
**SECTION 6
MECHANICAL ENGINEERING SERVICES**

Mechanical Specification

October 2008

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B06 Engineering services general description

To be read with Preliminaries/ General conditions

GENERAL

110 EXISTING SITE AND SERVICES

- Description: The Auditorium (Main Hall) and associated ancillary spaces are to be refurbished and finished in a style commensurate with the age and original concept of the building.
The adjacent parts of the building (Town Hall) will continue to be used and measures must be taken to avoid disruption to the users.
The heating system boiler plant, domestic cold water services (CWM and CWS), gas supply and fire suppression sprinkler system are common to the whole site. Local isolation of services is essential to eliminate disruption to areas outside of the immediate working area. Local isolating valves cannot be relied upon and the Contractor shall therefore allow for local freezing and 'cutting in' or replacement of valves as necessary.
- Systems: Heating from central boiler plant. Cold water service, mains from water company, location of main isolating valve has not been confirmed. Cold water service, down service from storage cistern located in an enclosure located on the roof. Fire suppression sprinkler system controls located in lower ground floor service area..

120 BUILDING WORKS

- Description: Refurbishment and redecoration of the Auditorium (Main Hall) and associated ancillary rooms and spaces.
Where services, appliances, fixtures and fittings are to be removed, replaced, added or worked upon, the Contractor shall exercise due care and diligence and shall carry out the work in a manner which will negate or reduce to a minimum the effect of his work on the surrounding building fabric and finish.
Building works: As above.

140A WATER SUPPLY SYSTEMS DOMESTIC COLD WATER

- Description: Mains cold water (CWM) is from the existing system currently connected to and rising through the premises. Cold down service (CWS) is from the existing system running throughout the premises from the existing storage cistern located in a roof mounted enclosure.
Systems: Cold water supply, as section S10.

140B WATER SUPPLY SYSTEMS DOMESTIC HOT WATER

- Description: Existing local (electric) water heaters and pipework are to be removed and be replaced by new (electric) water heaters and pipework.
Systems: Direct hot water storage supply system, as section S10.

160 GAS SUPPLY SYSTEMS

- Description: Removal of redundant lighting points only.
Systems: Natural gas supply system, as section S32.

190 FIRE FIGHTING SYSTEMS

- Description: Exists within the premises but is not installed within the Main Hall or ancillary spaces. Does exist within areas which the Contractor will have access to and carry out work on services within.
Systems: Sprinkler system, as section S63.

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200A HEATING SYSTEMS MAIN HALL

- Description: Existing radiators and pipework mounted at high level to be removed and replacement with new column type radiators and pipework all to be mounted at low level. On independent compensated circuit.
Systems: Low temperature hot water heating system, as section T10.

200B HEATING SYSTEMS ANCILLARY SPACES

- Description: Existing radiators mounted at low level and replacement with new column type radiators and adaptation or extension of pipework to suit. On compensated circuit which is common to other areas .
Systems: Low temperature hot water heating system, as section T10.

220A VENTILATION SYSTEMS MAIN HALL

- Description: Tempered air supply system with recirculation facility to be overhauled and fitted with new controls. Extract system to be overhauled and fitted with new controls. Both systems serve only the Main Hall.
- Systems: Mechanical supply ventilation system, as section U10 and Mechanical extract ventilation system, as section U10.

220B VENTILATION SYSTEMS TOILETS AND CLOAKROOMS

- Description: Extract systems to be ducted in the basement cloakrooms and local single point window or wall mounted elsewhere. All shall run permanently at trickle rate with actuation to full speed by personnel presence detection..
- Systems: Mechanical extract ventilation system, as section U10 and Toilet extract ventilation system, as section U10.

S10 Hot and cold water supply systems

To be read with Preliminaries/ General conditions

GENERAL

- 110 INCOMING WATER SUPPLY
- Water company: Thames Water Utilities Ltd, Clearwater Court, Vastern Road, Reading, RG1 8DB. Tel: 0118 373 8000.
 - Volume flow rate: Existing water main
Position of incoming mains water supply: Not confirmed
- 120 COLD WATER SUPPLY SYSTEM MAINS
- Type: Mains.
 - Water meters: Existing.
 - Storage tank or cistern: Existing.
 - Accessories: Existing.
 - Water treatment: Not required.
 - Pipelines:
 - Below ground: As section Y10.
 - Above ground: As section Y10.
 - Pipeline ancillaries: As section Y11.
 - Thermal insulation:
 - Pipelines: As section Y30.
 - Tanks: Existing.
 - Vibration isolation: Not required.
 - Sanitary appliances: Disconnect from existing, remove redundant pipework etc. Install new pipework etc and connect As indicated on drawings ML-05-02, ML-05-04, ML-05-06, ML-05-08, ML-05-10 and ML-05-12 .
 - Drinking water outlets: Disconnect from existing, remove redundant pipework etc. Install new pipework etc and connect, as indicated on drawings ML-05-02, ML-05-04, ML-05-06, ML-05-08, ML-05-10 and ML-05-12 .
 - Flush control devices: One for each pair of urinal cisterns. Manufacturer: Pegler Ltd.
Model: Optiflush OP2, mains version.
 - Water coolers: Not required.
 - Controls: As section Y40.
 - Completion:
 - Cleaning and chemical treatment: Flushing, as section Y12.
 - Plant and equipment identification: As section Y32.
 - Commissioning: Commissioning of cold water supply systems, as section Y50.

120A COLD WATER SUPPLY SYSTEM STORAGE

- Type: Storage.
- Water meters: Not required.
- Storage tank or cistern: Existing.
 - Accessories: Existing.
- Water treatment: Not required.
- Pipelines:
 - Below ground: As section Y10.
 - Above ground: As section Y10.
- Pipeline ancillaries: As section Y11.
- Thermal insulation:
 - Pipelines: As section Y30.
 - Tanks: Existing.
- Vibration isolation: Not required.
- Sanitary appliances: Disconnect from existing, remove redundant pipework etc. Install new pipework etc and connect As indicated on drawings ML-05-02, ML-05-04, ML-05-06, ML-05-08, ML-05-10 and ML-05-12 .
- Drinking water outlets: See MAINS.
- Flush control devices: See MAINS.
- Water coolers: Not required.
- Controls: As section Y40.
- Completion:
 - Cleaning and chemical treatment: Flushing and chemical treatment, as section Y12.
 - Plant and equipment identification: As section Y32.
 - Commissioning: Commissioning of cold water supply systems, as section Y50.

- 150A DIRECT HOT WATER STORAGE SUPPLY SYSTEM BASEMENT MALE CLOAKROOM AND FEMALE CLOAKROOM
- Disconnect and remove existing water heaters in each cloakroom together with associated redundant pipework and fittings.
 - Storage unit: Storage water heater, electric. Centralised storage. Manufacturer: AO Smith. Tel: 0870 2676484. Job ref:8513 Andrew Law. Model DRE80-18.
 - Immersion heater: 3 x 6kW
 - System: Unvented. Kit ref: WUV100/24/75.
 - Capacity: 300 litres.
 - Pumps: De-stratification only. Kit ref: MB0001.
 - Location: Install in Basement Store as indicated on drawing ML-05-04. Final position to be agreed on site.
 - Pipelines: As section Y10.
 - Pipeline ancillaries: As section Y10.
 - Temperature maintenance: Single pipe self-regulating heating cable system. Manufacturer: Raychem. Type HWAT-R. To be complete with all fittings and ancillaries and control devices. All HWS pipework between the water heater and (to within 300mm of) HWS mixing valves serving draw-off points shall be fitted with the tape system (between the pipework and thermal insulation) in accordance with the manufacturer's recommendations and instructions. Connect to power supply adjacent to the cylinder. Set to maintain 60°C water temperature.
 - Thermal insulation:
 - Pipelines: As section Y30.
 - Cylinders: Integral as fitted by manufacturer of water heater.
 - Vibration isolation: Not required.
 - Sanitary appliances: Connect to as indicated on drawing ML-05-04.
 - Cold water service: Connect to the mains cold water service as indicated on drawing ML-05-04.
 - Controls: Integral as fitted by manufacturer of the water heater. Connect to adjacent 3 phase power supply all as manufacturer's recommendations and instructions.
 - Completion:
 - Cleaning and chemical treatment: Flushing and chemical treatment, as section Y12.
 - Plant and equipment identification: As section Y32.
 - Commissioning: Commissioning of hot water supply systems, as section Y50.

- 150B DIRECT HOT WATER STORAGE SUPPLY SYSTEM GROUND FLOOR WC
- Disconnect and remove the existing water heater together with associated redundant pipework and fittings.
 - Storage unit: Storage water heaters, electric. Point of use. Manufacturer: Heatrae Sadia. Tel: 08700 603262 Model Multipoint 15.
 - Immersion heater: 3kW
 - System: Unvented. Kit ref: U1 + U5 + U6.
 - Capacity: 15 litres.
 - Pumps: Not required.
 - Location: Install at low level under/close to the basin as indicated on drawing ML-05-08
 - Pipelines: As section Y10 .
 - Pipeline ancillaries: As section Y11 + manufacturer's kit ref U7.
 - Thermal insulation:
 - Pipelines: As section Y30.
 - Cylinders: Integral as fitted by manufacturer of water heater.
 - Vibration isolation: Not required.
 - Sanitary appliances: Connect to as indicated on drawing ML-05-08.
 - Cold water service: Connect to the mains cold water service as indicated on drawing ML-05-08
 - Controls: Integral as fitted by manufacturer of the water heater. Connect to adjacent power supply all as manufacturer's recommendations and instructions..
 - Completion:
 - Cleaning and chemical treatment: Flushing, as section Y12.
 - Plant and equipment identification: As section Y32.
 - Commissioning: Commissioning of hot water supply systems, as section Y50.

- 150C DIRECT HOT WATER STORAGE SUPPLY SYSTEM FIRST FLOOR FEMALE TOILET
- Disconnect and remove the existing water heater together with associated redundant pipework and fittings.
 - Storage unit: Storage water heaters, electric. Centralised storage. Manufacturer Heatrae Sadia. Tel: 08700 603262 Model: DD125HE.
 - Immersion heater: 2 x 3kW
 - System: Unvented.
 - Capacity: 125 litres.
 - Pumps: Not required.
 - Location: Install in Store within the Female Toilet as indicated on drawing ML-05-12
 - Pipelines: As section Y10 .
 - Pipeline ancillaries: As section Y11.
 - Temperature maintenance: Single pipe self-regulating heating cable system. Manufacturer: Raychem. Type HWAT-R. To be complete with all fittings and ancillaries and control devices. All HWS pipework between the water heater and (to within 300mm of) HWS mixing valves serving draw-off points shall be fitted with the tape system (between the pipework and thermal insulation) in accordance with the manufacturer's recommendations and instructions. Connect to power supply adjacent to the cylinder. Set to maintain 60°C water temperature.
 - Thermal insulation:
 - Pipelines: As section Y30.
 - Cylinders: Integral as fitted by manufacturer of water heater.
 - Vibration isolation: Not required.
 - Sanitary appliances: Connect to as indicated on drawing ML-05-12.
 - Cold water service: Connect to the mains cold water service as indicated on drawing ML-05-12
 - Controls: Integral as fitted by manufacturer of the water heater. Connect to adjacent power supply all as manufacturer's recommendations and instructions.
 - Completion:
 - Cleaning and chemical treatment: Flushing and chemical treatment, as section Y12.
 - Plant and equipment identification: As section Y32.
 - Commissioning: Commissioning of hot water supply systems, as section Y50.

150D DIRECT HOT WATER STORAGE SUPPLY SYSTEM FIRST FLOOR MALE TOILET

- Disconnect and remove the existing water heater together with associated redundant pipework and fittings.
- Storage unit: Storage water heaters, electric. Point of use. Manufacturer: Heatrae Sadia. Tel: 08700 603262 Model Multipoint 15.
 - Immersion heater: 3Kw
 - System: Unvented. Kit ref: U1 + U5 + U6.
- Capacity: 15 LITRES.
- Pumps: Not required.
- Location: Install at low level under/close to the basin as indicated on drawing ML-05-12
- Pipelines: As section Y10 .
- Pipeline ancillaries: As section Y11 + manufacturer's kit ref U7.
- Thermal insulation:
 - Pipelines: As section Y30.
 - Cylinders: Integral as fitted by manufacturer of water heater.
- Vibration isolation: Not required.
- Sanitary appliances: Connect to as indicated on drawing ML-05-12.
- Cold water service: Connect to the mains cold water service as indicated on drawing ML-05-12
- Controls: ntegral as fitted by manufacturer of the water heater. Connect to adjacent power supply all as manufacturer's recommendations and instructions.
- Completion:
 - Cleaning and chemical treatment: Flushing, as section Y12.
 - Plant and equipment identification: As section Y32.
 - Commissioning: Commissioning of hot water supply systems, as section Y50.

PRODUCTS**310 DEZINCIFICATION**

- Fittings, pipelines and equipment located below ground or in concealed or inaccessible locations: Resistant to dezincification, e.g. gunmetal.

400 IMMERSION HEATERS As S10: 150A, 150B, 150C and 150D

- Standard: To BS EN 60335-2-73, BEAB Approved.
- Manufacturer: As S10: 150A, 150B, 150C and 150D.
 - Product reference: As S10: 150A, 150B, 150C and 150D.
- Type: As S10: 150A, 150B, 150C and 150D.
- Loading: As S10: 150A, 150B, 150C and 150D.
- Size: As S10: 150A, 150B, 150C and 150D.
- Mounting: As S10: 150A, 150B, 150C and 150D.
 - Thermostat: As S10: 150A, 150B, 150C and 150D.

420 STORAGE WATER HEATERS, ELECTRICAs S10: 150A, 150B, 150C and 150D

- Standard: To BS EN 60335-2-21, BEAB approved.
- Manufacturer: As S10: 150A, 150B, 150C and 150D.
 - Product reference: As S10: 150A, 150B, 150C and 150D.
- Type: As S10: 150A, 150B, 150C and 150D.
- Capacity: As S10: 150A, 150B, 150C and 150D.
- Output: As S10: 150A, 150B, 150C and 150D.
- Casing finish: As S10: 150A, 150B, 150C and 150D.
- Controls: As S10: 150A, 150B, 150C and 150D.
 - Accessories: As S10: 150A, 150B, 150C and 150D.

480A FLUSH CONTROL DEVICESBASEMENT: MALE CLOAKROOM

- Manufacturer: Pegler Ltd. Model: Optiflush OP2, mains version.
- Product reference: Optiflush OP2.
- Type: Mains powered.
Operation: By integral PIR.

480B FLUSH CONTROL DEVICESFIRST FLOOR: MALE TOILET

- Manufacturer: Pegler Ltd. Model: Optiflush OP2, mains version.
- Product reference: Optiflush OP2.
- Type: Mains powered.
Operation: By integral PIR.

EXECUTION**610A STRIPPING OUT BASEMENT. MALE CLOAKROOM**

- Extent of stripping out: Disconnect the existing sanitary ware, including, basins, wc cisterns, urinal cisterns, etc and remove redundant pipework to points suitable to enable installation of new. Disconnect and remove the existing (integral cistern) direct water heater and associated pipework and fittings. Where 'through' services exist, take care to preserve and install new pipework to enable the service to be maintained.

610B STRIPPING OUT BASEMENT. FEMALE CLOAKROOM

- Extent of stripping out: Disconnect the existing sanitary ware, including, basins, wc cisterns etc and remove redundant pipework to points suitable to enable installation of new. Disconnect and remove the existing (integral cistern) direct water heater and associated pipework and fittings. Where 'through' services exist, take care to preserve and install new pipework to enable the service to be maintained.

610C STRIPPING OUT GROUND FLOOR WC

- Extent of stripping out: Disconnect the existing sanitary ware, including basin, cistern etc and remove redundant pipework to points suitable to enable installation of new. Disconnect and remove the existing point of use direct water heater and associated pipework and fittings. Where 'through' services exist, take care to preserve and install new pipework to enable the service to be maintained.

610D STRIPPING OUT FIRST FLOOR. FEMALE TOILET

- Extent of stripping out: Disconnect the existing sanitary ware, including, basins, wc cisterns etc and remove redundant pipework to points suitable to enable installation of new. Disconnect and remove the existing point of use direct water heater and associated pipework and fittings. Where 'through' services exist, take care to preserve and install new pipework to enable the service to be maintained.

610E STRIPPING OUT FIRST FLOOR. MALE TOILET

- Extent of stripping out: Disconnect the existing sanitary ware, including, basins, wc cisterns, urinal cistern, etc and remove redundant pipework to points suitable to enable installation of new. Disconnect and remove the existing point of use direct water heater and associated pipework and fittings. Where 'through' services exist, take care to preserve and install new pipework to enable the service to be maintained.

610F STRIPPING OUT

- Extent of stripping out: GENERALLY
- Redundant services and pipework: Remove all redundant services, pipework and ancillaries.
- Cutting back: Where redundant services protrude from the buiding fabric, carefully cut back and remove to enable the surrounding fabric and finish to be made good.

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620 INSTALLATION GENERALLY

- Installation: To BS 6700.
- Performance: Free from leaks and the audible effects of expansion, vibration and water hammer.
- Fixing of equipment, components and accessories: Fix securely, parallel or perpendicular to the structure of the building.
- Preparation: Immediately before installing tanks and cisterns on a floor or platform, clear the surface completely of debris and projections.
- Corrosion resistance: In locations where moisture is present or may occur, avoid contact between dissimilar metals by use of suitable washers, gaskets, and the like.

