188 Eversholt Street for Total Oil

Employers Requirements

Building Services

Version 2
June 22, 2017

1. Introduction

This document sets out the high level design principles and construction standards for the building services installation at 183 Eversholt St, London on behalf of Total Oil

This document is written in an instructive voice to the contractor and uses the term provide to set out supply install test commission and undertake all works necessary for a complete working system.

This is a design and build contract and a proactive interface with the client team is critical to the design process.

Develop the design intent and requirements herein into options, detailed design proposals and provide technical submittals, samples and calculations to an agreed programme and actively liaise and seek solutions and highlight issues to the client team.

Refer to Colliers and Threesphere Workplace for details of contacts on the client team, contractual matters and Prelims

This document defines requirements for standards of workmanship, design requirements, processes associated with building services and the key objectives of the building services. The contractor must include for a high standard of design and communication, attendance at design meetings, technical submissions, calculations, landlord submission compliance statements and the paperwork and liaison with the client team expected from a quality designer.

Adherence with the detailed requirements of the tenants fit out guide is required, and the contractor should thoroughly familiarise himself with the guide and include for all requirements as appropriate. Tenants fit guide requirements have not been repeated herein.

Although this document sets out requirements, the contractor is to discuss these with the client team and offer alternatives and options and develop the design within the programme, actively suggesting solutions and value engineering and identifying dates when information is required.

Refer in detail to the architectural drawings, O&M information,Employers Requirements and Architectural ER design statement- these impart a lot of information about the building and requirements and include services items WHICH MAY NOT BE FULLY DESCRIBED WITHIN THIS DOCUMENT AND NEED TO BE INCLUDED

1.1 Existing information

Refer to site and undertake surveys. Existing drawings, O&M and site and reports by others are available but should be considered for guidance only – a site survey is required to minimise risk of variations / claims later.

The following link is for existing O&M information, which is also available directly from the building manager who is located at 203 Eversholt Road
https://1drv.ms/f/s!Ani9QWufrUibmKx6JNrTZIZgXxNb5A

1.2 Tenancy splits

The landlord has recently divided the third floor into two tenancies and at the time of writing this document, the works to separate the demises are not yet complete. As part of the validation check the separating, including but not limited to lighting circuits and controls

1.3 Future scenarios

There are no specific expansion scenarios to consider for this project

1.4 Building control

Discuss solutions to achieve the design proposals with building control, fire officer and other statutory authorities to create a compliant scheme. Include for fire alarm interfaces, fire barriers and other passive systems including magnetic door hold open devices.

Provide solutions/and options for the accommodation stair, liaise with building control to consider the options, and minimise aesthetic

Provide flashing beacons for fire alarm, and all other items required to comply with DDA and part M requirements to satisfy building control. Engage DDA compliance advice as required. Induction loops in all meeting rooms will be kiosk type provided by client as necessary

Provide a smoke detector / sounder in each cellular space or as required to achieve sound level. Also, provide interfaces with AV systems to mute the AV system in event of a fire.

Develop these proposals and agree them with building control at the earliest stage during design phase.

1.5 Services tender price

Provide a baseline price for the required services including all items required for a complete, fully commissioned working system and the required attendance and design input to develop the design with the client. The baseline price should include all the works needed to allow spaces to function as meeting rooms, break out and other spaces, with due consideration to the aesthetics, maintainability and cost

Any proposals or alternatives should be described and priced as separate options or below the line prices using the Contract Sum agreement document

Provide a detailed breakdown of costs and schedule of rates for all typical services items as part of the tender submission

2. Contents

3. Design Requirements

Develop the clients' requirements for services by attendance at meetings, clear communications provision of options and reports and demonstrate the technical merits of these to the client team upon request to allow fuller comparison of advantages and disadvantages.

