Castle Bromwich Parish Council

# Arden Hall – Dance Studio Ventilation


## Building Services Engineering Performance Specification

For and on behalf of:
**Castle Bromwich Parish Council**
**Arden Hall**
**Water Orton Road**
**Castle Bromwich**
**B36 9PB**

FML PROJECT SERVICES LIMITED

# CONTENTS



Prepared by: Fraser Lamont – MEP
Managing Director

Date 12th March 2025

Version: 1

# 1. General & Preliminaries

**General**

1.1 **Site Address:** Castle Bromwich Parish Council, Arden Hall, Water Orton Road, Castle Bromwich, B36 9PB

**Details of Parties**

1.2 **Client**

Name: Castle Bromwich Parish Council

Address: Arden Hall, Water Orton Road, Castle Bromwich, B36 9PB

Contact: Rachel Gorton

Tel: 0121 747 6503

E-mail: admin@castlebromwichpc.gov.uk

1.3 **Principal Contractor**

Name: TBC

Address: TBC

Contact: TBC

Tel: TBC

E-mail: TBC

1.4 **Principal Designer:**

Name: TBC

Address: TBC

Contact: TBC

Tel: TBC

E-mail: TBC

**Reference to contract documents**

1.5 This specification covers the indicative design and layout of all building works to meet the client's recommendations, as well as the supply, installation, testing, and commissioning of the building engineering services as described in the contract documents.

1.6 The Contract Documents shall include the Contract (**JCT Design & Build with MEP**), this Performance Specification, the Standard Workmanship and Materials Specification, and the schedules contained herein, and the tender drawings shall be read together and shall form part of the Contract Documents

1.7 The purpose of this specification is to provide the design intent (indicative) for the works and to enable the Contractor to develop the design to achieve the project's objectives.

1.8 The Contractor shall refer to the separate tender documentation (if sent separately) issued by the Project Manager for the General Contract Conditions and Instructions to Tenderers for information relating to any tender preparation and submission process.

**Definitions used in this Document**

1.9 Contractor shall mean the Sub-Contractor in relation to the Terms and Conditions of the Main Contract. The Contractor shall adhere to all conditions of the Main Contract.

1.10 The Engineer shall mean FML Project Services Ltd as detailed in the Main Contract Documentation.

**Checking documents**

1.11 The Contractor is required to check that all documents described in the Invitation to tender are received and check the number of pages of the tender documents. Should the Contractor find any to be missing, duplicated, or indistinct, the Contractor must inform the Engineer at once. Similarly, should the Contractor find a discrepancy between the tender drawings and the specification, he must raise a query during the tender period. The Engineer's response to the query will be issued to all Tenderers.

**Interpretation of specification**

1.12 Should the Contractor be in any doubt about the precise meaning of any term, item, or figure, the Contractor must inform the Engineer in writing so that the correct meaning may be decided before the date for submission of Tenders and accept such reply as the Engineer may give in writing. The Engineer's response to the query will be issued to all Tenderers.

1.13 The drawings supplied with this specification are intended to provide the tenderer with appropriate installation details to assist him in pricing the works. It shall be the Contractor's responsibility to mark and set out accurately his works and any unnecessary work executed by others and carried out through inaccuracy on the Contractor's part shall be made good at his expense.

**Contractor Design Elements**

1.14 This is a Performance Specification where the contractor is fully responsible for designing and implementing the works.

1.15 The Contractor shall be fully responsible for the following elements of design:

- Final Ventilation and sizing of Heat Recovery unit
- Final Electrical Requirements to serve the new ventilation unit
- Lifting requirements and Method statements

1.16 The Contractor shall supply and install all equipment associated with the above and submit calculations, determined from the requirements supplied by the manufacturer. All calculations associated with the above shall be carried out by the Contractor and representative samples submitted for comment.

1.17 Where a designed element of the works interfaces with a Contractor Designed element of the works it is deemed to be part of the Contractor Designed element to ensure that the Contractor Designed element properly integrates with the designed element to ensure a complete design solution. Any potential co-ordination problems between elements must be brought immediately to the attention of the Services Engineer during the tender period. No claim for additional costs or an extension of time will be considered for works that could reasonably have been considered and allowed for during this period.

1.18 The Principle Designer (CDM 2015) will require copies of risk assessments/hazard identification for the elements of the works for which the Contractor is acting as 'Designer' in the terms of the CDM regulations.

1.19 These should also be sent to the Engineer via the Contractor to enable all designers to consult co-operate and reduce risk as required by CDM regulations.

1.20 The residual hazards to be incorporated into the Construction Phase Plan.

**Site visit**

1.21 It is recommended that the contractor visit to familiarise themselves with the existing installations on site and the routes required for cables, pipework, and building works, where applicable.

1.22 The Contractor will be deemed to have visited the site and surveyed the building, services, and associated site conditions as a condition of the tender. Access to the site is to be arranged with the Castle Bromwich Parish Council

1.23 The Contractor shall contact:

Contact: Rachel Gorton

Tel: 0121 747 6503

E-mail: admin@castlebromwichpc.gov.uk

**Quality Standard**

1.24 The works will be executed in accordance with the relevant current British and European Standards, Codes of Practice, Local Authority, and this scheme design report.

1.25 Materials will be incorporated into the works in accordance with the manufacturer's recommendations and requirements.

1.26 The design and installations will comply in every respect with the latest versions of the following publications and any others relevant to the works being carried out: Noting that some may not be applicable to the works specified:

- Parish Council Design Guides
- Relevant British Standard Specification Code of Practice for Materials, Equipment and Installation Methods.
- Town and Country Planning Act 1971
- Building Regulations
- Office, Shops and Railway Premises Act 1963
- Health and Safety at Work Act 1974
- Health and Safety Executive Directives
- The Regulatory Reform (Fire Safety) Order 2005 England and Wales

- Building Control Officers Requirements – Noting changes from 1st Oct 2023 – Building Safety Act.
- Environmental Health, Fire, Petroleum and Highway Officers Requirements
- Local Byelaws
- BS 7671 IET Regulations and all amendments. Requirements of the Electricity Board, Local Authority and Insurance Companies involved
- Electricity at Work Regulations
- F-Gas Regulations
- Gas Safe Regulations
- Equality Act
- COSHH (Control of Substances Hazardous to Health) Regulations.
- Water Supply (Water Fittings) Regulations.
- The Control of Pollution Act.
- The Clean Air Act.
- CIBSE Guides and Technical Memoranda
- NES specifications
- Asbestos Regulations (if applicable)
- BSRIA Technical Notes
- Institute of Public Health Engineers Recommendations
- Any Special Regulations issued by the Electricity, Gas or Water undertakings.
- Insurance Company Requirements.

