# 1 DESCRIPTION OF BUILDING AND FACILITIES

## 1.1 General

Chelsea Farm and Jean Darling House consists of 40 dwellings. It is a managed block of flats.

Heating to is provided by 2 floor mounted Remeha gas boilers 200kW each.

Combustion gases from the boiler are discharged via a flue which rises through the building and terminates above roof level.

Hot water is served by 2no. 500litre storage calorifiers. The primary heat is delivered via low temperature hot water from the boilers. The hot water is distributed to the flats via a pumped secondary system.

The services leave the plantroom via a single riser adjacent stairwell G. The services appear to rise to the loft area and distribute in separate risers throughout the building.

The plantroom has a dedicated BMS panel.

Ventilation to the boiler house is provided by louvred openings in the external wall.

The distribution pipework appears to be run below ground in service ducts parallel to the buildings. Not all of the pipework is lagged.

The existing plant is thought to be just over ten years old whilst the distribution pipework is original.

Heating is provided to the spaces by radiators complete with thermostatic radiator valves. The is a two-port valve controlling heating to the individual dwellings.

Both properties are brick built with unfilled cavity, the windows are double glazed, and the external doors have been changed in the last few years. The roofs appear to be original, not insulated and we have assumed the ground floor and slab between floors to be solid.

Externally there is a small communal area between both properties and a small communal garden adjacent to Moravian Place.

## 1.2 Deliveries and Site Storage

Any materials and deliveries of equipment must be confined to a “just in time” method. Storage facilities do not exist, however consideration will be given to the contractor for providing a storage container for storing small items of plant / equipment, pipework etc. The container shall be located in an agreed position to maintain existing Fire Escape routes and be agreed with the Client / Site Manager.

## 1.3 Welfare Facilities

The Contractor should allow for the provision of temporary welfare facilities (i.e. OASIS) for his staff. Water and electricity will be provided free of charge but the contractor should allow all costs for extending these services. It is intended that the temporary welfare will be located adjacent / near to the ground floor lift.

## 1.4 Programme and Sequence of Works

It is intended to carry out the boiler house refurbishment, sprinkler system and primary heating from the Cremorne Estate communal heating system in a 24 week period.

## 1.5 Fire Stopping

Where apertures are required for cables/pipes and their containment to pass through fire barriers, the holes shall be fire stopped and such works shall be certified accordingly and product installed by an UKAS accredited fire stopping specialist contractors (see BS476 Part 20 and EN1366-3). Please refer to RBKC's fire policies for fire stopping requirements.

Where containment or pipes penetrate walls, fire pillows are to be installed where required, a notice shall be installed to the outside of the containment to indicate the installation of fire pillows.

## 1.6 Asbestos

The Contractor shall be provided with a historical asbestos report by the Client prior to any works commencing on site.

The Contractor is required to carry out their own R&D survey and satisfy themselves that the area is safe to work in.

The contractor shall make allowance within their programme to carry out asbestos removal works with a specialist contractor to ensure asbestos is removed prior to work starting works on site.

All operatives must have completed asbestos awareness training, and copies of all certification is to be provided prior to works starting on site.

## 1.7 CDM Regulations

The project is classified as notifiable contract under CDM Regulations 2015 and in this regard the contractor will be required to undertake the role of Principal Contractor. calfordseaden (Health & Safety) Limited are to act as the Principal Designer.

## 1.8 Resident's Liaison Officer (RLO)

The Contractor shall ensure that a dedicated Resident Liaison Officer is appointed for this project and duties shall comply with those set out by the Client.

The Contractor will nominate an operative of suitable standing to act as RLO. That operative will be available on site between the hours of 8.00 – 16.00 for contact by any tenants; name and CV to be provided at pre contract meeting for review and approval.

The Contractor will distribute a letter to each tenant or person that may be affected by the works detailing:

- The works to be undertaken.
- A program of works.
- The working hours of the Contractor.
- The contact name and telephone number of the RLO.
- Which properties may be affected by the noise of the operations?

Reassurance that no loss of supply will be encountered and if required, advise as to when programmed stages of loss of supply are.

The contents of the letters are not restricted to, but must contain the above items. The Client, before distribution, must also agree the contents.

The Contractor will provide and erect a signboard, with the Client's logo. Location and size to be agreed by Contract Administrator and Client representative.

The Contractor will provide an out of hours emergency telephone contact, for use by the Client emergency service, the contact number will be provided at the pre contract meeting. (The Client will test call the number prior to the start and during the term of the contract).

Where any shutdowns are required, the Contractor will hand deliver letters of interruptions of services to each resident no later than (14) days prior to the shutdown. The Client will require 7 days to approve the letters, this will mean a 21 day turn around for planned shutdown and letters issued. It should include:

- The day dates and time of any shutdown.
- The time the services will be restored.
- The duration of the shutdown.
- The time the services will be restored.

The name and telephone number (including emergency number) of the RLO.

The Contract Administrator must agree to the contents before distribution. The contractor will produce a copy of the letter at the pre-contract meeting.

# 2 SCOPE OF WORK

This document generally deals with, but is not limited to the following:-

a. Validation of existing heating and domestic water flow rates, temperatures, water pressures etc. within the boiler room / calorifier room and to each apartment.

b. Isolation and strip out of all existing heating distribution pipework from the boiler room to all of the dwellings.

c. Strip out of all existing heating distribution pipework within Chelsea Farm House Flats 1 to 18 and Jean Darling House Flats 1 to 16 up to and including all existing radiators.

d. Strip out of all existing heating distribution pipework within Chelsea Farm Studios 1 to 6 up to and including all existing radiators.

e. Strip out of all existing MCWS & BCWS distribution pipework to Chelsea Farm House Flats 1 to 18, Chelsea Farm Studios 1 to 6 and Jean Darling House Flats 1 to 16. The existing domestic hot and cold water pipework within the kitchens & bathrooms is to be retained for connection to the new BCWS and HIU units. Chelsea Farm Studios have their own electric point of use water heaters which are to remain.

f. Replacement of communal gas fired boilers with new of sufficient capacity to offset the current heating and hot water demands.

g. Installation of new primary heating flow and return pipework from the Cremorne Estate communal heating system to the new plate heat exchanger plant room.

h. New combined air separator and dirt separator fitted on the common heating return to provide protection to the new heating plant from potential residual system contamination.

i. New boiler flue system to suit the new communal boilers installation.

j. Provision of a new pumped primary boiler circuit to the new thermal store buffer vessel.

k. Provision for plate heat exchangers to provide hydraulic separation between existing and new system.

l. Provisions for new pumped secondary heating distribution system to Chelsea Farm House Flats 1 to 18 new HIU units.

m. Provisions for new pumped secondary heating distribution system to Jean Darling House Flats 1 to 16 new HIU units.

n. Provisions for new pumped secondary heating distribution system to Chelsea Farm House Studios 1 to 6 new radiators.

o. Provision of new incoming mains cold water supply to serve the new combined domestic / sprinkler cold water tank located in the GRP enclosure on the garage roof.

p. Provision of new combined domestic / sprinkler cold water tank within new packaged plant room mounted in a GRP enclosure on the garage roof.

q. Provision of new combined domestic / sprinkler packaged boosted cold water pump set within new packaged plant room mounted on the garage roof and distribution pipework to serve all dwellings.

r. Provision of new packaged CAT5 irrigation water boosted cold water pump set within new packaged plant room mounted on the garage roof and distribution pipework to serve external bib taps.

s. Provision of new primary and secondary automatic system pressurisation units served by the MCWS within the plant rooms.

t. Flushing and water treatment to new heating pipework distribution throughout the dwellings.

u. Flushing and sterilisation of new / existing domestic water services pipework distribution throughout the dwellings.

v. Servicing of all TMVs within all apartments

w. Provision of new BMS automatic controls for main plant including heat detection and gas shut off facilities.

x. Provision of new power and lighting circuits within the plant rooms.

y. Provision of structural steels / builders work over the existing garages to support the new GRP plant enclosure, cold water storage tank and packaged pump sets.

z. Installation of new Photovoltaic solar panels on Chelsea Farm & Jean Darling roofs to convert the suns energy into electricity.

aa. Installation of new roof void insulation and boarding out of roof voids.

bb. Provision of new cavity wall fill to Jean Darling House

cc. Provision of new boiler room combustion air louvres and ducted low level ventilation to comply with BS6644

dd. Provision of all associated builders works in connection.

ee. Other ancillary works subject to survey.