625 INSTALLATION BASEMENT. MALE CLOAKROOM

- Throughout: Install new hot water service pipework, fittings and ancillaries (as section Y10, Y11 and Y24) from the new water heater to the new mixing valves and from those valves to the basin outlets.

625A INSTALLATION BASEMENT. FEMALE CLOAKROOM

- Throughout: Install new hot water service pipework, fittings and ancillaries (as section Y10, Y11 and Y24) from the new water heater to the new mixing valves and from those valves to the basin outlets.

625B INSTALLATION GROUND FLOOR. WC

- Throughout: Install new hot water service pipework, fittings and ancillaries (as section Y10, Y11 and Y24) from the new water heater to the new mixing valve and from that valve to the basin outlet.

625C INSTALLATION FIRST FLOOR. FEMALE TOILET

- Throughout: Install new hot water service pipework, fittings and ancillaries (as section Y10, Y11 and Y24) from the new water heater to the new mixing valves and from those valves to the basin outlets.

625D INSTALLATION FIRST FLOOR. MALE TOILET

- Throughout: Install new hot water service pipework, fittings and ancillaries (as section Y10, Y11 and Y24) from the new water heater to the new mixing valve and from that valve to the basin outlet.

660 UNVENTED HOT WATER STORAGE DISCHARGE PIPES

- Fall (minimum): 1 in 80.
- Discharge: Via an air break and tundish.
 - Size: At least the diameter of the outlet of the safety device.
 - Tundish discharge: At least one diameter larger than the outlet of the safety device.
 - Discharge point: To local waste or gully or external space, within 10m, in locations to be agreed on site.

COMPLETION**910 HYDRAULIC PRESSURE TESTING OF HOT AND COLD WATER SUPPLY SYSTEMS**

- Standard: To BS 6700.
- Notice (minimum): 48 h.
- Pressure: 1.5 times working pressure.
Duration of test: 1 h.

980 DOCUMENTATION

- **Manufacturers' operating and maintenance instructions:** Submit for equipment and controls.
- **System operating and maintenance instructions:** Submit for the system as a whole giving optimum settings for controls.
Record drawings: Submit drawings showing the location of circuits and operating controls.

990 OPERATING TOOLS

- **Tools:** Supply tools for operation, maintenance and cleaning purposes.
Keys: Supply keys for valves and vents.

995 MAINTENANCE

- **Servicing and maintenance:** Undertake.
- Duration: Until 12 months after Practical Completion.

S32 Natural gas supply systems

To be read with Preliminaries/ General conditions

GENERAL

110 INCOMING GAS SUPPLY

- Gas transporter: Transco.
- Gas supplier: Corona Energy. Tel: 0208 2033636.
- Volume flow rate: Existing.
Position of meter: Existing.

EXECUTION

610 STRIPPING OUT

- Extent of stripping out: There are a number of existing gas lighting points. These shall all be removed and the pipework serving them shall be cut back and blanked off to enable the surrounding surface to be made good and flush finished. It is believed that the pipework is redundant and generally 'out of service', however, the Contractor shall test for the presence of gas or pressure within the pipework and shall, if necessary, make safe and carry out the work in an appropriate manner. The locations of the existing redundant lighting points are indicated on drawings numbered: ML-05-02, ML-05-06 and ML-06-10..

620 INSTALLATION GENERALLY

Installation: In accordance with IGE/UP/10.

650 INSTALLING GAS PIPELINES

Installation: In accordance with BS EN 1775.

COMPLETION

920 SMALL LOW PRESSURE COMMERCIAL AND INDUSTRIAL GAS INSTALLATIONS

Soundness testing and purging: In accordance with IGE/UP/1A.

S63 Sprinkler systems

To be read with Preliminaries/ General conditions

GENERAL The existing sprinkler system will not be directly affected by the work involved in this project. However, the contractor will have access to, and may need to work within, areas in which the existing system is installed. The contractor shall exercise due care and diligence so as not to accidentally cause activation of the system, cause damage to the system or comprise the system's operational status or performance.

T10 Heating systems

To be read with Preliminaries/ General conditions.

GENERAL

- 110A LOW TEMPERATURE HOT WATER HEATING SYSTEM MAIN HALL**
- Type: Two pipe with flow temperature limited to 60°C.
 - Heat source: Existing boiler plant.
 - Flues and chimneys: Existing.
 - Fuel: Gas (existing).
 - Pressurization units: Existing.
 - Feed and expansion tanks: Existing.
 - Pipelines: Steel.
 - Pipelines ancillaries: As section Y11.
 - Pumps: Canned rotor pumps, as section Y20.
 - Heat emitters: Radiators, as section T30.
 - Thermal insulation: As section Y30. Pipework exposed within the Main Hall shall not be insulated.
 - Vibration isolation: Compression isolators, as section Y31.
 - Central controls and building management systems: As section Y40.
 - Accessories: As pipeline.
 - Completion:
 - Cleaning and chemical treatment: Flushing, as section Y12.
 - Plant and equipment identification: Mechanical plant and equipment identification, as section Y32.
 - Commissioning: Commissioning of heating systems, as section Y50.
- 110B LOW TEMPERATURE HOT WATER HEATING SYSTEM ANCILLARY SPACES**
- Type: Two pipe.
 - Heat source: Existing boiler plant.
 - Flues and chimneys: Existing.
 - Fuel: Gas (existing).
 - Pressurization units: Existing.
 - Feed and expansion tanks: Existing.
 - Pipelines: Steel.
 - Pipelines ancillaries: As section Y11.
 - Pumps: Existing.
 - Heat emitters: Radiators, as section T30.
 - Thermal insulation: As section Y30. Pipework final connections to radiators are not be insulated.
 - Vibration isolation: Not required.
 - Central controls and building management systems: As section Y40.
 - Accessories: As pipeline.
 - Completion:
 - Cleaning and chemical treatment: Local flushing only.
 - Plant and equipment identification: Mechanical plant and equipment identification, as section Y32.
 - Commissioning: Commissioning of heating systems, as section Y50.

EXECUTION**610A STRIPPING OUT MAIN HALL**

- Extent of stripping out: The existing heating system is common to other parts of the premises which are outside the working area encompassed within this project. The contractor shall carry out his work in such a manner so as to avoid disruption to the heating or other services in areas other than those within this project. Drain, disconnect and carefully remove the existing high level emitters (steel panel radiators) and associated pipework. Note that the emitters may be heavy and that the contractor shall use appropriate measures to enable safe handling and good working practices (contractor shall submit proposals) See drawings numbered ML-05-01, ML-05-03, ML-05-05 and ML-

610B STRIPPING OUT ANCILLARY SPACES

- Extent of stripping out: The existing heating system is common to other parts of the premises which are outside the working area encompassed within this project. The contractor shall carry out his work in such a manner so as to avoid disruption to the heating or other services in areas other than those within this project. Drain, disconnect and carefully remove the existing emitters (steel panel radiators) and associated pipework. Note that the emitters may be heavy and that the contractor shall use appropriate measures to enable safe handling and good working practices (contractor shall submit proposals) Where practical, the existing pipework shall be retained in order that it can be extended, adapted or altered to facilitate installation of the new emitters. See drawings numbered ML-05-01, ML-05-03, ML-05-05, ML-05-07, ML-05-09 and ML-05-11.

610C STRIPPING OUT

- Extent of stripping out: GENERALLY.
- Redundant services and pipework: Remove all redundant services, pipework and ancillaries.
- Cutting back: Where redundant services protrude from the buiding fabric, carefully cut back and remove to enable the surrounding fabric and finish to be made good.

620A INSTALLING WATER BASED HEATING SYSTEMS MAIN HALL

Standard: To BS 5449 or BS EN 14336.

620B INSTALLING WATER BASED HEATING SYSTEMS ANCILLARY SPACES

Standard: To BS 5449 or BS EN 14336.

COMPLETION**905A HYDRAULIC PRESSURE TESTING OF LOW TEMPERATURE HOT WATER HEATING SYSTEMS MAIN HALL**

- Testing: In accordance with HVCA TR/6.
- Notice (minimum): 48 h
- Pressure: 1.5 times working pressure.
Duration of test: 1 h..

905B TESTING OF LOW TEMPERATURE HOT WATER HEATING SYSTEMS ANCILLARY SPACES

- Testing: Visual only. To be run and observed at maximum operating temperature and pressure. All to remain 'dry' as observed and throughout the defects liability period..
- Notice (minimum): 48 h
- Pressure: Normal operating pressure.
Duration of test: On-going.

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910 DOCUMENTATION

- Operation and maintenance instructions: Submit.
Record drawings: Submit.

920 OPERATING TOOLS

- Tools: Supply tools for operation, maintenance and cleaning purposes.
Keys: Supply keys for valves and vents.

930 MAINTENANCE

- Servicing and maintenance: Undertake.
- Duration: Until 12 months after Practical Completion.

T30 Heat emitters

To be read with Preliminaries/ General conditions.

PRODUCTS

350A RADIATORSMAIN HALL

- Standards: To BS EN 442-1, -2 and -3.
- Requirements: As Radiator schedule.
- Third party certification to RADMAC scheme: Required.
- Manufacturer: ZehnderLtd.
- Type: Multicolumn.
- Finish: Stove enamel, colour black. RAL reference to be confirmed.
- Mounting: Floor fixed on manufacturer's welded feet. Distance from wall panel to closest point of radiator shall be 300mm. Radiators shall be parallel to the wall.

350B RADIATORSANCILLARY SPACES (EXCLUDING GROUND FLOOR WC)

- Standards: To BS EN 442-1, -2 and -3.
- Requirements: As Radiator schedule.
- Third party certification to RADMAC scheme: Required.
- Manufacturer: Zehnder Ltd.
- Type: Multicolumn.
- Finish: Stove enamel, colour white. RAL 9016 pure white.
- Mounting: Floor fixed on manufacturer's welded feet with additional top brackets/fixings for increased stability.

350C RADIATORSGROUND FLOOR WC

- Standards: To BS EN 442-1, -2 and -3.
- Requirements: As Radiator schedule.
- Third party certification to RADMAC scheme: Required.
- Manufacturer: ZehnderLtd.
- Type: ZLTCA Low surface temperature with full height casing.
- Finish: Stove enamel, colour white. RAL 9010 semi gloss.
- Mounting: Wall fixed on manufacturer's brackets.

EXECUTION

610A INSTALLATION GENERALLY MAIN HALL

- Fixing: Securely and parallel or perpendicular to the structure of the building.
- Floor mounting: Fix to floors only by means of manufacturer's welded feet.
- Isolating valve: Provide on flow pipelines at each individual radiator.
Regulating valve: Provide on return pipelines at each individual radiator.

610B INSTALLATION GENERALLY ANCILLARY SPACES (EXCLUDING GROUND FLOOR WC)

- Fixing: Securely and parallel or perpendicular to the structure of the building.
- Floor mounting: Fix to floors only by means of manufacturer's welded feet plus manufacturer's additional top brackets/fixings .
- Location: Where radiators are located below, against or adjacent to architectural features, such as decorative panels, plaques etc, they shall be located centrally in relation to the feature. Pipework shall be adapted or extended to enable this.
- Isolating valve: Provide on flow pipelines at each individual radiator.
Regulating valve: Provide on return pipelines at each individual radiator.

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610C INSTALLATION GENERALLY GROUND FLOOR WC

- Fixing: Securely and parallel or perpendicular to the structure of the building.
- Wall mounting: Fix to wall by means of manufacturer's brackets.
- Isolating valve: Provide on flow pipelines at each individual radiator.
 - Regulating valve: Provide on return pipelines at each individual radiator.

U10 Ventilation systems

To be read with Preliminaries/ General conditions

GENERAL

- 130 MECHANICAL SUPPLY VENTILATION SYSTEM MAIN HALL (EXISTING PLANT. TO BE OVERHAULED)
- Location of plant: Basement plant room beneath Main Hall.
 - Route of distribution: Through basement rooms to floor plenum then on to supply grilles via vertical risers concealed within the building fabric. See drawings numbered: ML-05-01, ML-05-03, ML-05-05, ML-05-07, ML-05-09 and ML-05-11..
 - Type of system: Existing. Single duct, tempered air.
 - External air intake terminals: Existing.
 - Air filters: Pleated panels. Grade G4 to BS EN 779:1993.
 - Accessories: Pressure gauges, as section U83.
 - Heat recovery: Existing return air with modulating damper control.
 - Air handling units: Existing. manufactured by: Packaged Air Conditioning Equipment, Shipley, Yorks. Serial No. 1452/11486/1.
 - Fabrication: Existing.
 - Acoustic treatment: Existing.
 - Air ductwork and ancillaries: Existing. Sheet metal, rectangular in basement rooms. Unknown in Main Hall..
 - Accessories: Existing.
 - Thermal insulation on supply air ductwork: Existing.
 - Vibration isolation mountings: Existing.
 - Reheat batteries: None.
 - Room supply air terminal devices: Existing grilles and variable dampers.
 - Controls: As section Y40.
 - Completion:
 - Identification of ductwork and equipment: Not required.
 - Testing and commissioning: Air distribution system commissioning, as section Y50 and Performance testing, as section Y50.-
- 140A MECHANICAL EXTRACT VENTILATION SYSTEM MAIN HALL GENERAL EXTRACT (EXISTING FANS TO BE OVERHAULED)
- Location of plant: In roof mounted plant room accessed via Main Building roof access door from office corridor.
 - Room extract air terminal devices: Existing. Decorative grilles at high level adjacent to the stage and ceiling mounted centrally adjacent to the proscenium arch. General extract grilles at high level above the stage.
 - Air ductwork and ancillaries: Existing. Sheet metal, rectangular at high level above the stage and within the roof void.
 - Accessories: Existing.
 - Thermal insulation on extract air ductwork: Existing.
 - Vibration isolation mountings: Existing.
 - Heat recovery: See U10 130.
 - Acoustic treatment: Existing.
 - Extract fans: Existing. 2 off Flakt Woods. 600mm dia axial fans. 415V/3ph/50Hz. 3.3/5.7A .
 - External exhaust air terminals: Existing.
 - Controls: As section Y40.
 - Completion:
 - Identification of ductwork and equipment: Not required.
 - Testing and commissioning: Air distribution system commissioning, as section Y50 and Performance testing, as section Y50.

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- 150A TOILET EXTRACT VENTILATION SYSTEM BASEMENT MALE CLOAKROOM
- Room extract air terminal devices: Grilles, as section U88. .
 - Air ductwork and ancillaries: Sheet metal ductwork and fittings, circular, as section U80.
 - Accessories: Dampers, fire and smoke, metal ductwork, as section U80 and Flexible ductwork, as section U80.
 - Thermal insulation on extract air ductwork: Not required.
 - Vibration isolation mountings: Not required.
 - Acoustic treatment: Not required.
 - Extract fans: Toilet extract fans, as section U82. To be located in the adjacent Store as indicated on drawing number ML-05-03.
 - External exhaust air terminals: External louvres, as section U88 to discharge into external light well.
 - Controls: Permanent run at trickle rate plus PIR activation to full rate.
 - Completion:
 - Identification of ductwork and equipment: As section Y32.
 - Testing and commissioning: Air distribution system commissioning, as section Y50 and Performance testing, as section Y50.
- 150B TOILET EXTRACT VENTILATION SYSTEM BASEMENT FEMALE CLOAKROOM
- Room extract air terminal devices: Grilles, as section U88. .
 - Air ductwork and ancillaries: Sheet metal ductwork and fittings, circular, as section U80.
 - Accessories: Dampers, fire and smoke, metal ductwork, as section U80 and Flexible ductwork, as section U80.
 - Thermal insulation on extract air ductwork: Not required.
 - Vibration isolation mountings: Not required.
 - Acoustic treatment: Not required.
 - Extract fans: Toilet extract fans, as section U82. To be located in the adjacent Store as indicated on drawing number ML-05-03.
 - External exhaust air terminals: External louvres, as section U88 to discharge into external light well.
 - Controls: Permanent run at trickle rate plus PIR activation to full rate.
 - Completion:
 - Identification of ductwork and equipment: As section Y32.
 - Testing and commissioning: Air distribution system commissioning, as section Y50 and Performance testing, as section Y50.
- 150C TOILET EXTRACT VENTILATION SYSTEM GROUND FLOOR WC
- Room extract air terminal devices: Not required. .
 - Air ductwork and ancillaries: Not required.
 - Accessories: Not required.
 - Thermal insulation on extract air ductwork: Not required.
 - Vibration isolation mountings: Not required.
 - Acoustic treatment: Not required.
 - Extract fans: Toilet extract fan, as section U82. Through wall mounting.
 - External exhaust air terminals: Louvred outlet.
 - Controls: Permanent run at trickle rate plus lighting switch activation to full rate.
 - Completion:
 - Identification of ductwork and equipment: Not required.
 - Testing and commissioning: Operational test and electrical installation test.

150D TOILET EXTRACT VENTILATION SYSTEMFIRST FLOOR FEMALE TOILET

- Room extract air terminal devices: Not required. .
- Air ductwork and ancillaries: Not required.
 - Accessories: Not required.
- Thermal insulation on extract air ductwork: Not required.
- Vibration isolation mountings: Not required.
- Acoustic treatment: Not required.
- Extract fans: Toilet extract fan, as section U82. Window mounting.
- External exhaust air terminals: Louvred outlet.
- Controls: Permanent run at trickle rate plus PIR activation to full rate.
- Completion:
 - Identification of ductwork and equipment: Not required.
 - Testing and commissioning: Operational test and electrical installation test.