1.27 Reference to British Standards and Codes of Practice or other applicable standards does not give the year of issues or dates of amendment slips. The published version current when the Contractor submits his tender shall apply. Where British Standard numbers quoted have been superseded by or harmonised with a European or International Standard, the new applicable standard shall apply.

1.28 The tender shall be based on the regulations current at the date for return of tenders. If these regulations are amended or new regulations enacted after the date for the return of tenders the Contractor shall immediately inform the engineer.

1.29 Where no specific design, performance or installation standards are quoted the following shall apply.

- CIBSE Guide Books
- Guide A Environmental Design
- Guide B Heating, Ventilating, Air Conditioning and Refrigeration
- Guide C Reference Data
- CIBSE The SLL Code for Lighting.
- CIBSE Technical Memoranda.
- Institute of Plumbing, Plumbing Engineering Services Design Guide.

**Contractor's responsibilities**

1.30 The Contractor is required to develop the design to a construction-level documentation level using qualified designers. A chartered Engineer or other suitably qualified engineer who is not responsible for the design shall verify that the design complies with the design intent. The Contractor shall be fully responsible for the design and installation of the works.

1.31 The design relates to the:

- **Installation of a New Ventilation System to serve the amin dance studio on the 1st Floor.**
- **Installation of new electrical requirements to serve the new system**
- **Make good and isolations of existing systems.**

1.32 The Contractor shall be responsible for the design and development of the mechanical, electrical, and public health services as described in this specification and for the preparation of:

a) To undertake a detailed survey of the existing installations to confirm the extent of the works and verify that the existing installations have sufficient capacity to meet the design requirements.

b) Detailed design calculations, schedules, schematic design, detailed design, and layout drawings are for submission to the engineer for approval prior to the works commencing on site.

c) Designers risk assessments.

d) The Contractor shall retain responsibility for any services design or selection activity passed onto specialist contractors or suppliers.

e) The detailing of all builder's work required for installation of the works

f) Technical submissions are to be submitted before purchase for approval of all final equipment selections. Technical submittals shall include a system description, employer's requirements, design criteria, calculations, supporting drawings, and manufacturer's data. No equipment shall be procured until the technical submissions have been approved.

g) Fully coordinated working installation drawings supported where appropriate with manufacturers' "shop" drawings defining how the works will be installed.

h) Detailed coordination, together with the other contractors, of the complete works between services and structure.

i) Supply, installation, testing, commissioning, and setting to work of all plant, services and materials detailed in this specification, drawings and tender documentation.

j) Making all applications, giving all notices, and paying all fees required by and to comply with the provisions of the statutory requirements.

k) Fixing and correctly installing all plant and equipment. Ensuring that associated work such as electrical wiring, controls, builders' work, etc., is properly executed.

l) Commissioning the complete installation, including adjusting, calibrating, and balancing as necessary, inclusive of all site visits by specialists to achieve a working system, as detailed later in this section of this specification.

m) Demonstrating to the complete satisfaction of the Engineer that the equipment is capable of the performance and method of operation specified.

n) Providing identification labels on items of all equipment as specified or necessary for the users and future maintenance.

o) Providing "As fitted" record drawings and operating and maintenance manuals or in the case of this dilapidation works the removal drawings.

p) Instructing the Client staff in the operation of the installations.

q) Attendance before during and after the building completion.

r) Attend to defects in the time detailed in the contract and all other remedial works during the maintenance period.

s) Inspect the installations prior to the end of defects meeting and ensure all remedial items have been completed.

**Health and Safety – CDM**

1.33 The Contractor shall comply with the requirements of the Factories Act 1961, the Health and Safety at Work etc. Act 1974 and sub-ordinate legislation made under the enabling acts, including the following regulations, the Management of Health and Safety at Work Regulations 1992 and the Construction (Design and Management) Regulations 2015.

1.34 The Contractor shall comply with the terms set out in this document and the information contained in the pre-construction information as a minimum requirement regarding health & safety management.

1.35 The appointed Principal Designer shall provide the Pre-Construction Information Pack to the Contractor. Note that appointed PD (CDM) are not appointed under the Building Safety Act Principal Designer; this will be a separate appointment.

1.36 The Contractor is to provide all RAMS to **Principle Designer (CDM)** as appropriate in a timely manner i.e. before commencement of any works, to enable full and proper consideration.

1.37 The Contractor shall accept all risks other than those separately identified as Client risks.

1.38 The Contractor shall allow for all necessary temporary services required to carry out the works and shall always maintain the services throughout the site (where applicable).

1.39 The Contractor shall review, acknowledge, and manage all Constructor-defined risks as detailed in the site risk register.

1.40 The Contractor shall provide (where applicable) contract drawings (as built), maintenance data, warranties, user manuals, health & safety manuals, staff training regarding the use of equipment, keys, codes `and the like,' relating to the project, to **the Principle Designer**, at/prior, to the contract handover meeting.

**Asbestos**

1.41 The Contractor is not expected to remove or treat any asbestos present or found but is to consider the implications that the presence of asbestos may have on the contract programme and costs.

1.42 Removal of asbestos is only to be carried out by others (approved suppliers).

1.43 The Contractor shall consult the existing asbestos register and familiarise themselves with any risks prior to starting.

1.44 Castle Bromwich Parish Council will instruct a R&D survey to be undertaken prior to starting works to identify any risks in relation to the project.

**Sequence and timing of works**

1.45 The Contractor shall complete all works within programme and by milestone dates.

1.46 All work can be undertaken during normal working hours Monday through Friday (8am to 6pm) and on Weekends (8am to 4pm). These times can be changed with agreement with the client

1.47 Periods of excessive noise shall always be considered, and neighbouring properties shall be considered during the works.

**Schedule of rates**

1.48 The Contractor shall submit a Schedule of Rates within 14 days of a Contract order being placed. This shall comprise a schedule of quantities of all items and materials included in the tender and their unit prices, extended and totalled. Such totals shall agree with the lump sum figure of the tender. Sub-totals shall agree with those of the items in the Tender pricing schedule, and this applies to any specialist trade suppliers.

1.49 This schedule shall be part of the tender and the net rates in the said schedule shall be used for the valuation of any alteration in addition to, or omission from, the works as described in this specification and/or drawings.

1.50 Variation orders issued through the contract are to be priced in accordance with this schedule and submitted for agreement to the Engineer within 5 days of issue of the variation Instruction.

**Materials and workmanship**

1.51 Unless specifically stated to the contrary, all materials, plant, or apparatus supplied or work done shall comply with the current British or EN Standard where such exists and be fit for purpose.

1.52 Materials, equipment, and workmanship required under this contract shall comply with this specification.

1.53 Samples of all materials and components to be submitted to the client for approval as required.

1.54 The workmanship shall be carried out to the entire satisfaction of the client or his representative; any unsatisfactory work is to be taken down and replaced at the Contractor's own expense.

