

**Roof Refurbishment, CLB, Brunel University London**

**Mechanical Specification Section B Project Specific Particular  
Requirements**

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author **Gavin Lang**

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date **30/04/2020**

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signature

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## B1 SCOPE OF MEP SERVICES INSTALLATIONS

### B1.1 PROJECT INTRODUCTION

- A This specification section provides an introduction to the works required at roof level in relation to the existing MEP plant and the proposed replacement of the roof finishes.
- B The drawings, specifications and schedules indicate the full extent of the works and this section is primarily to assist the subcontractor in understanding the scope of works required.
- C Refer also to the following documentation:
- |   |                              |                                                                |
|---|------------------------------|----------------------------------------------------------------|
| 1 | Main Contract Documents:     | Preliminaries/Project Information                              |
| 2 | Section A                    | MEP Preliminaries                                              |
| 3 | Section B (M&P) Requirements | Mechanical Specification Section B Project Specific Particular |
| 4 | Section C (M)                | Materials and Workmanship – Mechanical Services                |
| 5 | Section C (E)                | Materials and Workmanship – Electrical Services                |
| 6 | Section D                    | Equipment Schedules                                            |
- D Note that section C of this specification defines the plant and equipment materials, construction and workmanship. The specific performance and sizing details of plant and equipment is contained in Section D which comprises the equipment schedules for this particular project.
- E The Contractor's attention is drawn to the BUL (Brunel University London) specifications and documents listed below which provides guidance on working at BUL and sets out particular standards, installation methods and equipment specifications which are to be adhered to. The Contractor will be required to make himself fully conversant with the contents of these specifications.
- |   |                                                                    |
|---|--------------------------------------------------------------------|
| 1 | BUL Site Handbook version 4.0                                      |
| 2 | ME Design Brief 3 <sup>rd</sup> Edition (July 2017)                |
| 3 | BUL Network Infrastructure Specification Version 5 (December 2018) |
- F It is the Contractor's responsibility to define by calculation and planning all equipment selections, service network distribution, access and maintenance requirements and operating efficiencies.

### B1.2 SCOPE OF THE BUILDING SERVICES INSTALLATIONS

The Building Services installations covered comprise the following new and modified services:

Mechanical Services comprise:

- 1 Existing ventilation cowls at roof level, air handling units, ventilation fans and curb mounted extract fans
- 2 Thermal Insulation
- 3 Noise and Vibration control
- 4 Automatic Controls
- 5 Building Management Systems
- 6 Mechanical services field wiring
- 7 Testing and Commissioning of the Mechanical Services

### B1.3 DEFINITIONS USED IN THE SPECIFICATION

- A. Within this Section B document references are made to "contractors" as set out below:
- 1 Main Contractor (or management contractor), employed by the client and contracts out packages or trades to sub-contractors

- 2 Building Services Contractor; a sub-contractor employed by the Main Contractor to carry out the work described by this specification. This is a generic term and includes the Mechanical and Electrical Services sub-contractors whether part of the same company or separate companies
- 3 Mechanical Services Contractor; a sub-contractor employed by the Main Contractor to carry out the mechanical services installations
- 4 Electrical Services Contractor; a sub-contractor employed by the Main Contractor to carry out the electrical services installations
- 5 Specialist Contractors; normally employed by the Main Contractor or Building Services Contractor and often supplying a design function with warranty.

## **B2      DESIGN PARAMETERS**

### **B2.1      MECHANICAL SERVICES DUCTWORK**

- A      Please refer to Mechanical Specification Section C, U80, for the mechanical ductwork specification (materials and workmanship). The ductwork classification is to match the existing which is assumed low pressure. All ductwork to meet the requirement of this specification and Brunel University requirements.
- B      Ductwork shall match existing sections and pressure classification ratings



## B3 MECHANICAL VENTILATION SYSTEMS

### B3.1 GENERAL

- A The Mechanical Services Contractor shall undertake a condition survey of the existing ventilation units, curb mounted fans and extract ductwork and fans and DX condensers at roof level and provide a condition report.
- B The Contractor to forward his Condition Report to the Client Team at the earliest opportunity in the Contract to enable the progressing of the refurbishment works.
- C Within the specification there are two options for some roof mounted equipment, either to isolate, disconnect, store, service and reinstate once the re-roofing works have been completed, or to isolate and remove plant where redundant. The contractor is to seek instruction from the project manager the option for each item of equipment prior to starting work on site.
- D All new supply ductwork is to be provided with new thermal insulation as Mechanical Specification C requirements for phenolic foam and suitably sealed and enclosed to render weathertight.
- E All ductwork is to be provided with new identification markings.
- F The newly installed ductwork systems shall be cleaned, balanced and commissioned for complete operation.
- G All materials and equipment shall meet the requirements of Brunel University London, as set out in their Design Brief.

