for a minimum of 10 years & shall be the most recent version of the equipment offered.

'Supported' shall mean that spare parts, consumables, software support, technical literature etc., shall be available for at least 10 years following completion of the project.

2.0 Mechanical & Public Health Services Installation Parameters

The Contractor shall be responsible for: -

- The final design and installation of the complete Mechanical Services Installation
- Coordination and Liaison with the Main Contractor
- Coordination and Liaison with Any Specialist Sub-Contractors
- Liaison with the Architect and Structural Engineer
- Coordination and Liaison with the Client and/or his representatives regarding the final positioning of all Specialist Equipment and any associated electrical attendances

2.1 Associated Documents

The complete Mechanical Services installation shall be designed, supplied, installed, tested, commissioned and set to work by the Contractor.

The following associated documents shall be utilised, but shall not be limited to, when carrying out all aspects of the design and installation:

- Building Regulations
- 17th Edition of the IEE Regulations for Electrical Installations (BS 7671)
- Regulations under the Factories Act
- CIBSE Guides Volumes A, B, C and D
- Energy Conservation Act
- British Gas Council Codes of Practice
- Regulations under the Electricity Acts
- Relevant HVCA Design Guidance Publications
- Memorandum of Guidance under the Electricity at Work Regulations 1989
- The Gas Safety Regulations
- The Clean Air Act
- The Control of Pollution Act
- Specific Requirements of the Local Electricity, Gas or Water Authority
- Requirements of the Local Fire Officer
- Health & Safety at Work Act
- Construction (Design and Management) Regulations
- Relevant British Standards and Codes of Practice
- Relevant European Standards
- Electro-magnetic Interference Guidelines
- Building Services Research & Information Association Code of Practices
- All CIBSE Codes of Practice and Design Guidance Notes
- Health and Safety at Work Act 1974.
- Electricity at Work Act 1989.

- Construction, Design and Management Regulations (CDM).
- Asbestos Regulations.
- Control of Substances Hazardous to Health Regulations. (COSHH)
- Fire Prevention on Construction Sites
- The Department of Environment's Energy Efficiency Best Practice Programme (BRECSU).
- F gas Regulations 2009
- Building and Engineering Services Association Standards and Codes of Practice
- ErP legislation

In all instances, the latest revision and/or amendments to the above publications/regulations/recommendations shall be utilised.

3.0 Mechanical & Public Health Services

3.1 Mains Cold Water Services & Hot Water Services Installations

The contractor shall supply, install, test, commission and set to work all the copper piped networks, valves, switches, items of plant and equipment, expansion and relief equipment, etc. to provide a fully functioning cold water and domestic hot water systems throughout the new toilets and kitchen areas in accordance with the layout drawings.

Existing distribution systems will be reconfigured to accommodate the new layouts.

The contractor shall allow for an additional CWS supply to a tea-point location to be agreed on site with the client.

The MCWS supplies shall distribute around the building and shall terminate at each outlet and appliance with an appropriate isolation valve.

Where pipes pass through floors, walls, ceilings and are visible they shall be with clip on type chromium plated floor plates. The floor plates shall be fitted after all the decoration of the building has been completed.

3.1.1 Flushing/ Chlorination

Immediately after the satisfactory completion of the MCWS & Domestic Hot Water installations, the Contractor shall flush out, remove all foreign matter and clean all the systems. The system shall be flushed out with clean water, fed in at high points and flushed out at low points with enough velocity to achieve the objective and shall be in accordance with the requirements of the Mechanical Standard Specification, Section 22.0.

The contractor shall employ a Specialist Company to undertake chlorination of all water systems in accordance with BS 6700. The contractor shall allow for disposal of chlorinated water and agree place of discharge with local water authority.

The contractor shall provide chlorination certificate/test results to demonstrate that the water is suitable for consumption and include appropriate sets in Operating and Maintenance Manuals.

3.1.2 Air Vents

Air vents shall be installed at all high points in the systems as necessary to enable the correct venting of the system to ensure the complete removal of air to maintain the operation of the system and shall be, generally as Mechanical Standard Specification, Section 3.0.

3.1.3 Drain Points

Drain points shall be fitted at all low points to facilitate draining of the installation and shall be as Mechanical Standard Specification, Section 3.0.

3.1.4 Valves

Valves shall be installed as necessary to ensure the correct isolation of the system. Main isolation valves shall be as manufactured by Danfoss (or equal and approved) utilising gate valves, butterfly valves shall not be permitted.