**Programme and Progress**

1.55 Provide detailed sub-programmes to assist the main contractor in producing a Master Programme for the Contract Works.

1.56 Due allowance is to be made in the programme(s) for the Works for, but not limited to, the following:

- Ordering and installation periods.
- Complete drawing, etc., including minimum working days for comment.
- Concurrent work by other trades.
- Any temporary works necessary for the completion of the engineering services installations.
- Pre-commissioning, commissioning and performance testing of the engineering services installations.
- Preparation and provision of Record Drawings and Operating and Maintenance Manuals.

1.57 Provide a separate and detailed commissioning programme for agreement with the Engineer. Make do allowance for the following:

- Commissioning, demonstration and instruction procedures.
- Provision of written notice before each (or series of) test, inspection, commissioning or demonstration procedures are to be carried out, not less than.
- Demonstration to the Engineer that test instruments and equipment are accurate.

**Technical Submissions**

1.58 Upon acceptance of the Order to undertake the works the Contractor is to provide a programme detailing the period in which it is proposed that all technical submissions for equipment and materials will be submitted to the Engineer for approval.

1.59 A period of 7 working days will be allowed for the Engineer to comment on the submission. The overall time allowed for the material approval submissions will be reflected in the programme for the works, and the main Contractors Programme submitted with the tender.

1.60 The new works are to be carried out using only approved manufacturers equipment and materials. Should substandard equipment or materials be installed, then if so directed by the Engineer, this is to be removed and replaced with approved equipment or materials at no cost to the Client. Such replacement works, if required, will not alter or affect the agreed programme of works or project completion date.

1.61 The Contractor shall submit to the Engineer the samples as listed below:

- Heat Recovery Unit proposed

**Existing services**

1.62 The Dance Studio is situated on the 1st floor and is currently served by an aged extract system (noting that the previous use of the room was as a function room / bar and the existing extract system installed to cope when smoking was still permissible within buildings.

1.63 The existing unit (Vent Axia) is located on the roof and serves two ceiling grilles. Over the years these grilles have been leaking (suspected condensation) onto the dance room floor causing staining and slip hazard – This is evident with the staining on the floor.

1.64 There are two wall grilles which allow fresh air to be drawn into the room. These have been partly covered, possible draft issue.

1.65 There is a escape staircase leading to the car park.

1.66 Controls are located within the old bar area behind the countertop on the wall

1.67 Electrics are served from the DB board on the 1st Floor and the main Electrical supply in the ground floor electrical room.

1.68 Heating to the space is via 2No Steel panel radiators situated under the window. These are served from the Gas fired Boilers in the ground floor plant room (Boilers replaced in 2023 ).

1.69 The contractor shall ensure that the works do not disrupt the business activities of Arden Hall.

1.70 A "permit to work" system shall be employed, and all relevant interested parties made aware of the works to be carried and their approval given in respect of the following activities:

a) "Hot work"

b) Working on electrical switchgear etc.

c) Fire alarm system

d) Data and telecom installations

1.71 The Contractor shall be responsible for any damage caused by non-compliance with the aforementioned clause and shall make good any such damage at his own expense, to the satisfaction of the Employer, Authorities, or Landlord as the case may be.

1.72 The Contractor shall take all proper measures to the satisfaction of the Engineer to minimise noise, vibration, and the spread of dust, dirt, etc., and to prevent any nuisance arising from the carrying out of the Contractor works, as any protection of existing works shall be provided by the Contractor.

**Coordination**

1.73 The Contractor shall be responsible for the detailed co-ordination of services in the preparation of the working installation drawings.

1.74 The Contractor shall accept responsibility for co-ordination of his works with the work of all other Contractors to ensure that the installation as detailed does not conflict with other services or the building fabric, either during construction or within the finished building.

1.75 The Contractor shall liaise with their subcontractors to determine restrictions imposed by other services.

1.76 The Principle Contractor shall take the lead role and accept the overall responsibility for coordinating all services in areas predominantly containing mechanical & electrical plants. These shall include ceiling voids, mechanical riser shafts, plumbing riser shafts, toilet ducts, and plant rooms.

**Contractor's drawings & Definition**

1.77 The Contractor shall provide design, installation and record drawings appropriate for CIC Stage 3 detailed development, Stage 4 production information and Stage 5 manufacture and installation as defined by BSRIA Guide BG6 2018 – "A Design Framework for Building Services".

1.78 A schedule of drawings shall be submitted for approval by the Contractor detailing a composite list of all design, builders work and working installation drawings that the Contractor proposes to produce for the contract together with a programme of their production for approval purposes within 5 days of receipt of order.

1.79 The Contractor shall in the preparation of drawings co-ordinate fully with the structure, finishes and other services. It shall be the Contractor's responsibility to obtain the information, by means of Requests for Information if necessary, to enable him to comply with the programme for the issue of such drawings.

1.80 All drawings shall be prepared and submitted to comply with the programme which shall include a minimum of 7 working days for approval by the Engineer.

1.81 The Engineer's comments upon the drawings submitted by the Contractor shall not in any way relieve the Contractor from his responsibility in respect of the accuracy of such drawings nor from his responsibility to provide equipment suitable in dimensions, construction and finish for the location in which it is to be installed.

**"As Fitted" record drawings**

1.82 The Contractor shall keep a record in his site office of any amendments to the installation as works proceed. This is to be achieved by updating the working installation drawings, a set of marked up drawings are to be available for the Engineer's inspection if requested.

a) All drawings shall conform to the following standards:

b) All drawings shall be of the International 'A' Series.

c) All drawings shall be dimensioned and scaled in S.I units.

d) The scale of the drawing shall be at least 1:50.

e) The record drawings shall be purpose-produced drawings and not modified copies of the working drawings.

f) The record drawings shall include detailed routes of all pipes, ducts, cables, trunking, cable trays, etc.

1.83 Each drawing prepared by the Contractor shall have the following information on the drawing:

1. Name of contract and, where appropriate, the phase and zone floor numbers.

2. Description of drawing.

3. Drawing Number.

4. Scale.

5. Name and address of Contractor.

6. Name and address of Engineer.

7. The words 'Record Drawing' in bold print.

1.84 Concept sketch drawing - Line diagrams and layouts indicating basic proposals, location of main items of plant, routes of main pipes, air ducts and cable runs in such detail as to illustrate the incorporation of the engineering services within the project as a whole and with respect to any zoning.¬

1.85 Concept schematics - Line diagrams indicating main items of plant and their interrelationships in such detail as to illustrate the incorporation of the engineering services within the project as a whole.

1.86 Developed design drawing - A drawing showing the extent of the services installations. The main features of developed design drawings should be as follows:

- Plan layouts to a scale of at least 1:100.