The contractor shall also allow for the following miscellaneous contractual requirements: -

i. Make any necessary allowance for protection within communal areas during the entire course of the works. This applies particularly to areas where the contractor may utilise the communal toilet area. External landscaped areas are also to be protected as necessary and made good at completion of the works.

ii. Works are to be carried out during normal working hours, Monday to Friday. During this time, the property will be fully occupied, hence noise and disruption should be kept to an absolute minimum.

iii. Whilst works are carried out within the flats some residents may want to vacate during the day, a provisional sum has been allowed for the contractor to arrange activities for the residents during the day whilst such works are carried out.

iv. Remove and safety dispose of all redundant equipment, pipework and other materials on a regular basis.

# 3 DESIGN CRITERIA

## 3.1 Public Health Services

- Criteria laid down in the current Institute of Plumbing and Design Guide, CIBSE Guide G, BS EN 806 and BS8558
- Local Water Supply Authority
- Water Supply Regulations
- Water Supply Byelaws Guide
- Water Supply Regulations
- The water services shall fully comply with the CIBSE TM13, HSE ACOP L8 and HSG274 and all other appropriate guidance relating to the prevention of Legionella.

Cold water storage shall be sized based upon an 8 hour disruption in supply. Where the domestic cold water storage tank is also utilised to provide combined storage for the sprinkler system, the Contractor shall ensure that the tank volume is sufficient for the application and that appropriate monitoring and fail-safe measures are provided.

## 3.2 External Noise Level

- As required by the Environmental Health Officer and Local Authority
- The external acoustic design shall be based upon the mechanical plant operating 24 hours per day Monday to Sunday inclusive

## 3.3 Pipework

LTHW

- 300 Pa maximum per metre run
- 1.5 m/s maximum velocity for pipework 65mm diameter or above
- 1.0 m/s maximum velocity for pipework of 50 mm and under

Domestic Water

- 300 Pa maximum per metre run
- 1.5 m/s maximum velocity for pipework 65mm diameter or above
- 1.0 m/s maximum velocity for pipework of 50 mm and under

Gas

100 Pa maximum pressure loss between gas meter and boilers

## 3.4 Metering

A detailed metering strategy in compliance with CIBSE TM39 shall be developed in conjunction with the Client to achieve his desired objectives with respect to metering. The provision for metering shall be no less than the minimum provision as detailed in Building Regulations Part L2A and referenced guidance. This shall also be compliant to the Heat Network Metering and Billing Regulations.

## 3.5 Electrical

The following design criteria shall be used as a basis for the design of the electrical installations. The design criteria shall satisfy the local Electricity Supply Company's requirements and also meet the following:

a) The electricity supply from the transformer will be 230 / 400v, 3-phase, 4-wire, 50Hz, earthed as advised by the local Electricity Supply Company.
b) The earth fault loop impedance at the low voltage supply terminals shall be as advised by the local Electricity Supply Company.
c) The prospective short circuit current at the low voltage supply terminals shall be as advised by the local Electricity Supply Company.
d) Method of protection against electric shock shall be earthed equipotential bonding and automatic disconnection of supply.
e) Basis of calculation and impedance criteria to be used is tables 41.1, 41.2, 41.3 and 41.4 of BS7671:2018 IEE Wiring Regulations18th Edition.

## 3.6 Design Calculations

The Stage 4 coordinated drawings shall substantiate in all respects the design calculations.

Copies of design calculations and drawings shall be submitted to the Client and his team by the Contractor for comment prior to ordering of materials and commencement of installation. Notwithstanding this, the Contractor shall be responsible for any error, discrepancy or omission in any calculation or design drawing prepared by him or on his behalf, whether or not such calculation or design drawing has been passed 'No Comment'.

Public Health Services calculations shall comprise, but not be limited to the following:

- New incoming water mains sizing
- Sizing of cold water storage tank
- Boosted cold water service pipework sizing

Mechanical Services calculations shall comprise, but not be limited to the following:

- Boiler plant load
- Pump sizing and selection curves
- Pipework sizing
- Acoustic calculations

Pipework schematics shall show velocity, flow rate, pipe size and pressure drop per metre to each main and branch.

Electrical Services calculations shall comprise, but shall not be limited to the following:

- Detailed calculations on all disconnection times, earth fault loop impedance, short circuit protection and discrimination, including volt drop, current carrying capacities of cables, space factors, grouping etc. to establish sizes for all cables and equipment on approved software such as Amtech, etc.
- Lighting design calculations, including provision of Isolux diagrams, photometric data and glare calculations on Dialux / Relux software.
- Emergency lighting calculations on Dialux / Relux software
- Schedule of loads including diversity values
- Protective and equipotential bonding conductor sizing calculations or as Table in IEE Wirings Regulations
- Protective device discrimination graphs / study on approved software such as Amtech
- Incoming electricity supply capacity

Sprinkler System calculations shall comprise, but shall not be limited to the following:

The Contractor shall carry out a detailed building study and ascertain all design limitations and installation restrictions. Develop a sprinkler design solution and complete all necessary calculations to ensure the design meets full compliance with BSEN 12845 (Incorporating LPC Technical Bulletins) to achieve the required risk mitigation for commercial and large communal spaces and a BS 9251 system for the residential floors.

The Contractor shall complete all necessary calculations to ensure the design meets the required Building Regulations submission, submit to Building Control and provide all necessary supporting information required to achieve Building Regulations compliance. Develop the designs using the best principles of design through Working Drawings to ensure compliance is achieved, liaising with other members of the construction team. Carry out all calculations and design development necessary for a Building Regulations Submission and allow for submission of these and obtain approval from the Building Control Department in this respect.

## 3.7 Contractor's Working Drawings

The Contractor shall be responsible for the correct settings out of the works and shall provide fully detailed and co-ordinated working drawings.

The Stage 4 working drawings shall be based on the Contractors design and shall take into account all drawings applicable to other disciplines, trades and service, site constraints and all modifications which may have or will take place to the buildings or installations. These drawings shall be correctly related to the selected plant and equipment.

The Contractor shall be responsible for providing all working drawings in adequate time to ensure that there is no delay in the programme. The Contractor shall be responsible for any error, discrepancy or omission in any drawing prepared by him or on his behalf whether or not such drawing has been passed 'No Comment'.

The Contractor shall be responsible for co-ordinating his working drawings with all other information, structure, interior details etc.

All drawings shall be prepared using AutoCAD software with each drawing being produced in "DWG" format on a CAD draughting system. The boiler room, pump room and tank room layouts shall be produced in 3D using AutoCAD Revit software.

All working drawings shall be submitted to the Client and Clients Building Services Engineer for comment prior to commencement of the installation. The Contractor shall allow a minimum period of 10 working days for any comments to be issued. Sufficient time shall be indicated in the Stage 4 design programme for comments to be issued, with due provision also allowed to incorporate the comments made. Work shall not be commenced on site until the appropriate drawing has been endorsed 'No Comment'. Any work commenced, or materials ordered prior to receipt by the Contractor or Contractor's drawings marked 'No comment' will be at the Contractor's own risk. Should any work installed, or materials orders, require alteration, amendment or re-ordering to suit any comments made shall render the Contractor solely responsible for accepting any costs incurred.

## 3.8 Builders Work Drawings

The contractor shall be responsible for preparing detailed builderswork drawings.

The builderswork drawings shall be based on the working drawings and shall take into account all drawings applicable to other disciplines, trades and services and all modifications which may have or will take place to the buildings or installations. These drawings shall be correctly related to the selected plant and equipment.

The Contractor shall be responsible for providing all builderswork drawings in adequate time to ensure that there is no delay in the programme. The Contractor shall be liable for any costs associated with delays, incorrect works, etc., caused by his failure to issue approved builderswork drawings in sufficient time.

The Contractor shall be responsible for any error, discrepancy or omission in any drawing prepared by him or on his behalf, whether or not such drawing has been passed 'No Comment'.

The Contractor shall allow 10 working days for the processing and commenting on the builderswork drawings by the Client and Clients Building Services Engineer within his programme, along with sufficient time to modify the builderswork drawings.

All builderswork drawings shall be prepared on a CAD draughting system using AutoCAD software with all drawings being produced in "DWG" format.

## 3.9 Record Drawings

The Contractor shall supply a comprehensive set of record drawings of the works. The record drawings shall be based upon the marked up copies of the working drawings.