3.1.5 Pressure Testing

All water services pipework shall be pressure tested hydraulically at twice working pressure for a period of two hours or 345KN/m2, whichever is the greater and carried out generally as the Mechanical Standard Specification, Section 22.0.

3.1.6 Sleeves

Where pipes span through walls, floors, ceilings, etc.… sleeves if the same material as the pipe or Tenmat Firefly products are to be inserted at a suitable length to finish flush with the respective finished faces.

Pipework passing through walls, slabs, etc. shall be insulated through their entire length including on their passage through the respective structures.

Sleeves should not touch the pipe under any circumstances. Where pipes pass through fire walls/barriers the contractor shall use fire sleeves utilising fire stopping materials to maintain the integrity of the fire barrier.

Particular attention is drawn to situations where multiple pipe arrangements pass through fire break walls. Consideration shall be given to providing a purpose-made mounting plate with sleeves welded in position at these situations to enable the hole to be adequately sealed. The Mechanical Contractor shall be responsible for ensuring that his services are installed in such a manner as to permit the fire stopping to be adequately installed around them and to fully liaise with other trades to ensure a fully fireproof barrier for all services is obtained.

Details showing the proposed pipework arrangement where four or more pipes pass through fire break walls shall be submitted to the Consulting Engineer and approved before erection.

3.1.7 Pipework's and Fittings

The domestic water pipework shall be installed generally as indicated on the drawings and shall be Copper Table X, non-arsenical and de-oxidised to BS EN 1057:2006+A1:2010, half hard having a 25-year guarantee in accordance with the Mechanical Standards Specification, Sections 2.0 and 3.0.

Victaulic joints and couplings shall not be permitted on any part of the installation.

All valves to be supplied by Tour and Anderson / Hattersley, or equal and approved.

Where pipework is exposed to view, copper pipework and fittings shall be chromium plated, and as the Mechanical Standard Specification, Sections 2.0 and 3.0.

Push fit plastic pipework will not be permitted.

3.1.8 Pipework Supports

The whole of the pipework installation shall be adequately supported throughout and shall be as Mechanical Standard Specification Section 2.0.

3.1.9 Domestic Hot Water Installations

The Contractor shall include for the design, supply, installation, commissioning and setting to work of the domestic hot water services installations to serve all outlets and appliances including but not limited to:

- Toilet Wash Hand Basins
- Changing Room Showers
- Cleaners Sink
- Tea Point Sink

Domestic hot water shall be provided by a number of local electric unvented water storage heaters. All water heaters & hot water outlets are identified on the mechanical layouts.

The domestic hot water systems shall incorporate all water heaters, controls, copper pipework, valves, expansion & pressure relief equipment, etc. to provide a fully functioning domestic hot water system.

The domestic hot water installation shall be designed and installed to provide flow temperature of 60^{o}C. The domestic hot water system shall be designed to comply with Approved Code of Practice L8.

Hot water outlets in the Accessible WC/Shower Rooms shall be provided with TMV mixing valves to 43°C. It should be noted that the shower in the Accessible WC/Shower Room shall be electric and not served from the stored domestic hot water.

Hot water at 60°C should be available from the Cleaner's Store sink.

Hot water dead legs should be minimised. Hot water should reach outlets in no more than 30 seconds. Where this is not feasible under-sink point-of-use electric heaters can be considered subject to Part L compliance requirements. Hot water pipework shall be fully thermally insulated.

The Contractor shall complete the connection to each outlet and appliance and this shall include a ball-o-fix valve immediately before each outlet and appliance.

All pipework shall be installed in copper table X with soldered joints and be suitably insulated along its entire length using foil faced mineral insulation.

Where pipework is exposed to view, copper pipework and fittings shall be chromium plated, and as the Mechanical Standard Specification, Sections 2.0 and 3.0.

Push fit plastic pipework will not be permitted.

The contractor shall employ a UKAS certified specialist to provide a bespoke legionella control and risk assessment working to the latest guidelines set out in Health and Saftey Executive HSG274 / HTM 04-01.

The Legionella Risk Assessment shall include the entire system and will identify and evaluate all potential sources of risk associated with Legionella in the water supply.

The specialist will advise the building manager on the Health and Safety at Work Act 1974, and compliancy with HSE ACoP L8 and HSG274 guidelines.