- Show the extent and types of service terminals visible within the occupied space.
- Show approximate locations of horizontal and vertical service runs.
- Show plant and distribution system sizes, particularly those affecting spatial allocation, while acknowledging that these may need some adjustment and refinement in the operation of the detailed design drawings and equipment schedules.
- Pipework and electrical containment represented by single-line layouts. Ductwork is represented by either double-line or single-line layouts as required to demonstrate that the routes indicated are feasible. Symbols and lines conventions in accordance with either a recognised standard (ISO of BS), or a supplied legend.

1.87 Developed schematic - A line diagram describing the interconnection of components in a complex system. The main features of a developed schematic drawing are as follows:

- The drawings should include all the functional components that make the system work, such as ducts, pipes, cables, busbars, plant items, pumps, fans, valves, dampers, control devices, terminals, electrical switchgear and components, security and fire sensors and control equipment.
- Symbols and line conventions in accordance with BS EN ISO 11091 recommendations for symbols and other graphic conventions.
- Label the drawings with appropriate pipe, duct, busbar and cable sizes, pressures and flow rates.

1.88 Indicate components which have a sensing, control or measurement function.

1.89 The major components indicated on the schematic drawings should be identified for cross-referencing purposes.

1.90 Technical design drawing - A drawing showing the intended locations of plant items and service routes in such detail as to indicate the design. The main features of technical design drawings should be as follows:

- Plan layouts to a scale of at least 1:100.

- Plant areas to a scale of at least 1:50 and accompanied by cross-sections.

1.91 The drawing will not indicate the precise position of services, but it should nevertheless be feasible to install the services within the general routes indicated. It should be possible to produce co-ordinated working drawings or installation drawings without major re-routeing of the services.

1.92 Co-ordinated working drawings - Drawings showing the inter-relationship of 2 or more engineering services and their relation to the structure and building fabric. The main features of a co-ordinated drawing are as follows:

- Plan layouts to a scale of at least 1:50, accompanied by cross-sections to a scale of at least 1:20 for all congested areas.

- The drawing should be spatially co-ordinated and there should be no physical clashes between the system components when installed. Critical dimensions, datum levels and invert levels should be provided.

- The spaces between pipe and duct runs shown on the drawing should make allowance for the service at its widest point. Allow for insulation, standard fitting dimensions and joint widths on the drawing.

- Make allowance for installation working space and space to facilitate commissioning and maintenance.

- Indicate positions of main fixing points and supports where they have significance to the structural design or spatial constraints.

1.93 Installation drawing - A drawing based on the technical design drawing or co-ordinated working drawing with the primary purpose of defining that information needed by the tradesmen on-site to install the works. The main features of installation drawings should be as per co-ordinated working drawings plus:

- Allowances for inclusion of all supports and fixings necessary to install the works.

- Allowances for installation details provided from manufacturers' drawings.

- Allowances for plant and equipment. This includes any alternatives to the designer's original specified options that have been chosen.

1.94 Installation wiring diagram - Drawing showing the interconnection of electric components, panels etc in accordance with the design intent indicated in the schematic drawings and incorporating the details provided on manufacturer's certified drawings.

1.95 Indicate the following: maximum electrical loading for each supply cable; cable termination facilities; and cable identification and all terminal numbers.

1.96 Builders work details - Drawings to show requirements for building works necessary to facilitate the installation of the engineering services.

1.97 Unless agreed otherwise, the following can be marked out on-site:

- Holes less than the threshold agreed by the team.
- Electrical socket and switch boxes.
- Openings that are best cut into block work or partitions.

1.98 Manufacturer's drawing - Drawing prepared by a manufacturer, fabricator or supplier for a particular project and which is unique to that project. Examples include drawings for ductwork, pre-fabricated pipework, sprinkler systems, control and switchgear panels and associated internal wiring, pre-fabricated plant, customised plant and equipment.

1.99 Record drawing - Drawing showing the building and services installations as installed at the date of practical completion. The main features of the record drawings should be as follows:

- Use a scale not less than that of the installation drawings.
- Include locations of all the mechanical, electrical and public health systems and components installed including ducts, pipes, cables, busbars, plant items, pumps, fans, valves, dampers, control devices, strainers, terminals, electrical switchgear and components, security and fire sensors and control components.
- Labelled with appropriate pipe, duct and cable sizes, pressures and flow rates.

- Have marked on the drawings the positions of access points for operating and maintenance purposes.

- The drawings should not be dimensioned unless the inclusion of a dimension is considered necessary for location.

1.100 Controls logic diagrams - Diagrams, drawings and/or schematic details of all control components and instruments showing the layout with each item uniquely identified together with a description of the controls operation and details of the associated interlocking.

1.101 Switchgear, starter and control instrumentation panel drawings - Drawings showing the construction and internal wiring diagrams of the starters, panels and/or other devices.

1.102 As installed drawings - Drawings/records retained on-site to record the progress of and any site modifications to the Works including any changes to software.

1.103 Plantroom schedules and schematics - Frame the following under glass and hang in each plant room and any other appropriate location.

- Schematic drawings of circuit layouts showing identification and duties of equipment, numbers and locations, controls and circuits.

- Valve schedules in the form of printed sheets showing the number, type, location, application/service and symbol, and normal operating position of each valve.

- Control schematics.

- Location of mechanical and electrical plant and equipment items.

- First aid instructions for treatment of persons after electric shock.

- Location of isolating switch for electricity supply.

- Location of main incoming gas valve serving gas meter.

- Emergency operating procedures and telephone numbers for emergency call-out service are applicable to any system or item of plant and equipment.

- All other items are required under statutory or other regulations.

**Builders' Work Obligations and Responsibilities**

1.104 Provide final builder's work details based on the installation and manufacturer's drawings to facilitate the installation of the works. Provide fully dimensioned drawings showing both size and position of the builder's work, making due reference to the structural engineering and architectural final dimensioned detailed drawings.

1.105 Detail all access requirements including access to false ceilings and ducts for maintenance.

1.106 Provide fully dimensioned and annotated drawings.

1.107 Undertake the redesign of the associated builder's work for approved alternative equipment or materials which subsequently varies the works in any way whatsoever.

1.108 Detailed design and locations of brackets and supports:

- Submit details of all types of brackets and supports including fixing details.
- Submit load and thrust calculations.
- Design, supply and installation of support for plant and services:
- Steelwork.
- Brackets.
- Hangers and clips etc.
- Plinths.
- Inertia bases.

1.109 Detail and supply sleeves, inserts, frames, fixing anchors, etc., and any other items required to be cast or built into the structures by others, including coordination of positions to such extent and accuracy to allow structural construction to proceed.

1.110 Detail design, supply, installation, and coordination of all access platforms, access covers, gratings, ladders, stairs, rails, and protecting elements required for future maintenance and operation of plant/equipment. Provide fully dimensioned and annotated drawings.

