

The Brodie Partnership

Building Services Consulting Engineers



**THE FORESTRY COMMISSION
620 BRISTOL BUSINESS PARK
PARTICULAR SPECIFICATION FOR
MECHANICAL ENGINEERING SERVICES**

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Prepared by:	G Beaven	Checked by:	
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STANDARD SPECIFICATION SECTIONS

- As part of our commitment to the environment our Standard Materials and Workmanship Specifications are provided electronically in a searchable PDF Read-Only Format. We hope to substantially reduce the amount of paper our industry consumes.
- The Standard Specification Sections applicable for this particular project are as indicated on the Contents page main index.
- The Particular Specification details and Schedules for this Project are provided within this Specification for your ease of reference. Only "Standard" Specifications are included separately.

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SECTION 12: PARTICULAR SPECIFICATION FOR MECHANICAL SERVICES

12.1 General

The works described herein are for the installation, testing and commissioning of the mechanical services associated with the alterations and cleaning of the HVAC systems at 620 Bristol Business Park Bristol.

The present Forestry Commission occupies the first floor and half of the ground floor tenancies with Lockhead Martin occupying the remaining half of the ground floor.

The existing HVAC services are a traditional four pipe fan coil system. There are two wall hung boilers and Central supply and extract air handling unit within the roof plant room. There is an external Chiller located within a compound in the corner of the car Park. The Existing HVAC has been set out to provide for an open plan office layout.

The tenants have experience problems with the HVAC system and its ability to control internal temperatures. Some of the issues have been caused by the fit out creation of cellular offices and these areas not being coordinated with the existing HVAC system. Other issues arise from the cleanliness of the system water and operation of the controls.

The building will remain occupied by the tenants throughout the works, and the works need to be planned and programmed to minimise disruption.

This specification must be read in conjunction with the Outline Drawings and schedules.

12.2 Regulations and Standards

Notwithstanding that British Standard Specifications have been quoted in the previous standard technical sections, full compliance with the latest appropriate BSS where such exist, including those issued in respect of materials manufactured to Metric or Harmonised Standards, is required for all specified materials. All equipment shall be manufactured in the EC unless otherwise authorised; equipment that uses electricity shall be CE marked.

The installation of the systems shall comply with all relevant statutory instruments, regulations and standards including the following:

Regulations

1. The IEE Regulation for Electrical Installations, 17th Edition BS. 7671 – 2008 and amendments.
2. The Electricity at Work Act.
3. Regulations under the Electricity Act.
4. Regulations under the Factories Act.
5. The Gas Safety Regulations.
6. Any special requirements of the local electricity, gas or water undertakings.
7. The Clean Air Act.
8. The Health and Safety at Work Act and HSE Guidelines and Regulations.
9. The Building Regulations.
10. British Council For Offices (BCO) Guide
11. Local Authority and Local Authority Fire Officers recommendations and requirements.
12. Control of Pollution Act.
13. Energy Conservation Act.
14. The Asbestos Regulations.

Standards

1. All relevant current British Standards and Codes of Practice.
2. Chartered Institute of Building Services Engineers Guides, Building Energy Codes, Commissioning Codes and Technical Memoranda.

12.3 Scope of Work

The works shall comprise of the Design, Procurement, Supply, and Delivery, off loading, Positioning, Installation, Testing and Commissioning of the complete Mechanical and Public Health services.

The works shall generally be as follows: -

1. Amend existing Secondary ventilation ductwork and grilles
2. Supply and install additional cross talk attenuators and Secondary Return Grilles
3. Reposition several existing four pipe fan coil units
4. Amendments to CHW & LTHW System Pipework to aid Flushing
5. Flushing and cleaning of Chilled Water System
6. Flushing and cleaning of LTHW Heating System
7. Replacement of Existing Four Port Control Valves to Fan Coils
8. Provision of new room controllers
9. Provision of new controllers to 3 no fan coil units
10. Amendments to BMS Strategy and control
11. Re Balance of LTHW & CHW Systems
12. Re Balance of Ventilation primary and secondary systems
13. Provision of new DX split to one cellular office
14. Instruct the client/tenants in the use of amended BMS & Controls systems.

