SPECIFICATION

for the proposed

HOT AND COLD WATER SERVICE SYSTEMS, SPACE HEATING SYSTEMS AND AIR TO WATER HEAT PUMP AND ASSOCIATED PLANT

to the

MOORLAND CENTRE

EDALE

DERBYSHIRE

Peak District National Park Authority

2016
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1. PROJECT PARTICULARS

1.1. The Project

The Contractor shall be responsible for the design supply, installation and commissioning of hot and cold water services, space heating services systems and associated Air To Water Heat Pump plant to the Edale Moorland Centre refurbishment and extension building project as described in this specification.

The Contractor will be working under a Main Contractor who will be responsible for undertaking builders work and other specialist services installations including the new electrical service installations identified below.

The Contractor will be responsible for liaison with the Main Contractor to ensure effective co-ordination of the various work packages.

1.2. Scope of Works

This work package comprises the design supply, installation and commissioning of all mechanical building services systems described in this document.

The contractor shall employ competent persons familiar with the type and nature of the proposed building services installations.

Microgeneration Certification Scheme (MCS) accredited contractors shall undertake all Renewable Heat Incentive (RHI) heat pump installations under the requirements and guidelines of Ofgem.

All installations shall comply with requirements of the Local Authority planners, Building Control and the Building Regulations.

A suitably qualified site manager/supervisor shall be employed to oversee the works and provide effective support to the main contractor and contract administrator during the construction phase.

All works shall be installed in accordance with relevant legislation, good engineering practice, and the technical standards described in this specification document. The contractor shall pay particular attention to ensuring that the requirements of “Legionnaires disease - The control of legionella bacteria in water systems Approved Code of Practice and guidance” (health and safety executive) are adhered to.

The Contractor shall include for the following building services systems installations noted below:

**Mechanical building services systems**
- Removal and modification of existing services.
- Air to water (ATW) heat pump (HP) space heating plant, services and associated controls
- ATW HP hot water plant, services and associated controls
- Associated hot water buffer/storage vessels
- Associated space heating infrastructure
- Mains cold water systems
- Testing and commissioning.

The Contractor shall allow for the co-ordination and integration of the various work element packages with the Main Contractor and specialist building services contractors.
1.3. The Site

The site is located at the Moorland Edale, Edale, Hope Valley, Derbyshire and is owned by the Peak District National Park Authority.

The site is currently used as a Visitor Centre, office space and campsite. The precise scope of the works is described in more detail below.

1.4. Design duty of care

The Contractor shall be responsible for the design duty of care and shall produce detailed design drawings, specifications and all other associated information that may be required to demonstrate compliance to the Regulations, standards and guidance noted in the specifications and all other contract documents.

1.5. Particular parties to the project

1.5.1. The Contract Administrator

Matt Freestone, Peak District National Park Authority. Tel: 01629 816 276

1.5.2. The Architectural Consultant & The CDM Coordinator

Barry Singleton, Gino Lombardo and Associates Tel: 01332 342 990

1.5.3. The Main Contractor

The main contractor shall be the successful building service contractor appointed to undertake the building work associated with this project. This includes the refurbishment and refitting of the campsite facilities. The Main Contractor will also be responsible for ‘contract management’ of the works described here i.e. the Main Contractor will be responsible for the day to day site management and have Principle Contractor responsibilities under CDM

1.5.4. The Contractor

The Contractor shall be the successful mechanical services contractor responsible for the works described in this document.

The Contractor shall enter in to a JCT Design and Build contract with the Employer but will report to the Main Contractor who will fulfil a contract management role.

1.6. Programme milestones and order of works

A programme of works is to be agreed with the Contractor and Main Contractor upon award of contract. The contractor shall liaise with the main contractor and CA to agree an appropriate programme of works prior to commencement on site. It is envisaged that the works described in this document will be undertaken between October - December 2016.

Site meetings will be held as and when required over the duration of the works.

1.7. Site Visits
The Contractor shall be responsible for visiting site to carry out a pre-tender survey to ascertain the conditions under which the work is to be carried out and to review the existing local built environment.

