##  SPECIFICATION FOR THE

 **MECHANICAL, ELECTRICAL AND**

 **PUBLIC HEALTH SERVICES INSTALLATIONS AT**

**THE ELMS FITZROY PARK LONDON N66HS**

 **CONTENTS**

 **Clause No1: Mechanical Cervices.**

 **Clause No2: Electrical And Telecommunication Cervices.**

 Clause Description 1No

 Mechanical installations.

1 GENERAL CONDITIONS

2 SCOPE OF WORKS

3 RAINWATER PIPEWORKIGUTTERS

4 FOUL DRAINAGE ABOVE SLAB LEVEL 5 COLDWATER

6 HOT WATER

7 GAS

8 HEATING

9 GENERAL VENTILATION

10 TOILET VENTILATION

11 KITCHEN VENTILATION

APPENDICES

A Drawing Issue Schedule

B Fan Coil Unit Schedule

c Radiator Schedule

1. Extract Fan Schedule
2. Grille Schedule
3. Schedule of Equipment
4. Attenuator Schedule

 1.GENERAL CONDITIONS.

 1.1The Project:

 The project comprises the construction of a detached house at The Elms, Fitzroy Park, London N6 6HS as

 described in the Main Contract Preliminaries

 1.2 Co-ordination of trades:

Allow for coordinating the contract works with the works of other trades and installations

which may be on site during the period of the contract.

1.3 Co-operation with others:

Ensure that the contract works integrate with that of others and that full co-operation is maintained during the execution of the works with that of others.

Co-operate with the Contractor, other sub-contracts, suppliers , local authorities and statutory undertakings in the execution of the works.

1.4 Noise and nuisance:

Ensure that the contract works are undertaken with as little noise as possible. Take all necessary precautions to prevent nuisance from smoke, rubbish and other causes.

1.5 Program:

The successful Contractor will be required to submit a detailed program of works prior to starting on site. The program shall include delivery dates of all equipment vital to the completion of the works within the Contract period.

1.6 Storage:

 Weatherproof, safe and secure storage shall be provided for all materials and equipment.

 All materials and equipment shall be offloaded, stored and transported in accordance with manufacturer’s recommendations.

 All electrical equipment and components shall be kept dry and free from dust.

 Plug, cap or seal open ends on all ductwork, tubes, conduit, trunking and associated equipment whilst in storage and during transportation to site.

 Provide racks to prevent distortion of pipes, conduit and similar materials.

1.7 Obligations and Responsibilities:

 The Specification and Drawings shall be interpreted in accordance with current good installation practice relevant to the particular installation.

 Where the drawings are to a small scale and/or are expressed in symbolic terms or are in the form of a diagram then indication of the exact location and detail of pipes, cables or other components shall not be inferred.

 The Tender Drawings accompanying this Specification are representative of the works to be carried out and, when read in conjunction with the Specification, provide information for tendering .

 Should there be a discrepancy between the Specification and the Drawings, the Contractor must obtain verification in writing as to which is correct before submitting his Tender. No extra payment will be allowed should such a discrepancy arise during the period of the Contract.

 The Contractor shall provide installation and builders work drawings produced in CAD format.

 The drawings issued by the Engineer show generally the layouts of the services required to be carried out, i.e. runs of mains and circuits, size of mains and equipment, they may not cover in every detail the whole of the work involved, i.e. bends, unions, flanges, clips, supports and the like but the Contractor must include in his Tender for all the above­ mentioned items, especially must he include for bends, offsets and swan necks where necessary due to piers, recesses, other services and the like.

 The Contractor shall include for the design development of the services tender design drawings in association with the Engineer, to provide fully co-ordinated Installation Drawings.

 It is the Contractor's responsibility to provide the complete Installation Drawings necessary for the proper instruction of the on-site craftsmen employed by him and which show the method of installation and location of the systems forming part of the Contract. Also, to develop from these drawings any associated builders work information relating to the installation of the services . The Contractor shall include in his price the cost of the preparation and progressive updating of this information and for the submission of copies to the Engineer for his comment and for him to ascertain that the Contractor has correctly interpreted the design and for the subsequent issue of copies of the final drawings.

 All drawings shall be submitted to the Engineer for comments prior to installation. Builders work requirements shall be either indicated on drawings or by setting out the requirements on site.

 The Contractor shall provide electrical diagrams for all electrical equipment and systems, which form part of the works.

 The Contractor shall be responsible for the accuracy of the information he provides and shall be liable for all costs arising from any errors or delays in such information.

 All drawings and revisions thereto shall be prepared in accordance with an approved format. Drawings shall identify all plans, elevations, sections and details associated with the manufacture, fabrication , assembly and installation of the works and their co-ordination with the other works . General layout drawings shall be to 1:50 scale with detailed drawings to larger scales as detailed herein.

 All information described above shall be submitted for review. Such review or lack of comment shall not relieve the Contractor of any responsibilities for such information.

 The Contractor shall be responsible for all errors, inaccuracies, discrepancies and omissions in the information he prepares, amends or revises, corrects or co-ordinates.

 The Contractor shall submit information in sufficient time to ensure that no delay to the works is caused by the requirements of the review, and the incorporation of all comments and amendments arising.

 Drawings prepared by the Contractor shall be fully checked and coordinated by the Contractor prior to submission. He shall allow adequate staff for this requirement and time for the same shall be allowed in the programme.

 The Contractor shall allow in his Tender for the above provision and checking of drawings, schedules etc., and sufficient time in his programme for this to be done thoroughly and correctly.

 Upon receipt of any comments, the Contractor shall make all necessary amendments and re-submit the information until it is returned without comment. The information shall not be generally issued, used for ordering, manufacture, fabrication and installation, until it is returned without comment.

1.8 Coordination of cervices:

 All aspects of the work require detailed co-ordinat ion to avoid any possible clash or conflict

with other trades and disciplines . Undertake such co-ordination in relation to the works.

 Where any new, revised or updated architectural, structural or services information is issued, examine such information and if necessary modify the works accordingly to prevent any clashes or abortive work .

1.9 Health and Safety:

 It must be ensured that during the progress of the works on site, the general recommendations of the 'Health and Safety at Work Act 1974' and subsequent additions and/or modifications are adhered to.

 A copy of the Contractor's Health and Safety policy document, including risk assessment procedures, shall be submitted with his Tender.

 A Health and Safety Information Pack will be prepared by the COM CCH>coordinator. However,

the Contractor shall comply with the requirements of the COM Regulations by:

 Compiling risk assessments for the contract works.

 Providing information on the contract works which might affect the health and safety of any person.

 Providing appropriate input to the Health and Safety Information Pack for the works.

2.SCOPE OF WORKS.

 The Contract Works shall comprise but not limited to the following:

-mains water installation

-gas installation

-cold water services installation

-hot water services installation

-heating installation

-mechanical ventilation to bathrooms , kitchen , utility room and general areas

-thermal insulation

-controls and associated wiring

-sanitary plumbing installation

-rainwater installation

-testing and commissioning

-provision of Record Drawings and Operating and Maintenance Manuals

 2.1 Commissioning and Testing:

 Pressure tests shall be applied to piping before connection of equipment and appliances .

In no case shall piping, equipment or appliances be subjected to a pressure exceeding their rating.

 Tests shall be completed and approved before any insulation is applied or pipes, valves and fittings have been concealed. Tests shall be performed in the presence of the Installer and to the satisfaction of the Engineer. Any leaks or defects uncovered by the tests shall be repaired and the system retested as above; all at no additional cost to the Employer.

 All water piping shall be tested and proved tight under hydrostatic pressure of at least 150% of maximum working pressure but at not less than 3.5bar. The prescribed pressure shall be maintained for two hours. All gas piping shall be tested and proven tight under pneumatic test of 50m bar and in accordance with British Gas Publication IM/5 and Corgi/Capita Regulations.

 All heating, chilled water, hot and cold water systems shall be commissioned and regulated in accordance with CIBSE Commissioning Code Wand BSRIA Application Guide 2/89.

 Automatic control systems shall be commissioned in accordance with CIBSE Commissioning Code C.

 Ventilation ductwork systems shall be adjusted and balanced to deliver the recommended air volumes at each inlet and outlet. The air quantities shall be within 5% of those required. Air distribution systems shall be commissioned in accordance with CIBSE Commissioning Code A and BSRIA Application Guide 3/89.

 All electrical systems shall be tested in accordance with BS 7671 (lEE Wiring Regulations). Provide test result sheets and completion certificates.

 All other specialist systems and equipment shall be tested and commissioned by the relevant specialist. Provide test result sheets and completion certificates from the specialists.

 All pressure and electrical test result sheets and certificates shall be included in the O&M Manuals.

2.2 Record Documents:

Record documents shall comprise the following :

Record Drawings (CAD format)

Plant room and switch room drawings and schematics .

Operating and Maintenance Manuals.

 2.3 Record Drawings:

 The Contractor shall provide as a pre-requisite of Practical Completion of the works, 3 copies of all Record Drawings in print form and 1 copy on CD disk.

 One set of Record Drawings shall be issued to the Engineer for comments at least three weeks prior to issue of the completed documentation. The drawings shall be clearly endorsed 'Record Drawing' near to the title block.

 The Record Drawings shall clearly indicate the position and size of all plant items, the layout and size of all pipework, ductwork, valves, luminaires, switches, sockets, power outlets and miscellaneous services outlets (i.e. telephones, data, security etc.) as actually installed. The routing of all conduits, trunking and trays shall also be indicated, together with all earth bond locations throughout the building. Detailed control and power wiring diagrams in connection with the Mechanical Services shall be provided.

2.4 Plant Room Drawings:

 Provide plant room and switch room drawings and schematics mounted in the respective rooms. Protect surfaces of such information by pressure lamination.

2.5 Operating and Maintenance Manuals:

 The Contractor shall provide on Practical Completion of the works 3 copies of the Operating and Maintenance Manuals. The Manuals should include how the building is intended to work and should explain to the occupier how to operate all systems efficiently. All information shall be contained within suitable ring binders with hard covers. A copy of the manuals shall be issued to the Engineer for comments at least three weeks prior to the issue of the completed documentation.

 The Operating and Maintenance Manuals shall be written in conjunction with the Record Drawings and shall comprise the following:

 A general description of the scope, purpose and manner of working of each system or apparatus forming part of the works.

 A detailed description of the scope, purpose and manner of working of each system of automatic controls monitoring instruments and special services.

 Data on general design parameters and associated normal operating temperatures,

pressures, correct operation etc, based on the commissioning activity.

 Clear and comprehensive instructions for the starting up, switching on, running and shut down of each system or apparatus.

 Clear and comprehensive instructions for dealing with emergency conditions for each system or apparatus.

 Instructions in respect of any precautionary measure from time to time necessary (e.g. against corrosion or freezing) .

 Instructions in respect of the care of apparatus normally subject to seasonal disuse.

 Instructions as to the nature, extent and frequency of servicing necessary properly to maintain the works in good condition and as to the materials to be used for the purpose. This information may be supported in detail, but not replaced, maintenance instructions provided by the suppliers or particular component apparatus.

 The names and addresses of suppliers of all major components of the works as may

potentially be required to obtain spare parts of replacements .