150E TOILET EXTRACT VENTILATION SYSTEMFIRST FLOOR MALE TOILET

- Room extract air terminal devices: Not required. .
- Air ductwork and ancillaries: Not required.
 - Accessories: Not required.
- Thermal insulation on extract air ductwork: Not required.
- Vibration isolation mountings: Not required.
- Acoustic treatment: Not required.
- Extract fans: Toilet extract fans, as section U82. Window mounting.
- External exhaust air terminals: Louvred outlet.
- Controls: Permanent run at trickle rate plus PIR activation to full rate.
- Completion:
 - Identification of ductwork and equipment: Not required.
 - Testing and commissioning: Operational test and electrical installation test.

PRODUCTS**EXECUTION**

- 610A STRIPPING OUT MAIN HALL (EXISTING PLANT. TO BE OVERHAULED)**
General: Strip out and remove from site the existing ventilation plant control system.
- 630 INSTALLING DUCTWORK ON AIR HANDLING UNITS**
Air discharge: Connect ductwork to allow air to straighten as it leaves the air handling unit.

COMPLETION

- 930 DOCUMENTATION**
- Operation and maintenance instructions: Submit.
 - Record drawings: Submit.

U80 Air ductwork and ancillaries

To be read with Preliminaries/ General conditions

PRODUCTS

- 305A DAMPERS, FIRE AND SMOKE, METAL DUCTWORK MAIN HALL. EXISTING. SUPPLY, RECIRCULATION/RECOVERY AND EXTRACT.
- Standard: Existing. Where altered: To BS EN 1366-2.
 - Type: Existing.
 - Manufacturer: Existing.
 - Product reference: Existing.
 - Material: Existing.
 - Accessories: Existing.
 - Fusible links fusing temperature: 72°C.
- 305B DAMPERS, FIRE AND SMOKE, METAL DUCTWORK BASEMENT MALE CLOAKROOM. EXTRACT.
- Standard: To BS EN 1366-2.
 - Type: Integral to extract air terminal devices.
 - Manufacturer: Lindab Ltd, 10 Woodall Road, Redburn Industrial Estate, Enfield, EN3 4LE.
 - Tel: 020 8805 3656.
 - Product reference: As extract air terminal device, type KSO-P.
 - Material: Steel. Stove enamel.
 - Accessories: None.
 - Fusible links fusing temperature: 70°C.
- 305C DAMPERS, FIRE AND SMOKE, METAL DUCTWORK BASEMENT FEMALE CLOAKROOM. EXTRACT.
- Standard: To BS EN 1366-2.
 - Type: Integral to extract air terminal devices.
 - Manufacturer: Lindab Ltd, 10 Woodall Road, Redburn Industrial Estate, Enfield, EN3 4LE.
 - Tel: 020 8805 3656.
 - Product reference: As extract air terminal device, type KSO-P.
 - Material: Steel. Stove enamel.
 - Accessories: None.
 - Fusible links fusing temperature: 70°C.
- 305D DAMPERS, FIRE AND SMOKE, METAL DUCTWORK BASEMENT MALE CLOAKROOM. EXTRACT.
- Standard: To BS EN 1366-2.
 - Type: Single blade.
 - Manufacturer: Lindab Ltd, 10 Woodall Road, Redburn Industrial Estate, Enfield, EN3 4LE.
 - Tel: 020 8805 3656.
 - Product reference: MFD Circular Fire Damper.
 - Material: Steel. Galvanised.
 - Accessories: External visual indication of fire damper blade position and manufacturer's wall sleeve (special order for London area).
 - Fusible links fusing temperature: 70°C.
 - Location: At wall between Plant Room and Store

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- 305E DAMPERS, FIRE AND SMOKE, METAL DUCTWORK BASEMENT FEMALE CLOAKROOM. EXTRACT.
- Standard: To BS EN 1366-2.
 - Type: Single blade.
 - Manufacturer: Lindab Ltd, 10 Woodall Road, Redburn Industrial Estate, Enfield, EN3 4LE.
Tel: 020 8805 3656.
 - Product reference: MFD Circular Fire Damper.
 - Material: Steel. Galvanised.
 - Accessories: External visual indication of fire damper blade position and manufacturer's wall sleeve (special order for London area).
 - Fusible links fusing temperature: 70°C.
Location: At wall between Plant Room and Store
- 340A FLEXIBLE DUCTWORK BASEMENT MALE CLOAKROOM. EXTRACT. FINAL CONNECTIONS
- Standard: To HVCA DW/144.
 - Manufacturer: Lindab Ltd, 10 Woodall Road, Redburn Industrial Estate, Enfield, EN3 4LE.
Tel: 020 8805 3656.
 - Product reference: Tecflex 500.
 - Material: Aluminium.
- 340B FLEXIBLE DUCTWORK BASEMENT FEMALE CLOAKROOM. EXTRACT. FINAL CONNECTIONS
- Standard: To HVCA DW/144.
 - Manufacturer: Lindab Ltd, 10 Woodall Road, Redburn Industrial Estate, Enfield, EN3 4LE.
Tel: 020 8805 3656.
 - Product reference: Tecflex 500.
 - Material: Aluminium.
- 350A GUARDS, BIRD MAIN HALL. EXISTING
- Manufacturer: Existing as installed to existing air handling unit.
 - Product reference: Existing.
 - Material: Existing.
- 380 ACCESS DOORS MAIN HALL. EXISTING. SUPPLY, RECIRCULATION/RECOVERY AND EXTRACT.
- Manufacturer: Existing.
 - Product reference: Existing.
 - Material: Existing.
- 380A ACCESS DOORS BASEMENT MALE CLOAKROOM. EXTRACT.
- Manufacturer: Lindab Ltd, 10 Woodall Road, Redburn Industrial Estate, Enfield, EN3 4LE.
Tel: 020 8805 3656.
 - Product reference: ACC18 Size 14.
 - Material: Galvanized sheet steel.
- 380B ACCESS DOORS BASEMENT FEMALE CLOAKROOM. EXTRACT.
- Manufacturer: Lindab Ltd, 10 Woodall Road, Redburn Industrial Estate, Enfield, EN3 4LE.
Tel: 020 8805 3656.
 - Product reference: ACC18 Size 14.
 - Material: Galvanized sheet steel.

FABRICATION

- 530A PLASTICS DUCTWORK AND FITTINGS, CIRCULARGROUND FLOOR WC**
- Standard: As supplied by manufacturer of extract fan
 - Classification to DW/154: Not applicable
 - Environmental conditions for plastics ductwork: Toilet extract.
 - Material: As supplied by manufacturer of extract fan.
 - Regulating dampers: None.
 - Type: None.
 - Operation: None.
 - Flexible joint connections: Fit on fan inlets and outlets and at building expansion joints.
 - Hangers and supports
 - Strength requirements: To BS EN 12236.
 - Access openings:
 - Function: None.
 - Sizes: None.
- 550A SHEET METAL DUCTWORK AND FITTINGS, CIRCULARBASEMENT MALE CLOAKROOM EXTRACT**
- Standards: To HVCA DW/144, BS EN 1506 and BS EN 12237.
 - Classification to DW/144: Class A.
 - Air leakage testing: Not required. Negative pressure
 - Material: Galvanised steel.
 - Construction: Spirally wound .
 - Regulating dampers:
 - Balancing type: Integral to air terminal devices.
 - Operation: Manual.
 - Material: Integral to air terminal devices.
 - Flexible joint connections: Fit on fan inlets and outlets and at building expansion joints.
 - Hangers and supports
 - Strength requirements: To BS EN 12236.
 - Access openings:
 - Function: Cleaning. Cap at 'end of run'.
 - Sizes: As duct.
- 550B SHEET METAL DUCTWORK AND FITTINGS, CIRCULARBASEMENT FEMALE CLOAKROOM EXTRACT**
- Standards: To HVCA DW/144, BS EN 1506 and BS EN 12237.
 - Classification to DW/144: Class A.
 - Air leakage testing: Not required. Negative pressure
 - Material: Galvanised steel.
 - Construction: Spirally wound .
 - Regulating dampers:
 - Balancing type: Integral to air terminal devices.
 - Operation: Manual.
 - Material: Integral to air terminal devices.
 - Flexible joint connections: Fit on fan inlets and outlets and at building expansion joints.
 - Hangers and supports
 - Strength requirements: To BS EN 12236.
 - Access openings:
 - Function: Cleaning. Cap at 'end of run'.
 - Sizes: As duct.

- 560A SHEET METAL DUCTWORK AND FITTINGS, RECTANGULAR MAIN HALL. EXISTING. SUPPLY, RECIRCULATION/RECOVERY AND EXTRACT
- Standards: To HVCA DW/144 and BS EN 1505.
 - Classification to DW/144: Existing. Where altered: Class A.
 - Air leakage testing: Not required.
 - Material: Existing. Where altered: To match existing.
 - Regulating dampers:
 - Balancing type: Existing. Where altered: To match existing.
 - Operation: Existing. Where altered: To match existing.
 - Material: Existing. Where altered: To match existing.
 - Flexible joint connections: Fit on fan inlets and outlets and at building expansion joints.
 - Hangers and supports
 - Strength requirements: To BS EN 12236.
 - Access openings:
 - Function: Existing. Where altered: To match existing.
 - Sizes: Existing. Where altered: To match existing.

EXECUTION

- 610 GENERAL
Cut edges on ductwork, flanges and supports: Smooth and burr free.
- 630A INSTALLATION OF PLASTICS DUCTWORK GROUND FLOOR WC
- Standard: To HVCA DW/154.
 - Other requirements: As supplied by manufacturer of individual extract fan.
 Installing flexible joint connections: Minimize pressure drop.
- 640 INSTALLATION OF SHEET METAL DUCTWORK
- Standard: To HVCA DW/144.
 - Other requirements: As manufacturer's recommendations.
 Installing flexible joint connections: Minimize pressure drop.
- 640A INSTALLATION OF SHEET METAL DUCTWORK BASEMENT MALE CLOAKROOM EXTRACT
- Standard: To HVCA DW/144.
 - Other requirements: As manufacturer's recommendations.
 - Co-ordination with existing services: New circular section ductwork shall be installed neatly above, below or alongside the existing ductwork and services. Route shall be chosen to minimise pressure drop and enable proper connection between duct sections, fittings and terminal devices.
 - Installing flexible joint connections: Minimize pressure drop.
- 640B INSTALLATION OF SHEET METAL DUCTWORK BASEMENT FEMALE CLOAKROOM EXTRACT
- Standard: To HVCA DW/144.
 - Other requirements: As manufacturer's recommendations.
 - Co-ordination with existing services: New circular section ductwork shall be installed neatly above, below or alongside the existing ductwork and services. Route shall be chosen to minimise pressure drop and enable proper connection between duct sections, fittings and terminal devices.
 - Installing flexible joint connections: Minimize pressure drop.
- 680A DUCTWORK SUPPORT GENERAL
Method of support: As HVCA DW/144.

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- 690 DRAINAGE OF DUCTWORK
- Ductwork: Install to drain entrained moisture
 - Joints: Lap to minimize moisture leakage.
- 700 TEST HOLES
- Location: In accordance with CIBSE Commissioning Code Series A and HVCA DW/144.
- 720A WEATHERPROOFING BASEMENT MALE CLOAKROOM EXTRACT
- Roof penetrations: None.
 - Wall penetrations: Termination of ductwork at external wall. As U88.
- 720D WEATHERPROOFING BASEMENT FEMALE CLOAKROOM EXTRACT
- Roof penetrations: None.
 - Wall penetrations: Termination of ductwork at external wall. As U88.
- 720E WEATHERPROOFING GROUND FLOOR WC
- Roof penetrations: None.
 - Wall penetrations: Termination of ductwork at external wall. As U82.
- 720F WEATHERPROOFING FIRST FLOOR FEMALE TOILET
- Roof penetrations: None.
 - Wall penetrations: None.
 - Window penetrations: Window mounting fan seal as U82.
- 720G WEATHERPROOFING FIRST FLOOR MALE TOILET
- Roof penetrations: None.
 - Wall penetrations: None.
 - Window penetrations: Window mounting fan seal as U82.
- 730A FIRE RATED DUCTWORK SLEEVES BASEMENT MALE CLOAKROOM EXTRACT
- Location: Between Plant Room and Store.
 - Material: Intumescent wrap or mastic seal 'Intumescent Acrylic Mastic, Envirograf Product 58' as manufactured by, Intumescent Systems Ltd, Envirograf House, Barfrestone, Dover, CT15 7JG. Tel: 01304 842555.
 - Application: Seal directly the joint/gap between the circular spiral ductwork and the wall.
- 730B FIRE RATED DUCTWORK SLEEVES BASEMENT FEMALE CLOAKROOM EXTRACT
- Location: Between Plant Room and Store.
 - Material: Intumescent wrap or mastic seal 'Intumescent Acrylic Mastic, Envirograf Product 58' as manufactured by, Intumescent Systems Ltd, Envirograf House, Barfrestone, Dover, CT15 7JG. Tel: 01304 842555.
 - Application: Seal directly the joint/gap between the circular spiral ductwork and the wall.
- 740 INSTALLING CONTROL EQUIPMENT
- General: Fit sensors, damper motors and other control equipment.
- 760 ACCESS TO DAMPERS FOR RESETTING AND MAINTENANCE
- Location: Provide access to damper mechanisms on fire dampers; smoke dampers; combined smoke and fire dampers; and volume control dampers through access doors, false ceilings etc. Where more than one fire damper is installed in a frame provide access to all fire dampers.
 - Fire links: Provide access so that they can be replaced.

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- 790A DUCTWORK CLEANLINESSMAIN HALL. EXISTING. SUPPLY, RECIRCULATION/RECOVERY AND EXTRACT
- Cleaning: The existing ductwork, air handling unit and extract fan cleaning is to be carried out under a separate contract prior to the commencement of this contract.
 - Level of protection: The contractor shall take necessary precautions and protect the existing systems so as to prevent the ingress of dirt, debris and general soiling .
- 790B DUCTWORK CLEANLINESSBASEMENT MALE CLOAKROOM EXTRACT
- Cleaning: In accordance with HVCA TR/19.
Level of protection: PD1.
- 790C DUCTWORK CLEANLINESSBASEMENT FEMALE CLOAKROOM EXTRACT
- Cleaning: In accordance with HVCA TR/19.
Level of protection: PD1.

COMPLETION

- 925A VERIFICATION OF CLEANLINESS OF VENTILATION SYSTEMS MAIN HALL. EXISTING. SUPPLY, RECIRCULATION/RECOVERY AND EXTRACT
- This is to be carried out by a specialist under a separate contract. The contractor shall allow access to the premises, work areas, plant and systems by the specialist.
- 960 FIRE DAMPER SPARES
- Fusible links: Supply spares.
 - Quantity: 5 for each type and size of fusible link installed.

U81 Air handling units

To be read with Preliminaries/ General conditions

PRODUCTS

- 310A AIR HANDLING UNITS MAIN HALL. EXISTING SUPPLY, RECIRCULATION/RECOVERY
- Standard: Existing
 - Manufacturer: Packaged Air Conditioning Equipment Ltd, Shipley, Yorks. .
 - Product reference: Serial No. 1452/11486/1.
 - Environment: Internal.
 - Construction: As Existing.
 - Arrangement: Draw through.
 - Method of support: Existing.
 - Components, as existing (in sequence from inlet): Bird screen, motorised inlet damper (fresh air), motorised inlet damper (recirculation), filter, attenuator LPHW heater battery, fan, fire damper.
 - Positions for maintenance access: Existing.
- 320A AIR CONTROL DAMPERS MAIN HALL. EXISTING SUPPLY, RECIRCULATION/RECOVERY
- Function: As existing.
 - Air volume: As existing.
 - Damper position: As existing.
 - Damper control: Motorized. To be replaced by the controls specialist contractor.
 - Type: As existing.
 - Material: As existing.
 - Ancillaries As existing.
- 330 PRIMARY FILTERS MAIN HALL. EXISTING SUPPLY, RECIRCULATION/RECOVERY
- Standards: To BS EN 779 and Eurovent 4/9.
 - Class of filter: G4.
 - Filter type: Pleated panels.
 - Flammability: Non-flammable.
 - Access: Existing.
- 380 REHEATER MAIN HALL. EXISTING SUPPLY, RECIRCULATION/RECOVERY
- Medium: Low temperature hot water.
 - Materials: Existing.
- 390A FANS MAIN HALL. EXISTING SUPPLY, RECIRCULATION/RECOVERY
- Performance: In accordance with BS 6583.
 - Type of fan: Existing. Centrifugal.
 - Motor mounting: Existing. Internal.
 - Accessories: As existing.

FABRICATION**510A AIR HANDLING UNIT CASING CONSTRUCTION MAIN HALL. EXISTING SUPPLY, RECIRCULATION/RECOVERY**

- Standard: As existing and where altered to BS EN 1886.
- Details: Existing.
- Casing class: Existing.
- Thermal performance of casing:
 - Thermal transmittance: Existing.
 - Thermal bridging: Existing.
- Acoustic insulation of casing: Existing.
- Fire protection: Existing.
- Material: Existing.
 - Finish: To match existing.
- Air handling unit feet: Existing.
 - Special requirements: None

520A AIR HANDLING UNIT ACCESS

- General: As existing.
- Seal: To prevent excessive air leakage.
- Seal durability: For normal maintenance operations over at least 10 years.
- Access type: Existing.
- Access clear width (minimum): 400 mm.
- Opening device: Existing.
 - Components requiring access: As existing.