Special attention is to be given to means of access to the building and obtaining full particulars of any part or parts of the existing installation that are to be re-used or adapted. No allowance shall be made for ignorance due to the Contractors neglect in this respect.

All site visits must be by prior arrangement via the Contract Administrator in the first instance.

1.8. **Tender queries**

All queries should be directed to the Contract Administrator.

1.9. **The Construction (Design and Management) Regulations 2014/2015**

The project will require notification under the current CDM Regulations.

Works are to be co-ordinated with the main contract work packages.

A Principal Contractor and a CDM co-ordinator will be appointed for the works.

The contractor shall liaise with the Principal Contractor and CDM co-ordinator and provide to them all necessary risk assessments, method statements and safe systems of work as may be reasonably requested. The contractor shall obtain safe systems of work and method statements for potentially hazardous contracting operations and initiate permit to work procedures where appropriate.

The contractor shall be responsible for issuing all necessary information to the Principal Contractor for inclusion within the Health and Safety File which shall be reviewed by the CDM co-ordinator.

1.10. **Hazardous Substances**

It is not envisaged that hazardous substances will be encountered during the works. The contractor shall undertake relevant risk assessments when undertaking his work.

If the contractor suspects that hazardous substances are present, he must immediately stop that particular operation and inform the Contract Administrator. The Contract Administrator will organise the carrying out all necessary testing and removal.

The existing LPHW services may contain water treatment chemicals. Details are available from the Employer.

An asbestos survey analysis/register is available from the CA.

1.11. **Existing Site Infrastructure/distribution and ‘As Built’ Services**

The existing incoming water services infrastructure will remain unaltered. The existing LPHW, ventilation services and H&C water services cold water distribution systems are to be utilised and modified where necessary to service and interface with the new building refurbishments and extension layouts/arrangements.

The main contractor will be responsible for undertaking site investigations and scans in respect existing concealed services that may affect the works.
Limited record drawings and as built technical information is available to the contractor from the Employer’s H&S files. It is the responsibility of the contractor to determine the accuracy or otherwise of this information prior to any modifications or extensions to the existing systems.

When removing or modifying existing services the contractor shall undertake relevant risk assessments and produce method statements for the project CDM Co-ordinator.

The CA & Employer shall be kept informed of any potential existing services infrastructure disruptions and the contactor shall plan and co-ordinate milestone dates for any building services interconnections, disconnections and or removals.

1.12. Energy Efficiency / Carbon Footprint / CO² Emission Rate Calculations

The building services systems and building construction are to be designed to achieve the requirements of Building Regulations part L2A & L2B target CO² emission rate (TER) and the building CO² emission rate (BER) requirements for this type of development.

Renewable Heat Incentive (RHI) engineering works include a new air to water heat pump system to replace the current electric HWS installations and to provide new space heat to specific areas currently unheated. The contractor shall be responsible for ensuring that the eligibility requirements of the Renewable Heat Incentive are met with particular attention drawn to the metering and pipework arrangements between heat source and distribution point.

1.13. Building Construction & The Building Regulations

The building construction elements and finishes are indicated on the drawing ‘Stage 3 – Heating and HW Room Data – GF/1st Flr. The construction and services installations are to comply with the current Building Regulations and shall be approved by Building Control.

The Contractor shall review the building fire strategy plans and effectively interface building services systems to ensure fire compartment integrity is maintained. The building services installations shall be installed to maintain the acoustic integrity of the elements of building construction.

The works shall be compliant to the in force Building Regulations and in particular the supporting ‘The Non–Domestic Building Services Compliance Guide’ NDBSCG document. including all amendments.

1.14. Conflict

Any contradiction between the specification and drawings must be brought to the attention of the Contract Administrator during the tender period when a ruling will be given. A discrepancy between the specification and drawings will not be accepted as a basis for additional payment after receipt of tenders.

The Contractor shall ensure all plant equipment and building services systems can be adequately integrated within the building construction elements of structure and are fully co-ordinated with other specialist building services systems.