This document generally deals with, but is not limited to the following:-

# 4 DESCRIPTION OF PROPOSED WORKS

## 4.1 Temporary Works

As the works are proposed to take place during the winter / spring period, it is necessary that heating and domestic cold & hot water systems are maintained to each dwelling throughout the contract period.

To achieve the continuous domestic cold water supply the existing mixture of tank fed and mains cold water service shall remain live and provide a continuous supply.

To achieve the temporary domestic hot water supply and heating to the VT and CT circuits, it will be necessary to provide a 300kW temporary LTHW supply facility by the provision of a temporary packaged plant arrangement located within the communal garden adjacent to the ground floor lift (final location to be agreed).

Temporary plant located outside of the boiler plant room must be contained within a secure enclosure. The successful tenderer will be responsible for the hire of the temporary header serving each of the CT & VT flow and return circuits.

The Contractor shall provide a flow and return connection to a temporary header serving each of the CT & VT flow and return circuits.

The Contractor shall provide a flow and return connection to a temporary header serving the HWS flow and return circuits.

The contractor shall provide a 16 Amp single phase commando socket at the location agreed with the supplier of the temporary containerised boilers.

The contractor shall provide all necessary suppose frames, bracketry etc. to allow distribution of the flexible pipework from the packaged container to the boiler room.

Whilst works are carried out in the flats and in particular during changeover works, temporary local heating may be necessary. The contractor shall allow to provide 2kW low surface temperature (LST) eco oil filled radiators. 60 units in total. Each unit shall be a Dimplex CDE2ECC 2kW Cadiz Eco oil free radiator with LCD remote (or equal and approved).

The contractor shall carry out any changes required to disconnect and reconnect the current temporary supplies within the boiler room to suit the boiler room sequence of works and allow installation of the new plant and equipment. The contractor shall give prior notice of any changeovers 7 days before such disconnection of the temporary supplies and subject to approval by the client and their professional team.

## 4.2 Communal Boilers and Flues

The existing gas fired boilers are to be isolated, dismantled and removed from site.

The new boiler installation shall comprise of 2no. Bosch gas fired boilers model GC7000WP 145kW V2 stainless steel condensing boilers providing a total output of 290kW complete with pipe and header kits and shunt pumps as detailed on the equipment schedule.

The boilers shall be installed using manufacturers frame and pipe kit. The frame and pipe kit shall comprise boiler support frames, headers for flow, return, gas and condense services with all interconnecting pipes, individual boiler module pumps and non-return valves. The frame shall be firmly bolted to the new concrete plinth and wall.

The contractor shall instal 1no. new 1000 litre thermal store buffer vessel as manufactured and supplied by Bosch. Due to space restrictions and subject to contractor site measurement, the thermal store may be delivered to site uninsulated to allow entry into the plant room. Once located the thermal store shall be fitted with 100mm insulation to the manufacturers requirements.

The thermal store shall be fitted with a connection on the secondary flow outlet for fitting a temperature sensor for the Master / Slave boiler sequence control.

The boilers shall be arranged as per the proposed layout drawings.

Boilers shall be part of a primary circuit equipped with a low loss header (thermal store) to ensure adequate flow through the boilers.

The primary and secondary heating systems shall be hydraulically separated using a plate heat exchanger (Run and standby with manual changeover).

The secondary heating circuits serving the dwellings shall be connected to the secondary side of the plate heat exchangers.

The primary and secondary heating circuits shall be sealed and equipped with new dedicated pressurisation units and expansion vessels.

2no. flow and return tails shall be installed and left capped off on the primary side for any future temporary boiler plant to be installed for future maintenance.

Condensate from the boilers and flue is to be piped via a common header to local gully / SVP (via trap at each connection to Water Authority requirements).

It is recommended that the contractor employs a flue specialist to carry out site survey, design and installation of the new boiler flue system to BS EN1443 : 2003 and BS EN1856 : 2009.

A new flue system shall be provided within the plant room to serve the boilers comprising a twin wall stainless steel header section laid to fall, 2no. boiler connections and pass through the existing route.

The flue system shall comprise products suitable for gas fired appliances; ideal for modern high efficiency and condensing applications.

Typical product construction would be grade 316 stainless steel inner liner, grade 304 stainless steel outer casing, and 25mm (nominal) void being packed with a dense mineral wool fibre. All joints would include cover bands / locking bands as applicable.

The flue installation from appliance flue spigots through to the discharge location shall be in accordance with IGEM/UP/10 Edition 4 and the Clean Air Act.

On completion, the flue system shall be pressure tested to satisfy requirements in IGEM/UP/10 Edition 4.

Flues and scaffolding to be provided by the contractor for suitable and safe access to the roof. All scaffolding shall be alarmed.

## 4.3 Heating Pumps

All of the existing heating pumps are to be disconnected and removed from site.

New pumps are to be provided as follows details of which are provided within the equipment schedules in section 5 of this document.

- Boiler shunt pumps - single head invertor type supplied by Bosch as part of the boiler pipe and header kit.
- Primary CT heating pumps – twin head invertor type.
- Secondary Chelsea Farm House Flats 1 to 18 heating pumps – twin head invertor type.
- Secondary Chelsea Farm House Studio Flats 1 to 6 heating pumps – twin head invertor type.
- Secondary Jean Darling House Flats 1 to 16 heating pumps – twin head invertor type.

All pumps are to be generally located as shown on the proposed layout drawing and schematic.

The Contractor shall carry out final external resistance calculations for all pumped circuits based on their new boiler room, ASHP packaged plant room and pipework distribution circuits to provide final selection of the new pumps for approval by calfordseaden.

## 4.4 Heating Pressurisation Unit

New BCWS fed pressurisation units and expansion vessels are to be provided for the new primary and secondary heating circuits within the boiler plant room.

## 4.5 Plate Heat Exchangers

2no. new plate heat exchangers (run/ standby with manual changeover) shall be installed to protect the new heating plant from potential residual contamination from the heating distribution system.

The plate heat exchangers are to be manufactured by UK Plate Heat Exchangers, of which are provided within the equipment schedules in section 5 of this document.

Plate heat exchangers are to be located generally as shown on the proposed plant room layout drawing and fitted with insulation jackets with Velcro fasteners, supplied by the plate heat exchanger manufacturer to suit each plate heat exchanger.

The plate heat exchangers specified in the equipment schedule are of the Gasketed Plate type, however should the contractor find space constraints affect the installation of large Gasketed type then Brazed exchangers may be considered.

## 4.6 Plant Room (Boiler Room, Pump Room & New GRP Packaged Plant Room) Heating, Domestic Water and Gas Pipework

The existing heating pipework, domestic water pipework and gas service pipework including gas valve within all plant rooms shall be replaced.

The Contractor shall allow for a line size combined air and dirt separator as manufactured by Spirotech DN 65 (Flanged Bottom demountable) on the heating return circuit. A bypass shall be installed with isolation valves and line size strainer.

The Contractor shall allow for the supply and installation of a commercial Magna Clean on the secondary return with isolation valves.

All new heating pipe work shall be Mapress Copper.

All new main distribution heating pipework, shall be fully insulated / reinsulated with a CFC free phenolic foam with a foil face finish and to a minimum thickness of 20mm on pipework up to 50mm, 25mm thick 50mm and above to BS 5422: 2009.

Heating pipework insulation shall be finished with an Isogenopac wrap and hammerclad within all the plant areas. All pipework shall be provided with a suitable range of identification bands and flow arrows.

The Contractor shall trace heat ALL external heating pipework or pipework run within un-conditioned spaces. The trace heating shall be as manufactured, supplied and installed by Raychem. The trace heated pipework shall be insulated and weatherproofed to Raychems specified requirements.

All pipework to be provided with a suitable range of identification bands and flow arrows to BS1710.

All domestic mains and boosted water pipework shall be installed in Mapress Copper utilising 'Mapress' fittings.

All new domestic water pipework, shall be fully insulated / reinsulated with a CFC free phenolic foam with a foil face finish to a minimum thickness of 20mm on pipework up to 50mm, 25mm thick 50mm and above to BS 5422 : 2009. Where copper pipework is used insulation shall be mineral wool. If phenolic CFC insulation is used a protective layer shall be applied to the pipework before insulation is applied.

Domestic water pipework insulation shall be finished with an Isogenopac wrap and hammerclad within the plant area. All pipework shall be provided with a suitable range of identification bands and flow arrows.