EXECUTION**609A OVERHAUL MAIN HALL. EXISTING SUPPLY, RECIRCULATION/RECOVERY**

- General: Thoroughly overhaul the existing Air Handling Unit and return it to service. The AHU will be cleaned by a specialist under a separate contract prior to the commencement of this contract.
- Dampers including linkages: Strip, clean, renew defective parts, lubricate, reassemble and refit.
- Damper actuators: To be replaced by the controls specialist and to be compatible with the new control system.
- Filters: Remove existing and replace with new.
- LPHW Heater battery: Dress and straighten fins. Inspect for signs of leakage and report accordingly.
- LPHW Heater battery control valve set: Actuator to be replaced by the controls specialist contractor and to be compatible with the new controls system. Check operation of the valve and replace components where necessary. Adjust or replace spindle gland seal. Remove strainer element, clean and refit. Check operation of all associated valves and adjust or replace spindle seals as necessary. Note the settings of the existing commissioning or regulating valves.
- Fan: Remove existing anti vibration mountings and supply and fit new of same type and pattern as existing. Remove existing drive belts and pulleys. Clean and lubricate motor slides/belt tensioning arrangement. Check mechanical and electrical condition of motor and report accordingly. Remove existing fan bearings and supply and fit new of same type and size. Supply and fit new drive pulleys and belts (type and size to match existing) and tension in accordance with belt manufacturer's instructions.
- Structure: Clean and where there is evidence of corrosion on any part of the AHU or associated components, prepare and apply suitable corrosion resistant paint and finish to match the existing.

610A COMPONENT ASSEMBLY

- Access panels: Remove existing seals and gaskets from access panels and mating surfaces. Supply and fit new seals and gaskets to prevent air leaking from casing.

660A SERVICES CONNECTIONS

Entry points: Seal around electrical cable and pipeline entry points to prevent air leakage.

COMPLETION

920 AIR LEAKAGE TESTING

Testing: In accordance with HEVAC Guide to air handling unit leakage testing.

U82 Fans

To be read with Preliminaries/ General conditions

PRODUCTS

310A AXIAL FLOW FANS MAIN HALL. EXISTING EXTRACT

- Performance: To BS 848-1.
 - Inlet and outlet arrangement: Existing.
- Application: Extract.
- Manufacturer: Flakt Woods.
 - Product reference: Existing. 2 off. 600mm dia. Serial number 473990/51K (one fan only, other to match).
- Duty:
 - Air volume: Not known.
 - Resistance: Not known.
 - Fan speed: 1440rpm.
 - External static resistance: Not known.
 - Sound power level spectrum: Not known.
- Mechanical safety: To BS 848-5.
- Electrical safety: To BS EN 60335-2-80.
- Dimensions: To BS 848-4.
- Operating conditions:
 - Environment: Normal internal.
 - Air density: 1.20 kg/m³.
- Operation: Two in parallel.
- Variable air volume method: Not required.
- Impellers: Fixed pitch 12°.
- Casing: Enclosing impeller and motor. .
- Motor and drive: Match fan. Existing.
 - Options: Existing.
- Material:
 - Casing: Existing. Manufacturer's standard.
 - Impeller: Existing.
- Anti-vibration mountings: Existing.
- Flexible duct connections: Existing.
 - Accessories: Existing.

360A TOILET EXTRACT FANSBASEMENT. MALE CLOAKROOM

- Performance: To BS 848-1.
 - Inlet and outlet arrangement: D.
- Manufacturer: Nuaire Ltd, Western Industrial estate, Caerphilly, CF83 1NA. Contact: Steve Welsh 07767 298250. Project ref: 08/17702
 - Product reference: ES-OPUSDC110-M Duct mounted fan. Ecosmart compatible c/w DC motor, run-on timer, trickle & boost control (variable speed) and mounting bracket.
- Duty
 - Air volume: As Fan schedule
 - Resistance: As Fan schedule.
 - Sound power level: As Fan schedule.
- Electrical safety: To BS EN 60335-2-80.
- Operation: Twin fan
- Location: Duct mounted in Store Room adjacent
- Materials: Manufacturer's standard
- Electrical supply type: Single phase.
- Accessories:
 - Access panel: Removable panel
 - Controls: Ecosmart PIR sensor ref: ES-PIR to be mounted in location indicated on drawings.
- Mode of operation: Continuous trickle with activation to boost rate by remote PIR sensor. Run on timer.
- Remote indication: Remote status indicator ref: ES-AVI to be located in Ground Floor Ticket Office and linked to fan by manufacturer's pre plugged cable (length to be specified by Contractor at time of order).
Connections to ductwork: Flexible connectors to suit 100mm dia spigot, ref: CFC10.

360B TOILET EXTRACT FANSBASEMENT. FEMALE CLOAKROOM

- Performance: To BS 848-1.
 - Inlet and outlet arrangement: D.
- Manufacturer: Nuaire Ltd, Western Industrial estate, Caerphilly, CF83 1NA. Contact: Steve Welsh 07767 298250. Project ref: 08/17702
 - Product reference: ES-OPUSDC110-M Duct mounted fan. Ecosmart compatible c/w DC motor, run-on timer, trickle & boost control (variable speed) and mounting bracket.
- Duty
 - Air volume: As Fan schedule
 - Resistance: As Fan schedule.
 - Sound power level: As Fan schedule.
- Electrical safety: To BS EN 60335-2-80.
- Operation: Twin fan
- Location: Duct mounted in Store Room adjacent
- Materials: Manufacturer's standard
- Electrical supply type: Single phase.
- Accessories:
 - Access panel: Removable panel
 - Controls: Ecosmart PIR sensor ref: ES-PIR to be mounted in location indicated on drawings.
- Mode of operation: Continuous trickle with activation to boost rate by remote PIR sensor. Run on timer.
- Remote indication: Remote status indicator ref: ES-AVI to be located in Ground Floor Ticket Office and linked to fan by manufacturer's pre plugged cable (length to be specified by Contractor at time of order).
Connections to ductwork: Flexible connectors to suit 100mm dia spigot, ref: CFC10.

360C TOILET EXTRACT FANSGROUND FLOOR. WC

- Performance: To BS 848-1.
 - Inlet and outlet arrangement: A.
- Manufacturer: Nuair Ltd, Western Industrial estate, Caerphilly, CF83 1NA. Contact: Steve Welsh 07767 298250. Project ref: 08/17702
 - Product reference: GENIE-X Universal extract fan. Wall mounted.
- Duty
 - Air volume: As Fan schedule
 - Resistance: As Fan schedule.
 - Sound power level: As Fan schedule.
- Electrical safety: To BS EN 60335-2-80.
- Operation: Single fan
- Location: Wall mounted in Ground Floor WC
- Materials: Manufacturer's standard
- Electrical supply type: Single phase.
- Accessories:
 - Access panel: Removable casing
 - Controls: PIR sensor ref: 230-PIRNT to be mounted in location indicated on drawing.
 - Outlet: Telescopic pipe c/w louvred outlet (low resistance) (white) ref: PVCWALL/6
 Mode of operation: Continuous trickle with activation to boost rate by remote PIR sensor.

360D TOILET EXTRACT FANFIRST FLOOR. FEMALE TOILET

- Performance: To BS 848-1.
 - Inlet and outlet arrangement: A.
- Manufacturer: Nuair Ltd, Western Industrial estate, Caerphilly, CF83 1NA. Contact: Steve Welsh 07767 298250. Project ref: 08/17702
 - Product reference: GENIE-X Universal extract fan. Window mounted.
- Duty
 - Air volume: As Fan schedule
 - Resistance: As Fan schedule.
 - Sound power level: As Fan schedule.
- Electrical safety: To BS EN 60335-2-80.
- Operation: Single fan
- Location: Window mounted in First Floor Female Toilet
- Materials: Manufacturer's standard
- Electrical supply type: Single phase.
- Accessories:
 - Access panel: Removable casing
 - Controls: PIR sensor ref: 230-PIRNT to be mounted in location indicated on drawing.
 - Outlet: Genie window kit, ref: WINKIT
 Mode of operation: Continuous trickle with activation to boost rate by remote PIR sensor.

EXECUTION**610A INSTALLATION TOILET EXTRACT FANS (GENERAL)**

- Fixing: Use manufacturer's fixing kits and points. Do not strain the fan structure when fixings are tightened.
- Orientation: Mount in accordance with manufacturer's instructions.
- Alignment: Install fan to allow optimum air flow path.

620 REFURBISHMENT MAIN HALL EXTRACT FANS

- **General:** The existing two fans are to be thoroughly overhauled to the manufacturer's standard. It is recommended that this work should be carried out by the original manufacturer: Flakt Woods Ltd, Axial Way, Colchester, Essex, CO4 5ZD. Flakt Woods are aware of the project. Contact Mr Andrew Knight on 07801 723487.
- **Site work:** Disconnect and remove the existing fans together with flexible connectors. Thoroughly clean and inspect. Report findings. Overhaul generally and replace bearings. Reassemble. Re-install and replace flexible connectors with new to match existing type and pattern. Test and carry out balancing to ensure vibration free running.

U83 Air filtration

To be read with Preliminaries/ General conditions

PRODUCTS

- 310A PRIMARY FILTERS MAIN HALL. EXISTING AIR HANDING UNIT
- Performance: To BS EN 779.
 - Filter type: Pleated panels.
 - Manufacturer: Contractor's choice.
 - Product reference: Contractor's choice.
 - Duty:
 - Air flow rate: Estimated 4.8cubic metres/second. Use for guidance purposes only .
 - Air velocity: Not known.
 - Initial filter pressure drop: Not known.
 - Final filter pressure drop: 250 Pa.
 - Filter class: G4.
 - Filter height, width and limiting depth: To suit existing frame.
 - Conditions: Ambient.
 - Flammability: Non-flammable for duration of recommended working life.
 - Casing: Manufacturer's standard.
 - Access: Existing.
 - Filter mounting frames: Purpose made, rigid, with building-in ties where filter is mounted in walls or partitions.
 - Material: Existing.
- 370 EDGE SEALS
- Function: Prevent air by-passing filters. Seals must remain effective after removal and replacement of cells.
- 380 PRESSURE GAUGES MAIN HALL. EXISTING AIR HANDING UNIT
- Type: Existing.
 - Manufacturer: Existing.
 - Product reference: Existing.
 - Gauge markings: Positions equivalent to 'Filter Dirty' and 'Filter Clean' conditions.
 - Pressure differential switch: Provide for visual or audio warning of 'Filter Blocked Condition'.

EXECUTION

- 610A EXISTING FILTER FRAMES MAIN HALL. EXISTING AIR HANDING UNIT
- Fixing: Check and where necessary remove and replace. Securely fasten frames to ductwork walls.
 - Gaps around the frames: Seal with mastic sealant.
- 620 INSTALLING FILTERS
- Mounting: Clamp securely against sealing gasket to prevent leaks.
- 630A PRESSURE GAUGES MAIN HALL. EXISTING AIR HANDING UNIT
- General: Remove, clean and refix using new connectors.
 - Fluid: Refill using fluid of appropriate specific gravity to manufacturer's recommendations.
 - Adjust: Adjust to zero at rest and fix markers indicating 'filter clean' (green) and 'filter dirty' (red) indicators at normal running duty.

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COMPLETION

910 SPARES

- Filter media: Supply one complete replacement for every filter.
Retaining clips and rubber gaskets: Supply sufficient to reseal access doors.

U84 Heating and cooling coils

To be read with Preliminaries/ General conditions

PRODUCTS

310A LOW TEMPERATURE HOT WATER HEATING COILS MAIN HALL. EXISTING AIR HANDING UNIT

- Performance: To BS 5141-2 and BS EN 1216.
- Manufacturer: Existing.
 - Duty: Existing (Estimated 143kW) to be measured by Contractor at commissioning.
- Hot water flow temperature: Existing (Estimated 80 °C).
- Hot water return temperature: Existing (Estimated 70 °C).
- Materials: Existing.
- Tube wall thickness: Existing.
- Fin thickness (minimum):
 - Aluminium: Existing
 - Copper: Existing
 - Fin spacing (maximum): Existing.
- Thermal expansion: Allow for movement.
- Casing finish: Existing.
- Access doors: Hinged, airtight and watertight for maintenance.
- Draining and venting: Existing.
- Water test pressure: Up to 2.1 MPa or 1.5 times the working pressure, whichever is greater.

350A DRAIN TRAPS

Material (Where installed): Existing.

EXECUTION

615 LOW TEMPERATURE HOT WATER HEATING COILS [MAIN HALL. EXISTING AIR HANDING UNIT]

- Clean, dress and straighten fins. Inspect for signs of leakage and report accordingly.
- Check fixings and fittings. Re-secure where necessary.

630A DRAIN TRAP INSTALLATION (EXISTING. WHERE FITTED)

- Air break: Locate between trap outlet and drainage system.
- Traps under suction: Install the outlet below the inlet by a depth equivalent to at least one and a half times working pressure.
 - Traps under positive pressure: Install inlet and outlet at same level.

U85 Heat recovery

To be read with Preliminaries/ General conditions

PRODUCTS

- 360 RECIRCULATION MAIN HALL AIR HANDLING UNIT
- Existing system: Air recirculation from return air grill below front of the stage to intake end of AHU in Basement plant room.

EXECUTION

- 609A RECIRCULATION MAIN HALL AIR HANDLING UNIT
- Dampers including linkages: Strip, clean, renew defective parts, lubricate, reassemble and refit.
 - Damper actuators: To be replaced by the controls specialist and to be compatible with the new control system.

U87 Silencers and acoustic treatment

To be read with Preliminaries/ General conditions

PRODUCTS

320A SILENCERS MAIN HALL. AIR HANDLING UNIT

- Manufacturer: Existing.
 - Product reference: Existing.
- Application: Supply.
- Performance requirements: To BS EN ISO 7235 and BS EN ISO 11691.
 - Insertion loss: Existing.
 - Air flow: Estimated 4.8 cubic metres per second.
 - Permissible pressure loss: Existing.
- Casing material: Existing.
- Lining material: Inert, fire proof, inorganic and non-hygroscopic.
- Duct connections: Existing.
 - Splitters: Existing.

EXECUTION

609A SILENCERS MAIN HALL. AIR HANDLING UNIT

Existing: Clean and inspect. Refix as necessary. Report findings.

U88 Air terminal devices

To be read with Preliminaries/ General conditions

PRODUCTS

- 310A AIR TERMINAL DEVICES, EXTRACTBASEMENT MALE CLOAKROOM**
- Performance:
 - Mixed flow applications: To BS EN 12238.
 - Sound power levels: To BS EN ISO 5135.
 - Manufacturer: Lindab Ltd, 10 Woodall Road, Redburn Industrial Estate, Enfield, EN3 4LE.
Tel: 020 8805 3656.
 - Product reference: Type KSO-P.
 - Duty: As Grille and diffuser schedule.
 - Core velocity (maximum): As Grille and diffuser schedule.
 - Sound power levels: Manufacturer's standard.
 - Application: Extract.
 - Air terminal device: Disc valves.
 - Position: Wall. To be located at high level in locations indicated on Drawing ML-05-03.
 - Material: Steel.
 - Finish: Stove enamelled.
 - Final connection to ductwork: Flexible duct. Lindab, tecflex 500 as U80 340A. Contractor to propose fixing, securing and transition arrangements.
- 310B AIR TERMINAL DEVICES, EXTRACTBASEMENT FEMALE CLOAKROOM**
- Performance:
 - Mixed flow applications: To BS EN 12238.
 - Sound power levels: To BS EN ISO 5135.
 - Manufacturer: Lindab Ltd, 10 Woodall Road, Redburn Industrial Estate, Enfield, EN3 4LE.
Tel: 020 8805 3656.
 - Product reference: Type KSO-P.
 - Duty: As Grille and diffuser schedule.
 - Core velocity (maximum): As Grille and diffuser schedule.
 - Sound power levels: Manufacturer's standard.
 - Application: Extract.
 - Air terminal device: Disc valves.
 - Position: Wall. To be located at high level in locations indicated on Drawing ML-05-03.
 - Material: Steel.
 - Finish: Stove enamelled.
 - Final connection to ductwork: Flexible duct. Lindab, tecflex 500 as U80 340B. Contractor to propose fixing, securing and transition arrangements.
- 325A AIR TRANSFER GRILLESBASEMENT MALE CLOAKROOM**
- Manufacturer: Intumescent Systems Ltd, Envirograf House, Barfrestone, Dover, CT15 7JG. Tel: 01304 842555.
 - Product reference: MG.
 - Size: 250 x 250mm.
 - Shape: Square.
 - Grille type: Non-vision.
 - Position: Door.
 - Finish BrassClear lacquer finish.
 - Location: One in each door/leaf at low level.