12.4 Programme of Works

The programme for the works shall be during the spring and summer of 2017. The contract shall be carried out in co-ordination with the client and their existing tenant.

12.5 Inspection of Site

The site may be inspected by prior arrangement with the client:

Liz Locke, Tel: 0300 067 5107

The Contractor shall be deemed to have visited site prior to tendering. No claims shall be entertained for a lack of knowledge to work content or working conditions on site.

The tendering contractor shall make all reasonable allowances (out of hours working, security vetting etc.) as necessary following consultation with the current tenant. Any actions which will result in a loss of any service must be agreed and notified in writing prior to commencement.

12.6 Ductwork Modifications

The contractor shall include within his costings for the amendment of the existing primary and secondary side ventilation ductwork and grilles as detailed on the tender drawings.

Where areas of the open plan office have been converted into cellular offices, the fan coil units associated with these spaces shall have their secondary ventilation supply ducts and grilles amended.

The contractor shall amend and relocate the grilles and ductwork to ensure that the fan coil units serve the appropriate areas.

The contractor shall also include for the minor amendments to the primary ventilation ductwork where a number of fan coil units have been relocated to serve the appropriate cellular office of open plan area.

12.7 Ductwork

The Contractor shall design supply and install ventilation ductwork to HVCA standard specification DW 144. Ductwork in general shall be constructed, supplied and installed and commissioned in accordance with Section 4 of this specification.

Ductwork shall be low pressure Class A.

Design Static Pressure 500pa maximum.
Design Mean Velocity 4.5m/s

Access panels/ doors are to be installed for plant access and cleaning purposes as Section 4 of the Standard Specification.

An adequate number of test holes shall be provided on each main branch to ensure satisfactory Testing and Commissioning of the systems.

Flexible ductwork shall be as Regaduct PAK ducting which shall be insulated when used on supply air systems. Flexible ductwork shall be limited to a length of no more 500mm.

The Contractor shall include for the pressure testing of ductwork where volume flow is above 1m³/s or as determined by HVAC document DW 143.

12.8 Volume Control & Fire Dampers

The Contractor shall supply and install volume control dampers and fire dampers as required by the ventilation design to ensure the balance and control of the ventilation systems and to maintain the fire integrity of the building and the compartments the systems pass through.

12.9 Supply & Extract Grilles

The Contractor shall supply and install additional new ventilation grilles as required by the ventilation design and detailed on the tender drawings.

Supply and extract grilles, shall be of a RAL 9010 colour to match the existing colour and design. Supply Grilles shall be Louvre faced 4 way blow and extract shall be egg crate grilles.

12.10 Repairs to Grilles

A number of the secondary supply air 4 way louvered grilles have been squashed and spacing between the louvres is uneven. This has resulted in a number of these grilles giving an uneven discharge throw pattern.

The contractor shall include for the straightening of all the necessary grilles and ensuring that the louvers spacing's and air throws from the secondary supply grilles are equal and even across all sides

12.11 Attenuators

The Contractor shall include for the supply and installation of new cross talk attenuators as detailed on the tender drawings. The attenuators shall be as manufactured by Caice Uk ltd, their CG circular range.

6no 150 dia x 600Long attenuators and 6no 200 dia x 600 long attenuators shall be installed within the existing ceiling void Rockwool sound attenuation which presently isolated each cellular office or meeting room.

Additionally the contractor shall supply and install as detailed on the tender drawings 2no sets of 150 dia x 600 long attenuators connected to 600mm sqr grilles as an air path into cellular offices.

12.12 Fan Coil Unit Repositioning

The contractor shall include within his costings for the repositioning of a number of fan coil units as detailed on the tender drawings.

The fan coil units FCU's G06, F01, F03, F05, F13 and F16 shall be relocated or swapped with adjacent units. The fan coil units shall be isolated at their local pipework isolation valves and new pipework installed from this point forward to the new position. This therefore shall avoid the requirement to fully drain the LTHW & CHW systems and maintain the provision of service to the remainder of the environmental control system during this portion of the works.

Where the pipework to the new fan coil unit position is extended further than 1 meter the contractor shall supply and install an additional TA Valves flushing loop H valve arrangement and isolation to allow the flushing of the extended pipework up to the fan coil.