The Contractor shall trace heat ALL external domestic water services pipework or pipework run within un-conditioned spaces. The trace heating shall be as manufactured, supplied and installed by Raychem. The trace heated pipework shall be insulated and weatherproofed to Raychems specified requirements.

Contour valve jackets shall be fitted on all heating valves 50mm and above.

Temporary plant connections are detailed on the boiler plant schematic, these shall be run and penetrate through the external wall at an agreed location ready for connection outside. The connections shall be covered by a secure stainless steel box with lock and labelled as such.

The Contractor shall extend the new gas main within the plant room from the existing gas meter and install a new isolation valve and emergency gas solenoid shut off valve.

Removal of all redundant services pipework located in the existing plantrooms.

Pipework in all areas including all plant rooms, distribution to all dwellings, within all dwellings, risers and throughout shall be sufficiently insulated.

All horizontal and vertical pipework distribution within all dwellings shall be enclosed using Pendock Profiles pipe boxing.

## 4.7 Cremorne Estate Primary Pipework

The Contractor shall supply and install a 65mm dia. heating flow and return pipework distribution from the Cremorne Estate to the Chelsea Farm House boiler / tank room.

The pipework shall be as manufactured by CPV Ltd and be the pre-insulated Hiline Fibre Flex Pro to match that used on the Cremorne Estate Heating Network.

The pipework shall emanate from the adjacent to Purcell House. Connections point / valves provided by others.

Heating leak detection & trace heating shall be left ready by the Cremorne Contractor to connect to under waterproofing layer.

The Contractor under these works shall employ the Cremorne Contractor to carry out the works across the road and connections etc. as to not affect warranties, so they will be waterproof until we expose this and connect. The Cremorne Heating Network Leak detection panel shall include the CFR/JDH branch.

The Contactor shall apply for a Section 50 Street Works Licence from The Royal Borough of Kensington and Chelsea Directorate of Highways and Traffic to allow the heating pipework to cross the road from the Cremorne Estate to CFR/JDH.

The Contractor shall allow for Payment of administration fee to the authority in lieu of issue and maintenance of the licence and Payment of inspection fees to the authority for each excavation allowing for 3 No inspections.

The Contractor shall notify the street authority of proposed date of commencement of works and anticipated duration in advance in line with traffic sensitivity of the street (Part N).

The Contractor shall notify the authority of the date when interim reinstatement has been carried out.

The Contractor shall notify the authority of the date when permanent reinstatement has been carried out (not later than six months from interim reinstatement).

## 4.8 Incoming Mains Water Supply

The Contractor shall provide a new suitably sized incoming main to serve the new cold water storage tank and BCWS serving both Chelsea Farm and Jean Darling House.

The Contractor shall be responsible for all necessary liaison, coordination etc. associated with the water supply. The water main connection shall be provided with a water meter and all necessary valves to comply with current regulations.

Liaise and make arrangements for the Water Authority to install a new external mains cold water supply including pipework, valves and connections to serve the new combined potable cold water storage / sprinkler tank and associated booster pumps located in the GRP Housing plantroom.

The pipework arrangement shall incorporate a suitable valve arrangement including a new principal stop valve, a double check valve and test point, and a new pulse output water meter which shall be the water authority meter, suitable for connection to the BMS system.

Allow and include for all costs associated with the new incoming water supply installation, including infrastructure charges and liaison with the Statutory Authorities. Obtain formal approval from the local Water Supply Company/ Authority for the complete installation to allow provision of water supply to premises.

## 4.9 External Irrigation System

An external irrigation system shall be provided by the Contractor to strategically located Arrow Valves external bib taps mounted to the building. Bib taps (minimum 4No) shall be sited in locations agreed in conjunction with the client (unless specified otherwise, these shall be surface mounted in lockable, insulated tamper-proof boxes by Arrow valves or equivalent), and shall incorporate all necessary backflow prevention to the standard as required by the local ruling water authority.

The irrigation system shall be served by the CAT5 cold water booster set located in the GRP Housing plantroom on the garage roof.

## 4.10 Combined Domestic Water and Sprinkler System Water Storage Tank and Packaged Cold Water Booster Set

The Contractor shall supply and install a Combined Domestic Water and Sprinkler System Water Storage Tank and Packaged Cold Water Booster Set located in the new GRP enclosure on the roof of the existing garages.

The Contractor shall calculate the booster set flow rate to BS806 Part 3 to meet all dwellings appliances loading units. The Contractor shall submit their calculations for comment / approval prior to ordering plant.

The packaged cold water booster set shall be as manufactured by Grundfos Model Hydro MPC-E 3 CRIE 5-9 having run/run/standby pumps.

The packaged pump set shall be a variable speed booster set with stainless steel manifolds and microprocessor control panel incorporating isolator & LCD display.

On completion, the booster set shall be commissioned by the manufacturer.

The cold water storage tank shall be as manufactured, supplied, delivered and installed by Decca Plastics Limited:

DECCA PLASTICS LTD
Victoria mill Lincoln Street
Preston
Lancs
PR1 6RE

Tel: 01772 825 757

Email: Sales@deccatanks.co.uk

Or equal and approved.

The sectional water storage tank shall have Internally Flanged Base & Externally Flanged Sides glass reinforced plastic (GRP).

The tank shall be sized to meet Water Authority Regulations and the Sprinkler Specialists design requirements.

The tank shall be manufactured to ISO9001: 2015, as well as complying to BS EN 13280:2001.

The tank shall have a Type AB – Cat5 Air Gap.

The tank shall be fitted with a maintenance divider to provide 2No. compartments.

For tender purposes the Contractor shall allow for a combined domestic water / sprinkler tank of 7,650 litres actual capacity, having internal dimensions of 3m x 2m x 1.5m high.

The panels shall comprise 50mm Fully Encapsulated insulation to Sides and Lid.

The 2No. Inspection Hatches and 2No. Manhole heavy-duty lids shall be insulated.

Bolts, washers and internal bracing shall be stainless steel throughout.

The Tank shall be fitted with 2No. Keraflo Tanktronic Servo Ceramic Valves (SCV) and a Keraflo Tanktronic Control Unit c/w Twin Pressure & Temp Sensor.

Tank Connections:

- 2 No. PN16 Flanged 67mm Outlet Connections
- 2No. UPVC Union Screened 80mm Overflow Connections
- 2No. McAlpine Screened 20mm Early warning Connections
- 2No. BSP Threaded Fitting (F) 50mm Drain Connections
- 2No. High Level Sensor Connections
- 2No. Low Level Sensor Connections
- 2No. Sprinkler Minimum Level Sensor Connections
- 2No. Temperature Gauge Connections
- 2No. Keraflo Tanktronic Connections

The Contractor shall ensure that the floor area for the new tank is solid continuous.

The sectional tank(s) shall be positioned above a GRP catchment tray, which shall be 150mm larger than the cisterns overall size and have a 100mm upstand. The tray shall also be fitted with a drain connection.

Terminate overflow and warning pipes in a suitable position agreed with the Client Representative.

Provide a water bund for testing purposes complete with suitable drainage provisions that will not give rise to any hazard to normal operations.

Ensure that the installation complies with the Water Regulations in all respects.

The tank installation shall be carried out by Decca Plastics approved installers for the standard 12-month warranty to be valid.

Commissioning & testing of the tank shall be carried out by the tank manufacturer.

It is essential that the tank is filled, commissioned and tested within 10 days from the date of erection of the tank. Any leaks reported within this 10-day period will be inspected and rectified free of charge.

The Contractor shall ensure the tank manufacturer tank erection team are present on the day of filling of the tank.

## 4.11 Cat5 Irrigation Water Packaged Cold Water Booster Set

The Contractor shall supply and install a Cat5 Irrigation Water Booster Set located in the new GRP enclosure on the roof of the existing garages.

The packaged cold water booster set shall be as manufactured by Arrows Valves Model BTAB 3-10A having duty / assist pumps.

Or equal and approved.

The packaged pump set shall be a variable speed booster set with stainless steel manifolds and microprocessor control panel incorporating isolator & digital display.

On completion, the booster set shall be commissioned by the manufacturer.

## 4.12 GRP Enclosure / Plantroom

The Contractor shall supply and install a GRP enclosure on the roof of the existing garages.

The GRP enclosure shall be as manufactured, delivered and installed by Decca Plastics Limited:

DECCA PLASTICS LTD
Victoria mill Lincoln Street
Preston
Lancs
PR1 6RE

Tel: 01772 825 757

Email: Sales@deccatanks.co.uk

Or equal and approved.