### B3.2 VENTILATION COWLS

- A Located on the roof of CLB there are 8 no. green ventilation cowls ( denoted VCxx on the ddrawing) which serve exiting air handling units located at level three of the building, which serve lecture rooms on the lower floors.



- B Some of these original cowls are in poor condition, and the contractor is to allow for fabricating matching replacement cowls for all existing cowls.
- C The approximate dimension of the cowls are 1200mm x 1800mm x 1000mm high. The contractor is to fabricate replica units in hot dipped galvanised steel to match the existing ventilation cowls in appearance and overall dimensions.
- D The louvres are to match the existing, and to have a minimum of 50% aerodynamic free area.
- E The existing ventilation cowls are fixed by flange with the waterproofing dressed over the flange. The replacement ventilation cowls are to be designed to be installed on top of the new extended kerb with a suitably deep skirt detail.

### **B3.3 EXTRACT FANS EF1, EF2, EF3**

- A Extract fans EF1, EF2, and EF3 provide extract ventilation from the projection rooms to the rear of the 3 main lecture theatres. They are located at the north end of the roof, and are kerb mounted axial extract fans.



- B The 7" extract fans are mounted on a 450mm x 450mm kerb.
- C The contractor is to provide a condition report on the 3 no. existing fans, including the electrical supply and controls where applicable.

#### **B3.3.2 EXTRACT FANS EF1, EF2, EF3 - OPTION A.**

- A The fans are redundant and to be isolated and removed. The electrical supply to the unit is to be traced to its point, isolated, and the redundant cabling removed where practical, including the redundant isolator at roof level.
- B The roof slab will then be made good, and the new finishes installed over.

#### **B3.3.3 EXTRACT FANS EF1, EF2, EF3 - OPTION B**

- A The fans are not redundant and are still required.
- B The contractor is to allow for carrying out any remedial or repair works to the electrical supply as identified by the condition report.

- C The existing upstand kerb to be modified to accommodate the specified fan and kerb specified.
- D The Contractor to allow for supplying and installing new kerb mounted extract fans to the following specification:
- Vent Axia Roof cowl Assembly RCZ 200
  - Vent Axia ESP 250 plate fan
  - Vent Axia RSZ200 shutter
- E The contractor shall also allow for supplying and installing a backdraft damper below the new fan.
- F The new fans are to be bonded to the lightning protection system where appropriate.

**B3.4 EXTRACT FANS EF4, EF5, EF6**

- A Extract fans EF4, EF5, and EF6 provide extract ventilation from the circulation spaces below. They are located at the north end of the roof south roof, adjacent to the lightwell and are kerb mounted axial extract fans.



- B The 7" extract fans are mounted on a 500mm x 500mm kerb.
- C The contractor is to provide a condition report on the 3 no. existing fans, including the electrical supply and controls where applicable.

**B3.4.2 EXTRACT FANS EF4, EF5, EF6 - OPTION A.**

- A The fans are redundant and to be isolated and removed. The electrical supply to the unit is to be traced to its point, isolated, and the redundant cabling removed where practical, including the redundant isolator at roof level.
- B The roof slab will then be made good, and the new finishes installed over.

**B3.4.3 EXTRACT FANS EF4, EF5, EF6 - OPTION B**

- A The fans are not redundant and are still required.

- B The contractor is to allow for carrying out any remedial or repair works to the electrical supply as identified by the condition report.
- C The existing upstand kerb to be modified to accommodate the specified fan and kerb specified.
- D The Contractor to allow for supplying and installing new kerb mounted extract fans to the following specification:
  - Vent Axia Roof cowl Assembly RCZ 200
  - Vent Axia ESP 250 plate fan
  - Vent Axia RSZ200 shutter
- E The contractor shall also allow for supplying and installing a backdraft damper below the new fan.
- F The new fans are to be bonded to the lightning protection system where appropriate.

### **B3.5 EXTRACT FAN EF7**

- A Extract fan EF7 provides extract ventilation from the plant room below. It is located at the north end of the roof south roof, adjacent to the lightwell and are kerb mounted axial extract fans.



- B The 7" extract fans are mounted on a 500mm x 500mm kerb.
- C The contractor is to provide a condition report on the 3 no. existing fans, including the electrical supply and controls where applicable.

### **B3.5.2 EXTRACT FANS EF7 - OPTION A.**

- A The fan is redundant and to be isolated and removed. The electrical supply to the unit is to be traced to its point, isolated, and the redundant cabling removed where practical, including the redundant isolator at roof level.



B The roof slab will then be made good, and the new finishes installed over.

### **B3.5.3 EXTRACT FANS EF7 - OPTION B**

A The fan is not redundant and is still required.

B The contractor is to allow for carrying out any remedial or repair works to the electrical supply as identified by the condition report.

C The existing upstand kerb to be modified to accommodate the specified fan and kerb specified.