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- 325B AIR TRANSFER GRILLESBASEMENT FEMALE CLOAKROOM**
- Manufacturer: Intumescent Systems Ltd, Envirograf House, Barfrestone, Dover, CT15 7JG. Tel: 01304 842555.
 - Product reference: MG.
 - Size: 275 x 200mm.
 - Shape: Rectangular.
 - Grille type: Non-vision.
 - Position: Door.
 - Finish BrassClear lacquer finish.
 - Location: One in each door/leaf at low level.
- 325C AIR TRANSFER GRILLESGROUND FLOOR WC**
- Manufacturer: Intumescent Systems Ltd, Envirograf House, Barfrestone, Dover, CT15 7JG. Tel: 01304 842555.
 - Product reference: MG.
 - Size: 275 x 200mm.
 - Shape: Rectangular.
 - Grille type: Non-vision.
 - Position: Door.
 - Finish BrassClear lacquer finish.
 - Location: One in door at low level.
- 325D AIR TRANSFER GRILLESFIRST FLOOR FEMALE TOILET**
- Manufacturer: Intumescent Systems Ltd, Envirograf House, Barfrestone, Dover, CT15 7JG. Tel: 01304 842555.
 - Product reference: MG.
 - Size: 275 x 200mm.
 - Shape: Rectangular.
 - Grille type: Non-vision.
 - Position: Door.
 - Finish BrassClear lacquer finish.
 - Location: One in door at low level.
- 325E AIR TRANSFER GRILLESFIRST FLOOR MALE TOILET**
- Manufacturer: Intumescent Systems Ltd, Envirograf House, Barfrestone, Dover, CT15 7JG. Tel: 01304 842555.
 - Product reference: MG.
 - Size: 275 x 200mm.
 - Shape: Rectangular.
 - Grille type: Non-vision.
 - Position: Door.
 - Finish BrassClear lacquer finish.
 - Location: One in door at low level.
- 380A EXTERNAL LOUVRES MAIN HALL. EXISTING AIR HANDLING UNIT**
- Application: Supply.
 - Manufacturer: Existing.
 - Product reference: Existing.
 - Duty: Existing.
 - Construction: Robust with purpose made subframe.
 - Configuration: Existing.
 - Screen: Existing.

380B EXTERNAL LOUVRES BASEMENT MALE CLOAKROOM

- Application: Extract.
- Manufacturer: Lindab Ltd, 10 Woodall Road, Redburn Industrial Estate, Enfield, EN3 4LE.
 - Product reference: WG38 External Weather Louvre.
- Size; 250 x 250mm
- Duty: Discharge from extract system 0.048 cubic metres/second.
- Construction: Robust with purpose made subframe. Integral drip cills.
- Configuration: In modular panel form.
- Screen: Bird-screen across inside face of louvres.
 - Connection: Via plenum box also available from Lindab.

380C EXTERNAL LOUVRES BASEMENT FEMALE CLOAKROOM

- Application: Extract.
- Manufacturer: Lindab Ltd, 10 Woodall Road, Redburn Industrial Estate, Enfield, EN3 4LE.
 - Product reference: WG38 External Weather Louvre.
- Size; 250 x 250mm
- Duty: Discharge from extract system 0.048 cubic metres/second.
- Construction: Robust with purpose made subframe. Integral drip cills.
- Configuration: In modular panel form.
- Screen: Bird-screen across inside face of louvres.
 - Connection: Via plenum box also available from Lindab.

390A GRILLES MAIN HALL. GROUND FLOOR

- Performance: Existing
 - Application: Supply.
- Manufacturer: Existing.
 - Product reference: Existing.
- Duty: See Execution.
- Core velocity (maximum): Existing.
- Sound power levels: Existing.
- Shape: Rectangular.
- Grille type: Existing. Adjustable double deflection.
- Position: Wall.
- Material: Existing. Metal.
 - Finish: Brass appearance.

390B GRILLES MAIN HALL. GALLERY (FIRST FLOOR)

- Performance: Existing
 - Application: Supply.
- Manufacturer: Existing.
 - Product reference: Existing.
- Duty: See Execution.
- Core velocity (maximum): Existing.
- Sound power levels: Existing.
- Shape: Rectangular.
- Grille type: Existing. Lattice.
- Position: Wall.
- Material: Existing. Timber or plaster moulding.
 - Finish: Painted.

390C GRILLES GROUND FLOOR. FOYER

- Performance: Existing
Application: Supply.
- Manufacturer: Existing.
- Product reference: Existing.
- Duty: See Execution.
- Core velocity (maximum): Existing.
- Sound power levels: Existing.
- Shape: Rectangular.
- Grille type: Existing. Lattice.
- Position: Wall.
- Material: Existing. Timber or plaster moulding.
- Finish: Painted.

410A PLENUM. FLOOR MAIN HALL

- Duty: Existing. Supply.
- Configuration: Existing plenum on three sides of the Main Hall.
- Construction: Existing, believed to be masonry with top being covered by existing timber floor.

EXECUTION**610 INSTALLATION**

- General: Do not distort air terminal devices. Fix securely.
- Air leakage: Prevent. Seal joints with self adhesive foam strip or equivalent.
- Appearance: Finish visible edge joints neatly. Do not leave sharp edges and protruding screws.

620A FIXING CIRCULAR AIR EXHAUST VALVES

Method: Hidden screw.

660A FIXING GRILLES MAIN HALL

- Method: Beading. Existing.
- Removal: The existing grilles have been removed prior to the commencement of this contract. The grilles and associated apertures have been numbered to assist in re-installation.
- Cleaning: Cleaning of the grilles will be undertaken by others prior to commencement of this contract.
- Re-installation: Re-install the metal grilles into the existing apertures in number matched order. Carry out replacement of the surrounding timber beading. This to be carried out by a suitably skilled craftsman as part of this contract and finished so as to be un-noticeable from the surrounding timber finish.

670 OPERATION

- General: Fit so that moving parts operate correctly and removable cores can be taken out and replaced.
- High level and ceiling applications: On removable cores, provide safety wires with quick release ends.

COMPLETION**910 SPARES**

- Loose keys: Supply for adjusting each size and type of grille, and for operating accessories.
- Quantity: Two off each.

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Y10 Pipelines

To be read with Preliminaries/ General conditions.

GENERAL

- 110 STEEL PIPELINES FOR LOW TEMPERATURE HOT WATER HEATING SYSTEMS
- Thickness series for tubes to BS EN 10255: Heavy .
 - Quality for tubes to BS EN 10216-1 and BS EN 10217-1: TR1.
 - Finish: Varnish.
 - Jointing method:
 - Permanently concealed: Welded class 1.
 - Accessible: Screwed up to and including 50 mm or Welded and flanged 65 mm and over.
- 120 COPPER PIPELINES FOR HOT AND COLD WATER SUPPLY SYSTEMS
- Standard: To BS EN 1057
 - Grade: R250.
 - Finish: Plain.
 - Jointing method:
 - Permanently concealed: Brazed.
 - Accessible: Capillary up to 67 mm for pressure up to 600 kPa and 110°C.

PRODUCTS

- 310 STEEL TUBES
- < 150 mm: To BS EN 10255.
 - 150 mm and above: To BS EN 10216-1 and BS EN 10217-1.
- 320 JOINTING MATERIALS FOR STEEL TUBES
- Jointing compound: To BS 6956-5.
 - PTFE tape: To BS EN 751-3.
 - Flange jointing rings: To BS EN 1514-4.
 - Elastomeric gaskets: To BS EN 681-1.
 - Welding rods: To BS EN 12536.
- 330 FITTINGS FOR STEEL TUBES
- Malleable: To BS 143 and BS 1256.
 - Flanged: To BS EN 1092-1.
 - Welded: To BS 1965-1 or BS EN 10253-1.
 - Mechanical couplings: Manufacturer's standard.
- 340 COPPER TUBES
- Standard: To BS EN 1057.
 - Buried R220.
 - Above ground R250.
- 350 JOINTING MATERIALS FOR COPPER TUBES
- Solder for capillary fittings: To BS EN ISO 9453.
 - Lead free solder for capillary fittings: To BS EN ISO 9453.
 - Brazing filling: To BS EN 1044.
 - Flange jointing rings: To BS EN 1514-4.

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360 FITTINGS FOR COPPER TUBES

- Capillary: To BS EN 1254-1.
- Compression: To BS EN 1254-2.
- Flanges: To BS EN 1092-3.
Press fittings: To manufacturer's standard.

420 FITTINGS FOR GLASS TUBES

Standard: To BS EN 12585.

430 MASKING PLATES

- Material:
 - All pipes except chromium plated copper: Plastic.
 - Chromium plated copper pipes: Chromium plated.
- Type: Split.

EXECUTION**605 PIPELINES INSTALLATION GENERALLY**

- Installation: In accordance with the latest edition of HVCA TR/20.
- Appearance: Install exposed pipe runs parallel with other pipe or service runs and building structure, taking account of gradients for draining or venting. Set vertical pipes plumb, or follow building line.
- Gradients: Install with gradients to allow drainage and air release.
- Air venting: Provide vents at high points.
- Draining: Provide drains at low points.
- Pipeline expansion and contraction: Arrange supports and fixings to accommodate pipeline movement caused by the thermal changes. Allow for movement at branch connections.
- Pipeline support: Arrange supports and accessories for equipment, appliances and ancillary fitments in pipelines, so that no undue strain is imposed upon pipes.

605A PIPELINES INSTALLATION HEATING. GROUND FLOOR MAIN HALL

- Installation: In accordance with the latest edition of HVCA TR/20.
- Appearance: Install exposed pipe runs parallel with other pipe or service runs and building structure, taking account of gradients for draining or venting. Set vertical pipes plumb, or follow building line.
- Orientation: The pipework within the Main Hall shall be run between the back of the new radiators and the wall panels. The flow and return pipework shall be run as one above the other (flow over return) using 2 part brass clips screwed to the floor and spacer stud between.
- Gradients: Install with gradients to allow drainage and air release.
- Air venting: Provide vents at high points.
- Draining: Provide drains at low points.
- Pipeline expansion and contraction: Arrange supports and fixings to accommodate pipeline movement caused by the thermal changes. Allow for movement at branch connections.
- Pipeline support: Arrange supports and accessories for equipment, appliances and ancillary fitments in pipelines, so that no undue strain is imposed upon pipes.
- Dirt, insects and rodents: Prevent ingress.
- Connection to existing: Retain the existing steel pipework within the basement where practical and sound. Install new pipework from existing, through the basement and rise to serve the new radiators.
Floor: When cutting through, drilling or fixing to the existing timber floor, the contractor

610A SPACING OF PIPELINES

- Minimum clearance between insulated pipelines and:
 - Wall finish: 25 mm.
 - Ceiling finish or soffit: 100 mm.
 - Floor finish: 150 mm, except in Main Hall where clearance shall be reduced to enable connection to radiators/valves.
 - Electrical services: 150 mm.
 - Adjacent services: 100 mm.
 - Uninsulated pipeline: 75 mm.
 - Another insulated pipeline: 25 mm.
- Minimum clearance between uninsulated pipelines and:
 - Wall finish: 25 mm.
 - Ceiling finish or soffit: 100 mm.
 - Floor finish: 150 mm.
 - Electrical services: 150 mm.
 - Adjacent services: 150 mm.
 - Another uninsulated pipeline: 25 mm.

620A PIPELINE SUPPORTS STEEL PIPE

- Type: Pipe clip, sling rod, washer and nuts.
- Manufacturer: Contractor's choice.
 - Product reference: Contractor's choice.
 - Material: Steel.
- Movement: Pipework shall be supported so as to allow free movement for expansion and contraction, particularly at the end of long runs and where a change of direction occurs.

620B PIPELINE SUPPORTS COPPER PIPE

- Type: Cast brass brackets.
- Manufacturer: Contractor's choice.
 - Product reference: Contractor's choice.
 - Material: Brass.

620C PIPELINE SUPPORTS EXTENSION OR ADAPTATION OF EXISTING PIPEWORK

- Type: Use supports to match the existing..
- Manufacturer: Contractor's choice.
 - Product reference: Contractor's choice.
 - Material: To match existing.

621 PIPELINE SUPPORT BRACKETS

- Type: Unistrut support.
Finish: Match pipeline supports.

625 PIPELINE FITTINGS

- Reductions and enlargements:
 - On horizontal pipeline runs: Eccentric.
 - On vertical pipeline runs: Concentric.
- Bushes: Use only at radiators.
- Square tees: Provide at vent and drain points.
- Square elbows: Do not use.
- Fabricated junctions and fittings: Same material as the main pipeline.
Demountable joints: Regularly spaced along pipeline runs and at items of equipment.

- 630A PIPELINE SLEEVES**
- Sleeves: Fit to pipes passing through building fabric.
 - Material: Match pipeline.
 - Size: One or two sizes larger than pipe to allow clearance.
 - Finish: Install sleeves flush with building finish. In areas where floors are washed down, install protruding 100 mm above floor finish.
 - Masking plates: Fit at visible penetrations, including through false ceilings of occupied rooms.
- 635 DISSIMILAR METALS**
Electrolytic corrosion: Prevent.
- 640 ANCHORS GENERALLY**
- Design: To resist axial stress transmitted by flexure of horizontal and vertical pipe runs, and loading on vertical pipes.
 - Fixings: Provide associated backing plates, nuts, washers and bolts for attachment to, or building into building structure.
Building structure: Suitable for transmitted stress.
- 645 ANCHORS FOR STEEL PIPES**
- Anchor: Two slip on flanges welded to pipes, bolted together through a mild steel channel section.
 - Fixing: Bolted to building structure.
Pipe restraints: Mild steel overstraps or heavy U-bolts welded to pipes.
- 650 ANCHORS FOR COPPER PIPES**
- Anchor: Two flanges fixed to copper female adaptors.
 - Anchor fixing: Bolted to building structure.
Pipe restraints: Saddle clamps.
- 660 SLIDE GUIDES**
- Expansion and contraction: Direct movement from pipe anchor points towards loops, bellows or flexible inserts.
 - Thrust: Linear relative to the axis of pipe.
Friction: Apply a friction reducing material between metal faces subjected to movement.
- 665 WELDING STEEL PIPEWORK GENERALLY**
- Standard: In accordance with HVCA TR/5.
 - Welder identification: Mark each weld to identify operative.
 - Non-destructive testing method: Not required.
Completed welds: Wire brush and protect from corrosion.
- 670 FLANGED JOINTS IN STEEL PIPES**
- Preparation:
 - Flange mating faces: Parallel.
 - Flange peripheries: Flush with each other.
 - Bolt holes: Align correctly.
 - Welded flanges: Weld neck and bore of 'slip on' flanges. Butt weld neck of welding neck flanges.
 - Screwed flanges: Apply jointing materials. Screw on flange. Expand tube into flange.
 - Making and sealing: Insert jointing between flange mating faces. Tighten joint equally all round.

- 675 **SCREWED JOINTS IN STEEL PIPES**
- Preparation of plain ends: Cut square. Ream out bore. Screw, taper thread.
 - Making and sealing: Coat male pipe thread with jointing compound and hemp, or PTFE tape on small sizes. Immediately after connect with female end of socket or fitting, and tighten. Remove coating intruding into pipe. Leave joint clean.
- 690 **BRAZED JOINTS IN COPPER AND COPPER ALLOY PIPES**
- Preparation, marking and sealing: In accordance with BS EN 14324.
 Brazing alloy filler: Silver.
- 700 **CAPILLARY JOINTS IN COPPER PIPES**
- Standard: To BS EN 1254-1.
 - Preparation: Cut square and deburr. Clean plain ends using fine steel wool.
 - Making and sealing: Do not use excess flux. Make joint. Clean off traces of flux when completed.
- 710 **COMPRESSION JOINTS IN COPPER PIPES**
- Standard: To BS EN 1254-2.
 - Preparation: Cut square and deburr.
 - Making and sealing:
 - Type A: Compress ring onto the wall of the tube.
 - Type B: Compress the formed portion of the tube against the formed end of the fitting.
- 765 **PROTECTION OF UNDERGROUND PIPEWORK**
- Protection: Apply an anticorrosive, non-cracking, non-hardening, waterproof sealing tape.
 - Application: After cleaning pipework wrap two layers contrawise spirally around the pipe, with 50% minimum overlap.
- 770 **PROTECTION OF BURIED PIPES**
- Earth cover (minimum):
 - Water pipework: 900 mm, 1200 mm maximum.
 - Fuel oil and gas: 500 mm.
 - Under roadways: 900 mm.
 - Marker tape: Provide to identify buried pipeservices.

COMPLETION

- 910 **GENERAL INSPECTION AND TESTING**
- Inspection of joints: Cut out, cut open and inspect.
 - Number of joints: 2 .
 - Safety precautions: In accordance with HSE GS4.

Y11 Pipeline ancillaries

To be read with Preliminaries/ General conditions.

GENERAL

- 110 PIPELINE ANCILLARIES FOR INCOMING MAINS WATER SUPPLY
- Water supply: Draw off taps and stop valves.
 - Accessories: Backflow prevention devices.
- 120 PIPELINE ANCILLARIES FOR HOT AND COLD WATER SUPPLY
- Float valves: Not required.
 - Isolating valves: Ball valves, copper alloy.
 - Check valves: Lift type and Swing type.
 - Regulating valves: Flow measuring devices to limit flow to 4 litres/min at outlets/draw off points.
 - Mixing valves: Thermostatic mixing valves.
 - Draining devices: Draining taps.
 - Expansion devices: Not required.
 - Vibration isolation: Flexible hoses.
 - Gauges: Pressure and altitude and Temperature.
 - Accessories: Backflow prevention devices.
- 130 PIPELINE ANCILLARIES FOR HEATING SYSTEMS
- Isolating valves: Ball valves, cast iron or steel and Ball valves, copper alloy.
 - Check valves: Swing type and Globe stop and check valves, carbon steel.
 - Regulating valves: Double regulating and Flow measuring devices.
 - Radiator valves: Thermostatic radiator valves.
 - Draining and venting devices: Automatic air vents and Draining taps.
 - Expansion devices: Not required.
 - Vibration isolation: Rubber bellows.
 - De-aerators: Not required.
 - Separators: Not required.
 - Gauges: Pressure and altitude and Temperature.
 - Accessories: Pipeline strainers and Test points.