The GRP housing shall have internal clear dimensions of 6m x 3m x 2.1m high having external dimensions of 6.15m x 3.15m x 2.25m.

The GRP housing double access door shall provide a 1524 x 1982mm opening.

The design and production of the GRP housings shall be manufactured to ISO9001: 2015. The unit shall be delivered fully-assembled in separate sections.

The housing shall be manufactured by 'Hand-lay method', Combining an approved polyester resin (BS3532 & BS2782) pigmented to BS4800 colour range Re. RAL 7004 or 6005 & 'E' fibreglass mat on an internal timber frame which when set shall be topped with a topcoat leaving a smooth finish.

The housing shall have an integrated GRP floor comprising of a plywood timber base mounted atop of treated softwood bearers which are then fibreglassed encapsulating and sealing the floor to the unit whilst also giving a solid flat floor to work from internally (approx. 90mm deep).

The housing shall comprise 25mm Fully Encapsulated insulation to all sides, roof & floor.

The contractor should note that the Decca Plastics average housing will have sound reduction up to 20dB.

The contractor should be aware of the ENVIRONMENTAL NOISE SURVEY report issued by Noico Noise Control dated 20/06/2023.

If the noise produced by plant located within the GRP Housing needs to be reduced further than its standard 20dB, then the GRP Housing walls, roof etc. should be constructed to meet any further reduction required by the local authority.

The housing shall comprise the following:

- 1.4 Way Consumer Unit – 100A – 230V – 3 MCB's fitted (1 spare space)
- Frost Room Thermostat – 16 Amp
- LED Bulkhead light – 230v AC – 15W LED
- Thermostatic Tubular Heater – 408mm L – 40w (c/w cage)
- Light switch.

All components shall be wired and mounted to precut board and electrical tested in house.

The housing shall have a pipework services slot/mesh.

The contractor shall employ a structural design engineer to design the steel supports to provide support of the GRP Housing and its contents (sectional water tank, cold water booster sets etc.). The steel supports sizes and located to suit the GRP Housing & Sectional Tank. The design shall be shared, discussed, issued to Decca Plastics for any comments to ensure the structural design meets their requirements.

## 4.13 Heat Interface Units

Chelsea Farm House Flats 1 to 18 and Jean Darling House Flats 1 to 16 shall be supplied with heating and hot water by means of a wall mounted heat interface unit (HIU), fed from the heat network distribution system. The HIU shall have a separate manifold to allow installation pipe work to be connected and tested before mounting the HIU, to aid site security and flushing.

HIU's shall be Worcester Bosch Greenstar E+, inclusive of heat meter and DPCV.

All HIU's to be fitted with a magnetic filter on the secondary return, a scale reducer on the cold water inlet and a flushing bypass. Note all connections to the HIU shall be at the bottom of the units.

Heat interface units shall be CE & CA marked, manufactured and tested to the following standards.

- BS EN60335
- BS EN62233
- BS EN55014
- BS EN61000
- BESA HIU Test Regime (version October 2018)

The HIU model shall hold full WRAS (or alternative water regulations scheme) approval for the complete HIU.

The HIU model shall be BESA registered and VWART tested.

The HIU shall have a white durable outer metal casing with fully insulated inner cladding, encompassing the plate heat exchangers and control valves.

Domestic Hot water (DHW) shall be provided instantaneously using electronic control valves to modulate the primary flow rate through the copper brazed stainless plate heat exchanger.

Central heating shall be supplied via a separate copper brazed stainless steel plate heat exchanger, with control via an electronic control valve.

The central heating return temperature shall be limited to 50°C by the HIU, to comply with Building Regulations. This shall be achieved via the electronic control valves.

The electronic control valves must be capable of opening fully from a closed position in under 3 seconds, to ensure fast reaction to demand change.

A DHW demand shall be sensed by a flow turbine giving fast activation of hot water delivery.

The DHW supply shall be protected by an internal hot water safety valve, which cuts off the flow under excessive hot water temperature of 65°C. Under these fault conditions there shall be no flow to the taps.

The heating circuit shall be controlled via an external time and temperature control with 230VAC connections to the HIU wiring box, or through EMS bus technology, providing the possibility of weather compensated operation.

The HIU shall incorporate a low energy pump with adjustable pressure curve.

The pump will activate once every 24 hrs if there has not been a heating demand in the previous 24 hrs, to ensure there is no chance of seizure.

The HIU shall incorporate a strainer for the primary circuit, to prevent contamination from foreign debris with a mesh size of 1.5mm, sufficient to protect vulnerable components, but large enough not to clog unnecessarily.

The HIU shall have inbuilt frost protection from water temperatures of 5°C, opening the district supply valve. At 8°C the internal secondary heating pump shall operate.

An energy heat meter shall be provided within the HIU primary circuit, to measure the heating energy consumption within the apartment. The meter must comply with the requirements of EN1434 (MID) Class 2. The energy meter shall have Mbus connectivity for export of data to external billing systems.

The minimum clearances for the HIU shall be no greater than 5mm either side, 200mm below and 30mm above.

The Heat Interface Unit shall be installed with a separate mounting jig to allow pipe work to be made and tested before the HIU is finally mounted in position.

The HIU shall incorporate a manual pressure gauge for the secondary heating circuit.

A built in WRAS approved keyless filler loop for filling the secondary system directly from the treated primary system.

Where required, a flushing bypass shall be available for initial system flushing in accordance with BSRIA BG29 guidance.

The HIU shall permit internal termination of the pressure relief valve from the secondary heating circuit, in accordance with manufactures guidance.

The HIU shall incorporate means to isolate electronically the internal control valves on command from external pre-payment systems, without the need for additional solenoid valves.

The HIU should be fully serviceable with all parts accessible from the front of the unit only. Minimal required clearances on the sides (5mm max.), above (30mm max.) and below (200mm max.) will be maintained to allow for the HIU to be installed in a tight location or within a cupboard.

All HIUs to be connected to a dedicated programmable thermostat.

The Contractor shall run all new LTHW pipework from the new HIU units to the radiators existing using Geberit Copper Mapress pipework.

The Contractor shall run all new domestic water services pipework from the new HIU units to point of connection to existing using Geberit Copper Mapress pipework.

ALL exposed pipework to be insulated and boxed in using Pendock Profile pipe boxing.

The Contractor shall trace heat ALL domestic hot water pipework from the HIU to ALL appliances / taps to maintain the temperature within the pipework at 55°C. The trace heating shall be as manufactured, supplied and installed by Raychem. The trace heated pipework shall be insulated and weatherproofed to Raychems specified requirements.

## 4.14 Radiators and Valve Replacement

The contractor shall allow for replacement of all radiators, thermostatic radiator valves (TRVs) and lockshield valves (LSVs) to Chelsea Farm House Flats 1 to 18, Chelsea Farm Studios 1 to 6 and Jean Darling House Flats 1 to 16 as detailed on the drawings.

calfordseaden have carried out a survey of existing typical flats and detail these on the drawings.

Access was not available to all the flats and assumptions have been made, although calfordseaden are aware some radiator sizes do differ within the flats.

Once appointed, the Contractor shall carry out a detailed measured survey of all the radiators ensuring access to each and every flat to produce a detailed schedule for issue and comment prior to ordering.

All new isolation valves within the ceiling void, flats and communal areas throughout the building shall be Crane D171 with lever type handles.

The contractor shall install a new wall mounted Honeywell (or equal and approved) temperature sensor / controller located within the entrance / hallway of each flat.

The Contractor shall allow for a Drayton type TRV 4 and a matching Drayton RT212 LSV with BOE connections. Radiators will be based upon Stelrad Compact range.

## 4.15 Sprinkler System

The Contractor shall employ an LPC, FIRAS and BAFSA approved sprinkler contractor who shall be solely responsible for the complete design, supply, installation, testing, commissioning, certification, setting to work the system. Prior to commencement of installation, the contractor shall obtain approval of his design drawings from the Client's Insurers, the Clients appointed Fire Specialist/Engineer and the local Fire Authority/Building Control of the entire system to meet the requirements of the building and the relevant statutory requirements.

The contractor shall employ the following company to carry out the design and installation of the new sprinkler system:

Auto Sprinkler Solutions Ltd
TMS House
Cray Avenue
Orpington
Kent
BR5 3QB

Contact: Chris Shaw
Tel: 01689 885043

The requirement is to provide a complete, fully integrated automatic wet residential sprinkler system to serve all parts of the buildings.