1.15. Operation and maintenance information

Two hard copy manuals together with two DVD CD format disk copies of the system operating and maintenance manuals should be issued to the CA at or before hand over. Those in charge of the premises
must be fully informed of the operational procedures necessary for the safe and proper use of the systems.

The manuals shall include a fully detailed written description of the installation and shall contain non-technical descriptions together with technical data sections including:

- Copies of all test certificates and commissioning sheets.
- Specialist manufacturer’s plant / equipment drawings and data sheets.
- A tabulated representation of recommended maintenance tasks.
- Manufacturer’s installation manuals.
- As fitted drawings
- Simplified operating procedures under both normal and emergency circumstances written in "laymen’s" language.

The contractor shall produce the "As Fitted" drawings, which shall be based on the construction drawings and shall be at least equal in quality and content. The drawings shall include all relevant information and shall exclude any information that is relevant during tender and construction. Each drawing shall be clearly labelled "As Fitted Drawing" and shall bear the contractors title block.

1.16. Commissioning and Completion

The whole of the service systems shall be set to work, tested & commissioned to the satisfaction of the CA prior to the handover inspection.

The commissioned systems shall be demonstrated to the CA or his representative at an agreed time. Commissioning data and test certificates shall be presented in the project Health and Safety file documentation package and signed off by the Employer or his representative.
2. PARTICULAR SPECIFICATION

2.1. Extent of the Works

The contractor shall be responsible for the design, supply, installation, testing and commissioning of all necessary equipment and services to complete the works as detailed within the specification and shown on the tender drawings. The primary works shall include the following new services:-

- Removal/ modification of existing building services.
- Air to water heat pump (ATWHP) systems
- ATWHP space heating & hot water systems
- Mains cold water (MCW) services
- Automatic control systems
- Testing and commissioning.

2.2. Existing Building Services Arrangements.

The full extent of the concealed pipework distribution systems is not known. The Contractor shall undertake obtrusive site surveys at the time of the construction phase to precisely determine location, size and type of existing services that are to be removed and modified.

2.3. Design Concepts

The Contractor shall include for the design concepts detailed within this engineering specification in his tender return. The Contractor may offer alternative design solutions and associated cost alternatives for review by the CA. Written clarification is necessary in respect of any departures from the engineering principals indicated in the specification document. Primary concepts are as follows:-

Visitor Centre Building

- Retain GSHP space heating, electric water heaters/H&CWS, mechanical exhaust systems.

Farm House Building

- Retain GSHP space heating and mechanical exhaust systems to areas indicated on accompanying drawings
- Install new ATWHP space heating to existing unheated areas as noted on drawings
- Install new mains water services and ATW HP pressurised hot water services.

Campsite facilities

- Install new ATWHP space heating as noted
- Install new mains water services and ATW HP pressurised hot water services.

The contractor shall refer to the room data drawings and this specification for design criteria and particular work package requirements as follows:

2.3.1. MCW Incoming Infrastructure/Distribution Systems
The existing incoming mains cold water infrastructure service to the building centre is to remain unaltered as the current existing arrangement. The contractor shall investigate and record the precise arrangements by way of isolation flow tests to all installed appliances.

It is currently assumed that a single 22mm MDPE enters the site and splits 22mm to the visitor centre plant room and 22mm to the camp site female campers WC. A water meter is located at each incoming location. The underground interconnecting service is to remain as this existing arrangement.

2.3.2. Hot and Cold Water Systems

Visitor Centre –
- Shall remain unaltered.

Farm house –
- New point of use heaters planned-installed by others.