The legionella risk assessor will attend site and carry out a survey, this will include:

- Trace of all pipework configurations and water sources
- Identification and inspection of all site assets
- Water Temperatures taken across the whole site
- System materials checked to ensure compliance with WRAS (The latest water fitting regulations)
- Control scheme recommendation against identified risks
- Photography of all sites assets and risk areas
- Detailed schematic identifying each asset including risk areas

A hard copy and electronic report will be provided and will include:

- HSE inspection approved certification of Risk Assessment
- Recommendation summary outlining Risk areas
- Summary of findings and recommendations for review
- Overall Risk rating with our unique scoring system
- Detailed schematic showing assets of the water system
- Asset reports for future monitoring of the entire system

3.2 Mechanical Ventilation Installations

This section of the works comprises the supply, installation and commissioning of the ventilation systems including fans, ductwork, grilles, attenuators, fire dampers etc., to form a complete installation in all respects to the details shown on all drawings and in this Specification.

3.2.1 Office Supply & Extract Ventilation

The MCA office shall be provided with balanced heat recovery supply and extract systems to satisfy the occupancy fresh air requirements.

A new Mechanical Ventilation with Heat Recovery (MVHR) unit shall be provided mounted in the office ceiling void.

The supply ventilation shall be ducted through the ceiling void to four way throw pattern diffusers.

Extract will be though the bellmouth terminations within the ceiling void. Extract grilles will be provided in the ceiling grid.

The intake and exhaust air ducts shall link to louvres integrated and co-ordinated with the facade of the building. Final details are to be agreed with Architect.

The installations shall operate through manufacturer's local wall mounted control unit located in the electrical cupboard.

The MVHRs shall provide heating and cooling via an integrated reverse cycle heat pump and thermal recovery wheel to provide tempered air matching the space design conditions.

Acoustic attenuation shall be provided on the system side, to meet the design noise criteria and external noise levels to meet planning restrictions.

Supply and extract air shall be supplied via galvanized spiral steel ductwork.

Extract is via a bell mouth in the ceiling void, which extracts from the office space via return-air grilles in the suspended ceiling.

All ductwork installed shall be thermally insulated.

The Contractor shall ensure that mechanical services plant and equipment are suitably isolated from the building structure, to prevent the transmission of vibration. The Contractor shall comply with the guidance on the satisfactory magnitude of building vibration, with respect to human response given in BS 6472 (all parts).

3.2.2 Toilet Extract Ventilation Systems

The Contractor shall include for the supply, installation, commissioning and setting to work of a fully functioning toilet extract ventilation installation.

A new dedicated Toilet Extract Fan shall be installed within the ceiling void and sized to suit the required air change rates to serve the toilet areas on the ground floor.

The system shall be ducted to an external louvre and extract grilles as indicated on the drawings.

Cross talk attenuators shall be installed where ductwork crosses toilet blocks.

Make-up air for the sanitary accommodation shall be from adjacent spaces. This shall be achieved with door undercuts coordinated with the Main Contractor.

3.3 VRF Heating / Comfort Cooling System Installation

This section of the works shall consist of the remedial and reconfiguration works to the existing Variable Refrigeration Flow (VRF) systems which serves the landlord and office areas.

The contractor shall employ a Mitsubishi accredited agent to service the existing four air-source heat pumps serving the Training Rooms, the Operations Room, the 1st floor offices and the Radio Room.

The specialist shall resolve leaks on the refrigerant branch controllers located in the store cupboard.

The specialist will remove the corrosion on the external unit chassis and repaint the metal work on all of the external units.

The specialist shall reconfigure internal units onto the new suspended ceilings within the MCA office and conference room and to accommodate the new Radio Room layout.

The specialist will recharge the system when all remedial work is carried out and re-balance the system. This will include for the compliance with regulations for handling the refrigerant and disposing of any discarded fluids.

3.4 Above Ground Drainage Installations

The Contractor shall include for the reconfiguration of the existing above ground drainage serving the toilets and kitchen.

The above ground drainage system shall serve all new appliances and outlets that require drainage including toilets, basins, urinals and sinks.

The sanitary plumbing installation shall be designed and installed in accordance with BS EN 12056, BS 8000 Part 13, Approved Document H and shall be fully in compliance with the requirements of the Local Authority and Building Regulations.

All necessary anti-siphon and ventilation pipework shall be provided to ensure that all water traps are maintained.