Liaise with the client team including project manager and engineering representative and statutory authorities including to develop the building services including, but not limited to;

- Office and meeting room fresh air, cooling and heating proposals
- Control systems
- Review and survey of existing furniture and technology which is nominated by the client to be used on the new project.
- Security and CCTV systems
- Incoming data
- Containment routes
- Power and data presentation methods to desks and underfloor
- Acoustic separation between rooms and attenuation of ductwork in particular
- Acoustic separation of meeting rooms / boardroom
- Equipment at main meeting room/ pantry / breakout and avoiding any pumped drainage
- Proactively seek details and make proposals for coffee machines and other tea points equipment, noting the special drainage requirements for commercial dishwashers, high electrical supplies for large coffee machines and need to avoid pumped drainage, management of heat build up
- AV requirements and the power, cooling and data to support them
- Controls
- Leak detection and alarm as required by landlord
- Comms rooms layouts (including patch rack)
- Comms room resilience of power and cooling systems
- Feature lighting and Lighting design details and luminaire choice
- Look and feel as relating to services – matching sockets, set point adjusters
- Furniture including stacking arrangements, storage, weights, how the loose chairs in large spaces such as boardrooms interlock / stack

3.1 Codes, Guides & Regulations

Design and install the works to comply with all current and relevant statutory instruments and regulations, and best practice, the requirements and regulations of all relevant local authorities, fire brigades, water and electricity authorities.

Any such portion of the works requiring the inspection and approval of such authorities shall not be built in, covered or otherwise obscured until such approval has been obtained, and should be discussed and agreed with the appropriate authorities by the contractor prior to order or construction to reduce programme risks and abortive costs. Submitting information to the client team will not absolve the contractor of his responsibilities to liaise directly with all appropriate authorities.

Any additional costs incurred by the contractor for non-compliance with this clause shall be borne by the contractor. Any client monitoring team additional fees will also need to be paid by the contractor if the quantity of additional works imposed on the clients' representatives exceeds £1000 for each relevant person.

Ensure all the equipment included in the tender and used on the site is manufactured and installed in full compliance with all British, European Standards and EEC Directives.
Unless otherwise specified, the whole of the works shall comply with the requirements of all relevant British and European Standard Codes of Practice.
The design and installation of systems and materials shall conform to the requirements of the latest edition of the all applicable guides and codes of practice, including but not limited to:

British Standard BS7671 - IEE Wiring Regulations
Electrical Safety Council
The Clean Air Acts
Regulations under the Factories Act
The Control of Pollution
CIBSE Codes of Practice and Guides
CIBSE Commissioning Codes
CIBSE lighting guides, code for interior lighting, External lighting guides
Water Bye Laws
Loss Prevention Standards
Fire Precautions Regulations
The Building Regulations
Health and Safety Regulations
Electricity at Work Regulations 1989
Electricity Supply Regulations
CE Mark
Workplace Regulations
Noise Regulations
Construction (Design and Management) Regulations
Disability Discrimination Act (DDA)
Environment Agency requirements
Environmental Health Officer
DEFRA requirements
NJUG
Control of substances hazardous to health (COSHH)
Insurer's Requirements (contractor to discuss with client)
The Electromagnetic Compatibility Regulations 2005 (SI 2005/281).
British Standards
BS EN 61000-6-1 Electromagnetic Compatibility (EMC). Generic standards. Immunity for residential, commercial and light industrial environments
BS EN 61000-6-2 Generic standards. Immunity standard for industrial environments.
BS EN 61000-6-3 Electromagnetic Compatibility (EMC). Generic emission standards. Emission standard for residential, commercial and light industrial environments.
The Machinery Directive 2006/42/EC
EN 12464-1:2001 and EN 12464-1 (Lighting of Indoor Workplaces)
Earthing standards including EN 50522, EN 50310: 2010, EN 50174-2: 2001, IEC 60050-195

Authorities shall be notified as necessary about the connection of electricity.
Any such portion of the works requiring the inspection and approval of such authorities shall not be built in, covered or otherwise obscured until such approval has been obtained. Any additional costs incurred by the contractor for non-compliance with this clause shall be borne by the contractor.

3.2 EPC

An EPC is not required on this project

3.3 Contractors Drawings

CAD drawings of existing services, structure and architecture are not available as part of the tender. All contractor drawings shall be produced using AutoCAD version 2008 or later, this includes working drawings, and O&M information.