12.13 Amendments to system Pipework to aid Pipework Cleaning

The contractor shall include within his costings for the provision of new 50mm dia connection points to the LTHW low loss header and the appropriate position on the CHW primary pipework.

These new 50mm dia connections shall be provided with lever valves and threaded connections suitable for the addition off temporary flushing hose connections during the works, but also to allow the installation of capped ends once the works have been completed.

12.14 Flushing of LTHW & CHW Pipework

The contractor shall include within his costings for the flushing and cleaning of the LTHW and CHW systems in accordance with the requirements of BSRIA BG 29/2012. The contractor shall include within his costings for all licences, treatment chemicals and UKAS independent Lab testing to be carried out during this process.

The Specialist Pipework Cleaning Contractor shall obtain an appropriate discharge licence from the local water authority for the period of the whole project including the initial pipe amendments and recommissioning.

The Specialist Pipework Cleaning Contractor (SPCC) shall survey the existing LTHW and CHW systems. Together with the information gathered in this survey and the contents of the O&M manuals the Contractor shall schedule all the materials contained within the

systems. This schedule shall act as a baseline check to determine which chemical agents are suitable for use at all stages by the SPCC.

The general BSRIA cleaning stage shall be as follows:

1. Dynamic flush
2. Biocide wash
3. Dynamic flush
4. Chemical clean and stabilisation of pipework
5. Dynamic flush
6. Inhibitor and biocide dosing

Upon completion of the post chemical clean dynamic flush, the SPCC shall immediately dose the LTHW and CHW systems with corrosion inhibitor and biocide. The corrosion inhibitor selected should be compatible with the materials in the system, in particular the heat exchangers inside the boilers and the pipe internal surfaces.

The SPCC shall include for the provision of all sampling and testing of the samples in accordance with the requirements of BSRIA Pre-commission Cleaning of Pipework Systems guide BG 29/2011. All samples shall be tested and results provided by and appropriately accredited UKAS laboratory.

The Contractor shall include for the timing and accessibility of works to meet the needs of the Consultant to be able to witness and record all the stages of the flushing and cleaning process.

The Contractor shall include within his costing for all operations within the ground and first floor occupied space to be carried out outside of normal working hours.

12.15 Replacement of Control Valves

The contractor shall include within his costings for the replacement of the four port control valves to all the fan coil units. This shall include the Chilled water and LTHW systems.

The contractor shall replace the existing four port brass bodied valves with new to be compatible with Schneider actuators.

12.16 Valve Actuators

The contractor shall include for the testing and replacement where necessary, of all the valve actuators to the LTHW & CHW four port control valves.

12.17 Fan Coil Unit Controllers

The existing ground floor fan coils 03,06 & 08 have been retro fitted with non TAC Satchwell controllers which are not compatible with the existing BMS system.

The contractor shall include for the replacement of the existing fan coil controllers to fan coils G03, G06 and G08. The contractor shall supply and install a new Schneider (existing TAC) BMS compatible controller.

The contractor shall include for the integration of these controllers to the existing BMS system including all wiring and coms control links to the BMS.

The replacement controllers shall provide identical level of control as the remainder of the existing fan coils. This shall also provide rocker switch on/off and three position fan speed control.

12.18 Wall Controllers

The contractor shall include for the provision of new wall mounted controllers to be linked to the fan coil unit dedicated to that room as detailed on the tender drawings.

The controller shall be able to provide temporary limited temperature adjustment. The digital controller shall be linked through the BMS so that the system will reset to the default position at midnight every day.

The contractor shall remove the existing analogue wall controllers and new are not identified on the proposed drawings no new controller is to be provided. The fan coil unit shall be amended to return to BMS automated control and sensing of return air temperature via a sensor positioned on the nearest return air grille.

12.19 Balancing of Pipework Services

The Contractor shall include for the commissioning of all parts of the LTHW and CHW systems. The Contractor shall include for the balancing of all control valves and regulation valves to provide the design flow conditions throughout the entire system.

The contractor shall utilise the existing Operations and Maintenance manual original commissioning figures where are available to re commission the LTHW & CHW systems.