PRODUCTS

- 302 CONNECTIONS FOR ANCILLARIES
- Capillary: To BS EN 1254-1.
 - Compression for copper tubes: To BS EN 1254-2.
 - Compression for plastics pipes: To BS EN 1254-3.
 - Flanged for cast iron: To BS EN 1092-2.
 - Flanged for copper alloy: To BS EN 1092-3.
 - Threaded:
 - Where pressure-tight joints are made on the threads: To BS 21 or BS EN 10226-1.
 - Where pressure-tight joints are not made on the threads: To BS EN ISO 228-1

- 305 WATER SUPPLY - DRAW OFF TAPS AND STOP VALVES GENERALLY
- Standard: To BS 1010.
 - Type: Angle pattern .
 - Manufacturer: Contractor's choice.
 - Product reference: Contractor's choice.
 - Material: Bronze.
 - Connections: Threaded.
- 309 WATER SUPPLY - STOP VALVES FOR POTABLE WATERGENERALLY
- Standard: To BS EN 1213.
 - Type: Straight.
 - Manufacturer: Contractor's choice.
 - Product reference: Contractor's choice.
 - Material: Copper alloy.
 - Connections: Compression.
- 331 ISOLATING VALVES - BALL VALVES, CAST IRON OR STEELGENERALLY.
- Standard: To BS ISO 7121.
 - Type: Full bore.
 - Manufacturer: Crane or Hattersley.
 - Product reference: Contractor's choice.
 - Material: Cast iron .
 - Connections: Threaded.
 - Options: Handwheel.
- 333 ISOLATING VALVES - BALL VALVES, COPPER ALLOYGENERALLY
- Manufacturer: Oventrop or Crane or Hattersley.
 - Product reference: Contractor's choice.
 - Material: Brass copper alloy .
 - Connections: Compression .
 - Finish: Natural.
- 343 ISOLATING VALVES - GLOBE VALVES, CARBON STEEL GENERALLY
- Standard: To BS EN 13709.
 - Type: Straight.
 - Manufacturer: Crane or Hattersley.
 - Product reference: Contractor's choice.
 - Connections: Threaded.
- 347 ISOLATING VALVES - GLOBE VALVES, COPPER ALLOY GENERALLY
- Standard: To BS 5154 or BS EN 12288.
 - Type: To suit application.
 - Manufacturer: Crane or Hattersley.
 - Product reference: Contractor's choice.
 - Series: A.
 - Connections: Compression.
 - Stem: Outside screw rising stem.
 - Options: Handwheel.
 - Accessories: Locking device and Position indicator.

- 359 CHECK VALVES - GLOBE STOP AND CHECK VALVES, CARBON STEEL GENERALLY
- Standard: To BS EN 13709.
 - Type: Straight.
 - Manufacturer: Crane or Hattersley.
 - Product reference: Contractor's choice.
 - Connections: Flanged.
 - Operation: Handwheel.
- 365 REGULATING VALVES - DOUBLE GENERALLY
- Standard: To BS 7350.
 - Type: Globe.
 - Manufacturer: Crane, Hattersley or Oventrop.
 - Product reference: Contractor's choice.
 - Material: Copper alloy.
 - Connections: To suit application.
- 367 REGULATING VALVES - FLOW MEASURING DEVICES Generally
- Standard: To BS 7350.
 - Type: 4.
 - Manufacturer: Crane, Hattersley or Oventrop.
 - Product reference: Contractor's choice.
 - Material: Copper alloy.
 - Connections: To suit application.
- 375A THERMOSTATIC MIXING VALVES BASEMENT MALE CLOAKROOM. MULTIPLE BASINS
- Standard: To BS EN 1111. With integral isolating valves and strainers
 - Manufacturer: Horne Engineering Ltd, Rankine Street, Johnstone, Scotland, PA5 8BD.
 - Product reference: H20-21B.
 - Accessories: Wall mounting kit ref: H20-22B. White plastic cover ref: H20-23B
 - Arrangement: One valve to serve each pair of basins and to be mounted at low level beneath the basins allowing access for maintenance.
 - Connections: WHS and CWS inlet shall be 22mm dia, HWS outlet shall be 22mm dia with 15mm tee branches to basin outlets (taps).
- 375B THERMOSTATIC MIXING VALVES BASEMENT FEMALE CLOAKROOM
- Standard: To BS EN 1111. With integral isolating valves and strainers
 - Manufacturer: Horne Engineering Ltd, Rankine Street, Johnstone, Scotland, PA5 8BD.
 - Product reference: H20-21B.
 - Accessories: Wall mounting kit ref: H20-22B. White plastic cover ref: H20-23B
 - Arrangement: One valve to serve each pair of basins and to be mounted at low level beneath the basins allowing access for maintenance.
 - Connections: WHS and CWS inlet shall be 22mm dia, HWS outlet shall be 22mm dia with 15mm tee branches to basin outlets (taps).
- 375C THERMOSTATIC MIXING VALVES GROUND FLOOR WC
- Standard: To BS EN 1111. and TMV3
 - Manufacturer: Heatrae Sadia Heating, Hurricane Way, Norwich, Norfolk, NR6 6EA. Tel: 08700 603262.
 - Product reference: Accessory pack U7.
 - Arrangement: Local to the water heater and basin. Serves one outlet only.

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- 375D THERMOSTATIC MIXING VALVES FIRST FLOOR FEMALE CLOAKROOM**
- Standard: To BS EN 1111. With integral isolating valves and strainers
 - Manufacturer: Horne Engineering Ltd, Rankine Street, Johnstone, Scotland, PA5 8BD.
 - Product reference: H20-21B.
 - Accessories: Wall mounting kit ref: H20-22B. White plastic cover ref: H20-23B
 - Arrangement: One valve to serve each pair of basins and to be mounted at low level beneath the basins allowing access for maintenance.
 - Connections: HWS and CWS inlet shall be 22mm dia, HWS outlet shall be 22mm dia with 15mm tee branches to basin outlets (taps).
- 375E THERMOSTATIC MIXING VALVES FIRST FLOOR MALE TOILET**
- Standard: To BS EN 1111. and TMV3
 - Manufacturer: Heatrae Sadia Heating, Hurricane Way, Norwich, Norfolk, NR6 6EA. Tel: 08700 603262.
 - Product reference: Accessory pack U7.
 - Arrangement: Local to the water heater and basin. Serves one outlet only.
- 375F THERMOSTATIC MIXING VALVES BASEMENT MALE CLOAKROOM. INDIVIDUAL BASIN IN CUBICLE**
- Standard: To BS EN 1111. With integral isolating valves and strainers
 - Manufacturer: Horne Engineering Ltd, Rankine Street, Johnstone, Scotland, PA5 8BD.
 - Product reference: H15-21B.
 - Accessories: Wall mounting kit ref: H15-22B. White plastic cover ref: H15-23B
 - Arrangement: To be mounted at low level beneath the basin allowing access for maintenance.
 - Connections: HWS and CWS inlet shall be 15mm dia, HWS outlet shall be 15mm to basin outlet (tap).
- 375G THERMOSTATIC MIXING VALVES BASEMENT FEMALE CLOAKROOM. INDIVIDUAL BASIN IN CUBICLE**
- Standard: To BS EN 1111. With integral isolating valves and strainers
 - Manufacturer: Horne Engineering Ltd, Rankine Street, Johnstone, Scotland, PA5 8BD.
 - Product reference: H15-21B.
 - Accessories: Wall mounting kit ref: H15-22B. White plastic cover ref: H15-23B
 - Arrangement: To be mounted at low level beneath the basin allowing access for maintenance.
 - Connections: HWS and CWS inlet shall be 15mm dia, HWS outlet shall be 15mm to basin outlet (tap).
- 385 RADIATOR VALVES GENERALLY. LOCKSHIELD.**
- Standard: To BS 2767.
 - Type: Angle pattern.
 - Manufacturer: Oventrop UK Ltd, Unit E, The Loddon Centre, Wade Road, Basingstoke, Hampshire, RG24 8FL. Tel: 01256 330441.
 - Product reference: Series, Combi 4 LSV (with fill and drain facility).
 - Material: Brass.
 - Connections: Threaded.
 - Finish: Nickel plated.
 - Options: Service tool. Lockshield.

- 387A THERMOSTATIC RADIATOR VALVES GENERALLY**
- Standards: To BS 7478 and BS EN 215.
 - Type: Presetting.
 - Pattern: Angle.
 - Manufacturer: Oventrop UK Ltd, Unit E, The Loddon Centre, Wade Road, Basingstoke, Hampshire, RG24 8FL. Tel: 01256 330441.
 - Product reference: Series AV6.
 - Connections: Threaded.
 - Thermostat: Uni DGH Wax filled
 - Finish: Nickel plated.
 - Options: Presetting key
- 403A DRAINING AND VENTING DEVICES - DRAINING TAPS GENERALLY**
- Standard: To BS 2879.
 - Type: 1.
 - Manufacturer: Contractor's choice.
 - Product reference: Contractor's choice.
 - Material: Bronze.
 - Connections: Threaded.
- 403B DRAINING AND VENTING DEVICES - DRAINING TAPS RADIATORS**
- Integral to lockshield valves.
 - Manufacturer: Oventrop UK Ltd, Unit E, The Loddon Centre, Wade Road, Basingstoke, Hampshire, RG24 8FL. Tel: 01256 330441.
 - Product reference: As Y11 385.
- 423 VIBRATION ISOLATION - RUBBER BELLOWSPUMPS.**
- Type: Untied.
 - Manufacturer: Contractor's choice.
 - Product reference: Contractor's choice.
 - Material:
 - Liner: Ethylene propylene diene monomer (EPDM) rubber.
 - Reinforcement: Nylon.
 - Cover: Ethylene propylene diene monomer (EPDM) rubber.
 - Connections: To suit application.
- 451 GAUGES, PRESSURE AND ALTITUDE HEATING**
- Standard: To BS EN 837.
 - Diameter: 63 mm.
 - Manufacturer: Contractor's choice.
 - Product reference: Contractor's choice.
 - Case: Stainless steel.
 - Connections: Syphon and cock, pattern 'U' or 'ring' to suit application.
- 451A GAUGES, PRESSURE AND ALTITUDE DIRECT HOT WATER STORAGE**
- Standard: To BS EN 837.
 - Diameter: 63 mm.
 - Manufacturer: Contractor's choice or as supplied by appliance manufacturer.
 - Product reference: Contractor's choice.
 - Case: Stainless steel.
 - Connections: To suit application.

- 453 GAUGES, TEMPERATURE GENERALLY.
- Standard: To BS EN 13190.
 - Type: Bi-metallic.
 - Manufacturer: Contractor's choice or as supplied by appliance manufacturer.
 - Product reference: Contractor's choice.
 - Case: Brass.
 - Connections: To suit application.
 - Integral accessories: 100 mm immersion length pocket.
- 465 ACCESSORIES - BACKFLOW PREVENTION DEVICES HEATING SYSTEMS (QUICK FILL)
- Standard: Check valves to BS 6282-1.
 - Manufacturer: Contractor's choice.
 - Product reference: Contractor's choice.
 - Material: Copper alloy.
 - Connections: Threaded.
- 465A ACCESSORIES - BACKFLOW PREVENTION DEVICES DOMESTIC COLD WATER SYSTEMS
- Standard: Check valves to BS 6282-1.
 - Manufacturer: Contractor's choice.
 - Product reference: Contractor's choice.
 - Material: Copper alloy.
 - Connections: Compression .
- 469 ACCESSORIES - SAFETY VALVES DIRECT ELECTRIC WATER HEATERS
- Standard: To BS EN ISO 4126-1.
 - Type: As supplied by manufacturer of appliance.
 - Manufacturer: As appliance.
 - Product reference: As supplied by appliance manufacturer.
 - Material: As supplied by appliance manufacturer.
 - Connections: Threaded.
- 471 ACCESSORIES - TEST POINTS MAIN HALL HEATING. BASEMENT PUMP SET
- Type: As existing.
 - Manufacturer: As existing.
 - Product reference: As existing.
 - Material: As existing.
 - Connections: As existing.
- 471A ACCESSORIES - TEST POINTS MAIN HALL HEATING. AIR HANDLING UNIT LPHW
- Type: As existing.
 - Manufacturer: As existing.
 - Product reference: As existing.
 - Material: As existing.
 - Connections: As existing.
- 473 ACCESSORIES - TUNDISHES GENERALLY
- Manufacturer: Contractor's choice.
 - Product reference: Contractor's choice.
 - Material: Copper sheet.
 - Connections: Diameter to suit drain line.

EXECUTION

- 610A INSTALLATION OF VALVES GENERALLY**
- Installation: In accordance with BS 6683.
 - Location: As indicated on drawings ML-05-01 to 12 and as general principal of the existing installations..
 - Isolation and regulation valves: Provide at equipment, appliances and on subcircuits.
 - Access: Locate valves so they can be readily operated and maintained. Locate next to equipment which is to be isolated.
Connection to pipework: Fit with joints that suit the pipe material.
- 620 INSTALLATION OF DOUBLE REGULATING VALVES**
- Locations: Provide 10 diameters of straight pipe upstream of valve and 5 diameters downstream.
- 640 INSTALLATION OF FLOW MEASUREMENT DEVICES**
- Locations: Provide straight length of pipe upstream and downstream.
- 655A INSTALLATION OF THERMOSTATIC RADIATOR VALVES**
- Locations: At each radiator and not behind curtains or enclosed in heating or radiator panels.
- 660 INSTALLATION OF VENT COCKS**
- Discharge pipes: Provide at outlets of ventcocks.
- 665 INSTALLATION OF DISCHARGE CONNECTIONS**
- Safety and relief valves: Terminate at a safe discharge point.
 - Vent cocks: Terminate 150 mm above floor level.
 - Air bottles: Terminate with air cock or needle valve in a convenient position.
 - Automatic air vents: Terminate over a suitable gully or drain line in a visible location.
- 695A INSTALLATION OF CONTROL COMPONENTS MAIN HALL HEATING.**
- Locations: Basement pump set.
 - Type: 3 port valve on variable temperature circuit.
 - Disconnect and remove the existing valve actuator assembly. Supply and install one new actuator assembly and connect to the new control system.
 - Note: This work to be carried out by the specialist controls contractor.
 - Supports: Do not strain components.
Access: Adequate for operation and maintenance.
- 695B INSTALLATION OF CONTROL COMPONENTS**
- Locations: General. As specialist controls contractor schedule.
 - Note: This work to be carried out by the specialist controls contractor.
 - Insulation: Submit details of proposed insulation method where control components are on insulated pipelines.
 - Supports: Do not strain components.
Access: Adequate for operation and maintenance.

COMPLETION

- 910 VALVE TESTS**
- Standard: To BS EN 12266-1.

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920 KEYS

- Tee handled short shank keys: Supply for valve spindle shanks.
 - Number: 2.
- Lever pattern keys: Supply for drain cocks.
 - Number: 2.

930 HOSE UNIONS

- Spares: Supply for drain cocks.
 - Number: 3.

Y12 Mechanical cleaning and chemical treatment

To be read with Preliminaries/ General conditions.

EXECUTION

- 610 **GENERALLY**
- Water analysis: Analyse water samples before treatment.
 - Preliminary checks: Before cleaning or chemical treatment, complete pressure tests, pre-commissioning and commissioning.
Disposal of waste: Neutralize waste products and dispose to drain.
- 620 **FLUSHING OF HOT AND COLD WATER SYSTEMS**
- Standard: To BS 6700.
 - Installation checks: Thoroughly inspect pipework.
Drainage: Provide adequate drainage, preferably direct to manhole.
- 630 **FLUSHING OF HEATING AND CHILLED WATER SYSTEMS**
- Flushing: In accordance with BSRIA AG 1/2001.1.
 - Installation checks: Thoroughly inspect pipework.
Drainage: Provide adequate drainage, preferably direct to manhole.
- 640 **PURGING GAS PIPEWORK**
Standards: To IGE/UP/1 and IGE/UP/1A.
- 650 **WATER TREATMENT FOR HOT AND COLD WATER SYSTEMS**
- Standard: To BS 6700.
Samples for analysis: Provide after flushing.
- 660A **WATER TREATMENT FOR HEATING SYSTEMS**
- Adaptation of existing system: The new installation will form a part of the existing 'site wide' system. The contractor shall sample and analyse the existing water and liaise with the Premises Manager to determine the type and level of existing treatment. Report findings to the Contract Administrator. Depending upon findings, carry out treatment.
 - Treatment: In accordance with BSRIA AG 2/93.
 - Chemicals:
 - Corrosion inhibitors: To be compatible with existing.
 - pH control: To be compatible with existing.
 - Scale inhibitors: To be compatible with existing.

COMPLETION

- 910 **WATER QUALITY TESTS**
- Standard: To BS 6700.
 - Samples: Submit samples for bacteriological analysis.
 - Water temperature: Record the temperature of the water at each sampling point, at the time of taking the sample.
Test results: Submit.

Y20 Pumps

To be read with Preliminaries/ General conditions

PRODUCTS

320 PUMPS GENERALLY

General safety standard: To BS EN 809.

- Electrical safety: To BS EN 60335-2-51.
- Dynamic balance: To BS ISO 2953.
- Test standards: To BS EN ISO 9906 and in accordance with BS EN ISO 5198.
- Belts and pulleys: To BS 3790.
- Rotodynamic pumps: To BS EN 1151-1 and -2.
- Connections:
 - Flanged, copper alloy and composite: To BS EN 1092-3.
 - Flanged, cast iron: To BS EN 1092-2.
 - Threaded: To BS 21 or BS EN 10226-1.