Architectural CAD drawings of the prior layouts are available but the accuracy of these cannot be guaranteed and the contractor should measure and investigate actual dimensions on site

Provide the following information is as a minimum requirement: -

- General arrangement drawings including plans, elevations and sections detailing the layout of the equipment described in this works package.
- Drawings showing clearly the arrangement of data and power at the desk
- Detailed comms room drawing and elevations including doors swings, racks, UPS, cooling, distribution board, lightingand smoke detectors
- A description of operations describing all control interfaces both new and existing, including boiler arrangements, fire alarm cause and effect, solenoid valve, air handling unit scheduling, lighting controls, fan coil system arrangements and set points
- Full electrical characteristics (where applicable) including power, voltage, current and power factor
- Schematic of air system showing air volumes and balancing arrangements
- Small power and data layout drawing over the floor including AV, Wifi, access control
- Schematic drawings for all equipment associated with the works package described herein

Produce drawings that contain sufficient detail as defined in the BSRIA guide BG6 and to enable the client and landlord team to review them and for sub-contractors to utilise them as the basis of the Working and Installation Drawings. The drawings shall be sufficiently coordinated and detailed so that clashes between differing mechanical systems and the various electrical systems are avoided. The drawings shall be suitably annotated so that the method of installation can be determined.

Prior to the commencement of the drawing package, produce a schedule of drawings, technical submittals, calculations indicating dates for their proposed issue to suit the commencement of the construction programme. As appropriate highlight an issues or possible impacts on programme

Drawings and technical submittals are to be issued to the client team for comment, although any comments made do not alleviate the Contractors responsibility for the accuracy of information provided.

A two-week period shall be allowed within the programme for return of comments from the client team and statutory authorities.
The Contractor shall be responsible for any error, discrepancy or omission in any drawing prepared by him or on his behalf by subcontractors, manufacturers, or the like regardless of whether the clients team has commented or given approval.

Ensure sufficient information is provided in the O&M to ease future requirements including changes to the office layouts or adapting to day 2 scenarios. The O&M should contain calculations, and detailed drawings to explain the design, commissioning rates for air demonstrating flow rate per meter square, cooling allowance per square meter, locations of plant space for future comms room cooling equipment.

3.4 Submissions and samples

At the commencement of the project;

- identify plant to be purchased and provide a programme for orders and a long lead schedule showing sign off date and periods for client team approval
- Provide a schedule of the proposed technical submissions for each piece of plant proposed allowing the design team two weeks to comment on the document this will include calculations.
- Provide a schedule detailing every drawing that will be produced with a date assigned to it

Provide a tracker sheet and submit WEEKLY listing the status of each submission including date submitted and date required and current approval status A, B or C.
Provide samples of any item visible to client, particularly luminaires and accessories
Provide long lead schedule showing the procurement of all plant and show dates for orders on programme

Provide technical submissions and compliance statements for all plant and equipment. The compliance statement will be relevant sections of the specification / drawings and accompanying calculations attached to the submission so that it the single document demonstrates compliance
Provide CAD drawings to the level of detail outline in BSRIA guide BG 6 as a minimum and higher where defined in this document
Provide a commissioning programme showing key witnessing dates and phased completion showing early handover of node and server rooms
Provide a document defining the procedures and programme for full testing and demonstration of all systems including an integrated services test.
Provide full operating and maintenance manuals, test certificates, CAD drawings, manufacturers' data. Organise into a legible and simple electronic system
At an early stage produce coordinated RCP drawings in liaison with architect. These drawings will include dimensions for key items.
Provide design drawings and working drawings. Keep a clear organised system and issue sheet and make a full current set at A0 available on site at all times. Keep the site set up to date.
Provide schematics for electrical and mechanical plant areas, water proof as necessary.
Provide risk assessment and design checklists.
Provide a detailed cause and effect schedule for the fire alarm schedule – this will need to be developed from the existing system
Provide a calculation for the lighting demonstrating compliance with part L requirements of energy efficiency – this will include the circuit watts and quantities of all lights – liaise with building control / approved inspector to his satisfaction.
Provide a set of drawings indicating the emergency lighting lux level in each area / room, every 5m along centre line of corridors and for each 20m² on open plan areas/ larger rooms.

3.5 Calculations

Provide full calculations and assessment of final points lists for all sections of the design. Accompany these with brief simple explanations of keys strategies and decisions and statements for issues like DDA, legionella, standby power, leak detection and other common items where a simple explanation is required.
Arrange as a clearly organised pack of information before seeking approval. Submitting a pack of information for a whole system vs for individual plant items is highly recommended so that the services requirements can be understood

For heat loss calculations use Hevacomp or similar– full IES type calculation is not required but is also satisfactory. Submit the calculations in electronic format with the O&M manual. Liaise with the landlord team, architects and demonstrate that reasonable endeavours have been made to find U-values and other information like G value for glazing.