The commissioning of the water closed loop systems shall be carried out by a specialist commissioning sub-contractor. The commissioning shall all be carried out in accordance with the requirements of the BSRIA guidance Commissioning of Water Systems BG 2/2010 and CIBSE Commissioning Code W: Water Distribution Systems 2010.

12.20 Balancing of Ventilation Services

The existing primary ventilation system has been tampered with since the original installation.

The contractor shall include for the replacement of all the filters to central Air Handling unit and the re commissioning and re balancing of the Primary Ventilation system.

The contractor shall utilise the existing Operations and Maintenance manual original commissioning figures where are available to re commission the ventilation system.

The Contractor shall rebalance the supply and extract air to all the occupied office floor areas in accordance with BSRIA Guidance Commissioning Air Systems AG 3/89.3 and CIBSE Commissioning Code A: Air Distribution Systems.

The contractor shall include within his costings for the re commissioning and balancing of all the secondary ventilation ductwork and grilles.

12.21 New Split Air Conditioning Unit

The contractor shall include for the supply, installation and commissioning of a new high wall direct expansion heat pump unit to serve the ground floor corner office.

The unit shall be as manufactured by Daikin Ltd their standard inverter model FTX35K indoor unit and RXS35L3 external condensing unit positioned as detailed on the tender drawings.

The contractor shall include for the supply and installation of all interconnecting refrigeration pipework power cabling and controls.

The contractor shall supply and install a wall mounted hard wired BRC1E52 style controller.

Refrigerant Pipework and Fittings

All pipework installed on refrigeration systems shall be copper unless otherwise specified. Plastic pipe will not be accepted under any circumstances.

Copper tube shall be to BS 2871, part 2 ASTM 280, DIN 1754/8905 fully tested by the eddy current method, dehydrated and capped.

Pipework installation shall be carried out by approved refrigeration engineers (certificate approval shall be submitted prior to the commencement of installation) and in accordance with BS 4434.

All pipework exposed to view will be of the half hard type unless 3/8" diameter or below. Fully annealed pipework will only be accepted when hidden from view of 3/8" diameter or smaller.

Bends shall be of the long radius type.

Brackets shall be the hydrozorb assembly type brass finish, fitted in either purpose made aluminium hydrozorb channel or hot dip galvanised unistrut, with all ends treated with cold galvanising paint.

Insulation shall be Armaflex or similar class 'O' fire rated and vapour sealed. Minimum wall thickness shall be 13 mm.

Suction and hot gas lines shall be insulated as previously described liquid lines need be insulated when they pass through areas of extreme temperatures, when they are 'semi expanded liquid' lines and where the manufacturer recommends.

Where the insulation meets a component, i.e., hydrozorb clip it shall butt up against the clip and be glued to the pipe at this point to form a continuous and effective seal.

All tube for refrigeration purposes shall be capped at all times other than when actually installed. It is imperative that the inside of the tube is kept free from dirt and moisture at all times.

No copper tube for refrigeration purposes shall be cut using a hacksaw or any tool, which creates filings, which will contaminate the system. Any operative found using any such tool will be removed from the site immediately and all of his previous work removed.

All joints made on a refrigeration system are to be brazed, flared, screwed or flanged. Flared joints will only be accepted on components inserted within the system such as sight glass, dryer, solenoid valve and only when 5/8" or below, or on proprietary items supplied such as compressor, condenser, etc. Flanged joints will only be accepted on propriety items and components such as sight glasses, dryers, solenoid valves, etc., where the connection sizes are 5/8" or greater. Screwed joints will be accepted only on plant items and only for control or test purposes. These joints are not to be used on connections greater than 1/2" and to be sealed using PTFE tape. All other joints will be brazed. Flared connectors, soft soldering etc., will not be acceptable.

When brazing is being carried out, oxygen free nitrogen should be passed through the pipework to displace the oxygen within the pipework to ensure that no oxidation takes place.

Brazing should be carried out by a skilled operative in accordance with the HVCA Code of Practice.

OFN brazing may be omitted on systems which are below 10kW and which are not heat pumps. However, this will be at the discretion of the PM.

At the end of the installation and following the successful completion of the pressure test the PM may select two joints which shall be cut open, and examined. If oxidation is found, all pipework shall be removed and re-installed using the brazing techniques previously described.