Campsite facilities –
- All hot water services shall be provided by the central ATW HP pressurised hot water storage cylinder(s). All existing pressurised electric point of use water heaters and central gravity fed HWS cylinders shall be removed with the exception of those in the campsite managers flat as noted on the room data drawings.
- The cold water system shall comprise a boosted pressure system if this is deemed to be necessary by the contractor.
- Thermostatic mixing valve control (TMV) shall be provided at the shower & wash basin discharges
- The contractor shall include for phased sterilisation of the systems as required to meet the project phasing/ programme milestones and as necessary when modifying or extending existing services. Sterilisation certificates shall be included within the O&M manuals
- Installations shall conform to local water utility company requirements and the Water Supply (Water Fittings) (WSWF) Regulations 1999.
- The general HWS thermal input shall be provided by an ATW HP via a buffer storage vessel heat sink and pressurised water storage cylinder(s) of appropriate thermal ratings and storage capacity
- HWS shall be stored and circulated within the cylinders at 60°C at times of operation.
- Appropriate electrical immersion thermal input boost rating shall be provided to maintain delivery and storage hot water temperatures and to offset system losses. The system shall be controlled in such a way so as to minimise the input required from the immersion heaters.
- A secondary HWS pumped circuit shall be installed to minimise dead legs and maintain drawn off HWS temperatures within design tolerances
- Individual ball type in-line valves shall be installed adjacent all water appliance/sanitary fittings.
- Hot and cold water services at individual combined outlets shall be suitably balanced in pressure.
- All pipework shall be insulated and shall be pressured tested to twice the normal working pressure of the respective service.
- The contractor shall provide all non-mixed hot water service (60°C) tap ware outlets with suitable ID labels denoting ‘caution VERY hot water’. Including campers pot washing sink units.
2.3.3. **Hot Water Storage Cylinders. ATWHP System**

The contractor shall provide hot water service storage cylinders of appropriate design and capacity. Hot water service generators/storage cylinders shall be sited at ground floor level within the store/ plant room.

The hot water shall be generated by the AWT HP primary coil(s) and uplifted at the cylinders by electric immersion heaters. Outflowing system HWS shall be at 60°C and reduced in some instances in temperature at the point of use thermostatic mixing valves.

Cylinders shall be complete with the following fittings / accessories and shall be installed in accordance with the manufacturer’s requirements.

- ATW HP primary heat exchange coil of appropriate size/rating
- HWS f/r with isolation valves
- Safety valve/HP safe discharge to drain
- Drain down isolation cocks
- Interconnecting parallel pipeline configurations
- Valved water cold feed
- Automatic programmer and control system (volt free contacts)
- Dial temperature and pressure gauges on HWS primary & secondary F/R
- Secondary HWS pump set/valves arrangement
- Mains pressure/expansion vessel with control/pressure relief valves
- Staged kw electrical Immersion heaters of appropriate size/rating

Storage capacities and ATWHP sizing shall be determined from CIBSE guidance and EN 8558 and shall not be less than the particular design parameters noted below.

- Each ‘shower’ to be 5mins @ 7ltrs/min
- 7No. showers in peak 5 minute period
- 12No. showers in peak 10 minute period
- Monitoring of shower usage over a weekend where the campsite was full to capacity in 2016 has given the following usage data:
  - Between 4pm-11pm, total number of 2 minute showers taken = 150. Most users have a 4 minute shower (the current system allows users to enter 2x20p pieces before entering shower to get a 4 minute shower) therefore assume there were 75No. 4 minute showers taken over the 7 hours.
- In addition allow for appropriate campers pot wash and general basin consumptions in addition. (Confirm diversity factor allowance)
- Recovery time not less than 120 minutes for complete storage water volume.

The contractor’s design HWS storage capacity and associated heat recovery period shall be agreed in consultation with the AWTHP manufacturer and shall be such so as not to impose undue electrical immersion load on the system.

2.3.4. **Mains Cold Water Services Internal Distribution**

The contractor shall retain the exhibition area metered MCW services.
The campsite area MCW service shall be modified as follows:

- New 22mm MCW service to the ATWHP plant area/[boosted] water storage tanks ball valve assemblies.
- Boosted CWS to campers area and to the HWS storage cylinder cold water feeds
- The 22mm MCW feed to water storage tank(s) is to be metered
- (Metering of CWS – to cylinders and connected HW appliances & connected CW appliances)

The contractor shall include insulation of the cold water services as required.

Note that the Main Contractor will supply and install all sanitary ware appliances and tap ware in the positions indicated on the drawings. The contractor shall allow for installations that may be connected directly to all sanitary and white goods appliances.