1.111 Undertake and detail all fire-stopping and sleeving systems for the Works where they pass through fire compartments.

1.112 Detail and install fire barriers where a fire-rated partition is penetrated.

1.113 Undertake and detail the weatherproofing of all services passing through external elements of the building.

1.114 Undertake and detail all acoustic stopping associated with the Works.

1.115 Detail the final requirements for access to ceiling voids and builder's work ducts for maintenance and operation.

**Testing and commissioning**

1.116 The Contractor shall test and commission all the installed services and systems to provide an effective working installation that will satisfy the Engineer.

1.117 The Contractor shall provide a detailed commissioning programme for the works identifying testing, witness testing and training dates. The programme shall allow sufficient time for testing and commissioning to be completed before the systems are offered for witness testing.

1.118 Testing and commissioning of the installations and systems shall be in accordance with recognised industry methods and the appropriate standards, in particular the BSRIA and CIBSE Commissioning Codes and BS 7671.

1.119 The Contractor shall notify the Engineer in writing when, in his opinion, the Contractor’s works or parts are ready for commissioning and testing.

1.120 The Contractor shall issue the Engineer with his own list of remedial items to be completed.

1.121 Should the plant tests fail to demonstrate that the plant and equipment are properly installed and functioning correctly, the cause of the failure shall be investigated, and should this be due to incorrect or faulty work by the Contractor or his Suppliers. The Contractor shall, without delay and at his own cost, carry out such remedial measures and adjustments as may be necessary and repeat the commissioning and testing procedure to the satisfaction of the Engineer.

1.122 In the event of commissioning tests and inspections failing to meet the required standards, the Contractor shall pay all abortive costs incurred by the Engineer or other parties, and these shall be in accordance with the appropriate time charge rates and expenses incurred.

1.123 Where portions of the work are commissioned and tested separately, the Contractor shall, upon final completion, demonstrate to the Engineer that all the several portions are capable of proper simultaneous operation in accordance with the requirements of the Contract.

1.124 The Contractor shall provide all necessary materials, labour, instruments, and testing equipment for the commissioning and testing of the installation.

**Testing and completion certificates**

1.125 Upon completion of the works the Contractor shall demonstrate the working of the installations/ systems to the Engineer and obtain approval from the regulating authorities as appropriate including the Fire Officer and Building Control Officer.

1.126 The Contractor shall be responsible for collating and presenting the following test results and completion certificates as applicable for the project described in Section 2 :

a) Electrical installation completion certificate

b) Ventilation and Commissioning Certificates

c) Any other system completion or test certificate

**Operating and Maintenance Manuals**

1.127 The Contractor shall include in the tender the services of a skilled Engineer to instruct the Client's staff in the correct operation and maintenance of the works. Such instruction shall take place

after the commissioning period, and its completion shall be a prerequisite of Practical Completion.

1.128 The Operating and Maintenance Manuals shall be prepared by a specialist technical author.

1.129 1 hard copy, 1No copy on USB storage device, and one soft copy of the manual shall be supplied conforming to the following minimum standards:

1. The various documents shall be contained within a loose-leaf, two-ring PVC bound stiff-sided binder not exceeding the international A3 size.

2. The cover shall be printed with the following information on the front face and spine: -

   (a) Operating and Maintenance Instruction Manual for the “project name” and “building name”.

   (b) Where more than one volume is necessary, the volume number is to be printed.

3. Each section of the manual shall be divided by a stiff divider of the same size as the holder. The divider shall be labelled as to the section of the manual which is following.

1.130 All written instructions within the manual not provided by the manufacturers shall be type-written with a margin on the left-hand side.

1.131 In compliance with the Construction (Design and Management) Regulations 2015, one copy of the Draft Manual is to be issued to the Engineer for comment/approval two weeks before the Practical Completion date. The comments or approval shall be given within five working days of their receipt by the Engineer.

1.132 The arrangements of the manual shall be as follows:

**SECTION ONE**

Index

**SECTION TWO**

Description of the design intent.

**SECTION THREE**

Description of the operational routines.

The description must include step by step instructions on starting and stopping each plant or system.

In addition, a simple instruction sheet shall be included giving fundamental guidance on starting/stopping the plant. This description shall also be mounted in the glazed frame in an agreed position.

**SECTION FOUR**

Planned Maintenance Instructions.

Instructions must include written step by step instructions on the maintenance of all items of plant. Data shall also be provided for ordered replacements. Full sets of Manufacturer's Maintenance Instructions including wiring diagrams and typical fault-finding routines.

**SECTION FIVE**

A set of Record Drawings in A3 and A1 size and Test Certificates. The record shall include schematics of the complete installation inclusive of controls.

A disk of all Record Drawings in AutoCAD Release 2011 'DWG' File format or equivalent to be included in this section, in addition to the A3 and A1 size Record drawings.

Full details of all plant and equipment including order/number, date, catalogue reference, makers/suppliers name, address and telephone number. This shall be produced in the form of a schedule with the location of the plant indicated.

A USB storage device containing the following information shall be issued with the record documents:

- All record Drawings in AutoCAD Release 2019 or current edition 'DWG' File format or equivalent.
- All Record drawings in 'PDF' format.
- All text and schedules from the manual are in Microsoft Word/Excel format.
- All copies of the test certificates shall be scanned and included on the USB storage Device

**SECTION SIX**

Emergency measures, including telephone number of Contractors emergency staff. Names, addresses and telephone number of all manufacturers and statutory authorities, i.e. gas board, electricity board and water board.

**Handover**

1.133 One full working week before practical completion the Contractor shall:

a) Inspection to witness the operation of any remaining controls or systems.

b) Prepare a list of defects for review by the Engineer, any works not listed, outstanding or not completed to the satisfaction of the Engineer will be cleared for inspection before the handover meeting.

c) Issue of the three approved completed copies of the Operating and Maintenance manuals and Record Drawings.

d) Completed to the satisfaction of the Client a practical demonstration and instruction on the operation of the system.

**Practical completion**

1.134 Practical completion shall be subject to the Contractor successfully demonstrating/providing the following:

a) Achieved completion of the works and commissioned the same to the satisfaction of the Engineer.

(b) Made, in the presence of the Engineer, the tests specified or reasonably required by him.

(c) Handed to the Engineer the record documents in accordance with this specification.

(d) Instructed the Client staff in the use and correct operation of the installation.

# 2. Scope of Works

## General

2.1 The contractor shall make provision to carry out a detailed site survey at **Arden Hall, Water Orton Road, Castle Bromwich, B36 9PB** and acquaint themselves with all necessary information, building fabric details, access, existing utilities, etc., together with reference to this schedule and in conjunction with any plans and associated drawings to distinguish the extent and understanding of the work required and the co-ordination of existing services. No claims for extra payments will be made for lack of knowledge of these conditions.