Brackets shall be installed at not greater than the following centres:-

Half hard (Hard drawn)

½", 5/8", ¾", 7/8", 11/8", 13/8", 15/8", 21/8", 25/8"

Horizontal

1.2m, 1.2m, 1.5m, 1.5m, 1.5m, 1.8m, 1.8m, 2m, 2m.

Vertical

1.5m, 1.5m, 1.8m, 1.8m, 2.4m, 2.4m, 2.4m, 2.4m.

Fully annealed (Soft drawn)

3/16", ¼", 3/8", ½", 5/8", ¾", 7/8".

Horizontal

0.8m, 0.8m, 1m, 1.2m, 1.2m, 1.5m, 1.8m.

Vertical

1m, 1m, 1.2m, 1.5m, 1.5m, 1.8m, 1.8m.

Additional brackets shall be installed as necessary at weak points such as bends to prevent vibration.

External Pipework Installation

Where pipework is externally installed it shall be clipped using hydrozorb anti-vibration clips fixed to return flange cable tray of a suitable size. Where the possibility of mechanical damage is evident a secondary cable tray should be fixed over the pipework to provide protection against damage.

Safety Protection Fittings

All refrigeration systems should have a low-pressure safety switch, high pressure safety switch, compressor overload protection, over pressure release and system filter dryer.

Consideration should be given to the following components:-

1. Sight glass – Moisture indicator to be fitted to all cooling only systems.
2. Solenoid Valve to be fitted where pump down control required or the danger of migration exists.
3. Vibration eliminators to be fitted on all compressor systems – condensing units
4. Head pressure control to be fitted on all systems, which will be providing cooling in low ambients.
5. Oil separators to be fitted on systems with extremely long pipe runs to provide early return of oil.
6. Hot gas muffler to be fitted on systems of over 70KW to prevent pulsation noise.
7. Non return valves where danger of migration occurs, non return valves should be considered.
8. The entire installation should be installed in a neat and tidy manner keeping all pipework straight where possible.

General Refrigerant Pipework Design

Particular attention shall be given to the following :-

1. Oil return
2. Pressure drops
3. Velocities
4. Operating parameters
5. Oil traps

Testing and Evacuation

The entire refrigerant system shall be pressure tested at 300 psi using oxygen free nitrogen and freon refrigerant. If the high and low side of the systems are able to be separately tested the high side shall be carried out by a halide torch or similar if the system fails to hold its pressure over 24 hours.

Once the system has passed the pressure test the nitrogen/freon mix should be released and vacuum pump placed on the system. All parts of the system on low and high side should be open to the vacuum pump. To achieve this it may be necessary to evacuate from more than one point on the system.

Systems Under 40 kW

Once the system has achieved a vacuum of one torr the system should be left on the vacuum pump for a minimum of four hours, if possible.

After the first evacuation achieved one torr, the system should be closed and the vacuum pump disconnected. The system should hold one torr for one hour after which time it should be filled with oxygen free nitrogen to a pressure of 30 psi. The nitrogen should then be released until it reaches a pressure of below 3 psi and the vacuum pump re-connected. This process should be repeated three times. After which time the system will be ready to charge.

Condensate Pipework

Gravity condensate pipework shall be run in either insulated copper pipework or ABS plastic pipework. If the latter is used the Contractor must ensure that support centres are adequate for this type of material.

12.22 External DX Condenser Power Supply

The contractor shall include for the supply and installation of a new single phase supply to serve the external condensing unit. The supply shall terminate with a rotary Isolator switch to IP65. The switch shall have a capacity of 16Amp.

The contractor shall include for the installation of new circuit fed from a 10A MCCB routed through the ceiling void to serve the externally mounted rotary Isolator.

The electrical installation shall be as detailed in section 13 of this specification.

12.23 Safety Valves

The existing LTHW Safety valves are set at a low pressure. Therefore the Contractor shall supply and install in the vent connections on the boilers pipework 2no new NABIC enclosed pattern safety valve to the requirements of BS779 and BS759 with padlock and drainpipe.

12.24 Controls Validation

The contractor shall include within his costing for the detailed survey and validation of the existing controls.