330 CANNED ROTOR PUMPS MAIN HALL HEATING. (BASEMENT PUMP ROOM)

- Arrangement: Two as duty/stand-by.
- Manufacturer: Grundfos.
 - Product reference: Magna 25-60.
- Impeller: Composite.
- Housing: Cast iron.
- Flow rate: 3.0 m³/hour.
- System resistance: 2m wg.
- Electrical supply: Single phase.
- Speed control: Variable.
- Accessories: Integral duty control.
 - Connections: Threaded .

EXECUTION

610A INSTALLATION OF PUMPS MAIN HALL HEATING (BASEMENT PUMP ROOM)

- Strip out: Disconnect and remove the existing two pumps.
- New pumps: Install 2 new pumps in place of the above.
- Pipeline connections: Arrange to prevent transmission of pipeline forces to pump casing. Adapt pipework and Install using new flexible bellows.
- Electrical connection: The new pumps are to be configured as duty/stand-by. Electrical connections shall be made to the new controls system by the specialist controls contractor.
- Pressure gauge tappings: Existing arrangement to be maintained.
- Brackets: Support pipeline mounted pumps on purpose made brackets lined with vibration absorbent material.
- Alignment: Align and balance to minimize vibration.
- Access: Provide adequate space for service and maintenance.
- Identification plate: Engrave showing
 - manufacturer's name and address;
 - serial number;
 - duty and maximum head;
 - speed; and

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620 VIBRATION ISOLATION

- Flexible connections: As section Y11.
Anti-vibration mountings: As section Y31.

COMPLETION

920 COMMISSIONING

- In-line pumps: Change impeller if necessary.
- Belt driven pumps: Change belt and pulley if necessary.
- Test certificates and performance curves: Submit.

Y24 Trace heating tapes

Refer to section Preliminaries/ General conditions

PRODUCTS

- 330 TRACE HEATING TAPE FOR PIPELINES HWS DISTRIBUTION PIPEWORK. BASEMENT.
- Manufacturer: Tyco Thermal Controls (UK) Ltd, 3 Rutherford Close, Stephenson Industrial Estate, Washington, Tyne & Wear, NE37 3HX, Tel: 0800 969 013.
 - Product reference: HWAT-R.
 - Application: Temperature maintenance.
 - Pipe material: Copper.
 - Tape: Self regulating.
 - Electrical voltage: 230 V.
 - Accessories: Manufacturers controller HWAT-ECO. Manufacturers joints, tees, splices, connections and terminations shall be insulation displacement type with gel seals, of type RAYCLIC..

EXECUTION

- 630 INSTALLING TRACE HEATING TAPE FOR PIPELINES (HWS DISTRIBUTION PIPEWORK. BASEMENT)
- Supply and install trace heating tape on all the HWS distribution pipework from the new water heater to within 300mm of each new HWS mixing valve in the Basement Male Cloakroom and Basement Female Cloakroom
 - The controller shall be installed at the water heater and shall be connected to the adjacent power supply.
 - Tee connections for branches off the main distribution pipe shall be made using the manufacturer's joints.
 - The whole of the tape installation, including testing and commissioning shall be in accordance with the manufacturer's instructions and recommendations.

Y30 Mechanical thermal insulation

To be read with Preliminaries/ General conditions.

GENERAL

- 110 INSULATION FOR HOT WATER PIPELINESGENERALLY
- Insulation materials: Mineral fibre pipe section.
 - Protection: PVC-U casing.
Accessories to be insulated: All.
- 120A INSULATION FOR COLD WATER PIPELINESGENERALLY
- Insulation materials: Mineral fibre pipe section.
 - Vapour barrier: Required.
 - Protection: PVC-U casing.
Accessories to be insulated: All.
- 130 INSULATION FOR HEATING PIPELINESGENERALLY
- Insulation materials: Mineral fibre pipe section.
 - Protection: PVC-U casing.
Accessories to be insulated: All.
- 150 INSULATION FOR PIPELINES TO PROTECT AGAINST FREEZINGGENERALLY
- Insulation materials: Mineral fibre pipe section.
 - Protection: PVC-U casing.
 - Specified conditions to BS 5422: 1.
Accessories to be insulated: All.
- 170A INSULATION FOR DUCTWORK CARRYING WARM AIRMAIN HALL SUPPLY. AS EXISTING
- Insulation materials: Where altered or affected, to match existing.
 - Protection: To match existing.
Accessories to be insulated: To match existing.

PRODUCTS

- 330 MINERAL FIBRE PIPE SECTION INSULATIONGENERALLY
- Standard: To BS 3958-4.
 - Manufacturer: Contractor's choice.
- Product reference: Contractor's choice.
 - Thermal conductivity: 0.034 W/m·K.
Finish: Aluminium .
- 370 INSULATION THICKNESSES
- Pipeline insulation thickness: As Pipeline insulation thickness schedule.
Ductwork insulation thickness: To match existing.
- 380 VAPOUR BARRIER
- Permeance: To BS 3177.
 - Vapour permeance (maximum):
 - Cold water pipelines: 0.05 g/s·MN.
 - Chilled water pipelines: 0.015 g/s·MN.
 - Refrigeration pipelines: 0.010 g/s·MN.
 - Chilled air ductwork: 0.015 g/s·MN.

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415 PVC-U CASING PROTECTION GENERALLY

- Manufacturer: Contractor's choice.
 - Product reference: Contractor's choice.
- Colour: Submit proposals.

480 INSULATION FOR VALVES AND FLANGES GENERALLY

- Insulation materials: Removable, flexible wrap.
 - Finish: Resilient covering.
 - Form: Removable and reusable pads.

495 INSULATION AT LOADBEARING PIPELINE SUPPORTS

- Hot pipelines up to 120 °C: 300 mm length of high density phenolic foam.
- Hot pipelines above 120 °C: 300 mm length of calcium silicate.
 - Cold pipelines: 300 mm length of high density phenolic foam.

EXECUTION**610 INSTALLATION GENERALLY**

- Timing: Insulate after installed system has been fully tested and joints proved sound.
- Insulation: Do not enclose adjacent units together.
- Clearance: Maintain between pipes.
 - Finish: Neatly finish joints, corners, edges and overlaps.

610A INSTALLATION HEATING. MAIN HALL

- Timing: Insulate after installed system has been fully tested and joints proved sound.
- Insulation: Do not enclose adjacent units together.
- Clearance: Maintain between pipes.
- Finish: Neatly finish joints, corners, edges and overlaps.
- Application: The pipework within the Basement shall be insulated. The pipework within the Main Hall shall not be insulated.

610B INSTALLATION HEATING. ANCILLARY SPACES

- Timing: Insulate after installed system has been fully tested and joints proved sound.
- Insulation: Do not enclose adjacent units together.
- Clearance: Maintain between pipes.
- Finish: Neatly finish joints, corners, edges and overlaps.
- Application: Distribution pipework shall be insulated. Final connections to radiators shall not be insulated. Match existing principle.

610C INSTALLATION HOT AND COLD WATER SERVICES

- Timing: Insulate after installed system has been fully tested and joints proved sound.
- Insulation: Do not enclose adjacent units together.
- Clearance: Maintain between pipes.
- Finish: Neatly finish joints, corners, edges and overlaps.
- Application: All pipework shall be insulated except for - Between HWS mixing valves and basin outlets.

Final connections to basin cold water outlets.

625 INSTALLATION OF FOIL FACED MINERAL FIBRE INSULATION ON PIPELINES

- Joints: Close butt, seal with 50 mm wide class 0 tape on both longitudinal and circumferential joints.
- At fittings: Mitre. Secure with tape.
- Vapour seal: Tape exposed insulation membrane. Seal vapour barrier at pipe support with class 0 tape.

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- 660A INSTALLATION OF FOIL FACED MINERAL FIBRE INSULATION ON DUCTWORK
MAIN HALL SUPPLY AS EXISTING
Match existing in all respects.
- 690A INSTALLATION OF INSULATION ON WATER HEATERS
- All as supplied by the water heater manufacturer.
 - Fit and finish in accordance with manufacturer's instructions.
Access: Allow for removal of access covers.
- 740 INSTALLATION AT VALVES AND FLANGES
Application: Do not obstruct removal of nuts and bolts, or operation of valves.
- 750 INSTALLATION AT LOADBEARING PIPELINES SUPPORTS
- Application: Close butt to insulation.
 - Joints: Seal with 100 mm wide class '0' foil tape.
Sleeve: Provide sheet metal protection sleeve.
- 755 INSTALLATION AT NON-LOADBEARING PIPELINES SUPPORTS
Insulation: Carry through pipe support.
- 760 INSULATION NOT CARRIED THROUGH PIPELINES SUPPORTS
Insulation at supports: Provide aluminium end caps.
- 770A INSULATION CARRIED THROUGH DUCTWORK SUPPORTS
Match existing.
- 800 INSTALLING VAPOUR BARRIERS
Integrity: Maintain throughout.

Y31 Vibration isolating mountings

PRODUCTS

310 MOUNTINGS GENERALLY

- Criteria: Ensure that vibration generated by the engineering services is not transmitted to pipework, ductwork, the building and supporting structure.
- Overload capacity (minimum): 50%.
- Colour code: Identify for load and deflection rating.
Marking: Label with load capacity.

310A MOUNTINGS VENTILATION PLANT. MAIN HALL. AIR HANDLING UNIT FAN

- Criteria: Ensure that vibration generated by the engineering services is not transmitted to pipework, ductwork, the building and supporting structure.
Match existing.

370 RUBBER BELLOWS PUMPS

- Type: Untied.
 - Manufacturer: Contractor's choice.
 - Product reference: Contractor's choice.
 - Material:
 - Liner: Ethylene-propylene diene monomer (EPDM) rubber.
 - Reinforcement: Nylon.
 - Cover: Ethylene-propylene diene monomer (EPDM) rubber.
- Connections: Malleable iron unions.

EXECUTION

620 INSTALLATION GENERALLY

Install in accordance with manufacturer's instructions and recommendations.

COMPLETION

910 DOCUMENTATION

Operation and maintenance instructions: Submit.

Y32 Mechanical plant and equipment identification

To be read with Preliminaries/ General conditions.

PRODUCTS

310 PLANT AND EQUIPMENT IDENTIFICATION LABELS

- Standard: To BS 1710.
- Type: Laminated plastics plates.
- Manufacturer: Contractor's choice.
 - Product reference: Contractor's choice.
- Information: Purpose and reference number.

320 VALVE IDENTIFICATION LABELS

- Standard: To BS 1710.
- Type: Metal plates.
- Manufacturer: Contractor's choice.
 - Product reference: Contractor's choice.
- Information: Purpose and reference number.
 - Colours: Basic and safety colour identification of associated system.

330 VALVE CHARTS AND SCHEMATICS

Type: Plastic encapsulated. Wall mounted in plant rooms or at appliance location.

EXECUTION

610 IDENTIFYING PIPEWORK

- Standards: To BS 1710.
- Identification type: Adhesive colour bands.
- Application of basic identification colour: Coloured bands as BS 1710 clause 3.3.
- Safety colour identification: On or next to the coloured bands.
- Information: Abbreviation of name and Colour bands as BS 1710 appendix D.
- Direction of flow: Indication arrow and the word FLOW or the letter F and Indication arrow and the word RETURN or the letter R.

620A IDENTIFYING DUCTWORK VENTILATION. MAIN HALL.

Where altered: match existing.

620B IDENTIFYING DUCTWORK VENTILATION. BASEMENT. MALE CLOAKROOM. EXTRACT

- Standard: To HVCA DW/144 appendix B.
- Identification type: Self-adhesive plastics or transfers.
- Direction of flow: Equilateral triangle, 150 mm length of side, with one apex pointing in the direction of flow.
 - Information: Space served by the duct and associated plant.

620C IDENTIFYING DUCTWORK VENTILATION. BASEMENT. FEMALE CLOAKROOM. EXTRACT

- Standard: To HVCA DW/144 appendix B.
- Identification type: Self-adhesive plastics or transfers.
- Direction of flow: Equilateral triangle, 150 mm length of side, with one apex pointing in the direction of flow.
 - Information: Space served by the duct and associated plant.

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- 630 **INSTALLING PLANT AND EQUIPMENT IDENTIFICATION**
- Fixing: Fix with adhesive to equipment.
 Location: On equipment.
- 640 **INSTALLING VALVE IDENTIFICATION**
- Fixing: Secure with metal chain.
- 650 **INSTALLING VALVE CHARTS AND SCHEMATICS**
- Fixing: Plug and screw to wall.
 Location: Plant room and adjacent to appliance. Final locations to be agreed on site.

Y40 Mechanical engineering services control and management systems

To be read with Preliminaries/ General conditions.

GENERAL

- 110A MECHANICAL ENGINEERING SERVICES SYSTEMS CENTRAL CONTROL AND MONITORING SYSTEM MAIN HALL HEATING AND VENTILATION TO BE CARRIED OUT BY SPECIALIST. SEE PROVISIONAL SUMS
- Description: Computer controlled as an extension of the existing system serving the whole of the premises.
 - Equipment interconnectivity: Wired.
 - Link to building monitoring and management system: To be fully integrated with the existing system.
 - Systems to be controlled:
 - Water supply systems: Not applicable.
 - Fuel supply systems: Not applicable.
 - Steam and condensate systems: Not applicable.
 - Heating systems: Low temperature hot water, as section T10.
 - Cooling systems: Not applicable.
 - Ventilation systems: Mechanical supply, as section U10 and Mechanical extract, as section U10.
 - Air conditioning systems: Not applicable.
 - System control strategies:
 - Heating system;
 - Mechanical ventilation system; and
 - Mechanical extract system.
 - Data logging: To be fully integrated with the existing system.
 - Monitoring: To be fully integrated with the existing system.
 - Equipment:
 - Control panel;
 - Actuators;
 - Alarms; and
 - Motorized valves.
 - Sensors:
 - Flow in duct;
 - Air temperature; and
 - Water temperature.
- 150A LOCAL VENTILATION SYSTEMS CONTROLS BASEMENT. MALE CLOAKROOM
- Systems to be controlled: Toilet extract, as sections U10 and U82.
 - Description: Duct mounted twin fan unit. .
 - Control strategies: Mechanical extract system to run at continuous trickle with activation to boost rate by activation of remote PIR sensor.
 - Data logging: None.
 - Monitoring: Remote indicator/alarm panel to be located in the Ground Floor Ticket Office.
 - Equipment: As above.
 - Sensors: Remote PIR. Status detection integral to fan unit.

- 150B LOCAL VENTILATION SYSTEMS CONTROLS BASEMENT. FEMALE CLOAKROOM**
- Systems to be controlled: Toilet extract, as sections U10 and U82.
 - Description: Duct mounted twin fan unit.
 - Control strategies: Mechanical extract system to run at continuous trickle with activation to boost rate by activation of remote PIR sensor.
 - Data logging: None.
 - Monitoring: Remote indicator/alarm panel to be located in the Ground Floor Ticket Office.
 - Equipment: As above.
 - Sensors: Remote PIR. Status detection integral to fan unit.
- 150C LOCAL VENTILATION SYSTEMS CONTROLS GROUND FLOOR WC**
- Systems to be controlled: Toilet extract, as sections U10 and U82.
 - Description: Wall mounted extract fan.
 - Control strategies: To run at continuous trickle with activation to boost rate by activation of the room lighting switch..
 - Data logging: None.
 - Monitoring: None.
 - Equipment: As above.
 - Sensors: None.
- 150D LOCAL VENTILATION SYSTEMS CONTROLS FIRST FLOOR FEMALE TOILET**
- Systems to be controlled: Toilet extract, as sections U10 and U82.
 - Description: Window mounted extract fan.
 - Control strategies: To run at continuous trickle with activation to boost rate by activation of remote PIR sensor..
 - Data logging: None.
 - Monitoring: None.
 - Equipment: As above.
 - Sensors: Remote PIR.
- 150E LOCAL VENTILATION SYSTEMS CONTROLS FIRST FLOOR MALE TOILET**
- Systems to be controlled: Toilet extract, as sections U10 and U82.
 - Description: Two window mounted extract fans.
 - Control strategies: To run at continuous trickle with activation to boost rate by activation of one common remote PIR sensor..
 - Data logging: None.
 - Monitoring: None.
 - Equipment: As above.
 - Sensors: Remote PIR.
- 242A MECHANICAL EXTRACT SYSTEMS CONTROL STRATEGY CLOAKROOMS AND TOILETS**
- Start and stop control: Permanent trickle with activation to boost by local sensor or lighting switch .
 - Control points schedules: Not required.
- 254 SMOKE AND HEAT CONTROL SYSTEM, PLANT SHUTDOWN CONTROL STRATEGY MAIN HALL. VENTILATION**
- Operation: On receipt of fire alarm signal control all plant to shutdown.
 - Firemans' override switch: Operate relative fan and open relative damper when switch is positioned to Extract
 - Variable speed fans: Not applicable.