2.2 The contractor shall be responsible for fully designing the works described in this schedule.

2.3 This specification describes the proposed works for the mechanical, electrical, and public health services installations forming part of the refurbishment of the ground floor areas as identified within the drawings.

2.4 The Contractor shall design, supply, install, test and set to work all necessary equipment required for the complete building engineering services installations as described in this specification.

2.5 The contractor is to note that this is an outline schedule of works only, designed to assist the contractor in preparing his tender. The works in principle:

- **Installation of a New Ventilation System to serve the Dance Studio**
- **Installation of New Electrical Requirements**
- **Isolation and Make good, including blocking ceiling grilles**

2.6 All work must be carried out within normal working hours: Monday to Friday, 8am to 6pm, and weekends, 8am to 4pm. Working hours outside of these times must be agreed upon with the client.

2.7 **Contract programme & milestone dates (Provisional) –** Refer to Main Tender Submission by Castle Bromwich Parish Council

**2.8 Submission requirements**

Information shall be provided by the Contractor as follows;

**On the tender return date**

- Initial project proposals, including method statements and outline specifications for the design and execution of the works.
- Detailed cost proposals for the works.
- Critical path programme (to include lead in times) and
- Information required by the Principal Designer at the tender stage.
- Risks with any Equipment along with all lead-in times

**Prior to starting on-site**

- Detailed project proposals for the works, including detailed design drawings, schedules, specifications, developed Construction phase H&S plan, RAMS.
- Agreed contract sum.
- Updated contract programme
- Confirmation of access proposals agreed with site staff.

## Preliminaries

2.9 The contractor shall allow for all necessary prelims to undertake their works in accordance to the performance specification and not be limited to the following:

- Site Supervision
- Waste Management – 8 Yard Skips / or other means for waste disposal and removal
- Loading & Unloading Materials and Equipment
- Hire equipment
- Access Equipment – Towers, scaffolding and MEWPS
- 110v site power
- Site Lighting as Required
- bWIC
- Design
- Project Management
- Ongoing cleaning

## Provisional Sums

2.10 The Contractor shall allow for the following Provisional Sums:

- Additional electrical works in association with works - £750.00
- Additional make good - £500.00
- **Total Provisional Sum - £1,250 .00 excl VAT**

# Building Services – Design Criteria

## General Design Conditions

1. The mechanical & electrical engineering services installation shall be designed in accordance with the design parameters and criteria set out below.

**External Design Conditions**

| Element | Temperature |
|---|---|
| Winter | -4°C, 100% saturated |
| Summer | 31°C db, 20°C wb |

**Internal Design Conditions**

2. The following schedule states the internal summer and winter design conditions for the spaces indicated based upon the design ambient temperature stated elsewhere.

3. Unless there is no means of automatically re-setting the internal temperature from the summer to winter conditions or vice versa and during the mid-season, the average space temperature will vary between the two temperature limits.

4. At this stage there are no proposals to provide humidity control to the general ventilation plant and therefore the internal humidity will vary considerably depending on external conditions and internal latent gains.

| Space | Winter | Summer |
|---|---|---|
| Dance Studio | 21°C +/-2°C | Not Controlled |

Note: No Relative Humidity control

**Building Fabric**

| Element | U Value |
|---|---|
| Ground Floor | 0.25 W/m2K |
| External Walls | 0.35 W/m2K |
| Roof | 0.25 W/m2K |
| Glazing | 1.6 W/m2K : g value – 0.4 |

| | |
|---|---|
| External doors | 2.2 W/m2K |

5. Glazing shall have a “g” value of 0.4.

**Ventilation**

6. Ventilation shall comply with Part F of the Building Regulations.

7. The Contractor shall provide a minimum of 10l/s fresh air per person to the spaces

| Space | Occupancy |
|---|---|
| Dance Studio | 15 Persons |

**Internal Heat Gain Loads**

| Element | W/m2 |
|---|---|
| People | 130 Watts per person (75W sensible / 55W latent) – In office type areas where persons are sedentary. |
| Lighting | 10 W/m2 |
| Equipment | 25 W/m2 |
| Comms rack | N/A |

**Illuminance Levels**

8. Lighting shall be designed in accordance with the design criteria below and the following:

- SLL Code for Lighting, published by the Chartered Institution of Building Services Engineers and wit other relevant CIBSE Technical Memoranda.
- British Standard 5489
- BS EN 13201-1&2
- Building Regulations Approved Documents L2.

9. For areas where computer screens are regularly used, the lighting design shall comply with CIBSE Lighting Guide 7 sections 2.4, 2.13 to 2.15, 2.20, and 6.10 to 6.20. This gives recommendations highlighting:

10. Limits to the luminance of the luminaires to avoid screen reflections. (Manufacturers’ data for the luminaires should be sought to confirm this.)

11. Any area where a surface is used to reflect light into a space, such as uplighting, the recommendations refer to the luminance of the lit ceiling rather than the luminaire; a design team calculation is usually required to demonstrate this.

12. Recommendations for direct lighting, ceiling illuminance, and average wall illuminance.

13. The internal lighting in all relevant areas of the building shall be designed to provide illuminance (lux) levels and colouring rendering index in accordance with the SLL Code for Lighting 2012 and any other relevant industry standard. Internal lighting shall be appropriate to the tasks undertaken, accounting for building user concentration and comfort levels

1.3

| Space | Lux levels |
|---|---|
| Dance Studio | 300 lux (min) |

**Internal Noise Criteria**

1.4

| Room | Noise rating |
|---|---|
| Dance Studio | NR435 |

**External Noise Criteria**

14. External noise from the plant shall not exceed 50 dBA at 3m from the boundary of the site or in accordance with the Environmental Health Officer's requirements. The Contractor shall liaise with The Local Authority and Building Control as required.

**General Electrical**

15. All circuits shall emanate from Existing Distribution Boards and be routed via existing or new containment systems.

16. All new containments for electrical services shall be sized in accordance with BS7671: 2018, and particular attention should be given to 521.10.202 within BS7671 18th Edition.

17. The contractor shall be accredited with the NICEIC or similar and provide all necessary certification required.

**Small Power**

18. The electrical distribution will be designed to suit the specific loads and an allowance of 15W/m2 for office equipment.

19. Switchgear and sub-main distribution shall be sized with 25% spare capacity.

## Water storage

| Service | l/s per person |
|---|---|
| Cold water storage | 15 |
| Hot water storage | 15 |

# Mechanical Services

## Strip out / Make Safe / Protect

2.11 The contractor shall strip out/set aside or dispose of (as applicable) the services:

- Electrical Isolations of the existing Vent Axia Systems and strip back of existing electrical installation in relation to the old system. Removal of the existing wall controllers
- Removal of the Vent Axia System and ductwork—Note that a review on-site may need the unit to remain due to the existing roof covering and water penetration—allow to remove and make good for the tender.
- Block up the existing ceiling Grilles within the dance studio to avoid unwanted drafts, etc., from the isolated unit.
- All rubbish and unused materials are to be cleared away from the site on completion.