It was observed during a recent control and BMS survey that several fan coils and items of central plant are not under automatic control.

The contractor shall employ a specialist controls contractor to investigate the BMS and controls and ensure that all items of Plant are operating under automatic control.

The specialist controls contractor shall prove the operation of all fan coil units in both full cooling and full heating modes and automatic change over control.

The controls sub contractor shall demonstrate the full automatic operation of all central plant items in sympathy with the adjustment of internal and external set points. If this requires additional control strategy to be written into the existing programme then the contract shall include within his costs for these works.

The controls sub-contractor shall also include within his costings for the amendment of the two port zone control valves. A new sub routing shall be required to be written into the software so that if the zone valves on any LTHW or CHW zone do not open within a 24 hr period then the central primary circulation pumps for that system are operated for a minimum hour period and the non-operating zone valve is operated. This routing is required to prevent stagnation of fluid in any one zone of the system.

12.25 Chiller Time Clock

The present BMS system calls for operation of the external chiller only when the internal conditions require cooling. However the Chillers internal control time clock is set Monday to Friday 8am to 6pm and therefore will only operate when the call signal from the BMS is within this period.

Therefore the contractor shall include within his costs to amend the Chillers internal time clock to allow operation of the chiller over a greater time period and additional days.

12.26 Commissioning

The Commissioning Contractor shall carry out all commissioning of services in compliance with the BSRIA & CIBSE Commissioning guides, and shall record all volume flow rates and temperatures as required for statutory compliance with Part L regulations and completion of O+M manual.

12.27 CDM Regulations

In compliance with the Construction Design and Management Regulations, areas of foreseeable risk, which have been assessed at the design stage and are impractical to design out, shall be scheduled in the Project Health and Safety Plan.

The project does not meet the requirements of being 'notifiable' under the CDM Regulations.

The installation shall be undertaken in full compliance with the CDM Regulations.

12.28 Secondary Steelwork

The Contractor shall provide secondary steelwork supports (i.e. Unistrut etc) for the fixing and suspension of equipment and fittings as required. The secondary steel shall be affixed to the main structure. Such fixings shall be confirmed with the Structural Engineer prior to installation works commencing.

12.29 Drawings

The Contractor shall produce all necessary design and detailed working drawings detailing all elements of the mechanical services installations. These drawings shall be the result of all necessary site surveys, detail design and co-ordination with the Architectural and Structural Drawings.

Working drawings at 1:50 scale or as agreed shall be provided for the following services: -

1. LTHW & CHW plant and pipework.
2. Primary and Secondary Ductwork

The Contractor shall submit working drawings to the Consulting Engineer prior to commencing fabrication and works on site. Drawings will be returned with comments within five working days of receipt. In addition, the Contractor shall provide a schedule of equipment complete with design duties.

12.30 Services Co-ordination

All aspects of the mechanical service installation require close co-operation and co-ordination and it is essential that the Contractor shall be prepared to co-ordinate the mechanical services and avoid any possible clash or conflict with other trades and disciplines. The lead coordinator will be the sub-contractor for Mechanical Services.

No extra cost will be considered due to a conflict of equipment positioning, etc, where full liaison with other sub-contractors and the Main Contractor would have prevented such an occurrence.

12.31 Builder's Work

Builder's work shall generally, be carried out by the Mechanical Contractor. Accuracy of dimensions or drawings in relation to all plant, equipment etc., shall at all time be the responsibility of the Contractor. The Contractor shall be responsible for producing builder's work drawings and marking out as per Section 2, clause 2.16 of this Specification.

12.32 Fire Barriers

The Contractor shall provide Fire Barriers to the Mechanical services in compliance with the Fire Compartment walls of the building and BS 476.

Fire Barriers/ fire stops of 1-Hour resistance shall be installed within Ductwork and around cables ducts and pipes where these pass through fire compartments.

12.33 Installation, Access and Plant Removal

The Contractor shall ensure that all plant and equipment is manufactured in unit sizes, which can be taken through the openings provided for the installation of the plant and for its future replacement.

All items of plant (pumps etc) shall be provided with facilities for disconnection without undue disturbance to adjacent pipework, building fabric and fitments. This shall be achieved via suitable union or flange connections and isolators/disconnection switches.