 Copies of manufacturer's data shall be supplied with respect to the nature, type and method of operation of individual pieces of equipment, together with their detailed maintenance instructions. Such data, in the form of individual booklets and the like, shall be indexed and cross referenced to the Operating and Maintenance Instructions and presented suitably protected in box files or folders.

2.6 Completion and Handover:

 Prior to Practical Completion, the Contractor shall instruct the owner of the building in the use, function and operation of the installations, including all items and procedures listed in the Operating and Maintenance Manual.

 3. RAINWATER PIPEWORK AND GUTTERS

3.1 Performance Objectives:

 Provide a complete rainwater drainage system.

3.2 System Parameters:

 All systems to comply to BS EN 12056, BS EN 752, CIBSE Guides, Building Regulations, Local Authority and Thames Water requirements.

 3.3 System Description:

 Provide a fully complete external rainwater drainage system taking water from all roof areas, terraces, balconies, canopies, gutters, connecting to the drainage system as required.

 All internal rainwater pipework will be cast iron to the same standard laid down elsewhere in this specification for above slab foul drainage.

 Rainwater outlet from flat roofs and terraces will be as the Harmer range of products and be suitable for the application .

Control Requirements

Install to the requirements of the manufacturer.

Internal rainwater pipework shall be insulated for anti-condensation with 25mm thick rockwool wrap and reinforced foil facing.

 4 FOUL DRAINAGE ABOVE SLAB LEVEL

4.1 Performance Objectives:

Provide a complete sanitation drainage system.

4.2 System Parameters:

 All systems to comply to BS EN 12056, BS EN 752, BS 8000 Part 13, CIBSE Guides,

 Building Regulations, Local Authority and Thames Water requirements.

 4.3 System Description:

 The main horizontal and vertical soil stacks shall generally be carried out in cast iron

unless otherwise noted on the drawings .

 The Contractor shall supply and fix all soil and ventilating pipework including connections to drain sockets and extending through the building and terminating 300mm above roof level.

 The Contractor shall provide all necessary bends, offsets, branches, roof passing, and the like required for the installation. The pipework shall be installed in such a manner as to facilitate ease of maintenance.

 The Contractor shall supply and fit access pipes to the base of all soil and vent pipes. All accessible branches in the main soil pipes shall be made with access branches.

 Cast Iron Soil, Waste and Ventilating Pipework

 The main horizontal and vertical soil and ventilating pipes and branch soil pipes from WCs shall be constructed from cast iron pipes as manufactured by Sinclair Foundries and marketed as 'Sinclair Ensign', kitemarked to BS EN 877.

 The jointing of pipework and fittings shall be made with cast iron couplings with stainless steel nuts and bolts and synthetic EPDM rubber gaskets.

 Earth continuity shall be provided for.

 All waste branches into the soil pipes shall be made with push fit adaptors. All accessible bends in the main soil pipes shall have oval inspection doors.

The Contractor shall supply and fix all necessary supports and angle iron brackets to vertical cast iron pipes and these shall be constructed from mild steel or cast iron either for building in or plugging and screwing to concrete as necessary to meet the requirements of the installation.

 Horizontal pipework shall be suspended on mild steel threaded drop rods secured to 50 x 50mm channel iron. The channel iron shall be fixed to the soffit of the slab by means of 2 no. mild steel plates with welded threaded drop rods and nuts and washers , supports shall be provided at all bends, branches and at 2 meter centers.

 Intermediate angle bracing supports generally as above shall be provided at 4-meter centers.

 Where required, utilize manifolds or parallel junctions.

 All ferrous pipe supports, and the like, shall be painted with two coats of red oxide prior to installation.

 The vent pipes shall terminate at main roof level with a sheet lead weathering piece constructed from No. 6 sheet lead and shall be 450mm square.

 The pipe section of the weathering piece to be 300mm high minimum with top section dressed into vent pipe and shall be complete with copper wire balloon guards.

 Connection of WC to Cast Iron

 The method of joining WC pans to cast iron soil branches shall be McAlpine 'MultiKwik' plastic pan connectors fitted in accordance with the manufacturer 's instructions . The McAlpine 'Multikwik' is available from McAlpine & Co. Ltd. (tel: 0141 882 3213).

 Branch Waste Pipework

 Fix all branch waste and antisyphonage pipework to connect the discharge from sanitary fittings to the main soil, waste and ventilating pipework.

 All branch pipes shall be swept into the main pipe in the direction of flow .

 Where branch waste pipework is required to connect direct to drain, the Contractor is to include for this, together with the correct connector (for dissimilar materials) and the necessary joint.

 MuPVC Branch Waste Pipework

 The branch and antisyphonage pipework shall be carried out using MuPVC pipework and fittings conforming to BS 5255:1989 and these shall be as manufactured by Polypipe Terrain or equal.

 The manufacturer's installation recommendations are to be strictly adhered to. Joints shall be solvent welded .

Spigot ends of MuPVC may be joined to cast iron pipework by means of a Sinclair

'Ensign' push fit adaptor.

 Expansion joints must be used between fixed points if they are more than 900mm apart . Between fixed points the pipe fastenings shall permit free movement. The maximum length between expansion joints for 32mm to 50mm pipe shall be 2000mm.

 MuPVC pipework shall be supported with screw to wall brackets at the following centres:

Pipe Diameter:

35mm to 40mm

50mm and over

Support Centers:

 500mm

 900mm

MuPVC pipework fixed vertically shall be provided with supports at not greater than 1200mm centers.

Sleeves.

 The Contractor shall supply and fix pipe sleeves where MuPVC pipes pass through walls and these shall be of a diameter one size larger than the pipe. Where pipes pass through floors the sleeves shall terminate 25mm above finished floor level.

Traps.

 Unless stated otherwise on the drawings, all traps shall comply to BS 3493 and have a 75mm depth of water seal. The hidden traps shall be as manufactured by Hepworth as HEPVO units.

 Shower traps are to be of a type that facilitates maintenance from the top and are to be suitable for the appropriate application .

Temporary Sealing Off Pipework.

 During the progress of the works all open ends of pipework shall be temporarily sealed to prevent the ingress of debris .

 Heavy gauge plastic caps securely wired to the pipe shall seal cast iron and MuPVC pipework.

 The use of plastic bags, paper, wood blocks or bricks shall not be accepted.

 Testing of the Complete Soil, Waste Ventilation and Internal Pipework Installation

 The installation or section thereof to be tested shall be suitably plugged and filled with air at a pressure equivalent to head of 40mm of water.

 The test shall be deemed satisfactory if the pressure remains constant for a period of five minutes.

 The Contractor is to ensure that the installation or section thereof is tested to the requirements of the Local Authority.

 Allow for the partial re-testing of the installation to be witnessed by the Engineer and Local Authority as required.

Fix Only Sanitary Fittings.

 Unless otherwise stated the Contractor shall fix only all sanitary fittings which he shall assemble to maker's instructions including the provision of approved jointing materials and washers required and fix to the approved position, supplying all fixing materials necessary for the work.

 Where builders work is involved, the Contractor shall furnish the necessary information (drawings, dimensions, sizes) and attendance required.

 All gold, polished brass or chromium plated fittings and fixings shall be fitted at a time when damage by other trades is less likely and shall be protected throughout the period of the installation.

 No fittings or equipment shall be accepted other than in a clean and unblemished condition at completion of the installation

 5.COLD WATER

5.1 Performance Objectives:

 Provide a complete domestic cold water system to the house.

5.2 Design Parameters:

 All systems to comply with BS 6700, EN806, Water Regulations/Model Water Byelaws, CIBSE Guides, Building Regulations and Thames Water requirements .

 All installation works on the unvented/pressurised cold water mains installation shall be carried out by an approved BBA registered operative, and be certified as required under current legislation.

5.3 System Description:

 Connect off existing incoming water main in the ground and extend into the house generally, as indicated on the drawings.

 Provide in the basement plant room, a cold water break tank as manufactured by Sarena Mfg Ltd (tel. 01634 370887) or approved equivalent. The tank shall be a fully insulated totally internally flanged sectional GRP tank and shall be 2 metres long x 1 meter wide x 1 meter high. The tank shall comply with Water Byelaw 30 and shall be complete with bolted cover, bolted man way, inspection hatch, screened air inlet, screened warning and overflow pipes.

 Provide in the basement plant room, a fully packaged 2 pump fixed speed potable water booster set.

 The set shall be complete with control panel, accumulator vessel, flexible pipe connections, anti­vibration mounts and interconnecting copper pipework. The pumps shall be duty/assist, each pump capable of delivering 50% of the duty. The booster set shall be type NEWPAC 2F.5525- 10/100/Cu/PRV and shall have a total flow rate of 2 liters/s at a discharge pressure of 4 Bar. Due to the limited space down the stairs into the basement plant room, the Contractor shall determine before ordering, if the booster set needs to be delivered in sections for assembly on site.

 Each part of the piping system shall be complete in all details provided with all control valves and accessories necessary for satisfactory operation.

 All piping shall be grouped wherever practical and shall be erected to present a neat appearance . Pipes shall be parallel to each other and parallel or at right angles to structural members of the building and shall give maximum possible headroom. All pipework shall generally be installed as close to the walls along the building lines as possible. Exact locations to be agreed on site.

 All pipe drops shall be truly vertical. No joints shall be formed in the thickness of walls, floors or ceilings where access is not indicated on the Engineer's drawings. The Contractor shall be responsible for ascertaining the thickness of plaster and other wall finishes; skirting heights, sill lengths and floor finishes.

Pipework shall generally be set around all columns and shall follow the contour of the building whether so indicated on the drawings or not. Piping shall not pass in front of doorways or windows and shall be generally arranged so that it is at least 100mm above finished floor level and at least 20mm from finished wall faces . Sufficient space is to be allowed for accessibility for servicing.

 Piping shall be pitched for proper circulation and drainage.

 Run outs shall be graded in such a manner as to prevent air traps being formed within them when the mains expand or contract.

 All cold-water pipework within the building shall be carried out in copper tube to BS 2871 Part 1 Table X. Pipework buried in screed and in wall chases shall be carried out in Kuterlex Plus plastic coated copper tube as manufactured by IMI Yorkshire. Generally, capillary integral solder ring type fittings shall be used complying with BS 864 Part 2 and shall be of the non-dezincifible type, with lead free solder joints.

 Cold-water pipework installed below ground shall be carried out in blue polyethylene to BS 6572. The pipework shall be installed at sufficient depth to prevent freezing.

 Supports for copper pipes shall be non-ferrous.

 All pipework, valves and equipment shall be adequately supported .

 Details of hangars and supports to be used by the Contractor shall be submitted for approval before fitting .

 Spacing of pipework supports shall be as follows :

PIPE BORE

(mm)

 MAXIMUM SUPPORT SPACING (M)

Copper Pipe

Nom. 15

22

28

35

42

54

Horiz. 1.2

1.4

1.8

2.4

2.4

2.7

Vert .

1.8

2.1

2.4

3.0

3.0

3.0

 All pipe openings through walls, partitions and slabs shall have sleeves with an internal diameter at least 25mm larger than the outside diameter of the pipe. Sleeves shall be flush with the building finish. Provide masking plates where visible pipes pass through building elements.