**To summary of costs**

# New Ventilation Unit to Dance Studio – Based on Vent Axia HR range & Framework Support

2.12 The Contractor shall supply, install, and set to work a new ventilation heat recovery unit to provide fresh air to the dance studio.

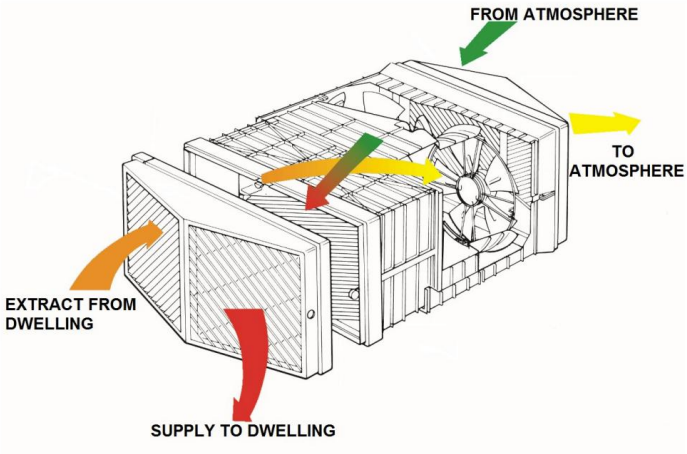
- Dance Studio Space – 50m2
- Ceiling Height – 2.4m
- Room Volume – 125m3
- Occupancy – 15 persons
- Air Changes – 6 to 10ACH (therefore Min 750m3h , mid 1000m3h and max 1250m3h)
- Air Flow Requirement – 150L/s (based on 10l/p/s)

2.13 The Contractor shall ensure that the unit is easily accessible for maintenance purposes

2.14 The Contractor shall carefully remove the existing wall grilles and metal louver to allow the new units to be installed.

2.15 The contractor shall supply, install, and set to work 2No "Vent Axia—HR500X" wall unit. The contractor may offer equal approval and is not bound to use the above unit.

- Vent Axia – HR500X – 2No
- Heat Recovery Ventilation—Air Flow—153L/s per unit—Note 1No Unit will serve 15 persons with sufficient fresh air; however, the space is considered high activity; therefore, to minimise odours and humidity 1No HR500 will serve 550m3h (heat Recovery or 900m3h high performance), which is under the minimum requirements. Therefore, 2No units are recommended. The top-up for the 250m3h can be achieved with openable windows and doors.
- HR500 Wall Controller – Install behind the bar and counter area – One number wall controller can control both HR units.




2.16 As the existing wall is circa 350mm think the unit will require additional support the above unit, which requires a minimum of 450mm. The units shall be fitted as be manufacturers guidelines.

2.17 The Contractor shall allow the supply, design, and manufacture of a support framework for each unit. Treated timber with sufficient strength and rigidity may be used if appropriate.

2.18 The Contractor shall use a heavy-duty steel angle or box section adequately sized to support the weight of the HR unit (circa 19kg each).

2.19 The Framework to provide sufficient support to ensure the shortfall in the wall depth is captured circa 100-150mm standoff from the mounting surface (wall).

2.20 The Framework to be designed to accommodate the dimensions and mounting points of the HR500 unit.

2.21 The framework is to be designed to distribute the weight of the HR500 unit evenly.

2.22 The framework must be level.

2.23 All joints to be securely welded or bolted.

2.24 Framework to be treated with a corrosion-resistant finish

2.25 All fixings must be of a suitable standard for the intended load:

- Appropriate fixings for the mounting surface (e.g., masonry anchors, toggle bolts, etc.).
- Fixings to be rated for the weight of the HR500 and the framework.

2.26 Anti-Vibration Mounts:

- Rubber or neoprene isolation mounts, designed to reduce vibration transmission.

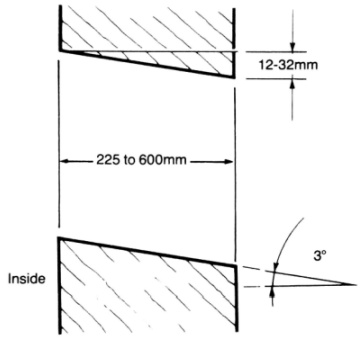
2.27 Mounts to be rated for the weight of the HR500.

- Mounts to be installed between the HR500 and the support framework.
- Mounts to be installed in accordance with the manufacturer's instructions.
- Mounts must be evenly spaced to provide balanced support.

2.28 Install the HR500 units and secure the HR500 to the framework using appropriate fasteners.

2.29 The Contractor shall ensure that the external section is fully weather proofed on completion to ensure the integrity of the unit.

2.30 The Contrcator shall note that the HR500 is designed to be installed with a slight slope (circa 3 degrees) to the outside to provide condensate drainage.




2.31 All to fully set up , commission and set to work the HR vent system.

**To Summary of Costs**

# Electrical Services

## Strip out / Make Safe / Protect

2.32 The contractor shall strip out/set aside or dispose (as applicable) the services from areas in conjunction with the works

- Carefully Isolate and Lock off the electrical supplies to the existing extract system and strip them back to the distribution board.
- All redundant work equipment to be removed and disposed of from the site.
- All rubbish and unused materials are to be cleared away from the site on completion.

**To summary of costs**

## Low Voltage Distribution & Small Power

2.33 The contractor shall allow for all necessary electrical supplies for the full extent of their works.

2.34 The contractor shall ensure all wiring and cabling have the appropriate containments and supports in compliance with BS 7671 18th edition requirements, paying particular attention to regulation 521.10.202.

2.35 All circuits shall emanate from the nearest distribution board and be routed via a containment system.

.

2.36 All new containment for electrical services shall be sized in accordance with BS7671: 2008.

2.37 The Contractor shall ensure that all containment provides full segregation between power and data cabling, in accordance with BS 7671 and EN 50174

2.38 The following Wiring types should be used

- General sub-main cables: XLPE/SWA/LS0H (Cu).
- General lighting and small power cables: LSOH (Cu) twin and earth cables.
- Areas with a surface fixed installation: LSOH (Cu) singles in conduit and/or trunking.

2.39 All Main earthing and main equipotential bonding in association with the works needs to be allowed for within scope of works.

2.40 All small power shall emanate from the appropriate distribution boards (Distribution Boards to and be routed where possible via the existing containment system. If none, then the contractor is to provide new.