The Contractor shall ensure that adequate access is provided for future maintenance of all the equipment installed under the Mechanical Services element of this project.

12.34 Record Drawings & O + M Manuals

The requirements for Working Drawings, Record Drawings and O+M manuals are clearly defined in Section 2 and shall be strictly adhered to.

It shall be especially noted that, as a result of the provisions of the Health and Safety at Work Act the Employer cannot accept handover of the installation until full information concerning the installation is in possession of his operational maintenance staff and therefore the Certificate of Practical Completion cannot be issued until the requirements for Operational and Maintenance Manuals and Record Drawings have been complied with.

The Contractor shall provide the final checked copies of Record Drawings in paper and Electronic format in AutoCAD compatible drawing files as well as Adobe Acrobat PDF files on a CD ROM.

Appendix 1

BUILDING SERVICES RISK ASSESSMENT

In accordance with the requirements of the Construction, Design and Management (CDM) Regulations this provides the criteria for establishing the severity, probability and acceptability of risk.

This shall be read in conjunction with the Project Hazard Identification and Record Sheets which define the project hazards and shall be included within the Project Health and Safety Plan by the Planning Coordinator.

SEVERITY SCORING	PROBABILITY SCORING
1. Negligible injuries	1. A highly improbable occurrence
2. Minor injuries	2. A remotely possible but known Occurrence.
3. Severe injuries	3. An occasional occurrence
4. Single fatality	4. A fairly frequent occurrence
5. Multiple fatality on site	5. A frequent/regular occurrence
6. Multiple fatality including fatalities Off site.	6. Almost a certainty.

Severity	Probability Rating					
	1	2	3	4	5	6
Rating						
1	1	2	3	4	5	6
2	2	4	6	8	10	12
3	3	6	9	12	15	18
4	4	8	12	16	20	24
5	5	10	15	20	25	30
6	6	12	18	24	30	36

Add Assessment for severity and probability and read from Probability Rating.

If score falls below bold line, specific preventative, precautionary or control measures are required from the Designers.

* Stage + C – Construction

O&M – Operation and Maintenance

R – Residual Risk (Demolition)

Read in conjunction with Standard Risk Assessment Criteria

BUILDING SERVICES DESIGN RISK ASSESSMENT – HAZARD IDENTIFICATION AND RECORDS

Project : 620 Bristol Business Park	Sheet : 1	Project No: 1521
Element : Electrical & Mechanical services	Completed by : G. Beaven	Date : November 2016

Stage	Activity	Risk	Risk Assessment		Proposals to Control Risk
			Severity	Probability	
D	Removal of existing services	Electric Shock	4	2	Isolate all supplies before commencing work. Use site temporaries only for lighting and power
D	Removal of existing equipment	Manual handling - injury	3	4	Break down the equipment into manageable elements. Use lifting equipment.
C	Installation of services to the building within Hidden Voids	Existing water, electric, gas and comms in the ground. Risk of damage.	4	2	Review the radar survey dwgs and utility record dwgs, cat scan prior to excavation, hand dig where necessary.
C	Use of electricity (230V/400V)	Electric Shock	4	2	Isolate live power supplies. Use 110V tools and plant.
C	Working at high level	Working at height/injury to others from falling materials	3	2	Contractor to provide adequate working platforms and cordon off working areas
C	Drilling / cutting	Harmful substances, dust and debris etc.	3	2	Contractor to provide suitable protective clothing and dust masks etc.
C	Installing new plant and equipment	Manual handling Working in confined spaces	3	2	Contractor to provide method statements and plan installation of plant items. Break-down items into manageable component parts.
C	Water treatment	Handling chemicals	2	3	Submit COSHH assessments and method statements. Avoid contact with skin. Beware of fumes
C	Soldering	Risk of fire due to use of naked flame	4	2	Keep portable fire extinguishing equipment available.
C/D	Asbestos	Exposure to Fibrous Material	4	4	Cease all work upon discovery of suspicious material, provide full sample analysis.

* Stage + C – Construction

O&M – Operation and Maintenance

R – Residual Risk (Demolition)

Read in conjunction with Standard Risk Assessment Criteria