2.3.5. Thermostatic Mixing Valves and showers.

The contractor shall provide localised thermostatic mixing valve (TMV) arrangements to the following appliances to limit hot water outlet temperatures.

- All male, female and accessible showers
- All male, female and accessible basins

See also drawing STAGE 3 - MCW/MHW supplies for positions and a schedule of supplies required.

All TMV’s shall be have an integral flow restriction capability set at 7ltr/min.

Multi point TMV’s may be provided subject to compatibility with the design HWS flow temperature inputs and the system hot and cold water pressure criteria.

All general showers are to be complete vandal resistant components, including fixed riser pipe/head and exposed valves with flow and temperature control. The showers shall incorporate motorised on off automatic control by way of coin operated activation. Coin operated timers to be ET30 Coin / Token Meter available from Leisure Controls International Ltd or similar approved. Associated solenoid valves to be included. All to be installed as per the manufacturers recommendations.

Accessible showers are to be complete with lever flow/ temperature control with flexible riser pipe.

Particular care and attention shall be given to laying out services to ensure valve stations/ TMV’s are fully accessible and pose no H&S risk and legs shall not exceed 2m in length.

Units shall be suitable for the system hot and boosted cold-water pressure arrangements and be complete with flushing kit & inline strainer and isolation valve assemblies.

The units shall be installed in accordance with the manufacturer’s requirements and the installations shall comply with the Water Regulations, the Water Supply and Fittings Regulations 1999.

2.3.6. Existing CWS Storage Tanks.

The existing campers area is currently serviced by two gravity fed HWS storage cylinders each of approximately 300 litres capacity located at ground level in the male campers area. These existing cylinders are to be removed and replaced with ATWHP system cylinders of greater capacity.
The cylinders are fed by two GRP tanks located above the male camper’s area. Each tank is approximately 2000x1000 x1500h (2500litres each). It is envisaged that that these tanks can be retained and utilised to provide a stored water reservoir source for the proposed boosted water pump set/HWS cylinder(s) feed and cold water supply. The contractor shall provide additional supplementary storage capacity as may be required for his design proposals.

The contractor shall allow for inspecting, draining down, cleaning and adapting the tanks as may be required for incorporation into his design strategy and for specification compliance.

- Tank outflows shall be symmetrical in design to ensure equal through flow in each tanks.
- Additional supplementary storage capacity shall be provided as required
- The tanks shall be suitable for and provide a potable water service supply.

The completed tank installation shall conform to local water utility company requirements and the WSWF Regulations 1999. All systems are to be sterilised prior to completion and handover.

2.3.7. **Boosted Water Services**

The contractor shall determine the requirement for a boosted cold water system and install an appropriate system if required.

The contractor shall ensure that sufficient pressure is maintained to operate all shower outlets simultaneously.

The installations shall conform to the requirements of the water utility company requirements and the WSWF Regulations 1999.

2.3.8. **ATWHP LTHW Radiator Space Heating Systems**

The contractor shall install new radiant wet panel radiator installations/pipe coils to the Farm House and Campers areas as noted in the room data drawings. The primary energy source shall be via the new ATWHP installation.

A dedicated automatically controlled pump set two pipe heating circuit shall be provided.

A separate circuit shall be provided to the campsite wardens flat/campsite shower facilities and to other areas. (2no zones as shown on the Heating and Hot Water room data drawings (GF and 1st Flr)). This is to facilitate separate control and heat metering of the camping zone area.

All heat emitters shall be appropriately sized to cater for the building fabric, natural air infiltration and mechanical ventilation loads in accordance with BSEN 12832 and shall have localised thermostatic control. Systems shall incorporate drain and air venting provisions.

All new system components shall be suitable for the ATWHP F/R temperatures and the respective system pressures. All concealed pipework within voids and in plant room & stores shall be insulated.

New commissioning valve stations and isolation arrangements shall be installed as required. All new sections of pipework shall be pressurised tested to twice the normal operating pressure.

Systems shall be designed to operate at the ATWHP flow & return design conditions. (TBC/ATWHP manufacturer to advise)
Radiators shall be finished in with factory applied powder coating. Contractor is to allow for removing and re-fixing the radiator casings once for decoration. All radiators shall be finished in RAL 9003 standard powder coated finish.