A fully automatic residential sprinkler system shall be provided in accordance with BS9251 and all other relevant standard, including but not limited to, complying fully with the edition (including amendments) of each of the following, current at the time of installation:

- The Building Regulations, Part B
- The Fire Precautions Act
- The Fire Precautions (Workplace) Regulations
- The Local Authority Acts and Byelaws
- The Water Supply (Water Fittings) Regulations
- BS 9251 Sprinkler systems for residential and domestic occupancies - Code of practice
- CIBSE Guide E Fire Engineering FPA LPC Rules for automatic sprinkler installations
- GFSS Guidelines for the supply of water to automatic sprinkler systems (by the FPA)
- PD 7974-7 Application of fire safety engineering principles to the design of buildings. Probabilistic risk assessment.

The system shall comply fully with the requirements of the Client's Insurers, the Clients appointed Fire Specialist/Engineer, and the local Fire Authority/Building Control.

The minimum duration of water supply discharge shall be determined by the Fire Engineer as part of the overall fire strategy for the building.

The design of the sprinkler installation shall be the sole responsibility of the installer.

The system shall be complete with all storage, pipework, sprinkler heads, valves, switches and gauges to ensure correct operation.

Unless directed otherwise by the fire strategy, the system shall be configured using quick response frangible bulb elements, so that only those heads/nozzles in the immediate vicinity of a fire operate. Heads/nozzles shall be located in a regular arrangement as far as practicable.

The system shall be fed from the domestic cold water storage tank, with the tank and fill line sized to comply with the requirements of BS 9251 providing 50 litres per minute to at least 4 sprinkler heads for a 30 minute duration. The Contractor shall include for installing a demand valve to the BCWS supply after the tee from the sprinkler network from the boosted cold water set. The demand valve shall be held open, energised via a controlled link to the sprinkler flow switch. Upon sprinkler activation the demand valve will isolate the BCWS providing full storage and in-fill water for fire purposes.

Additionally, a low level alarm should be installed on the tank by the Contractor. This low level switch should be set at a level just below the normal low level of the tank under the peak domestic draw acting as a warning for failure of tank infill.

The cold water booster set shall be on a dedicated electrical circuit in fire rated cable and must not be linked to a shutdown from the BMS or fire alarm panel.

The system design shall be co-ordinated with all other mechanical and electrical services, building structure and fabric.

All fire safety systems are to meet the requirements of the Local Building Control Surveyor, the Fire officer, LPC and the Operator's Insurance Company, (as applicable).

The Contractor shall complete the required Building Regulations submission, submit to Building Control and provide all necessary supporting information required to achieve Building Regulations compliance. Develop the designs using the best principles of design through Working Drawings to ensure compliance is achieved, liaising with other members of the construction team. Carry out all calculations and design development necessary for a Building Regulations Submission and allow for submission of these and obtain approval from the Building Control Department in this respect.

Ensure that the Contractors and any sub-contractors are LPS Certified sprinkler installers and FM approved.

Sprinkler Design Calculations

The Contractor shall carry out a detailed building study and ascertain all design limitations and installation restrictions. Develop a sprinkler design solution in full compliance with BSEN 12845 (Incorporating LPC Technical Bulletins) to achieve the required risk mitigation for commercial and large communal spaces and a BS 9251 system for the residential floors

Design the sprinkler to serve the dwellings based on the worse case hazard classification.

Provide WRAS/KIWA certification if a combined BCWS and fire sprinkler system is used.

Prepare full design and installation Drawings of the scheme and obtain the Client Representative approval of the design and then the subsequent installation.

Allow to:

- Provide a fire and life safety risk assessment
- Provide a clear statement of coverage and any allowable exceptions
- Prepare a main schematic drawing showing the entire installation on one sheet
- Provide floor layout plans for each floor level to illustrate the specific routing of pipework
- Provide specific details or exploded views as required to highlight key areas
- Provide builders works schedules and details

Sprinkler Water Storage Tank

It is proposed to supply and install a combined domestic cold water and sprinkler tank on the roof of the existing garages in a packaged roof plant room.

The Contractor shall size and provide a water storage tank to meet the storage requirements of the sprinkler risk calculations, located as indicated on the Tender Drawings. The storage capacity of the tank should be appropriate to the risk and meet the requirements of the domestic water system design.

Provide high and low water level alarms with interfaces to cold water booster pumps and Building Energy Management System.

Sprinkler Water Pump Set

It is proposed to supply and install a combined domestic cold water and sprinkler cold water booster pump set complete with all necessary valving and control interfaces.

Sprinkler Distribution Pipework

The Contractor shall supply and install distribution pipework through the desired areas of the dwellings complete with all necessary zone valves, control and accessories. Provide valved connections within the packaged plant room with separate zone controls.

The Contractor shall trace heat (Raychem) any external pipework or pipework run within un-conditioned spaces.

Sprinkler Heads

Provide semi-concealed sprinkler heads.

## 4.16 Kingspan

Under no circumstances will the client or any of the client's team accept any materials or products to be delivered or used on any buildings or sites within The Royal Borough of Kensington and Chelsea that are manufactured by or contain any materials manufactured by Kingspan Group including Kooltherm, QuadCore, Klargester or any other product within the Kingspan portfolio.

## 4.17 Noise and Vibration

All equipment that can pass vibration or noise into the structure shall be isolated from the structure using vibration isolators and flexible connectors as necessary.

Equipment such as pumps shall be provided with flexible connections on pipework and conduit to prevent vibration transmission.

Pipework shall be vibration isolated to the same standard as the equipment to which it is attached. Isolators shall be provided for a distance equal to 50 times pipe dia.

Spring hangers to consist of a helical steel spring securely located in the steel box cage. The hole in the bottom of the cage to be large enough to allow a 15$^{o}$ movement of the drop rod.

The springs shall have an outside diameter of not less than 75% of the operating height and be selected to have at least a 50% overload capacity before becoming coil bound.

## 4.18 Chemical Clean of Heating System

The contractor shall allow for full lab water samples to be taken prior to any works starting and fortnightly thereafter.

The contractor shall allow for a full "non-aggressive" chemical clean and flush and inhibitor/ biocide dosing of the entire heating system.

The contractor shall utilise a "non-aggressive" chemical which shall be left to circulate within the system for no less than 5 days. The chemicals shall then be fully flushed from the system and a water sample taken and analysed to demonstrate the efficiency of the process. At completion of the works, a further flush with clean water shall be required, followed by the introduction of propriety scale inhibitor and biocide chemicals. A final water sample and analysis shall be provided to demonstrate the overall effectiveness of this treatment.

The exact methodology for the chemically cleaning heating system shall be provided by the contractor and/ or their chemical treatment specialist, however, consideration should be given to utilising the existing or temporary boiler plant to provide background head order to maximise the efficiency process.

The contractor shall allow for any discharge licences required to allow for this to happen.

## 4.19 Automatic Control

The existing controls and all associated controls serving the main plant are to isolated and removed from site.

A new wall mounted cabinet style BMS control panel shall be provided within the first floor boiler room to control and monitor the new boiler plant and associated plant/equipment in the location as shown on the proposed layout drawing.

A new wall mounted cabinet style BMS control panel shall be provided within the new GRP Housing located above the garages to control and monitor the new boosted cold water supply & sprinkler plant and associated plant/equipment in the location as shown on the proposed layout drawing.

The controls system shall be a Trend Building Management IQ4 System, designed, manufactured, supplied and installed by a Trend controls specialist approved by Trend Control Systems Ltd, Albery House, Springfield Road, Horsham, West Sussex, RH12 2PQ.

The panels shall be provided with all necessary power equipment and safety devices, hand/off/auto switches for all plant, together with run and trip lamps and a lamp test facility.

An audible alarm shall be provided on the panels together with a mute button. This alarm indication shall be extended by a wireless link to a remote plant alarm indicator located outside both the boiler room and GRP Housing – nominally the scheme manager's office at ground floor level, however the final location shall be advised.

Each of the panel facias shall also incorporate 1 no. 13 amp switched socket outlets for general power use within the plant room and GRP Housing.

The boilers shall be sequence controlled using the Master / Slave sequence control integral to each boiler control panel. One of the boilers shall be selected to be the Master boiler and the remaining boilers shall be Slave boilers. The controls shall have the ability of rotating the boiler sequence on a 7 day cycle.