 Main isolating valves in plant rooms shall be Crane Fig. No. D159 or equivalent. All other valves shall be ball valves, Pegler Fig. No. 808 or approved equivalent. All sanitary fittings shall be provided with ball valves.

 Pressure reducing valves shall be of the 315 Series as manufactured by Reliance Water Control (tel: 01386 47148) . Double check valves shall be as manufactured by Reliance or approved equivalent.

 Drain cocks shall be fitted on all low points in the systems whether shown on the drawings or not. Drain cocks shall be Crane Fig. No. D341 or approved equivalent.

 All cold water pipework in riser ducts, ceiling and roof voids, basement plantrooms and concealed from view shall be thermally insulated with 13mm thick Class '0' Armaflex as manufactured by Armacell UK Ltd. Insulation in plant room areas shall be mechanically protected with sheet aluminum casings.

 All shower thermostatic mixing valves and others shall provide associated showerheads. However, the mixing valves and showerheads shall be assembled, fixed and piped up by the Contractor.

 The complete cold-water installation shall be sterilized in accordance with BS 6700.

 The Contractor shall fix only all sanitary fittings, which he shall assemble to the makers instructions, including the provision of approved jointing materials and washers required.

 For materials and workmanship, comply with the relevant 'Y' sections of the NES Specification where applicable.

 The cold-water booster set shall be available for operation 24 hours per day. The booster set shall automatically operate the pump according to demand via its integral control system.

 Provide in the cold-water break tank, a low water cutout float switch to stop the operation of the booster pump set under low water conditions. Include for interconnecting wiring between the float switch and booster set.

 Include for wiring from local power supplies to the booster pump set.

 6. HOT WATER

6.1 Performance Objectives:

Provide a complete domestic hot water system to the house.

6.2 Design Parameters:

 All systems to comply with BS 6700, EN 806, Water Regulations/Model Water Byelaws, CIBSE Guides, Building Regulations and Thames Water Requirements.

 All installation works on the unvented/pressurised cold water mains installation shall be carried out by an approved BBA registered operative, and be certified as required under current legislation.

6.3 System Description:

 Provide in the basement boiler room 2 No. unvented hot water storage cylinders as manufactured by Heatrae Sadia. The indirect cylinders shall be Megaflo type CL600 Ltrs and shall be complete with cold water combination valve, temperature and pressure relief valve, 2 port motorised valve and 3 kW electric immersion heater.

 Hot water pipework shall be extended off the hot water cylinders to serve all sanitary fittings as indicated on the drawings. For pipework details refer to Section S10.

 Provide a hot water service circulating pump type UP20-30N as manufactured by Grundfos Pumps, capable of a duty of 0.25 litres/s at 15 KPa.

 All hot water pipework shall be carried out in copper tube to BS 2871 Part 1 Table X. Pipework buried in screed and in wall chases shall be carried out in Kuterlex Plus plastic coated copper tube as manufactured by IMI Yorkshire . Generally, capillary integral solder ring type fittings shall be used complying with BS 864 Part 2 and shall be of the non-dezincifible type, with lead free solder joints.

 Supports for copper pipes shall be non-ferrous.

 All pipework, valves and equipment shall be adequately supported.

 Details of hangars and supports to be used by the Contractor shall be submitted for approval before fitting.

Spacing of pipework supports shall be as follows:

PIPE BORE

(mm)

MAXIMUM SUPPORT SPACING (M)

Copper Pipe

Nom. 15

22

28

35

42

54

Horiz. 1.2

1.4

1.8

2.4

2.4

2.7

Vert .

1.8

2.1

2.4

3.0

3.0

3.0

 All pipe openings through walls, partitions and slabs shall have sleeves with an internal diameter at least 25mm larger than the outside diameter of the pipe. Sleeves shall be flush with the building finish . Provide masking plates where visible pipes pass through building elements.

 Isolating valves in basement plant room areas shall be Crane Fig. No. D159 or equivalent. All other isolating valves shall be ball valves, Pegler Fig. No. 808 or approved equivalent. All sanitary fittings shall be provided with ball valves.

 Drain cocks shall be fitted on all low points in the systems whether shown on the drawings or not. Drain cocks shall be Crane Fig. No. D341 or approved equivalent.

 All hot water pipework in ceiling and roof voids, within basement plantrooms, builderswork ducts and concealed from view shall be thermally insulated with Class '0' Armaflex to the following thickness:-

Pipe Diameters:

15mm

22mm

35mm

42mm

54mm

Insulation Thickness

19mm

25mm

25mm

25mm

25mm

32mm

32mm

Insulation in plant room areas shall be mechanically protected with sheet aluminum casings .

The complete hot water installation shall be sterilized in accordance with BS 6700.

For materials and workmanship comply with the relevant ‘Y’ sections of the NES Specification where applicable.

6.4Control Requirements:

Provide in the heating circuit to each unvented hot water storage cylinder a two port motorized valve to operate in conjunction with the cylinder integral temperature control thermostat. Include for wiring valve to thermostat and heating programmer as necessary.

The hot water service-circulating pump shall be available for operation 24 hours per day. The cylinder-heating pump shall stop operating when the motorized valves are shut.

7. GAS

7.1Performance Objective:

Provide a complete gas supply installation.

7.2 Design Parameters:

The gas pipework shall be sized to provide the necessary quantity of gas to the boilers, gas fires and cookers.

All installation works on the gas installation shall be carried out by an approved registered operative (Gas Safety Register) and be certified as required under current legislation.

7.3 System Description:

 Connect off existing incoming gas main in the ground and extend into the house generally as indicated on the drawings .

 All gas pipework installed below ground shall be carried out in yellow polyethylene pipe (MOPE) and fittings conforming to BS 7281.

 Gas pipework within the house shall be carried out in copper tube to BS 2871 Part 1 Table X . Generally, capillary integral solder ring type fittings shall be used complying with BS 864 Part 2.

 All ceiling voids, floor voids and riser ducts containing gas pipework shall be ventilated in accordance with Capita/Corgi regulations.

 All pipework, valves and equipment shall be adequately supported.

 Details of hangars and supports to be used by the Contractor shall be submitted for approval before fitting.

 All pipe openings through walls, partitions and slabs shall have sleeves with an internal diameter at least 25mm larger than the outside diameter of the pipe. Sleeves shall be flush with the building finish . Provide masking plates where visible pipes pass through building elements.

 Gas isolating valves shall be Crane Fig. No. 0191 or D191T or approved equivalent.

 For materials and workmanship comply with the relevant ‘Y’ sections of the NES Specification where applicable.

7.4 Control Requirements:

 Isolation valve on each boiler and gas fire, and approved self-sealing cooker point.

 Gas solenoid valve on pipework in basement boiler room (refer to Control Requirements in Section T32 for more details) .

 8. HEATING

8.1 Performance Objective:

Provide a complete heating system to the house.

8.2 Design Parameters:

 All systems to comply with BS 6700, CIBSE Guides, Part L1A of the Building Regulations 2006 Edition and Thames Water requirements.

 8.3 Internal design temperatures:

Living areas & bedrooms

Bathrooms

Hall, stairs & utility

Boiler flow and return temperatures

21°C

22°C

18°C

80°/60°C

8.4 System Description:

 Provide in the boiler room, 3 no. High efficiency natural gas wall hung condensing boilers as manufactured by ATAG Ltd (tel. 0118 978 3434) . Each boiler shall be kW. The boiler shall be complete with the manufacturer's 100/150mm concentric flue system terminating with a suitable terminal.

 The manufacturer shall commission the boiler.

 Provide in the boiler room a wall mounted microprocessor controlled sealed system Electronic Filling Device (EFD) as manufactured by Mikrofill Systems Ltd. The system expansion vessel shall be Model N50/6.

 Provide the following heating circulating pumps as manufactured by Grundfos Pumps Ltd:-

a) Boiler Shunt Pumps

No. off Model Flow rate

Pump head

Electrical supply

3

UPS 32-80

0.75 litres/s

30 kPa 240V/1ph/50 Hz

b) Main Heating Pump

Model Flow rate

Pump head Electrical supply

UPS 32-120F

1.8 litres/s

70 KPa

240V/1ph/50 Hz

c) Hot Water Cylinder Heating Pump

Flow rate 0.5 litres/s

Pump head 30 KPa

Electrical supply 240V/1ph/50 Hz

d) Plunge Pool Heating Pump

Model Flow rate

Pump head Electrical supply

UPS 25-40

0.151itres/s 30 KPa

240V/1ph/50 Hz

Note:

The size of the plunge pool heating pump is for tender purposes only . Exact size to be confirmed on receipt of Pool Specialist's requirements.

Provide throughout the building under floor heating. The under floor heating shall be supplied and installed by PECC Engineers (Tel: 01428 656762, Contact: Vic Hansford} , as Specialist Contractors .

The works to be carried out by the Specialist Contractor shall comprise the complete design , supply and installation of the under floor heating system including pipework , fixings, supports, manifolds, mixing valves , circuit pumps, zone control valves , wiring

centers, floor heating time clocks , set back temperature controls, room thermostats and

associated testing and commissioning .

 Where there are fan coil units within the rooms, the under floor heating system shall include an interface with the fan coil unit cooling controls to prevent the cooling and heating operating at the same time.

 The under floor circuits shall be laid to the necessary patterns and densities to suit the space heating requirements with a higher density of pipe adjacent to windows and external walls to offset the higher heat losses from these areas. The pipework shall be retained in position by proprietary clips/spacers. The pipework shall be laid in continuous pipe coils from the manifolds without any joints within the floor.

 Each manifold shall be complete with all necessary individual circuits isolating and flow balancing valves, air vents and drain cocks.

 Thermostatic control of each area/room shall be provided by zone actuators operating in conjunction with a room thermostat.

 All pipework shall be pressure tested hydraulically to a pressure of at least 150% of maximum working pressure, but not less than 3.5 Bar. All pressure tests shall be maintained for four hours. Tests shall be completed and approved before any screed is laid over the heating pipework .

 All heating circuits shall be flow balanced to ensure that design conditions are met.

 The Specialist Contractor shall provide design drawings for the heating installation and Record Drawings and Operating and Maintenance Instructions on completion.

 Provide where indicated on the drawings heated towel rails. The towel rails shall be as specified by the Interior Designers. The contractor shall include for fixing the towel rails in position and for-connecting to 1tle heating installation. Provide the manufacturer 's thermostatic valve sets for each towel rail.

 Provide where indicated on the drawings, radiators as detailed on the Radiator Schedule . Each radiator shall be provided with an angle thermostatic radiator valve on the Flow type RAS-D2 as manufactured by Danfoss Randall. Provide a matching lock shield valve on the return connection.

 All heating pipework shall be carried out in copper tube to BS 2871 Part 1 Table X . Pipework buried in screed and in wall chases shall be carried out in Kuterlex Plus plastic coated copper tube as manufactured by IMI Yorkshire. Generally , capillary integral solder ring type fittings shall be used complying with BS 864 Part 2 and shall be of the non-dezincifible type, with lead free solder joints .

 Supports for copper pipes shall be non-ferrous.

 All pipework, valves and equipment shall be adequately supported.

 Details of hangars and supports to be used by the Contractor shall be submitted for approval before fitting.