Radiators shall be complete with 15mm BOE connections, key operated air vent, drain cock and thermostatic and lockshield valves. Myson/Stelrad or equal.

2.3.9. Pipework and Ductwork Services

The Contractor shall install new services in the following materials:-

<table>
<thead>
<tr>
<th>Service</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>LTHW heating</td>
<td>Copper Tube to BS.2871 Part 1 Table X (or WRAS equivalent)</td>
</tr>
<tr>
<td>BCWS &amp;MCS/HWS</td>
<td>Copper Tube to BS.2871 Part 1 Table X (or WRAS equivalent)</td>
</tr>
</tbody>
</table>

2.3.10. Air to Water Heat Pump System (ATWHP)

The Contractor shall supply and install ATWHP systems. Systems capacities and performance shall conform to the guidance requirements of B&SE TR30 & BSEN 8558, BSEN 12831 and BSEN14825

The system shall be a packaged unit of proprietary manufacture complete with all integral parts and associated engineering components and features including the following;

- Fully sealed and pressurised HP cycle and LTHW loops
- External/internal condenser, evaporator, compressors, expansion, control valves.
- Buffer storage vessel. HWS cylinder(s), Wet heat exchange coils/elect immersions
- LPHW/HWS primary circulation pumps
- Control panel with BMS interface volt free contacts
- Fully automatic controls and localised electrical isolation

The LTHW side has be of appropriate F/R temperatures to satisfy the required of the HWS and LPHW flow rates and thermal demands at peak times and maximum temperature differences. The wet water system side shall be complete with

- Line isolating/commissioning stations/strainers.
- Dial immersion temperature gauges on HWS F/R and LPHW F/R
- System fill and chemical treatment facilities
- Pressurised system components.
- Fully automatic controls and localised electrical isolation

Both internal and external HP sections shall be installed to the manufacturer’s technical and space planning requirements with appropriate maintenance arrangements.

The ATWHP sectional components shall be sited in allocated locations as indicated on the architectural layout plans.
The unit shall be sized to cater for the HWS and space heating demands of which the HWS instantaneous demand shall take precedence in the control philosophy.

Microgeneration Certification Scheme (MCS) accredited contractors shall undertake all Renewable Heat Incentive (RHI) heat pump installations under the requirements and guidelines of Ofgem. The contractor shall be accredited under the Microgeneration Certification Scheme (MCS) and shall undertake all heat pump installations as per Microgeneration Installation Standard (MIS) 3005 (issue 4.3) and any other requirement deemed by OFGEM in order to enable the Client to successfully claim the non-domestic Renewable Heat Incentive (RHI). Upon commissioning, the contractor will deliver a valid and compliant MCS Certificate for the installation(s) alongside schematic drawings of the installation to allow the Client to complete the application.

The contractor shall at the earliest opportunity determine the design electric peak/diversified electrical loadings and associated run amperage to enable the Employer/design electrical contractor to undertake a feasibility of the proposed connected load against the existing building incoming power take.

Under no circumstances shall the project proceed on site and or plant and materials be ordered until this feasibility study has taken place and the contractor is authorised to proceed in writing.

2.3.11. Microgeneration Certification Scheme (MCS) Installer Standards

The systems shall conform to the standard requirements of the MCS including in the categories

- Material supply
- Design
- Installation
- Setting to work and commissioning,
- Energy Metering and reporting.

Approved guidance and reference materials to be used with the standards can be found within MCS guidance MIS3001/2/3/4/5 and 3072

The completed installations must be MCS accredited if installed capacity is 45kWth or under.

2.3.12. Energy Metering

The contractor shall supply and install metering station equipment to satisfy the requirements of Ofgem for RHI systems and installations. Guidance is given in the Ofgem publication ‘Essential Guide to Metering’

Space heating, domestic hot water services, heat pump electrical consumption and hot water service immersion heater circuits shall be appropriately metered. Metering positioning and span of control guidance is given in Appendices 3 and 4 of the above publication.