The Master boiler shall have all the sequence control operating parameters programmed within it.

Additionally, the Master boiler shall have the common flow sensor wired back to it along with the external air sensor.

To facilitate communication between the boilers each boiler shall be equipped with an LPB BUS Communication module allowing a daisy chain BUS between the boilers. The Master boiler shall use this BUS to enable the boilers as required to meet the heat load.

The Master boiler shall be enabled from the BMS and control heat into the primary circuit once enabled. The enable signal can be either 0-10V analogue input or a switched volt free contact.

The control system shall be capable of sequencing and modulating the boilers and shunt pumps, control of the heating circuits etc.

A control start signal shall be provided to each pump motor and the BMS shall provide the auto pump change over control.

The BMS system shall be fitted with outside temperature sensor. The outside temperature sensor is to be located on a north wall away from any direct sunlight. Final location to be agreed on site.

The Cremorne Estate communal heating circuit, CT Primary Heating circuit and Secondary Circuits shall be fitted with a flow and return temperature sensors.

The contractor shall employ T Browns limited to carry out any controls works on the Cremorne side of the new circuit / system.

The BMS specialist shall allow to add 10 graphic cards to the BMS front end located on the Cremorne Estate. This shall also provide and allow remote monitoring and alarms.

Electrical supply to the plant room is provided by a supply cable within the pump room, this shall be extended to the new control panel location within the boiler room. It is intended that this cable be retained and extended to serve the installation, subject to integrity testing from the point of origin within the electrical switch room. Note that a provisional sum has been allocated for any remedial/replacement works relating to this cable following the electrical integrity test.

The contractor shall make an allowance for at least 2 additional whole day site visits following completion of the above works, in order to provide further assistance to the client in setting up remote access to the BMS, including the configuration of broadband (to be installed by others), and to work with the client's internal IT team to achieve satisfactory completion of the remote access facility.

## 4.20 Associated Electrical Works

All new power supplies to equipment within the boiler room are to emanate from the new wall mounted BMS control panel unless otherwise instructed or agreed.

All new power supplies to equipment within the GRP Housing above the garages are to emanate from the new wall mounted BMS control panel unless otherwise instructed or agreed.

All new wiring shall be carried out in accordance with BS:7671.

New cable containment throughout shall be carried out using galvanised steel trunking and / or conduits. Final connections to all electrical equipment shall be carried out using flexible conduits from local isolators. All local isolators are to be suitably labelled.

The contractor shall allow for providing new LED light fittings in both the GRP Housing, boiler room and pump room complete with new wiring within the boiler plant room. Power supplies are to be taken from the existing lighting circuits in the boiler room and pump room. The LED fittings shall be suspended where necessary to provide the optimum light level within the plant rooms. Final locations are to be agreed on site.

The contractor shall allow for a replacement bulk head type non maintained emergency luminaire in each of the GRP Housing, boiler room and pump room.

The contractor shall allow for a new shrouded emergency stop button adjacent to the boiler room entrance door, together with rate of rise heat detectors over each boiler module. All the foregoing are to be linked to the new gas solenoid valve within the plant room.

The standalone fire protection system described above shall be provided with a link to the main building fire alarm system for possible future connection.

A propriety rubber mat shall be provided adjacent to each of the new plant control panels.

The contractor shall make an allowance for power and control wiring to all new HIU units in all flats and communal areas.

The contractor shall make an allowance for power and control wiring to the new 2 port control valves / wall mounted temperature sensor / controller in all flats.

The contractor shall allow for providing power, control wiring and lighting to the new GRP Housing located above the garages.

The contractor shall allow for providing secondary back-up power to the sprinkler pump and associated plant in the GRP Housing located above the garages.

## 4.21 Associated Builders Work

Any existing main plant bases within the heating plant room no longer required shall be removed and floor finish made good.

The boiler plant and pump room floor is to be painted with a propriety floor paint – 2 coats. Hazard tape or yellow paint is to be fixed to all plant based edges.

The internal walls and ceiling of the boiler plant room are to be decorated with a PVA emulsion paint – 1 wash coat and 1 top coat. This paint finish is to be applied prior to the installation of new services and then touched in as necessary at completion of the works. And control wiring

The Contractor shall provide all builders work in connection with the M&E services including, but not limited to, all holes, notches, chases, steel work, supports, cast-in fixings and access panels necessary to enable the installation and completion of the building services described here in.

The Contractor shall allow for modifications to the existing pump room access door to allow installation of new plant. Both boiler room and pump room access doors should be suitably protected throughout the works. The Contractor shall ensure openings provide adequate and compliant boiler house ventilation.

The contractor shall allow for installing Pendock profile to all horizontal and vertical distribution pipework within the flats.

The contractor shall submit proposals for all builders work items for approval prior to works starting on site to ensure works are fully coordinated.

## 4.22 Roof Void Insulation & Panelling

The existing roof void is in a state of repair.

The contractor shall allow for 200m$^2$ of roof void insulation to replace existing as well as reinstating the existing that can be reused.

The contractor shall allow for 185mm thick Hybryss as manufactured by:

ACTIS INSULATION LTD

Unit 2a Cornbrash Park

Bumpers Way

Bumpers Farm Industrial Estate

Chippenham

Wiltshire

SN14 6RA

Or equal and approved.

The contractor shall issue details of the insulation to the client for final approval and ensure it meets local authority requirements.

The contractor shall supply and install sustainable wooden flooring / boards in both Chelsea Farm & Jean Darling House to provide safe access throughout..

## 4.23 Cutting Back of Trees

To allow installation of certain services the contractor shall allow to cut back existing trees as follows:

- Adjacent to Jean Darling House to allow installation of the PV on the roof
- Adjacent to the garages to allow installation of the new GRP Housing

## 4.24 Structural Support for New GRP Housing

calfordseaden have carried out a visual inspection of the interior of one of the three garages and one of the adjacent bin stores.

The dividing walls between the three garages were confirmed to be single 215mm brick wide, solid masonry walls. These walls were considered as load bearing, supporting the concrete roof slab.

The walls separating the bin stores were confirmed to be a half brick 100mm thick walls, but they were not considered as load bearing as the top of wall stopped short of the concrete roof slab.

Measurements taken indicated that the roof slab is approximately 150mm thick and the assumption is that it is constructed of reinforced concrete. The roof slab was considered to be one way spanning between the 215mm single brick, load bearing walls. The structural properties of the slab were not determinable.

The rear wall of the garages appeared to be a retaining wall of unknown structural form but were not considered as support to the roof slab.

The structural properties of the garage roof slab and supporting structure were not determinable during the site visit. It was therefore not possible to determine if the roof slab over the garages was capable of carrying the additional loading of a water/sprinkler tank.

In the absence of as-built information, the assumption was that, based on the loadings provided and the size of the tank, the garage roof slab would not be capable of carrying the proposed water tank if sat directly on the slab.

Provision of a new raised steel frame to support the water tank and transfer the loading to the walls below, is the proposed solution.

An initial analysis of the load bearing masonry walls was undertaken using the loading provided for the water tank and a conservative approach, and the conclusion was that with the provision of a secondary steel frame, the structure will be capable of supporting the GRP Housing / water tank.

The contractor shall employ a Structural Engineer to design and produce detailed drawings for a secondary steel frame to support the new GRP Housing and its cold water storage tank, cold water booster pumps, control panel and associated plant / equipment.

The Structural Engineer shall involve Decca Plastic Ltd in the design of the secondary steel frame to ensure it works with their GRP Housing & cold water storage tank and for any comments they may have.

calfordseaden have indicated such secondary steel support frame on the Stage 3 layouts for tender purposes but these shall be designed by the contractor and their structural engineer at Stage 4.

## 4.25 Testing and Commissioning

The contractor shall allow for safe and proper setting to work of the new installation together with any temporary works in respect of the heating system throughout the course of the contract.

The contractor shall ensure that the heating system is adequately dosed and air vented prior to any commissioning works taking place.

The contractor shall allow for all necessary Gas Safety Certification for the new boiler plant in accordance with Gas Safety Regulations.

A control panel shall be fully tested and commissioned prior to any demonstrations that take place to the Contract Administrator and / or Client. The contractor shall provide a schedule of default set points for the control system for approval by the Contract Administrator prior to commissioning.

The contractor shall provide all necessary certificates for system testing and commissioning of the works including laboratory sample analysis reports for the heating system.