EXECUTION

- 610A STRIPPING OUT [MAIN HALL HEATING AND VENTILATION] TO BE CARRIED OUT BY SPECIALIST. SEE PROVISIONAL SUMS
Extent of stripping out Existing control panel. sensors, actuators, cabling and containment.
- 620A INSTALLATION OF SENSORS CLOAKROOMS AND TOILETS EXTRACT. BY ELECTRICAL CONTRACTOR
- Standard: In accordance with Building Controls Industry Association (BCIA) Guide Control sensor installation.
 - Screening: Screen from direct sunlight.
 - Cable: Flexible. Allow sufficient spare cable to allow for removal of sensor.
Positions of sensors: As drawings EL-06-05 and EL-06-08.
- 640 LOCATION OF MOTORIZED VALVES
Spindles: Vertical.
- 700A INSTALLING CONTROL PANELS AND SYSTEM MAIN HALL. HEATING AND VENTILATION. TO BE CARRIED OUT BY SPECIALIST. SEE PROVISIONAL SUMS
- Install new control system for the Main Hall heating and ventilation plant and systems.
 - Install all new panels, devices, sensors, actuators, cabinets, cables, containment etc necessary to permit full and proper operation of the systems as an integrated part of the existing system serving the whole of the premises.

COMPLETION

- 910A INSPECTION AND TESTING MAIN HALL. HEATING AND VENTILATION. TO BE CARRIED OUT BY SPECIALIST. SEE PROVISIONAL SUMS
- Standard: To BS 7671.
 - Notice before commencing tests (minimum): 2 weeks.
 - Certificates: Submit.
 - Number of copies: 2.
 - Test equipment identity: Record on test certificates.
 - Certificates of calibration: Submit for each test instrument.
 - Control panel test certificates: Submit.
 - Number of copies: 2.
- 915A START UP AND COMMISSIONING GENERALLY
Standard: In accordance with BCIA System start up and commissioning guide.
- 915B START UP AND COMMISSIONING MAIN HALL. HEATING AND VENTILATION. TO BE CARRIED OUT BY SPECIALIST. SEE PROVISIONAL SUMS
Standard: In accordance with BCIA System start up and commissioning guide.
- 915C START UP AND COMMISSIONING LIAISON MAIN HALL. HEATING AND VENTILATION
- Liaise with the specialist controls system contractor regarding commissioning and testing.
 - Allow attendance of mechanical personnel for 3 days in conjunction with the specialist controls system contractor. Timing to be agreed between both parties.
- 950A MAINTENANCE GENERALLY
- Servicing and maintenance: Undertake.
 - Duration: Until 12 months after Practical Completion.

950B MAINTENANCE MAIN HALL. HEATING AND VENTILATION. TO BE CARRIED OUT BY SPECIALIST. SEE PROVISIONAL SUMS

- Servicing and maintenance: Undertake.
 - Duration: Until 12 months after Practical Completion.

Y50 Mechanical commissioning

To be read with Preliminaries/ General conditions.

EXECUTION

- 610 COMMISSIONING PROGRAMME
- Generally: Submit before commissioning commences.
 - Notice (minimum): 2 weeks.
 Commissioning manager: Submit details.

 - 615 PERFORMANCE TESTING PROGRAMME
 - Generally: Submit before performance testing commences.
 - Notice (minimum): 2 weeks.
 Performance testing manager: Submit details.

COMPLETION

- 910 COMMISSIONING OF HOT AND COLD WATER SUPPLY SYSTEMS
- Commissioning: In accordance with BS 6700, BSRIA AG 2/89 and CIBSE Commissioning code W.
 - Notice (minimum): 1 week.
 - Equipment: Check and adjust operation of equipment, controls and safety devices.
 - Outlets: Check operation of outlets for satisfactory rate of flow and temperature.
- 930 COMMISSIONING OF HEATING SYSTEMS
- Commissioning: In accordance with BSRIA AG 2/89 and CIBSE Commissioning code W.
 - Notice (minimum): 1 week.
- 970A COMMISSIONING OF AIR DISTRIBUTION SYSTEMS MAIN HALL. VENTILATION. SUPPLY
- Carry out balancing of the supply by adjustment of the duct dampers (where fitted) and the supply grille dampers to achieve an evenly shared distribution of the total volume flow at each outlet.
 - Adjust the grille vanes to achieve a minimum perceptible draught whilst maintaining optimum volume flow.
 - Notice (minimum): 1 week.
- 970B COMMISSIONING OF AIR DISTRIBUTION SYSTEMS MAIN HALL. VENTILATION. EXTRACT
- Carry out balancing of the extract by adjustment of the duct dampers (where fitted) and the extract grille dampers to achieve an evenly shared distribution of the total volume flow at each grille.
 - Notice (minimum): 1 week .
- 970C COMMISSIONING OF AIR DISTRIBUTION SYSTEMS BASEMENT. MALE CLOAKROOM. EXTRACT
- Commissioning: in accordance with BSRIA AG 3/89 and CIBSE Commissioning code A .
 - Notice (minimum): 1 week .
- 970D COMMISSIONING OF AIR DISTRIBUTION SYSTEMS BASEMENT. FEMALE CLOAKROOM. EXTRACT
- Commissioning: in accordance with BSRIA AG 3/89 and CIBSE Commissioning code A .
 - Notice (minimum): 1 week .

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- 980A COMMISSIONING OF CENTRAL CONTROLS AND BUILDING MANAGEMENT SYSTEMS MAIN HALL HEATING AND VENTILATION] TO BE CARRIED OUT BY SPECIALIST. SEE PROVISIONAL SUMS
- Commissioning: In accordance with CIBSE Commissioning code C.
Notice (minimum): 1 week.
- 985A PERFORMANCE TESTING
- General: Demonstrate the performance of the installations.
 - Environmental tests: Carry out environmental testing. If necessary, use artificial loads to simulate operating conditions.
 - Recorders: Supply and maintain portable seven day space temperature and relative humidity recorders, complete with charts.
 - Number of recorders: 2.
 - Duration of loan: 2 weeks.Reports: Submit.
- 990 INSPECTION AND TEST RECORDS
- Records for water systems: In accordance with BSRIA AG 2/89.
 - Records for air systems: In accordance with BSRIA AG 3/89.
 - Record sheets: Submit.
 - Number of copies: 3.
- 992A RECORD DRAWINGS
- At the date of Practical Completion the Contractor shall provide a complete set of record drawings showing the whole of the services as installed.
 - The record drawings shall take the following form:
Number of copies: 2 -Medium:-The tender drawings have been prepared using AutoCAD and the Contract Administrator will forward to the Contractor copies of the original drawings.
The Contractor shall prepare the record drawings, utilising similar CAD techniques and shall submit these as pdf files to the Contract Administrator certifying them to be Virus free.

994A ENGINEERING OPERATION AND MAINTENANCE MANUALS

- Purpose: The Engineering Operation and Maintenance Manual is to be a comprehensive information source and guide for the Employer, end users and maintenance operatives providing a complete understanding of the building and its systems to enable efficient and safe operation and maintenance.
- Compilation: - Prepare all information for Contractor designed or performance specified work including as-built drawings.
 - Obtain or prepare all other information to be included in the Manual.
 Content: As clause 994C. Presentation of Manual: As clause 994G. Reviewing the Manual: Submit a complete draft.
 Amend in the light of any comments and resubmit. Do not proceed with production of the final copies until authorised.
 Final copies of the Manual: - Number of copies: 2. - Latest date for submission: 2 weeks before the date for Practical Completion stated in the contract.
- As built drawings: -Number of copies: 2 -Medium: PAPER A1 Features to be included:
 - (i)Card dividers. (ii)Index of record drawings. (iii)Details of all equipment settings and actual values obtained of controlled variables during commissioning.
 - (iv)Manufacturers' literature, including detailed drawings and control circuit details, printed operating and maintenance instructions, for all specific items of equipment and plant supplied under this contract.
 - (v)Diagrammatic drawings of each system indicating the principal items of plant and equipment with the number code of each item indicated.
- The diagrammatic drawings shall: -
 - (a)Show values with number codes related to schedules of equipment and record drawings.
 - (b)Show main items of mechanical plant, control panels, pipe and duct routes with sizes, control damper and values.

994F CONTENT OF THE ENGINEERING OPERATION AND MAINTENANCE MANUAL

- General: Details of the property, the parties, fire safety strategy, operational requirements and constraints of a general nature.
 Building services: Description and operation of systems, diagrammatic drawings, record drawings, identification of services, product details, equipment settings, maintenance schedules, consumable items, spares and emergency procedures.
 Documentation: Guarantees, warranties, maintenance agreements, test certificates and reports.

994G PRESENTATION OF THE ENGINEERING OPERATION AND MAINTENANCE MANUAL

- Format: A4 size, plastics covered, loose leaf, four ring binders with hard covers, each indexed, divided and appropriately cover titled.
 Selected drawings needed to illustrate or locate items mentioned in the Manual:
 Where larger than A4, to be folded and accommodated in the binders so that they may be unfolded without being detached from the rings.
 As-built drawings:
 The main sets may form annexes to the O&M Manual.

995 DEMONSTRATIONS

- Running of plant: Run, maintain and supervise the installations under normal working conditions.
 - Duration: 1 week.
- Instruction: Instruct and demonstrate the purpose, function and operation of the installations.

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995A TRAINING

- Before Completion, explain and demonstrate to the Employer's maintenance staff the purpose, function and operation of the installations including items and procedures listed in the Building Manual. Operating time: Include a minimum of 5 days.

Appendix of Schedules

Title

M	Mechanical Schedules
	Fan schedule
	Grille and diffuser schedule
	Pipeline insulation thickness schedule
	Radiator schedule

Radiator schedule										Revision: -		
										Date: 27 October 2008		
Reference	Type	Manufacturer	Product reference	Output (W)	Length (mm)	Height (mm)	Depth (mm)	Finish	Connections	Accessories		
R001	Multicolumn	Zehnder	3055 30 section	1689	1380	550	100	White stove enamelled	15mm B.O.E	Welded feet and top bracket		
R002	Multicolumn	Zehnder	3050 28 section	1445	1288	500	100	White stove enamelled	15 mm B.O.E	Welded feet and top bracket		
R003	Multicolumn	Zehnder	3050 28 section	1445	1288	500	100	White stove enamelled	15 mm B.O.E	Welded feet and top bracket		
R004	Multicolumn	Zehnder	4060 18 section	1436	828	600	136	White stove enamelled	15 mm B.O.E	Welded feet and top bracket		
R005	Multicolumn	Zehnder	4060 18 section	1436	828	600	136	White stove enamelled	15 mm B.O.E	Welded feet and top bracket		
R101	Multicolumn	Zehnder	2055 20 section	838	920	542	62	White stove enamelled	15 mm B.O.E	Welded feet and top bracket		
R102	Multicolumn	Zehnder	2050 29 section	1114	1334	492	62	White stove enamelled	15 mm B.O.E	Welded feet and top bracket		
R103	Multicolumn	Zehnder	2050 29 section	1114	1334	492	62	White stove enamelled	15 mm B.O.E	Welded feet and top bracket		
R104	Existing											
R105	Existing											
R106	Multicolumn	Zehnder	6060 43 section	3175	1978	600	210	Black stove enamelled	15 mm B.O.E	Welded feet		
R107	Multicolumn	Zehnder	6060 21 section	1551	966	600	210	Black stove enamelled	15 mm B.O.E	Welded feet		
R108	Multicolumn	Zehnder	6060 43 section	3175	1978	600	210	Black stove enamelled	15 mm B.O.E	Welded feet		
R109	Multicolumn	Zehnder	6060 34 section	2511	1564	600	210	Black stove enamelled	15 mm B.O.E	Welded feet		
R110	Multicolumn	Zehnder	6060 50 section	3693	2300	600	210	Black stove enamelled	15 mm B.O.E	Welded feet		
R111	Multicolumn	Zehnder	6060 43 section	3175	1978	600	210	Black stove enamelled	15 mm B.O.E	Welded feet		
R112	Multicolumn	Zehnder	6060 21 section	1551	966	600	210	Black stove enamelled	15 mm B.O.E	Welded feet		
R113	Multicolumn	Zehnder	6060 43 section	3175	1978	600	210	Black stove enamelled	15 mm B.O.E	Welded feet		
R114	Multicolumn	Zehnder	6060 34 section	2511	1564	600	210	Black stove enamelled	15 mm B.O.E	Welded feet		
R115	Multicolumn	Zehnder	6060 50 section	3693	2300	600	210	Black stove enamelled	15 mm B.O.E	Welded feet		
R201	Multicolumn	Zehnder	3045 32 section	1498	1472	442	100	White stove enamelled	15 mm B.O.E	Welded feet and top bracket		
R202	Multicolumn	Zehnder	3050 30 section	1548	1380	500	100	White stove enamelled	15 mm B.O.E	Welded feet and top bracket		
R203	Multicolumn	Zehnder	4100 11 section	1375	506	1000	100	White stove enamelled	15 mm B.O.E	Welded feet and top bracket		

Fan schedule										Revision: -	
										Date: 27 October 2008	
System	Manufacturer	Product Reference	Fan Type	Air volume (m ³ /s)	Resistance (Pa)	Electrical	Notes	Accessories			
Basement Male Cloakroom	Nuair	ES-OpusDC110M	In line extract	0.048	300	230/1/50		ES-PIR, ES-AVI			
Basement Female Cloakroom	Nuair	ES-OpusDC110M	In line extract	0.030	224	230/1/50		ES-PIR, ES-AVI			
Ground Floor WC	Nuair	Genie-X	Wall fan	0.012	Free air	230/1/50		PVCWALL/6, 230PIRINT			
First Floor Female Toilet	Nuair	Genie-X	Window fan	0.012	Free air	230/1/50		WINKIT, 230PIRINT			
First Floor Male Toilet	Nuair	Genie-X	Window fan	0.010	Free air	230/1/50	Both fans from one PIR	WINKIT, 230PIRINT			
First Floor Male Toilet	Nuair	Genie-X	Window fan	0.010	Free air	230/1/50	Both fans from one PIR	WINKIT			

Grille and diffuser schedule										Revision: -
										Date: 27 October 2008
Reference	System	Manufacturer	Product reference	Type	Plenum box	Air volume (m ³ /s)	Diameter (mm)			Accessories
E1	Basement Male Cloakroom	Lindab	KSO-P	Circular Air Valve		0.006	100			Integral fire damper
E2	Basement Male Cloakroom	Lindab	KSO-P	Circular Air Valve		0.006	100			Integral fire damper
E3	Basement Male Cloakroom	Lindab	KSO-P	Circular Air Valve		0.030	150			Integral fire damper
E4	Basement Male Cloakroom	Lindab	KSO-P	Circular Air Valve		0.006	100			Integral fire damper
E5	Basement Female Cloakroom	Lindab	KSO-P	Circular Air Valve		0.006	100			Integral fire damper
E6	Basement Female Cloakroom	Lindab	KSO-P	Circular Air Valve		0.006	100			Integral fire damper
E7	Basement Female Cloakroom	Lindab	KSO-P	Circular Air Valve		0.006	100			Integral fire damper
E8	Basement Female Cloakroom	Lindab	KSO-P	Circular Air Valve		0.006	100			Integral fire damper
E9	Basement Female Cloakroom	Lindab	KSO-P	Circular Air Valve		0.006	100			Integral fire damper

Pipeline insulation thickness schedule				Revision: - Date: 27 October 2008	
Pipeline size	Hot water system	Cold water system	Heating system	Chilled water system	
15	25	25	30	30	
20/22	30	30	35	35	
25/28	30	30	35	35	
32/35	35	30	35	40	
40/42	35	35	40	40	
50/54	35	35	40	45	
65	35	35	45	45	
80/76	35	40	45	50	
100/108	40	40	45	50	
125	40	45	50	60	
150	40	45	50	60	
200	40	50	50	70	

**MECHANICAL SUMMARY OF TENDER
ISLINGTON TOWN HALL. AUDITORIUM**

£

Hot and Cold Water Systems

01. Basement

02. Ground floor

03. First Floor

SUB TOTAL CARRIED FORWARD

Natural Gas Systems

01. Basement

02. Ground Floor

03. First Floor

SUB TOTAL CARRIED FORWARD

Heating Systems

01. Basement

02. Ground Floor Main Hall

03. Ground Floor Ancillary/Other Spaces

04. First Floor

SUB TOTAL CARRIED FORWARD

MECHANICAL SUMMARY OF TENDER (continuation)

ISLINGTON TOWN HALL. AUDITORIUM

£

Ventilation Systems

- 01. Basement general
- 02. Basement Cloakrooms extract
- 03. Main Hall Air Handling Unit and system
- 04. Main Hall extract
- 05. Ground Floor
- 06. First Floor

SUB TOTAL CARRIED FORWARD

Thermal Insulation

- 01. Basement HWS and CWS
- 02. Basement heating
- 03. Basement ventilation system making good
- 04. Ground Floor HWS and CWS
- 05. Ground Floor heating
- 06. First Floor HWS and CWS
- 07. First Floor heating

SUB TOTAL CARRIED FORWARD

Testing and Commissioning

Documentation (including O & M, valve charts, drawings etc)

Training

Maintenance

MECHANICAL SUMMARY OF TENDER (continuation)

ISLINGTON TOWN HALL. AUDITORIUM

£

Hot and Cold Water Systems (brought forward)

Natural Gas Systems (brought forward)

Heating Systems (brought forward)

Ventilation Systems (brought forward)

Thermal Insulation (brought forward)

Testing and Commissioning (brought forward)

Documentation (brought forward)

Training (brought forward)

Maintenance (brought forward)

Provisional Sum for Controls System works



Provisional Sum for Builder's work in connection with Controls System



Provisional Sum for removal of redundant services uncovered or exposed during building works



Provisional Sum for Builder's work in connection with removal of redundant services as above



Provisional Sum for additional links to services and controls if required by Fire Authority



TOTAL OF MECHANICAL WORKS TO BE CARRIED FORWARD TO MAIN SUMMARY OF TENDER

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