Meters shall be positioned in accordance with the manufacturer’s requirements to ensure accuracy of readings. Wet meters shall be installed with appropriate free length inlet and outlet runs to ensure laminar flow and prevent turbulent flow inaccuracies.

In addition to the metering equipment the contractor shall be responsible for provision of all associated requirements such as remote temperature detection/sensing facilities.
All meters shall be complete with system ID and be of the smart meter type.

The contractor shall liaise with the electrical contractor to ensure adequate electrical power requirements are made for all metering stations.

Separate heat meters shall also be installed on the HWS supply to the campsite shower facilities and on the space heating circuits to the campsite and campsite managers heating zone as shown on the room data drawings. The heat meters for this purpose are not required to satisfy the requirements of the RHI or MCS but will, as a minimum, log and display the total number of kWh heat supplied to each circuit.

2.3.13. **Sanitary Ware, Tap Ware and Waste Systems**

These systems and appliances are detailed under separate cover and are to be provide by others.

The Main Contractor will supply and install all sanitary ware appliances and tap ware in the positions indicated on the drawings. The Contractor shall allow for appropriate MHW and MCW supplies that may be connected directly to all sanitary and white goods appliances as specified on the MCW/MHW Supplies drawing.

The Contractor shall set WC cistern levels and ensure systems are suitable for operation.

2.3.14. **Control Systems & BMS Trend Controls**

The contractor shall provide all automatic controls as required for the complete and energy effective operation of the systems. Automatic controls shall be provided as follows.

- The ATWHP shall be complete with a manufacturer’s control system & panel incorporating pump set selection/changeover, pressure set, buffer HWS and cylinder storage vessel(s).
- Time programmes/ temperature control/pressure control and including all remote sensors/detectors/immersion heaters.
- If appropriate, the boosted water pump set shall be complete with a manufacturer’s control system & panel.

Controls shall be of a propriety manufacturer and supplied as an integral part of the respective system. All controls shall be set to work and commissioned by the manufacturer/component person.

2.3.15. **Water Treatment Regimes Etc**

The Contractor shall include for chemical dosing of the space heating system in accordance with the ATW HP manufacturer’s/radiator manufacturer’s requirements.

Provision shall be made in the system design for drainage, sampling and fill of chemical additives for life time maintenance regimes.

The domestic hot and cold water services systems shall be cleaned and sterilised in accordance with the WSWF Water Regulations 1999.

2.3.16. **Fire Strategy and Building Compartments**

The Contractor shall note the individual building fire compartments as indicated on the fire strategy architectural plans available from the Main Contractor.
All mechanical services passing between these areas shall be fire stopped in accordance with the Building Regulations and Building Control requirements

2.3.17. Electrical Services

The Main Contractor shall be responsible for all electrical services associated with the mechanical building service installations. The works shall be carried out by a suitably qualified ECA/NICECI registered electrician and shall comply with BS.7671 including all amendments.

The contractor shall provide a schedule of electrical heat pump system requirements including all associated energy metering requirements. The Contractor shall provide all necessary wiring diagrams/control logic diagrams and other details as may be reasonably requested to enable installation of the works.

2.3.18. Builders work

The contractor shall be responsible for detailing all builders work requirements necessary for the integration and co-ordination of the building services installations. The main contractor shall undertake these works

2.3.19. Tender Inclusions and Schedules

The contractor shall include within his tender return for the manufacturer’s plant and materials noted in the specification. The contractor may offer separately alternatives for the employer’s consideration. Any cost adjustments must be declared.

The contractor shall complete in full the itemised summary of costs form. The successful contractor may be required to complete a full schedule of rates prior to commencement on site.

2.3.20. Programme and Order of Works

The contractor shall undertake his works in consultation with other trades and to the Contract Administrator’s (CA) TARGET programme and associated detailed order of works. The programme is to be agreed with the CA, Main Contractor and Contractor.

The office accommodation and campsite managers facility is to remain operational throughout and personnel and equipment shall be decanted at strategic time window slots to specific areas of the centre. This will be agreed upon award of contract.

The campsite facilities will close in their entirety for the duration of the works.