D The Contractor to allow for supplying and installing new kerb mounted extract fan to the following specification:

- Vent Axia Roof cowl Assembly RCZ 400
- Vent Axia ESP 450 plate fan
- Vent Axia RSZ400 shutter

E The contractor shall also allow for supplying and installing a backdraft damper below the new fan.

F The new fan is to be bonded to the lightning protection system where appropriate.

### **B3.6 EXISTING AHU 01**

A This air handling unit is located at the centre of the roof.

B The air handling consists of supply and extract sections and is served by a DX cooling coil served by a DX condenser located adjacent to the air handling unit.



- C The contractor is to provide a condition report on the AHU, including the electrical supply and controls where applicable.
- D The contractor is to provide estimates for any remedial work identified as part of the condition survey.
- E The contractor is not to carry out any work on the until instructed by the project manager.

#### **B3.6.2 AHU01 – OPTION A**

- A The AHU is redundant and to be isolated and removed. The electrical supply to the unit is to be traced to its point, isolated, and the redundant cabling removed where practical, including the redundant isolator at roof level.
- B The contractor is to allow for decommissioning the unit, including the removal of all insulation and dismantling the unit. Decommissioning to include the decommissioning of the DX cooling system by a suitably qualified refrigeration specialist.
- C The roof slab will then be made good, and the new finishes installed over.

#### **B3.6.3 AHU01 – OPTION B**

- A The unit is operational and is to be retained.
- B The contractor is to provide a condition report on the AHU, including the electrical supply and controls where applicable.
- C The contractor is to provide estimates for any remedial work identified as part of the condition survey.
- D The contractor is not to carry out any work on the until instructed by the project manager.
- E The contractor is to allow for carefully decommissioning the unit, including the removal of all insulation and dismantling and storing the unit carefully whilst the roof replacement works are carried out. Decommissioning to include the decommissioning of the DX cooling system by a suitably qualified refrigeration specialist.
- F The unit is to be reinstalled and all necessary remedial works carried out and the unit recommissioned.
- G Subject to the condition survey, the contractor shall allow for replacing the following as a minimum:
  - Replacement of all ductwork insulation. Replacement insulation to include for installation of a waterproof covering to the ductwork, and additionally hammered aluminium casings.
  - The DX condenser is to be serviced, along with the DX cooling coil, and reinstated. The condenser is located adjacent to the air handling unit and is to be installed on a suitable Unistrut frame and 'big foot' type plant supports, compatible with the new roof system.
  - All insulation to the refrigeration pipework to be replaced and clad with a metallic cladding to prevent damage by birds.

#### **B3.7 MEDIA SERVICES AHU 02**

- A This air handling unit is located at the centre of the roof and has asset numbers LC/AHU/13 & LC/AHU/14.
- B The air handling consists of supply and extract sections and is served by a LTHW heating coil and DX cooling coil served by two DX condensers located adjacent to the air handling unit.



- C The air handling unit is functioning and is to be retained. Before commencing work the Contractor is to carry out a full condition and functional inspection and survey of the unit, noting any items which are not functioning correctly, damaged and require replacement, or require repair.
- D The contractor is to provide estimates for any remedial work identified as part of the condition survey.
- E The contractor is not to carry out any work on the until instructed by the project manager.
- F The contractor is to allow for carefully decommissioning the unit, including the removal of all insulation and dismantling and storing the unit carefully whilst the roof replacement works are carried out. Decommissioning to include the decommissioning of the DX cooling system by an suitably qualified refrigeration specialist.
- G The unit is to be reinstalled and all necessary remedial works carried out and the unit recommissioned.
- H Subject to the condition survey, the contractor shall allow for replacing the following as a minimum:
- Replacement of the heating coil – to be assumed to be 30kW capacity with flow and return temperatures of 82°C / 71°C ( actual duty to be confirmed with Brunel University Estates department). To include the pipework between the coil and connected to the existing pipework within the plant room below. The contractor to allow for 20m of 40mm pipework.
  - Replacement of two port control valve associated with the heating coil and all other pipework ancillaries such as isolating valves.
  - Replacement of all ductwork insulation. Replacement insulation to include for installation of a waterproof covering to the ductwork, and additionally hammered aluminium casings.
  - Replacement of all insulation to the LTHW pipework, in accordance with the specification.
  - The DX condensers are to be serviced, along with the DX cooling coil, and reinstated. The condensers are located adjacent to the air handling unit, and are to be installed on a suitable Unistrut frame and 'big foot' type plant supports, compatible with the new roof system.
  - All insulation to the refrigeration pipework to be replaced and clad with a metallic cladding to prevent damage by birds.