 Spacing of pipework supports shall be as follows:

PIPE BORE

(mm)

MAXIMUM SUPPORT SPACING (M)

Copper Pipe

Nom. 15

22

28

35

42

54

Horiz.

1.2

1.4

1.8

2.4

2.4

2.7

Vert.

1.8

2.1

2.4

3.0

3.0

3.0

 All pipe openings through walls, partitions and slabs shall have sleeves with an internal diameter at least 25mm larger than the outside diameter of the pipe. Sleeves shall be flush with the building finish. Provide masking plates where visible pipes pass through building elements.

 Isolating valves on the heating installations shall be Crane Fig. No. D171 or approved equivalent. Drain cocks shall be fitted on all low points. Flow measurement valves (Op­ DRV) shall be Crane Fig. No. D931 or equivalent. Each boiler shall be provided with a 22mm NABIC high lift safety valve.

 Provide in the heating system where indicated on the drawings a 22mm automatic bypass valve type AVDO as manufactured by Danfoss Randall.

 The suction and delivery connect ions to each circulating pump shall be provided with anti­ vibration joins. These shall be type AS (EPDM rubber) tied as manufactured by Engineering Appliances or approved equivalent.

 Provide air bottles at all high points in the heating installation. Air bottles shall be constructed from 50mm diameter tube approximately 300mm long with sealed ends. Include for running from high point on air bottles a 12mm diameter air vent. Vent pipe shall terminate approximately 900mm above floor level with a manual air cock.

 All pipework services in the boiler room and plant room shall be color coded and labeled in accordance with BS 1710. All valves shall be provided with valve tags engraved with a numerical reference. The tags shall be securely fixed to the valve. Provide in the boiler room a diagrammatic chart of the pipework systems indicating the location, size and function of all valves.

 Include for lining existing fireplaces/chimneys where indicated on the drawings. A stainless steel twin wall flexible liner shall be provided which shall be terminated at the top of the chimney with a suitable rain cap.

For tender purposes only, the liner shall be 175mm diameter. The exact size shall be confirmed prior to installation .

All heating pipework in ceiling and roof voids, within boiler room and plant room areas, builders work ducts and concealed from view shall be insulated with Class '0' Armaflex or other similar insulation to the following thickness:-

Pipe Diameter

15mm

22mm

28mm

35mm

 42mm

54mm

76mm

Insulation Thickness

 19mm

25mm

25mm

25mm

 25mm

 32mm

 32mm

Insulation in boiler room and plantroom areas shall be mechanically protected with sheet aluminum casings.

 The heating system shall be provided with water treatment. A dosing pot shall be provided in the system across the flow and return pipework generally as indicated on the drawings. The dosing pot shall be a type 'Kompact' size 5K as manufactured by Aldous and Stamp or approved equivalent. Prior to the introduction of chemicals the Contractor shall ensure that the heating pipework is free from any debris, swart and mill scale. Injecting Fernox Superconcentrate Restorer into the heating system and circulating for one hour shall carry out Pre­ commissioning. Drain and flush the system and repeat twice more. At the time of finally filling the heating system Fernox Superconcentrate Protector shall be injected into the system. The correct concentration shall correspond to a pH of 9.5 to 10. The chemical shall be introduced in accordance with the manufacturer's recommendations.

Provide in bathrooms where indicated on the drawings , electric under floor warming. This shall be supplied and installed by PECC Engineers Tei""01428 656762, contact: Vic Hansford) as Specialist Contractors. The heating shall be complete with floor sensing thermostat with integrated timer.

For materials and workmanship comply with the relevant 'Y' sections of the NES Specification .

Control Requirements

The control systems described under shall be carried out by the Contractor via his Controls Specialist who shall be totally responsible for the design, installation and commissioning of the systems.

All sensors and valves shall be located such that they are easily accessible for maintenance. The Controls Specialist shall liaise with the Contractor and advise him of the location of pipeline and duct mounted sensors which shall be fitted by the Contractor.

The Controls Specialist shall manufacture and install all control panels, supply all controls including valves and sensors and install all control and motor wiring. The Specialist shall provide panel-wiring diagrams.

The Controls Specialist shall be Contromec Services Ltd (Tel. 01322 865552) or equal and approved .

8.5Heating System

3 -Boilers

1 -Pressurization unit

1 -Boiler sequence control

1 -Boiler room gas safety circuit

1 -Gas valve reset

1 -Heating programmers

 The boilers, pressurization unit and heating circulating pumps shall be time controlled by an electronic 7 day programmer having independent time control of heating and hot water. The programmer shall be located in a position to be agreed with the Interior Designer (assume Ground Floor Kitchen for tender purposes) .

 The boilers shall have lead/lag sequence control with the facility to reverse the sequence.

 The heating pressurization unit shall continually maintain the system working pressure. The boiler plant shall be linked to the pressurization unit high and low pressure volt free contacts to stop the operation of the system under these conditions .

 On plant shut down, the boiler shunt pumps shall run on a minimum of 5 minutes to dissipate residual heat within the boilers. The boiler shunt pumps shall be wired into the boiler control terminal strip.

 A frost thermostat shall be provided in the building in a location to be agreed to override the programmer off period and operate the heating system in the event of low temperature.

 The main heating pumps in the boiler room shall stop operating if hot water only is selected on the programmer.

 The plunge pool-heating pump shall be directly under control of the plunge pool filtration plant.

 An electro thermal link shall be provided over each boiler. An emergency knock off button shall be provided adjacent to the boiler room door. These shall be interconnected to a gas solenoid valve to shut off the gas supply if either is operated. The valve shall be automatically reset to the open position by pressing a button on the control panel facia.

 The under floor heating shall have its own integral controls.

 The Radiators shall have its own circuit and much listed building style.

 The domestic hot water circulating pump shall run continuously.

 The temperature of the water in the unvented hot water cylinders shall be controlled by two port motorised valves (provided free issue as part of the cylinder package) operating in conjunction with the cylinder control thermostat and overheat thermostat.

The cylinder-heating pump shall stop operating when the motorized valves are shut.

 Water treatment shall include for treatment of test water to protect against pseudomonas bacteria.

 Prior to any introduction of chemicals the Contractor shall ensure that the chilled water

 pipework installation is free from any debris, swart and mill scale.

Pre-commissioning shall consist of removing all traces of oil and grease by introducing into

 The system CL-28 pre-commissioning solvent as supplied by Aldous and Stamp Ltd

 The concentration shall be 10 liters per 1000 liters of water. The correct concentration shall

 Correspond to a pH of between 9.5 and 10.

 Chemical shall be introduced in accordance with manufacturer 's recommendations.

9.GENERAL VENTILATION

9.1 Performance Objective

Provide mechanical supply and extract ventilation to the basement as indicated on the drawings . Provide extract ventilation to the Utility/Laundry Room.

9.2 Design Parameters

To comply with CIBSE Guide requirements, latest Building Regulations and British Standards .

Provide a minimum extract rate of 30 liters/s to the Utility/Laundry Room.

9.3 System Description

Provide mechanical ventilation to the basement areas, generally as indicated on the drawings.

Provide supply air, heat recovery units and extract fans as detailed in the Schedule of Equipment and Extract Fan Schedule.

All ductwork shall be carried out in galvanized mild steel sheet in accordance with HVCA Specification DW 144. Provide suitable hangers and supports at distances recommended in DW 144.

Provide within the ductwork systems where indicated on the drawings, multi-leaf opposed blade regulating dampers as manufactured by Actionair Ltd, or equal and approved Adjacent to each damper position, provide in the ductwork an adequately sized access panel.

Provide where indicated on the drawings stainless steel shutter type fire dampers as manufactured by Actionair Ltd or approved equivalent. Each damper shall be held open by a fusible link set to operate at 68°C and shall be complete with installation frame. An inspection door shall be provided in the ductwork adjacent to each fire damper .

 Provide where indicated on the drawings on duct connections to grilles, motorized dampers. The dampers shall motor open

 and motor shut on receiving a signal from a manual On/Off switch in the room.

 Provide where indicated on the drawings, grilles as supplied by JPR Services (tel. 01707 871526) . All grilles shall be of

 aluminum construction finished with a stove enameled paint finish to a BS color. The color shall be confirmed with the Interior

 Designer/Architect prior to ordering . Grilles shall have welded comers and secret fixings. Grille sizes and type shall be as

 indicated on the Grille Schedule .

APPENDIX A EXTRACTOR FAN SCHEDULE

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Area Served | Manufacturer | Type | Air Volume1/s | ExternalResistance Pa | Controllers |
| BasementToilet RB5 | Nuaire | OPUS40S | 15 | 70 | Wired to operate via PIR |
| BasementLaundry Room RB6 | Nuaire | OPUS 60S | 30 | 50 | Wired to operate via humidity controller with manual override |
| BasementShower Room RB11 | Nuaire | OPUS40S | 20 | 50 | Wired to operate via PIR |
| Ground FloorWCRG6 | Nuaire | OPUS40S | 15 | 70 | Wired to operate via PIR |
| Ground Floorwe RG19 | Nuaire | OPUS40S | 15 | 70 | Wired to operate via PIR |
| Ground Floorwe RG2o | Nuaire | OPUS40S | 15 | 70 | Wired to operate via PIR |
| 1• FloorBathroom 1.5 | Nuaire | OPUS40S | 20 | 70 | Wired to operate via PIR |
| 1• FloorShower Room R1.10 | VentAxia | ACM 150 | 30 | 100 | Wired to operate via PIR |
| 1• FloorBathroom R1.15 | VentAxia | ACM 150 | 50 | 100 | Wired to operate via PIR |
| 1• FloorBathroom R1.17 | Nuaire | OPUS40S | 20 | 70 | Wired to operate via PIR |
| 1• FloorBathroom R1.19 | Nuaire | OPUS40S | 20 | 70 | Wired to operate via PIR |

##

##  APPENDIX B

##  GRILLE AND VENTOUTLETS SCHEDULE

|  |  |  |  |
| --- | --- | --- | --- |
| Ref | Type | Size | Function/Connections |
|  | SSS VDA 1 | 150 X 150 | Supply Air |
|  | SSS VDA 1 | 150 X 150 | Extract Air |

 APPENDIX C

 SCHEDULE OF EQUIPMENT

|  |  |
| --- | --- |
| Item | Description |
| Supply/Extract Air Handling Unit In Basement PlantroomHeat Recovery Ventilation Unit in Basement Laundry Room | The Unit shall be as manufactured by Scientaire Thermal Systems Ltd (Tel. 020 8892 4761).The unit shall be of the horizontal multi-section type suitable for internal mounting Model EBSH2/HR.The air handler shall be a double stacked unit comprising the following:-Supply side: a) Panel filter with manometer1. Crossflow recuperator
2. Re-heat coil

d) DIDW centrifugal fan complete with 2 speed motor.Extract side: a) Panel filter with manometerb) Recuperatorc) DIDW centrifugal fan complete with 2 speed motor.The supply and extract air volumes shall be 0.5m3/s against an external pressure of 200 Pa.The reheat coil shall be capable of heating 0.5m3/s of airfrom 9°C to 20oC when fed with LTHW at 80/60°C .The air handling unit shall be supplied in flat pack form for assembly on site by Scientaire.The heat recovery ventilation unit shall be as manufactured by Mitsubishi Electric (tel. 01707 282480) .The unit shall be of the ceiling recessed Lossnay RX4 range complete with filters and shall be Model LGH-80 RX4 capable of 200 litres/s against a pressure of 150 Pa.The unit shall be complete with Lossnay Controller.Provide in the supply air duct duct external to the unit a heater battery (LTHW) capable of heating 200 litres/s from 1ooc to 20°C. |