The following plant shall be specifically commissioned and certified by the manufacturer:

- Gas fired boilers and associated controls.
- ASHPs.
- Invertor pumps.
- Flue system.

- Cold water tank.
- Packaged cold water booster pump set.
- Sprinkler system.
- HIU Units.

## 4.26 Snagging

The Contractor shall allow for at least 2 joint snagging visits with the Client, Contract Administrator and themselves. This is a minimum requirement. If a high number of snagging items are found, further joint snagging visits will be required. This is at no additional cost to the Client.

## 4.27 Training and Qualifications

It is deemed that the Contractor will utilise suitably trained and competent staff in order to carry out the works to complete this project. Training records and proof of qualifications will be required of all members of staff before they enter site. All qualification documentation will need to be submitted to the Contract Administrator prior to the Contract start date for approval.

## 4.28 Works in Occupation

The contractor shall pay special attention to the way the works are programmed. The building will be fully occupied at the time of the works. Works are to be programmed to ensure residents have minimal disruption.

The contractor will be required to move furniture and other items in order for the works to be carried out. The contractor shall take record photos of all areas prior to starting the works. Any damage caused by the contractor will be repaired at the contractors expense.

The contractor shall allow for temporary electric heaters for use within the flats. The contractor shall check the electrical load to ensure the circuits are not overloaded.

It is envisaged the sequence of works will be as follows:

1) existing system transferred to temporary boilers and calorifier

2) New plant room fitted out and distribution retrofitted concurrent

3) HIUS fitted , connected and commissioned

4) Apartment changeovers with one day

5) making good and boxing in

## 4.29 Handover Documentation and Client Training

The contractor shall allow for 1 hard bound copy within a wall mounted cabinet within the plant room and an electronic copy of the Operating and Maintenance (O&M) Manual and record drawings for the works at completion of the contract.

A draft copy of the O&M Manual and record drawings are to be left on site at completion of the works, prior to practical completion being granted, albeit it is acknowledged that final certification documents may not be available at this juncture.

The Operating and Maintenance Manuals shall consist of, but not be limited to, the following:-

- Description of building systems.
- Description of methods and materials used.
- Description of client operation.
- Product details and manufacturers maintenance literature.
- Record drawings.
- Guarantees and warranties etc.
- Information regarding preventative maintenance.
- Emergency procedures.
- Testing and commissioning certification.
- Residual health and safety issues.

Also required to be provided is a simple user friendly operating guide for scheme personnel which shall be utilised as a menu for the system demonstration and client training exercise.

# 5 EQUIPMENT SCHEDULES

## 5.1 Communal Boilers

| | | |
|---|---|---|
| Manufacturer | : | Bosch |
| Model | : | Bosch Condens GC700WP 145 stainless steel condensing boilers complete with pipe and header kits and shunt pumps |
| Capacity | : | 290 kW (total) |
| Electrical Supply | : | 230/1/50 |
| Number of | : | 2 |

## 5.2 Boiler Shunt Pumps

| | | |
|---|---|---|
| Manufacturer | : | Grundfos |
| Model | : | part of Bosch header kit |
| Electrical Supply | : | 230/1/50 |
| Number of | : | 2 |

## 5.3 Primary Heating Pumps

| | | |
|---|---|---|
| Manufacturer | : | Grundfos |
| Model | : | MAGNA3 D 50-150F |
| Duty | : | 2.76 kg/s @ 80 kPa |
| Electrical Supply | : | 230/1/50 |
| Number of | : | 1 (twin head pump) |

## 5.4 Chelsea Farm House Flats 1 to 18 Secondary Heating Pumps

| | | |
|---|---|---|
| Manufacturer | : | Grundfos |
| Model | : | MAGNA3 D 40-180F |
| Duty | : | 1.29 kg/s @ 140 kPa |
| Electrical Supply | : | 230/1/50 |
| Number of | : | 1 (twin head pump) |

## 5.5 Chelsea Farm House Studio Flats 1 to 6 Heating Pumps

| | | |
|---|---|---|
| Manufacturer | : | Grundfos |
| Model | : | MAGNA3 D 32-100 |
| Duty | : | 0.32 kg/s @ 95 kPa |
| Electrical Supply | : | 230/1/50 |
| Number of | : | 1 (twin head pump) |

## 5.6 Jean Darling House Flats 1 to 16 Heating Pumps

| | | |
|---|---|---|
| Manufacturer | : | Grundfos |
| Model | : | MAGNA3 D 40-180F |
| Duty | : | 1.15 kg/s @ 140 kPa |
| Electrical Supply | : | 230/1/50 |
| Number of | : | 1 (twin head pump) |

## 5.7 Primary Circuit Heating System Pressurisation Unit

| | | |
|---|---|---|
| Manufacturer | : | Mikrofill |
| Model | : | Mikrofill 3 (wall mounted) |
| Electrical Supply | : | 230/1/50 |
| Number of | : | 1 |

## 5.8 Secondary Circuit Heating System Pressurisation Unit

| | | |
|---|---|---|
| Manufacturer | : | Mikrofill |
| Model | : | Mikrofill 3 (wall mounted) |
| Electrical Supply | : | 230/1/50 |
| Number of | : | 1 |

## 5.9 Heating System Expansion Vessel

| | | | |
|---|---|---|---|
| Manufacturer | | : | Mikrofill |
| Capacity | Primary Circuit | : | 80 litres model MikroPro XP |
| | Secondary Circuit | : | 300 litres model MikroPro XP |
| Pressure Rating | Primary Circuit | : | 4 bar |
| | Secondary Circuit | : | 6 bar |

## 5.10 Plate Heat Exchanger

| | | |
|---|---|---|
| Manufacturer | : | UK Exchangers<br>55 Stilebrook Road,<br>Olney<br>Buckinghamshire<br>MK46 5ES |
| Model | : | UKE-55 (60 PLATES)<br>316 Stainless Steel duty / standby |
| Duty | : | Hot Side – 2.76 kg/s at 70-45°C<br>Cold Side – 2.76 kg/s at 65-40°C |
| Maximum Pressure Drop | : | 10kPa (0.1 bar) |
| Number of | : | 2 (run/ standby)<br>Supplied with mounting feet, drip tray, insulation jacket, Tighten Bolt Bearing Boxes, Flange Studs (c/w nuts and washers), DN65 PN16 mating flanges, stainless steel frame bars, stainless steel tightening bolts and maintenance spanner (friction type) |

## 5.11 Flue

| | | |
|---|---|---|
| Manufacturer | : | A1 Flues<br>Systems House<br>Maun Way<br>Boughton Industrial Estate<br>New Ollerton<br>Nottingham<br>NG22 9ZD |
| Model | : | Twin Wall 316 Stainless Steel |

# 6 PROGRAMME AND SEQUENCING OF WORK

The contractor will be required to provide an outline programme to include sequencing of works within their tender submission. Programmes should be such that a clear understanding of the proposed tender can be demonstrated to the Contract Administrator and Client.

Following appointment, the successful contractor will be required to provide a master programme of works which must include the following details as a minimum.

- Survey strategy.
- Planning and mobilisation.
- Start and finish dates for each main activity.
- Identification of critical items.
- Testing and commissioning of the works where applicable.
- Information required dates.
- Plant shut down periods.

The contractor shall be required to attend a pre-contract meeting with residents at the scheme approximately 4 weeks before commencement of works to fully explain the works scope, programme and potential disruption and also to agree site welfare facilities etc.

The contractor will be required to update the programme throughout the duration of the works and to include any addition works instructed by Contract Instructions, the expenditure of provisional sums and optional works.

Submission of the master programme will not relieve the contractor of responsibility to advise the need for further details and / or drawings etc in accordance with the contract.

A current copy of a master programme is to be kept on site at all times throughout the contract period.

A review of the programme and associated progress will take place at regular site meetings – nominally fortnightly – throughout the duration of the contract, however, interim progress meetings may be required at the dictate of the Contract Administrator.

Sequencing of the works is viewed as a critical element of the contract, particularly as the scheme will be fully occupied throughout the contract period. Residents will require the provision of domestic hot and cold water to be maintained, however, it is acknowledged that limited disruptions to the services is unavoidable. Downtimes should be kept to an absolute minimum that residents should be advised in advance of these occurrences.

The contractor shall pay particular attention to the provision of heating during the contract period. Temporary heating is to be maintained by the temporary boiler plant until such time as the replacement boiler plant is fully operational, tested and commissioned.