**B3.8 DX cooling units DX1 & DX2, serving rooms 312d & 312e.**

- A Located towards the south end of the roof are two DX condensers, asset numbers 002/211 & 002/212. These units serve rooms 312d & 312e. The existing pipework serving these units is routed via the ventilation cowl serving one of the main AHUs in the plantroom below.



- B These DX condensers are to be inspected, and a condition report prepared and submitted to the project manager.
- C No works are to commence on these units until instructed by the project manager.
- D The DX condensers are to be degassed and decommissioned by a suitable specialist contractor. The units are to be removed and stored safely.
- E Once the roof works have been completed the DX condensers are to be serviced and reinstated. The condensers are to be installed on a suitable Unistrut frame and 'big foot' type plant supports, compatible with the new roof system.
- F All insulation to the refrigeration pipework to be replaced and clad with a metallic cladding to prevent damage by birds.
- G The pipework from the condensers is currently routed to the plant room below through the ventilation ductwork.
- H The pipework from the reinstated condensers is to be rerouted through a new proprietary services entry described in section B3.8.



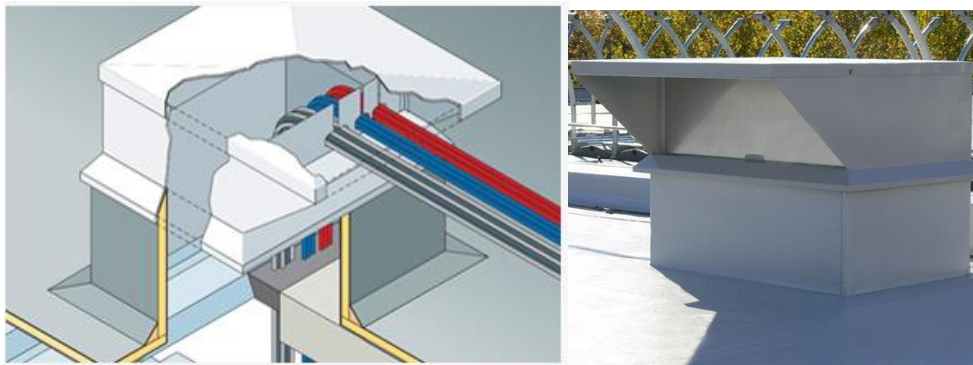
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**B3.9 SERVICES ENTRY, ST1.**

A Currently there are cables routed from the roof to the plant room below via a redundant vent shaft.



B This is to be replaced by a proprietary services entry housing, such as the one illustrated below.



C This services housing is to be used to route the refrigeration pipes from DX units DX1 & DX2 to below, as well as the electrical cables currently routed through the existing vent.

**B3.10 EXTRACT FAN EF8.**

- A Extract fan EF8 provides extract ventilation from below. It is located at the south end of the roof.



- B The existing extract fan is mounted on a support frame and is connected to the extract by galvanised duct.
- C The contractor is to provide a condition report on the existing fan, including the electrical supply and controls where applicable.

**B3.10.2 EXTRACT FAN EF8 - OPTION A.**

- A The fan is redundant and to be isolated and removed. The electrical supply to the unit is to be traced to its point, isolated, and the redundant cabling removed where practical, including the redundant isolator at roof level.
- B The roof slab will then be made good, and the new finishes installed over.

**B3.10.3 EXTRACT FAN EF8 - OPTION B**

- A The fan is not redundant and is still required.
- B The contractor is to allow for carrying out any remedial or repair works to the electrical supply as identified by the condition report.
- C The existing duct extract exiting from below is to be reinstated and dressed with a suitable collar and the roof finishes dressed around the duct.
- D The Contractor to allow for supplying and installing a new extract fan complete with the connecting ductwork to the following specification:
- Nuaire Volve twin fan unit AVT4-R
- E The fan is to be installed on a suitable Unistrut frame and 'big foot' type plant supports, compatible with the new roof system.
- F The new fan is to be bonded to the lightning protection system where appropriate.

**B3.11 EXTRACT DUCT EX1.**

- A Extract duct EX1 forms the extract from a communication server room. It is formed of a galvanised ductwork swan neck, assumed diameter 300mm ( to be confirmed on site).



- B The contractor is to allow for removing this prior to the commencement of the roof works and reinstating with a suitable collar and flashing detail once the roof resurfacing works have been completed.

### **B3.12 SVP VENTS**

- A There are 5 no. SVP vents located on the south roof of the CLB building. Currently these vents are plain pipes extending approximately 20mm above the existing finishes.



- B The contractor is to allow for reinstating the SVP vents on the completion of the roof works with proprietary covered SVP vents similar to the illustration below.





Gavin Lang  
Buro Happold Limited  
Camden Mill  
Lower Bristol Road  
Bath  
BA2 3DQ  
UK

T: +44 (0)1225 320 600

F: +44 (0)870 787 4148

Email: [peter.naylor@burohappold.com](mailto:peter.naylor@burohappold.com)