 APPENDIX D

 SCHEDULE OF BATHROOM WARE AND RADIATORS

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| PROJECT: THE ELMS |   |   |   |   |   |   |   |   |
| ADRESS: FITZROY PARK,N6 6HS |   |   |   |   |   |   |   |   |
| SANITARYWARE SPECIFICATION |   |   |   |   |   |   |   |   |
| BASEMENT LEVEL |   |   |   |   |   |   |   |  |
| ROOM | REFERENCE | DRWG.NUM | SINK SPEC | TOILET SPEC | SHOWER TRAY SPEC | SHOWER | BATH SPEC | RADIATORS SPEC |
| SHOWER ROOM | ROOM RB11 | 492/RB.11 | H880xW910xD550 | H765xW530xD690 | 800x800 | H980xD411 | N/A | N/A |
| ROOM WS | ROOM RB23 | 492/RB.23 | H880xW910xD550 | H765xW530xD690 | N/A | N/A | N/A | N/A |
| GROUND FLOOR LEVEL |   |   |   |   |   |   |   |   |
| ROOM | REFERENCE | DRWG.NUMBER | SINK SPEC | TOILET SPEC | SHOWER TRAY SPEC | SHOWER | BATH SPEC | RADIATORS SPEC |
| ROOM WS | ROOM RG 19 | 492/RG 19 | H880xW910xD550 | H765xW530xD690 | N/A | N/A | N/A | N/A |
| ROOM WS | ROOM RG 20 | 492/RG 20 | H880xW910xD550 | H765xW530xD690 | N/A | N/A | N/A | N/A |
| STUDY | N/A | 7458/212 | N/A | N/A | N/A | N/A | N/A | H645xW1000 |
| FIRST FLOOR LEVEL |   |   |   |   |   |   |   |   |
| ROOM | REFERENCE | DRWG.NUMBER | SINK SPEC | TOILET SPEC | SHOWER TRAY SPEC | SHOWER | BATH SPEC | RADIATORS SPEC |
| SHOWER ROOM | ROOM R1.10 | 492/R1.10 | H880xW910xD550 | H765xW530xD690 | L1800xW1200 | H980xD411 | N/A | N/A |
| BATHROOM | ROOM R1.15 | 492/R1.16 | H880xW910xD550 | H765xW530xD690 | L1800xW1200 | H980xD411 | L1800XW770XH790 | N/A |
| SHOWER ROOM | ROOM R1.17 | 492/R1 17 | H880xW910xD550 | H765xW530xD690 | 900x900 | N/A | N/A | N/A |
| SHOWER ROOM | ROOM R1.19 | 492/R.19 | H880xW910xD550 | H765xW530xD690 | 900x900 | N/A | N/A | N/A |
| BEDROOM | ROOM R1.11 | 492/R1.11 | N/A | N/A | N/A | N/A | N/A | H645xW1000 |
|   |   |   |   |   |   |   |   | H645xW1000 |
|   |   |   |   |   |   |   |   | H645xW1000 |
| BEDROOM | ROOM R1.12 | 492/R1.12 | N/A | N/A | N/A | N/A | N/A | H645xW1000 |
|   |   |   |   |   |   |   |   | H645xW1600 |
|   |   |   |   |   |   |   |   | H645xW1000 |
| DRESSING ROOM | ROOM R1.14 | 492/R1.14 | N/A | N/A | N/A | N/A | N/A | H645xW1000 |
| BEDROOM | ROOM R1.16 | 492/R1.16 | N/A | N/A | N/A | N/A | N/A | H645xW1200 |
|   |   |   |   |   |   |   |   | H645xW1200 |
| BEDROOM | ROOM R1.18 | 492/R1/18 | N/A | N/A | N/A | N/A | N/A | H645xW900 |
|   |   |   |   |   |   |   |   | H645xW900 |
|  |  |  |  |  |  |  |  |  |







Clause Description No2.

 Electrical And Telecommunication Cervices.

 1.GENERAL CONDITIONS.

 2. SCOPE OF WORKS

 3. LV SUPPLY/PUBLIC UTILITY SUPPLY

 4. GENERAL LIGHTING

 5. GENERAL LV POWER

 6. TELECOMMUNICATIONS.

 7. RADIO/TERRESTRAIL/SATELLITE/CABLE TV

 8. ACCESS CONTROL

 9. FIRE DETECTION AND ALARM

 10. EARTHING AND BONDING

 1.GENERAL CONDITIONS.

 1.1The Project:

 The project comprises the construction of a detached house at The Elms, Fitzroy Park, London N6 6HS as

 described in the Main Contract Preliminaries

 1.2 Co-ordination of trades:

Allow for coordinating the contract works with the works of other trades and installations

which may be on site during the period of the contract.

1.3 Co-operation with others:

Ensure that the contract works integrate with that of others and that full co-operation is maintained during the execution of the works with that of others.

Co-operate with the Contractor, other sub-contracts, suppliers , local authorities and statutory undertakings in the execution of the works.

1.4 Noise and nuisance:

Ensure that the contract works are undertaken with as little noise as possible. Take all necessary precautions to prevent nuisance from smoke, rubbish and other causes.

1.5 Program:

The successful Contractor will be required to submit a detailed program of works prior to starting on site. The program shall include delivery dates of all equipment vital to the completion of the works within the Contract period.

1.6 Storage:

 Weatherproof, safe and secure storage shall be provided for all materials and equipment.

 All materials and equipment shall be offloaded, stored and transported in accordance with manufacturer’s recommendations.

 All electrical equipment and components shall be kept dry and free from dust.

 Plug, cap or seal open ends on all ductwork, tubes, conduit, trunking and associated equipment whilst in storage and during transportation to site.

 Provide racks to prevent distortion of pipes, conduit and similar materials.

1.7 Obligations and Responsibilities:

 The Specification and Drawings shall be interpreted in accordance with current good installation practice relevant to the particular installation.

 Where the drawings are to a small scale and/or are expressed in symbolic terms or are in the form of a diagram then indication of the exact location and detail of pipes, cables or other components shall not be inferred.

 The Tender Drawings accompanying this Specification are representative of the works to be carried out and, when read in conjunction with the Specification, provide information for tendering .

 Should there be a discrepancy between the Specification and the Drawings, the Contractor must obtain verification in writing as to which is correct before submitting his Tender. No extra payment will be allowed should such a discrepancy arise during the period of the Contract.

 The Contractor shall provide installation and builders work drawings produced in CAD format.

 The drawings issued by the Engineer show generally the layouts of the services required to be carried out, i.e. runs of mains and circuits, size of mains and equipment, they may not cover in every detail the whole of the work involved, i.e. bends, unions, flanges, clips, supports and the like but the Contractor must include in his Tender for all the above­ mentioned items, especially must he include for bends, offsets and swan necks where necessary due to piers, recesses, other services and the like.

 The Contractor shall include for the design development of the services tender design drawings in association with the Engineer, to provide fully co-ordinated Installation Drawings.

 It is the Contractor's responsibility to provide the complete Installation Drawings necessary for the proper instruction of the on-site craftsmen employed by him and which show the method of installation and location of the systems forming part of the Contract. Also, to develop from these drawings any associated builders work information relating to the installation of the services . The Contractor shall include in his price the cost of the preparation and progressive updating of this information and for the submission of copies to the Engineer for his comment and for him to ascertain that the Contractor has correctly interpreted the design and for the subsequent issue of copies of the final drawings.

 All drawings shall be submitted to the Engineer for comments prior to installation. Builders work requirements shall be either indicated on drawings or by setting out the requirements on site.

 The Contractor shall provide electrical diagrams for all electrical equipment and systems, which form part of the works.

 The Contractor shall be responsible for the accuracy of the information he provides and shall be liable for all costs arising from any errors or delays in such information.

 All drawings and revisions thereto shall be prepared in accordance with an approved format. Drawings shall identify all plans, elevations, sections and details associated with the manufacture, fabrication , assembly and installation of the works and their co-ordination with the other works . General layout drawings shall be to 1:50 scale with detailed drawings to larger scales as detailed herein.

 All information described above shall be submitted for review. Such review or lack of comment shall not relieve the Contractor of any responsibilities for such information.

 The Contractor shall be responsible for all errors, inaccuracies, discrepancies and omissions in the information he prepares, amends or revises, corrects or co-ordinates.

 The Contractor shall submit information in sufficient time to ensure that no delay to the works is caused by the requirements of the review, and the incorporation of all comments and amendments arising.

 Drawings prepared by the Contractor shall be fully checked and coordinated by the Contractor prior to submission. He shall allow adequate staff for this requirement and time for the same shall be allowed in the programme.

 The Contractor shall allow in his Tender for the above provision and checking of drawings, schedules etc., and sufficient time in his programme for this to be done thoroughly and correctly.

 Upon receipt of any comments, the Contractor shall make all necessary amendments and re-submit the information until it is returned without comment. The information shall not be generally issued, used for ordering, manufacture, fabrication and installation, until it is returned without comment.

1.8 Coordination of cervices:

 All aspects of the work require detailed co-ordinat ion to avoid any possible clash or conflict

with other trades and disciplines . Undertake such co-ordination in relation to the works.

 Where any new, revised or updated architectural, structural or services information is issued, examine such information and if necessary modify the works accordingly to prevent any clashes or abortive work .

 1.9 Health and Safety:

 It must be ensured that during the progress of the works on site, the general recommendations of the 'Health and Safety at Work Act 1974' and subsequent additions and/or modifications are adhered to.

 A copy of the Contractor's Health and Safety policy document, including risk assessment procedures, shall be submitted with his Tender.

 A Health and Safety Information Pack will be prepared by the COM CCH>coordinator. However,

the Contractor shall comply with the requirements of the COM Regulations by:

 Compiling risk assessments for the contract works.

 Providing information on the contract works which might affect the health and safety of any person.

 Providing appropriate input to the Health and Safety Information Pack for the works.

 2.SCOPE OF WORKS.

 Installation shall comply with all statutory requirements including Building Control, Approved Document Part M, and

 Disability Discrimination Act etc.

 The Contract Works shall comprise but not limited to the following:

 -Mains Distribution Switchgear

 -External and Internal Cabling works

 -Mechanical Plant Power

 -Small Power and equipment power

 -Lighting, including Interior Designer specified luminaires

 -Fire Alarms

 -Security, including Access Control

 -Telephones and Data

 -Audio-Visual

 -Earthing and Bonding

 -Testing and Commissioning

 -Record Drawings and O&M Manuals

 2.1 Commissioning and Testing

 All electrical systems shall be tested in accordance with BS 7671 (lEE Wiring Regulations) .

 Provide test result sheets and completion certificates.

 All other specialist systems and equipment shall be tested and commissioned by the relevant specialist.

 Provide test result sheets and completion certificates from the specialists.

 All electrical test result sheets and certificates shall be included in the O&M Manuals.