2.41 All new containment for electrical services shall be sized in accordance with BS7671: 2018-amendment 2.

2.42 Where trunking or cable tray/basket or individually supported cables pass through structural or fire compartment elements, the Contractor shall effectively seal the opening around the trunking and/or cables with a fire-resisting material for the full width of the aperture to maintain the rated fire integrity of the fire compartment.

2.43 To provide compliance with the IET wiring regulations, any 'protected escape routes' identified in the fire strategy or identified by the Building Control Officer must remain fire sterile.

2.44 Generally, with respect to electrical services and cables passing through 'protected escape routes', this means that cables in a firefighting lobby, shaft or staircase of a protected escape route should be limited to lighting and associated accessories, emergency lighting and fire detection and alarm systems.

2.45 All socket outlets installed shall be dual earth connections to allow compliance with chapter 54 of BS7671: 2018 Amendment 2.

2.46 Each end of the earth cable on the small power circuits feeding the socket outlets shall be connected separately at the distribution board, this may require installing a second earth bar within each of the distribution boards.

2.47 The contractor shall allow for all testing and commissioning as applicable to hand the electrical systems over safely and compliantly to the client on completion.

2.48 The following quantities are for tender purposes and may be subject to change- The drawings provided provide locations of sockets; this will be confirmed prior to starting.

2.49 The contractor shall install the following power outlets in white MK range or equivalent. The HR500X unit should have local Isolation within 1m of the unit.

- HR500X – 220-240V / 50/60HZ via a fused double pole isolator switch - 3Amp fuse having contact separation of not less than 3mm
- The unit must be earthed

- The Controller should a suitable length of 5 core 0.75mm2 cable – must be round with a diameter of 7-10mm.

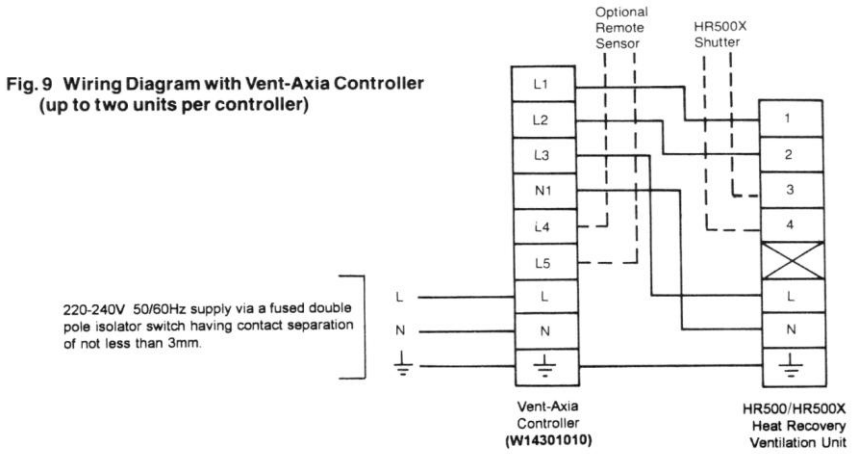



**Fig. 9 Wiring Diagram with Vent-Axia Controller (up to two units per controller)**

2.50 Testing and commissioning of the installations and systems shall be in accordance with recognised industry methods and the appropriate standards, the BSRIA and CIBSE Commissioning Codes and 18th Edition BS 7671.

2.51 The Contractor Shall provide Engineers that have achieved City and guilds 2391 or equivalent to carry out the final inspection and testing.

2.52 The electrical contractor shall coordinate with the mechanical contractor to ensure the supplies are suitably sized to serve their systems

**To Summary of Costs**

# General

## Training

2.53 The contractor to ensure that full training is provided, and quick user guide is made available for the Parish Council and Maintenance teams

2.54 The contractor shall ensure that the staff members to be trained sign a detailed training sheet to keep within the O&M manual.

**To summary of costs**

## Make Good Works

2.55 The contractor includes all make good works following the works to ensure that there are no disturbed finishes following the works. This will not be limited to the sanding, filling and local painting around the areas of your works.

2.56 Particular attention will be paid to the integrity of fire breaks and compartments

2.57 The Contractor shall ensure before and after photos are taken to demonstrate the level of make good and highlight any issues.

**To summary of costs**

## Fire Stopping

2.58 The contractor shall ensure a propriety sealing system certified to maintain fire resistance is to be applied to all openings through compartment walls. This shall be undertaken by the Contactors accredited fire-stopping sub-contractor. The contractor to ensure that any openings are kept to a minimum. The Contractor shall provide before and after photos of the fire-stopping measures applied and ensure that details of the fire-stopping material are provided as part of the handover documentation. All fire stopping shall be labelled for compliance.

**To summary of costs**

## O&M & Handover Documentation

2.59 The record information shall be prepared in accordance with the requirements of the specification and all services shall be treated as if new. Therefore, the installation being retained shall be provided with operating and maintenance instructions and detailed on the record drawings.

2.60 Record drawings shall be prepared using Auto CAD computer software and a USB Storage Device containing the O&M's.

2.61 The complete documentation required at handover shall include all certificates and incorporate all services.

2.62 The Contractor shall provide all passwords on handover day to the maintenance provider and FM teams.

2.63 The contractor shall make allowances for producing the working drawings to be submitted to the project manager prior to the installation of new services.

2.64 The contractor shall allow for verifying the installed systems to the project manager and demonstrating the installed system to the Client /End User.

2.65 Upon completion of the works, the Contractor shall hand over 2No. Copies (1 hard copy and 1No USB Memory Stick) of an operating and maintenance manual which shall contain, but not be limited to, the following information:

- Materials and Systems used
- Emergency contact numbers
- Procedures for fault finding
- Emergency procedures.
- System description.
- Certification
- Passwords
- Manufacturer's maintenance instructions and contact details.

- Revised and new distribution board charts if applicable.
- NIC/EIC completion certificate
- As fitted drawings.
- All test results.

2.66 A copy of the manual and record drawings shall be provided electronically on USB Memory Stick and a complete copy of the O&M to be provided in 1No PDF document.

2.67 A draft copy of the manual sufficient for the safe operation of the systems installed shall be available upon handover. A final copy shall be submitted to the PM within 14 days of handover.

**To summary of costs**

## Deep Clean of Area on completion

2.68 The contractor shall ensure area is fully cleaned prior to handover.

**To summary of costs**

# APPENDIX A – MEP Drawings

(Refer to zip file)

**Drawing Register:**

- Arden Hall – Proposed Mechanical Ventilation

# APPENDIX B – SUMMARY OF COSTS (EXCL DOC)

# APPENDIX C – DESIGNER RISK ASSESSMENTS (EXCEL DOC)

# APPENDIX D – DESIGN LIABILITY STATEMENT (SEE DOC FOR SIGNING)

# APPENDIX E – Equipment Details - For Information

- Vent Axia - HR500X

**END**