All stacks shall be ventilated by a ventilating pipe continued up the building to discharge to the atmosphere at roof level. The ventilating pipe may be common to a number of stacks if correctly sized.

Drainage expansion joints shall be added in vertical and horizontal pipework as per manufacturer's recommendations.

All main vertical soil, waste and ventilation pipework shall be installed in PVC-U pipework and all horizontal waste pipework in PVC-U or MUPVC, conforming to BS 4514 or BS 5255.

3.5 Builders Work

The Contractor shall include for the design, supply and installation of all builder's work in connection with and necessary to undertake the works, which shall include but not be limited to:

- Forming penetrations through walls, floors, ceilings etc.… and making good
- Provision of all fire stopping in accordance with the current fire strategy
- Forming plant bases and supports
- Provision of all fixings and supports for plant, equipment and containment.
- New holes for duct/pipe penetrations in plantrooms, roofs etc.

3.6 Thermal Insulation

This section comprises the supply and installation of the whole of the thermal insulation by an approved Thermal Insulation Specialist. All thermal insulation work shall be carried out by a member of the Thermal Insulation Contractors Association (TICA).

Insulation shall not be applied until pipes, plant, equipment and ductwork have been tested.

All pipework in voids, ceiling spaces and cupboards, etc., and where otherwise concealed, shall be insulated.

All material shall be new when delivered to site in suitably labelled manufacturer's cartons.

No insulation containing asbestos or other deleterious material shall be permitted.

The mixing of manufacture or type of insulation will not be permitted unless otherwise detailed within this specification.

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

All insulation shall be CFC and HCFC free, non-fibrous, with zero Ozone Depleting Potential (ODP) and Global Warming Potential (GWP) less than 5.

Insulation shall be manufactured to BS EN ISO 9001:2008, BS OHSAS 18001:2007 and BS EN ISO 14001:2004 with a factory applied vapour barrier.

Where insulation passes through risers or ceiling voids which are accessed from the escape route it shall be non-combustible insulation to the Fire Engineer's approval.

3.6.1 Ductwork & Pipework

Supply ductwork, fan coil unit plenum boxes, hot and cold-water pipework shall be insulated using rigid phenolic foam sections to the thicknesses detailed on the Mechanical Standard Specification, Section 15.0.

All thermal insulation applied to external ductwork and pipework shall have a stucco aluminium finish with mastic vapour seal applied.

Phenolic Pipe Insulation shall include passivated, impregnated, liner technology with a passivating foam additive, creating a fully bore coated product.

Under the terms of the Montreal Protocol as enforced under EC Reg 1005/2009 [X], neither chlorofluorocarbons (CFCs) nor hydrochlorofluorocarbons (HCFCs) are permitted in the production of thermal insulation in the EU.

Phenolic pipe insulation shall be CE Marked in accordance BS EN 14314:2009+A1:2013 as required by the Construction Products Regulation (EU) No 305/2011 (CPR)

Phenolic pipe insulation shall have a European fire classification of BL-s1,d0 to BS EN 13501-1:2007+A1:2009 and achieve BS 476-6 and BS 476-7 results to enable a Class O classification to the Building Regulation in England & Wales, and a Low Risk classification to the Building Standards in Scotland.

Pipe Insulation shall be FM Approved to Approval Class 4924 and achieve ASTM E84 Class 1/A and UL 723 25/50

Thermal insulation applied to domestic hot and cold water shall have an aluminium foil finish and have a double vapour barrier.

3.6.2 Identification Bands

Identification shall be in accordance with BS 1710.

All valve and control positions where concealed shall be identified by circular traffolyte labels to BS 1710.

3.7 Testing & Commissioning

The contractor shall include for testing of all new plant and equipment to ensure that the systems are set to work in the appropriate manner once the works have been undertaken.

All testing and commissioning shall be carried out in accordance with BSRIA and CIBSE Commissioning Codes, together with test procedures defined within British Standards and Standard Specification Clauses.

3.8 Operation & Maintenance Manuals

The Contractor shall be responsible for the production of all operation and maintenance manuals including 'As Fitted' drawings for the complete mechanical services installations.

The Operation and Maintenance Manuals shall be submitted to the contracted administrator for comment, not less than 4 weeks prior to practical completion with 3 full and final sets of documentation provided at completion.

3.9 Building User Manual

The Contractor shall allow providing a Building Regulations Part L log book.