 2.2 Record Documents.

 -Record documents shall comprise the following:

 -Record Drawings (current release AutoCAD format)

 -Plant room and switch room drawings and schematic (current release AutoCAD format) .

 -Operating and Maintenance Manuals.

 2.3 Record Drawings.

 -The Contractor shall provide as a pre-requisite of Practical Completion of the works, 3 copies of

 all Record Drawings in print form and 1 copy on CD disk .

 One set of Record Drawings shall be issued to the Engineer for comments at least three weeks prior to issue of the

 completed documentation.

 The drawings shall be clearly endorsed 'Record Drawing' near to the title block .

 The Record Drawings shall clearly indicate the position and size of all items, the layout and size of all work,

 luminaires , switches , sockets , power outlets and miscellaneous services outlets (i.e. telephones ,

 data , security etc.) as actually installed . The routing of all conduits, trunking and trays shall also be indicated,

 together with all earth bond locations throughout the building detailed control and power wiring diagrams in

 connection with the Mechanical Services shall be provided.

 2.4 Plant Room And Switch Room Drawings.

 Provide plant room and switch room drawings and schematics mounted in the respective rooms. Protect surfaces of

 such information by pressure lamination.

 Operation and Maintenance Manuals

 The Contractor shall provide as a pre-requisite to Practical Completion of the Works , three copies of the Operating

 and Maintenance manuals. All information shall be contained within suitable ring binders with hard covers. A copy of

 the manuals shall be issued to the Engineer for comments at least three weeks prior to the issue of the completed

 documentation.

 The Operating and Maintenance manuals shall be written to be read in conjunction with the Record Drawings and

 shall comprise the following:

 An index of the total content of the manuals.

 General description of the systems and associated equipment.

 Design intent and performance specification.

 Manufacturer 's performance and technical data.

 Schedules of equipment and cables with manufacture r's name, catalogue no., address and tel. no.

 Controls and their operations

 Operating procedures.

 Procedures for faultfinding.

 Instructions for dealing with emergency conditions for each system or apparatus.

 Maintenance procedures.

 Copies of all electrical equipment layout record drawings.

 Copies of all manufacturers' equipment record drawings.

 Copies of all specialist equipment wiring diagrams.

 Equipment schedules.

 Luminaire schedules.

 Distribution board circuit reference schedules.

 Recommended spares schedules.

 Testing/Commissioning certificates of all systems and installation.

 Copies of insurance, inspection, test and guarantee certificates.

 Health and Safety/Statutory Requirements.

 Recommendations for future testing.

 The content of the O&M manuals and drawing shall be folded to a size A4, to be contained within individual clear

 plastic envelopes.

 Copies of manufacturer 's data shall be supplied with respect to the nature, type and method of operation of

 individual pieces of equipment , together with their detailed maintenance instructions . Such data, in the form of

 individual booklets, copies from catalogues for the equipment shall be contained in clear plastic envelopes within the

 Operating & Maintenance manuals.

 2.5 Completion and Handover:

 Prior to Practical Completion, the Contractor shall instruct the owner of the building in the use, function and operation of

 the installations, including all items and procedures listed in the Operating and Maintenance Manual.

 Prior to Practical Completion, the Contractor shall instruct the owner of the building in the use, function and

 operation of the installations, including all items and procedures listed in the Operating and Maintenance Manual.

 3. LV Supply/Public Utility Supply

 3.1 Performance Objectives

 To meet the demand/load requirements for the dwelling provide low voltage electricity from the public utility service

 network to the dwelling.

 As current dwelling is historic building, grate care shall be taken to minimize, as far as it is practical, impact of such

 Regulations.

 The nature of the incoming public utility electricity supply is:

 Voltage: 400V three phase and neutral +10% -6%

 230V single phase and neutral +10% -6%

 Nature of the current: alternating.

 Frequency:50 Hz

 Earthing system:TN-S

 3.2 System Description

 The incoming electricity supplies shall be provided by the public utility electricity supplier EDF Energy for the

 development. This supply is to be provided as a standard EDF arrangement. Refer to EDF.

 The Installer shall make all necessary cable, duct and cable tray provisions for the new supply heads and liaise with

 the public utility supplier for the incoming supply, service head metering equipment and service cable connections ,

 together with arranging for all necessary builders work for the incoming electricity supplies .External enclosure shall

 be constructed to EDF's requirements .

 All cables shall be tested and certified by BASEC. Where cables are likely to be submerged in water , marine cables

 shall be used. Contractor shall confirm with cable manufacturer/supplier the suitability of cables in relation to the site

 conditions .Contractor shall include for removal and disposal of any redundant installation .

 3.3 System Drawings

 Refer to drawing schedule.

 LV DISTRIBUTION SYSTEM

 Performance Objectives

 Safe distribution of low voltage power supply.

 Provide protection against electric shock

 Direct Contact: Method of protection against electric shock by direct contact is to be by Insulation of live parts or

 protection by barriers or enclosures.

 Indirect Contact: Method of protection against electric shock by indirect contact is to be by earthed equipotential

 bonding and automatic disconnection of supply .

 Special Risk: In areas of special risk supplementary protection shall be provided by residual current devices with

 appropriate operating characteristics .

 Surge current protection shall be provided.

 Design Parameters

 In accordance with the requirements of the BS 7671.

 To the requirements of EDF Energy.

 A minimum spare capacity shall be included in the LV distribution network including cables and equipment.

 System Description

 The installation of mains and sub-mains distribution equipment and cables for supplies within the dwelling shall be

 undertaken by the Electrical Installer in accordance with the details shown on the drawings . Surge current

 protection shall be provided .

 Distribution switchgear and cabling shall be provided as per control requirements

 This work shall include all necessary equipment, cabling and connect ions.

 Generally mains and sub-mains cables shall be multi-core armored complying with BS 6724 XLPE/SWA LSF .

 All cables shall be tested and certified by BASEC . Where cables are likely to be submerged in water r, marine cables

 shall be used. Contractor shall confirm with cable manufacturers/suppliers the suitability of cables in relation to the

 site conditions .Multiple runs of sub-mains cables shall be supported by cable management system . Systems shall be

 generally galvanized finish .

 All cable routes and equipment locations shall be coordinated with other services and the building structure .

 Main cable trays and routes have been shown provisionally on drawings . Any additional cable trays, conduits, etc.

 required shall be provided .

 Distribution boards shall be complete with integral switch isolator , miniature circuit breakers, RCDs and spare ways .

 Protective devices fitted to the distribution equipment of the LV distribution system shall provide full discrimination

 between each device in the system .

 Distribution boards and consumer units shall comply with the relevant British Standards .

 Identification and Warning notices, signs and labels shall be provided to all items of distribution equipment.

 Provide warning notices for voltage exceeding 230V and dual supply from two different sources , such as distribution

 boards, as per the lEE Regulations requirements . This shall include locations such as switch plates, socket outlets ,

 isolating switches etc.

 The MCB serving the fire alarm equipment shall be colored red and lockable in the 'ON' position. The MCB shall be

 labeled "FIRE ALARM - DO NOT SWITCH OFF" using 5mm high red lettering on a white background .

 3.4 Control Requirements

 HRC fuses, MCCBs, MCBs and combined MCB/RCDs , as appropriate to the installation to provide short circuit and

 overload protection to the distribution system , ensuring discrimination of protective devices .

 The system shall be arranged and design to minimize the effect of any fault current occurring within the distribution

 system.

 4. General Lighting.

 Performance Objectives

 To provide general and decorative lighting as per contract requirements, retaining specific character of historic side

 of dwelling by implementing, as far as it is practically applicable, fixtures and fittings corresponding to period. Install

 fire and acoustic hoods for sealing of penetrations in fire and acoustic resistant elements in walls , floors and ceilings

 All wiring systems shall be suitably fire sealed in an approved manner .

 4.1 Design Parameters

 CIBSE code of practice for interior lighting.

 Building Regulations .

 In accordance with the luminaire and equipment schedules and details included with this specifications, including AV

 Lighting specialist's and Interior Designer's requirements.

 System Description

 The Installer shall provide the complete and operational lighting installation as indicated on the drawings. Refer to

 Architect's and Interior Designer's drawings for layouts.

 The Electrical Contractor shall provide luminaires as currently indicated on drawings and on luminaire schedule.

 Luminaire schedule details are mainly prepared and submitted by the Client's Interior Designer. Exact quantities and

 product codes shall be checked and confirmed by the Contractor . Further product details of the luminaires that

 have been specified by the Interior Designer may be obtained via Internet search engines .

 Contractor shall also include for supply of all luminaires , as shown on tender drawings and detailed on the luminaire

 schedule .

 Contractor shall check and confirm that the luminaires specified by the Client's Interior Designer are suitable for the

 UK regulations , requirements , application , etc .

 The Installer shall terminate final circuit wiring to each light point in a suitable junction box/ceiling rose with final

 connection to luminaire/lamp holder by three core flexible cable , using plug-in ceiling roses where appropriate .

 Final connections shall be high temperature cable/cord . Provide fire and acoustic hoods for sealing of penetrations

 in fire and acoustic resistant elements in all walls , floors and ceilings.

 Final positions of luminaires/light points shall be verified by the Electrical Contractor , with the Architect before

 outlets are installed. All setting out details as per the Architect's drawings and instructions .

 Luminaires shall conform to BS 4533 , BS EN 60598 etc . and shall be of the types and manufacturer as shown on the

 contract documents .

 Luminaires shall comply with BS EN 61547 for EMC immunity .

 Luminaires in external and wet areas shall be IP65.

 Lighting shall be connected to RCD circuits, where required, in compliance with the lEE Regulations.

 Control gear for fluorescent type luminaires shall be high frequency electronic type .

 All luminaires and lamp holders shall be fitted with suitable lamps.

 Final connections to all tungsten halogen luminaires shall be carried out using heat resistant flexible cables ,

 connected to a fixed terminal box.

 All control gear for luminaires shall be electronic type high frequency operation .

 Lamps shall be as follows :-

 Fluorescent:

 triphosphor color temperature 2700K (warm white classification) . Also refer to the Interior Designer's

 requirements.

 Tungsten halogen: reflector type lamp with dichroic full glass reflector .

 Lamps shall comply to BSEN 60081 , BS EN 60901 , BS EN 61199, BSEN 61195 , BSEN 60969 , BSEN 60968 , BSEN

 60432-2 and BSEN 60357.

 Luminaires shall be supported independent of the ceiling system or mounted on suitable ceiling plate.

 Switches shall be suitably rated for the load connected .

 Time switches shall be 24 hour 7 day operation complete with spring reserve .

 Mounting heights of accessories shall be in accordance with the Part M requirements or as details included in the

 appendices to this Specification , subject to the final agreement with the Client/Architect/Engineer .

 Internal luminaires shall be IP20 except in bathrooms and shower rooms where luminaires shall be IP44 minimum ,

 subject to requirements of the pool area and bath/shower area zone classifications . Installation shall comply with

 Section 701 and 702 of BS 7671 , including all the equipment installed in the pool area and bath/shower areas . Also

 refer to Luminaire Schedule .

 Installation in rooms and cabins containing sauna heaters shall comply with Section 703 of BS 7671.

 4.2 Control Requirements

 Provide lighting control as shown on contract documents.

 All light switches shall be as shown on drawing , single or multi-gang units.

 System Drawings

 Refer to drawing schedule

 Electromagnetic Compatibility

 Ensure all equipment and systems are installed to provide electromagnetic compatibility within the systems and with

 any other systems installed in the same location.

 4.3 Final Circuit Arrangements.

 The LSF wiring system for general lighting and LV power shall be twin and earth cabling to BS 7211 450/750V installed

 flush within ceiling voids and wall finishes . All accessories boxes are to be installed flush with the surface of the

 ceiling/wall finish using metal boxes fixed to noggins within the wall . XLPE/SWAILSF cables in ducts to be used as

 necessary for external locations .

 Installation shall comply with the lEE Regulations requirements .

 Switches shall be rocker type, Heritage Brass, Victoria Elite range .

 In the kitchen, behind kitchen units at low level and plant rooms , stores, etc. accessories shall be MK Logic range,

 white.

 External areas shall be surface mounted metal cover plates galvanized finish with IP rating suitable for location.

 Final circuit wiring for each service/system ; lighting and small power and cabling for fire alarm and other services

 are to be segregated from each other .

 Where cables of different voltage classifications are run together , they are all to be insulated for the highest voltage .

 Final circuits are to conform to the requirements for conventional circuit arrangements as set out in Appendix E of

 the lEE Wiring Regulations Guidance Notes number 1 - Selection and Erection.

 Cable protection (conduit , metal capping etc) shall be provided as per the lEE Regulations and lEE Regulations

 Guidance Note 1 - 'Selection and Erection'.

 The maximum permitted length of final circuits are to comply with requirements set out in Section 7 and Table 7.1

 conventional circuits of the lEE on-site guide , or the latest equivalent.

 Cable management system internally within building shall be galvanized finish and in external underground locations

 shall be Rigiducts or similar .

 Main cable trays and routes have been shown on drawings. Any additional cable trays , conduits , etc. required shall

 be provided.

 The Installer shall include for providing protection to all accessory face plates to obviate any damage from other

 trades, in particular plastering and painting.

 Mounting heights of accessories shall be in accordance with Building Regulations Approved Document Part M, and as

 details included in the appendices to this specification.

 External Lighting/Security lighting shall be PIR controlled. Provide all PIRs and necessary control items.

 5.General LV Power

 5.1 Performance Objectives

 To provide final circuit power installations from final circuit distribution boards terminating in socket outlets , fuse

 connection units and other outlet accessories, with reference to historic decorative arrangement in each individual

 part of dwelling, retaining as far as it is practically possible original character of dwelling and in accordance to BS

 1363, unless otherwise shown on the drawings . Install fire and acoustic seals to all penetrations in fire and acoustic

 resistant elements in walls , floors and ceilings . All wiring systems , including conduits shall be suitably fire sealed in

 an approved manner.

 5.2 Design Parameters

 Requirements of BS 7671.

 In accordance with the equipment schedule included with this specification .

 In accordance with the Architect's detailed layouts , elevations , etc. and any other

 requirements , including Interior Designer's and AV Specialist's drawings and specifications.

 5.3 System Description.

 General purpose socket outlets shall be Heritage Brass, Victoria Elite range, switched 13A to BS 1363 matching those

 used for the lighting. In plant areas, they shall be MK Logic White.

 Installation and siting of equipment in locations containing bath and showers shall be in

 accordance with section 701 of BS 7671 .

 Items of fixed electrical equipment (e.g. under floor heating , towel rails, fans , boilers , pumps, etc.) shall be wired and

 connected by the Electrical Contractor . Provide local isolating switches for all extract fans and other plant and

 equipment. Isolating switches to be provided in accessible locations.

 Co-ordinate with mechanical regarding all electrical installations relating to mechanical plant and equipment ,

 including any signal , control and LV cabling works, local isolating switches , etc .

 Kitchen electrical appliances shall have unswitched 13A sockets at low level to receive the appliance plug top. 20A D.P.

 grid switches with fuse and neon mounted vertically below each switch in same grid shall be provided to isolate the

 fixed kitchen appliance equipment. All isolator grid switches controlling electrical appliances shall be labeled as to

 their use. All labels shall be engraved on outlet cover plate .

 All connection units, local isolators and connection plates controlling electrical appliances shall be labeled as to their

 use. All labels shall be engraved on outlet cover plate .

 Where 13A, 5A, data, TV and other services outlets are shown side by side, provide bespoke accessory plate such that

 any combination of these outlets are accommodated on a single plate.

 Provide mirror heater pads at the locations where power feeds have been shown on drawings.

 Provide all installations for AV and other specialists as per their drawings and specification.

 5.4 Final Circuit Arrangements.

 The LSF wiring system for general lighting and lv power shall be twin and earth cabling to BS 7211 450/750V installed

 flush within ceiling voids and wall finishes. All accessories boxes are to be installed flush with the surface of the

 ceiling/wall finish using where appropriate metal boxes fixed to noggins as required. XLPE/SWNLSF cables for external

 items of equipment may also be used as necessary.

 Installation shall comply with the lEE Regulations requirements.

 Final circuit wiring for each service/system; lighting and small power and cabling for fire alarm and other services are

 to be segregated from each other in separate wire ways.

 Where cables of different voltage classifications are enclosed in the same wire ways, they are all to be insulated for the

 highest voltage.

 Final circuits are to conform to the requirements for conventional circuit arrangements as set out in Appendix E of the

 lEE Wiring Regulations Guidance Notes number 1 -Selection and Erection .

 Cable protection (conduit, metal capping etc.) shall be provided as per the lEE Regulations and lEE Regulations

 Guidance Note 1 - 'Selection and Erection'.

 The maximum permitted length of final circuits are to comply with requirements set out in Section 7 and Table 7.1

 conventional circuits of the lEE on-site guide , or the latest equivalent.

 Cable management system internally within building shall be galvanized finish and in external underground locations,

 shall be rigiducts or similar .

 Main cable trays and routes have been shown on drawings . Any additional cable trays, conduits etc. required shall be

 provided .

 The installer shall include for providing protection to all accessory face plates to obviate any damage from other

 trades , in particular plastering and painting .

 Prior to painting of walls and other similar surfaces , the installer shall remove all accessory cover plates and upon

 completion of this work replace all cover plates.

 Mounting heights of accessories shall be in accordance with Building Regulations Approved Document Part M, and as

 details included in the appendices to this specification.

 5.5 System Drawings.

 Refer to drawing schedule.

 6. Telecommunications.

 Performance Objectives BT SERVICES

 Provide telephone and data outlets, wiring for speech and data transmission.

 Provide BT incoming lines. Liaise with BT. Allow for main distribution point (MOP), sub distribution point (DP) for BT

 distribution, as required. Allow for four incoming BT lines and Broadband facilities,

 Provide lines for Redcare for the intruder alarm and fire alarm systems, and lift.

 Provide cabling from each outlet to Data hub and the incoming BT lines to the Data Specialist's requirements .

 Works shall be as per the drawings and specification by the Specialist.

 6.1 Design Parameters

 BT SERVICES

 All work to comply with the requirements of British Telecom and as per the details by the AV Specialist.

 Also provide BT/data cabling from BT main distribution point in Boiler Room to the AV/Data hub in the Security .

 Install 4-pair screened Cat 7 Voice and Data cabling, including termination in outlets , from each single telephone/data

 outlet to AV Hub in the Security Room (i.e. 2 No. 4-pair Cat 7 to each twin outlet position) . AV hub will be provided by

 the AV specialist. Termination in AV hub will be by the AV Specialist. Cabling for the telephone system shall be fully

 segregated from all other services .

 6.2 System Description

 BT SERVICES

 Provide wiring for speech and data transmission to each outlet shown on drawings . Provide cabling as above .

 Telephone and data outlets shall be provided as shown on the drawings . Allow BT compatible master and secondary

 telephone and data outlets.

 All work to comply with the requirements of British Telecom , BS EN 50173 and 50174 . All cabling shall be star-wired

 to the Data hub as per BT requirements.

 Also provide 1 No. 4-pair Cat 7 cabling to each TV outlet position in a separate outlet box with wall plate/outlet as

 necessary.

 Cabling for the telephone system and data shall be fully segregated from all other services.

 Cabling to be installed within ceiling void and down the walls in suitable manner. External ductwork shall be provided

 for external cabling in ground with draw pits, as necessary. Coordinate with BT.

 Cabling systems shall be multicore and the installation shall be installed to the requirements of BS 6701 , BS EN 50173

 and 50174, and British Telecom.

 Cabling shall be protected from interference.

 Outlet plates shall be Heritage Brass, Victoria Elite range as specified for the lighting and power accessories . Where

 outlets are combined with other outlets they shall be included on the combined plate as described in General LV

 Power.

 6.3 General Approvals

 Ensure that all apparatus and equipment provided for the telecommunications system is approved under Section 22

 of the Telecommunications Act 1984 for connection to the PTO's Specified Public Telecommunications System and is

 installed as set out in the conditions for use. Submit documentary evidence of such approval.

 Electromagnetic Compatibility

 Ensure all equipment and systems are designed and installed in accordance with BS EN 50173 , BS EN 50174, BS EN

 41003 and BS 6701 . Provide electromagnetic compatibility

 within the system and with any other system installed in the same locations .

 6.4 Products/Materials/Workmanship

 Quality Control

 Handle store and install all equipment, apparatus and components of the telecommunications system in accordance

 with BS EN 50173 , BS EN 50174 and BS 6701 , and the manufacturer's recommendations .

 Inspect all equipment, apparatus and components on delivery, before fixing and after

 installation and reject or replace any which are defective, record all commissioning measurements and tests.

 Install telecommunications systems in accordance with BS EN 50173 , BS EN 50174 and BS 6701 and the

 manufacturer's recommendations and the requirements of the Specialist.

 7. Radio/Terrestrial/Satellite Cable TV

 7.1 Performance Objectives

 RADIO/TV AERIAL DISTRIBUTION SYSTEMS

 Provide audio and visual distribution networks for the transmission of audio and visual signals for radio/TV services

 from the aerial array for the reception of digital and analogue terrestrial and satellite services to outlet points in

 dwelling.

 Provide terrestrial/cable/satellite facility to all television points in the house, including Sky Plus and Russian satellite

 channels, as agreed with the Client/Architect/Engineer, outlet locations as shown on drawings.

 Telephone outlet and 4-pair Cat 7 cabling to each TV point position.

 7.2 System Description.

 RADIO/TERRESTRIAL/SATELLLITE,ITV DISTRIBUTION SYSTEM

 Design, install, commission and test a complete aerial system .

 The Specialist shall be a member of the Confederation of Aerial Industries.

 The system shall comprise an aerial array and satellite dish for the reception of digital and analogue terrestrial and

 satellite TV transmissions and fm/am radio frequencies including DAB reception with amplifiers and splitters to

 distribute the signals via a network of co-axial cables routed through the electrical risers and ducts.

 A common satellite dish and aerial array and distribution system shall be provided to serve all areas, located at an

 accessible position to be agreed with Client/Architect/Engineer. Signal quality testing shall be carried out to ensure

 the best position of the array and dish . Refer to details of the System Specialist. Facilities shall include Sky Plus.

 Provide outlets at locations as shown on drawings.

 All cabling and equipment shall be in accordance with BSkyB 'internal cabling of new developments ' design guidelines

 and as per the System Specialist's requirements. Cabling shall be segregated from all other services. Facilities shall

 include Sky Plus. Splitters and amplifiers shall be provided within the building as necessary. Power and signal outlets

 and cabling shall be provided in all areas as per the requirements of the System Specialist. Refer to the Specialist 's

 details.

 Demonstrate that systems meet all specified requirements and provide quality and improvement of sound/vision

 reproduction as required.

 A blanking plate to suit accessories shall be provided to all back boxes not connected at contract completion. At TV

 outlet position, single bespoke integral multi services outlet plate shall be provided to accommodate all multi-services

 outlets, where multi-services outlets are shown side by side on drawings . Refer to Architect 's and System Specialist's

 details and requirements.

 All systems and outlets shall be live upon commissioning, i.e, residents shall be able to plug their receiving equipment

 into the sockets and obtain signals immediately , providing they have subscribed to the services where relevant.

 Installation shall be in compliance with all relevant standards , regulations , codes of practice and recommendations ,

 including BS 6330, BS 6513 , BS EN 50083-1 & BS 6259.

 Amplifiers and equipment racks shall be located in the Security Room.

 All details are subject to the Specialist Supplier's/lnstaller 's requirements and

 recommendations.

 Amplifiers will be connected to the head end equipment via CT 125 cables and 2 x 2 No. CT 100 cables (total 4 No. CT

 100 cables) from amplifier/splitter to each TV outlet shown on drawings, subject to the specialist's details and Client's

 requirements.

 Ensure all equipment and systems are designed and installed to provide electromagnetic compatibility within the

 system and with any other systems installed in the same locations, and comply with BS EN 55020 where applicable.

 Engage a system specialist to develop design, supply, install , commission and set to work the system .

 Demonstrate that system meets all specified requirements and provide quality and improvement of sound/vision

 reproduction as required .

 Bond all aerials, satellite dishes and mountings to the lightning protection system, if applicable .

 7.3 Radio/TV Systems Demonstration:

 Demonstrate that the radio/TV system meets all specified requirements and provides quality and impairment of sound

 or vision reproduction as required.

 7.4 Areal System Installation.

 Standard - BS 6330, BS 5008/3, BS 5640 and EMC 88/336/EEC .

 Channels to be received and distributed

 Band II, complete band (88 - 108 MHz) for stereo FM sound,

 (Band IV) All channels normally

 (Band V) available within at the location

 (Band VI) direct satellite broadcasting Field strength survey

 Carry out field strength survey on all required broadcast channels, and on possible interfering channels.

 7.5 Method of test.

 Using aerial system specified, and signal strength meter.

 Using aerial system specified, standard receiver and broadcast test cards.

 Using portable field strength meter with integral antenna.

 Planning margin

 Allow a planning margin of+ or - 3 dB for signal levels throughout the VHF/UHF distribution system.

 Earth bonded in accordance with latest Electrical Safety Isolations standards.

 Ensure input signal level to the head-end is not less than 8 dB below effective noise figure of the head-end equipment

 for television reception and not less than 20 dB for sound reception

 Location: Wall or mast (max 1.8m) as appropriate.

 7.6 VHF/UHF RADIO AND TELEVISION Distribution Specialist:

 Engage a VHF/UHF distribution system specialist to develop design, supply, install, commission and set to work a

 system distributing sound and vision programmes at frequencies between 40 MHz and 860MHz, in accordance with BS

 6330 , BS 6513 and BS EN 50083-1 .

 7.7 Wideband Cable Distribution System Specialist:

 Engage a wideband cabled distribution system specialist to develop design, supply, install, commission and set to work

 a system distributing sound and vision programs in accordance with BS 6513 and BS EN 50083- 1.

 Facility to include terrestrial broadcasting radio and television channels and SKY and Sky Plus digital satellite

 broadcasting channels.

 8. Access Control.

 8.1 Audio-video Door Entry System.

 Main equipment shall be located in the Security Room.

 Comply with requirements of Approved Document M, BS 8300-2001 and DDA 1995. System shall be installed by NSI-

 NACOSS approved installer.

 Provide all power outlets as necessary.

 Provide power supply units for door locks and access control equipment as necessary.

 Installation shall be in accordance with the specialist 's requirements.

 The wiring installation shall be flush.

 Ensure all equipment and systems are designed and installed to provide electromagnetic compatibility within the

 system and any other systems installed in the same locations and comply with BS EN 55020 where applicable .

 The system shall be tested and commissioned by the Specialist.

 Cabling shall be installed generally within ceiling void and down the walls in suitable manner. Provide ducts for cabling

 in external ground.

 8.2Radio Reception And Distribution System Specialist:

 Engage a radio reception and distribution system specialist to develop design, supply, install, commission and set to

 work a system distributing sound broadcast programs in accordance with BS 6330 and BS 6259 .

 8.3 Electromagnetic Compatibility:

 Ensure all equipment and systems are designed and installed to provide electromagnetic compatibility within the

 system and with any other systems installed in the same locations, and comply with BS EN 55020 where applicable .

 9.FIRE DETECTION AND ALARM

 9.1 Performance Objectives

 Provide automatic detection of fire and smoke control to the requirements of Building Control ,

 NHBC and the Building Regulations.

 9.2 Design Parameters

 Provide automatic heat and smoke alarms as required under the Building Regulations section B1, Building Control

 Requirements and in accordance with BS 5839 Part 1 2002.

 9.3 General

 All cabling for the fire alarm system shall be fully segregated from all other services and shall be carried out using fire

 integrity cabling system , enhanced fire resistant cabling (FP200 Gold or approved equivalent) with red LSF over sheath.

 Employ a Specialis Fire Alarm system supplier/Installer to design, install, commission and test a complete system .

 Tender drawings indicate a general layout of the system detectors, manual call points and sounders .

 Installation shall comprise an analogue addressable , minimum 2-loop fire alarm and control panel, complete with

 batteries, to be located in the Security Room in the basement , with repeater panel on the Ground Floor. Smoke, heat

 and carbon monoxide detectors shall be provided, sounders and beacons shall be included, with minimum sound level

 of 65 dB as per the BS requirements .

 The capacity of batteries shall be such that they are capable of maintaining the system in full quiescent operation for

 72 hours and thereafter the system continues in alarm mode for a period of half an hour with all sounders in operation

 Voids above 800mm high shall be covered with smoke detection , e.g. in loft/attic/pitched roof areas Manual call

 points shall be installed.

 Provide interface units to shut down gas supply and mechanical plant and ground the lift, in the event of a fire alarm

 activation; include all wiring and terminations .

 Provide reflective beam detectors, loop driven, for areas with high ceilings, as shown on drawings .

 Auto dialer facilities for link to remote monitoring station shall be included. Provide BT Redcare service for

 communications purpose.

 Remote lamp indicators shall be used to signal the operation of automatic detectors in enclosed areas . The units shall

 comprise LED indicators fitted to flush mounting cover plates. Cover plates shall be engraved 'FIRE ALARM ' and labels

 fixed adjacent detailing locations of fire detectors .

 All cabling for the fire alarm system shall be fully segregated from all other services and shall be carried out using fire

 integrity cabling system , enhanced fire resistant cabling (FP200 Gold or approved equivalent) with red LSF over

 sheath.

 10. Earthing And Bonding

 10.1 Performance Objectives

 Provision of earthed equipotential zones to the building for safety from in-direct electric shock.

 10.2 Design Parameters

 The installation shall comply with the requirements of

 BS 7671 and BS 7430

 Electricity supply regulations.

 In accordance with electricity supply company's requirements.

 10.3 System Description.

 A separate circuit protective conductor shall be provided for all wiring systems. Ensure any part of the earth fault

 current path provided by the electricity supply company or others is suitable for the operation of the earth fault

 protection to be installed. Obtain the agreement and permission of undertakings providing services which are to be

 bonded to the earthing system .

 Bond in accordance with BS 7430 and BS 7671 to main earth terminal all extraneous conductive parts of the

 installation. Ensure that all bathrooms and shower rooms are bonded to BS 7671 section 601 .

 Provide a multi way copper earth bar near main distribution panel (incoming electrical service positions) and connect

 to the EDF's main earth terminal.

 Earth bar shall be 50mm x 6mm copper bar mounted on suitable insulators with disconnecting links for each of the

 main earth connections provided by EDF Network . It shall have sufficient ways to take all earth bonding cables plus 3

 no. spare ways.

 From the main earth bar provide individual main equipotential bonding conductors to the requirements of BS 7671

 including lift installation .

 Bond earth terminals and metallic structure of switch and control gear and plant.

 Connect each earth terminal to all other earth terminals by a ring conductor sized as BS 7430 and BS 7671. Connect

 main earth conductors and main equipotential bonding conductors to main earth

 terminals. Extend protective conductor from incoming main cable gland direct to main earth terminal. Extend separate

 protective conductor from main switch/ switch panel served by incoming main cable .

 When main cable is provided by electrical supply company, extend separate protective conductor from main cable

 armoring gland or direct earth terminals or PME earth installed by supply company to main earth terminal.

 Bond in accordance with BS 7430 and BS 7671 to main earth terminal all extraneous conductive parts of the

 installation.

 Ensure the following services are also bonded:

 Electrical and mechanical plant including switchgear in garage and mechanical plant room .

 Main water pipes Main gas pipes

 Pipe and Air duct lines Water pipework

 Exposed metallic parts of building structure

 Thermal insulation metallic cladding

 Metallic cable sheaths of all cables except British Telecom Lift Installation

 Bond all plant rooms, bathrooms and shower rooms with supplementary equipotential bonds to protective conductor

 system to BS 7671 Section 701.

 Bond to non-current carrying parts of Electrical Installation in associated spaces to BS 7671

 and BS 7430.

 Install earthing to chiller enclosure in accordance with BS 7430 and BS 7671.

 10.4 General Approvals

 Carry out electrical system earthing work in accordance with BS 7671 (lEE wiring regulations) , BS 7430 ; Electricity

 Supply Regulations ; and Local Electricity Supply Authority Requirements .

 10.5 Exchange of information:

 Consult with the electricity supply company regarding the earthing arrangements of the installation. Construct the

 earthing system to the requirements of electricity supply company . Ensure any part of the earth fault current path

 provided by the electricity supply company or others is suitable for the operation of the earth fault protection to be

 installed. Obtain the agreement and permission of undertakings providing services which are to be bonded to the

 earthing system .

 10.5 Workmanship

 Carry out installation of earthing system in accordance with BS 7671 (lEE Regulations) and BS 7430.

 Bond in accordance with BS 7430 and BS 767 1 to main earth terminal all extraneous conductive parts of the

 installation.

 Ensure the following services are bonded.

 Main water pipes.

 Bond with supplementary equipotential bonds to protective conductor system , all simultaneous accessible

 conductive.

 Ensure the following areas are bonded to BS 7671, Section 601.

 bathrooms and shower rooms .

 kitchens and laundries .

 Bond to non-current carrying parts of Electrical Installation in associated spaces to BS7671 and BS 7430.

 Use clamps to BS 951 for bonding of pipes .