Provide calculations for fresh air, ductwork sizing and acoustics at grilles for both new and existing systems. Accepting that some assumptions must be made at the time of tender, for the site process and post site occupation It MUST NOT be assumed that the existing design and load capability and commissioning set up is correct – undertake validations and calculations from first principles and calculate heat loss and gain and generally ensure that the final system function correctly. Provide a full calculation pack to demonstrate that the systems function correctly and are suitable for the new proposal and variations of the layout such as future breakout or arrangements where sliding folding doors change the occupational density and heat loads within the space.

For ductwork calculations, key examples of each duct are required and the schematic should show;

- pressure drop,
- Air flow flowrate,
- duct dimensions
- loss factors for each bend

Provide a specific fan power calculation and statement in regards meeting requirements / legislation.
Provide pipework calculations produce a spreadsheet showing the pressure drop calculations, index runs

Provide schematics of the fan coil systems (new and existing) showing pipework distances from condensers

Provide electrical design calculations in Amtech format or similar and include the distribution system from incoming electrical mains through the transformer to final circuit, and feeds to roof plant. The calculations/schematic should include cable sizes and installed lengths even for existing sub mains.

For lighting calculations provide dialux calculations, and emergency lighting calculations
For cooling and heating and Ventilation provide hevacomp or similar for all rooms and open plan areas.

THE CONTRACTORS ATTENTION IS DRAWN TO THE FOLLOWING PROCESS WHICH MUST BE FOLLOWED – key to this is that calculations get approved before drawings are undertaken and equipment is ordered.

- FIRST -CLIENT BREIF TAKING MEETINGS
- SECOND -DESIGN AND CALCULATIONS
- THIRD -SUBMISSIONS FOR EQUIPMENT APPROVAL
- FOURTH- DESIGN DRAWINGS
- FIFTH -WORKING DRAWINGS
- After the above – installations can commence.

3.6 Contractors Deliverables

Actively seek information on the existing installation undertaking investigations into existing services on site and liaising with manufacturers. Keep the client team representative appraised of the progress on these matters

Engage suitably qualified designers and specialists as required and seek advice from the client team representative for clarifications

Provide the following as a minimum

- If requested, Provide an Estimated Maximum Demand calculation power to show that there is adequate power available for new scheme including comms equipment, UPS and other new condensers / mechanical plant, comms room– apply appropriate diversities
- Lighting calculation for each different room type in dialux – where similar room types are different sizes and shapes submit individual calculations
- Lighting calculation to show 500 Lux on face of the cabinet within comms room.
- Distribution board chart in NICEIC format – (to be in O&M and fitted at each board)
- Grille acoustic nonagram / calculation sheet and grille clip technical page.
- Heat gain calculation
- Fresh air calculation showing air per room, speed in ducts for acoustic checking, grille air speed and noise level
- Resultant noise level in each room
- Cross talk attenuators tech sub
- Calculation showing cooling of any break out spaces which have several fridges and will need DX cooling to provide cooling even outside working hours to prevent heat build-up in the space
- Tea point / break out are boosted extract fans sizing calculation and attenuator tech sub and calculation for duct and negative pressure of tea point. Boosted extract required at break out and tea point areas especially near microwaves
- Clip sheet for each light type showing manufacture, exact part number, colour temperature, dimmable / control gear detail and any emergency pack
- Emergency lighting calculation using dialux or similar calculation programme to show the lighting level for new and existing lighting.
- Measured fire alarm noise level annotated onto plans of the building and witnessed by building control
- Revised BMS description of operations
- Fan coil selection tech sub including static pressure and acoustic calc
- Attenuator selections calculations where ducts cross partition walls
- Lighting scene set arrangements, with proposals showing how lighting will be commissioned to lux levels on the working plane rather than fixed % of light output
- BMS graphics proposals
- Cold water pressure calculation demonstrating the pressure available at the boiling water tap / each tea point (new and existing)
- Physical samples of sockets, switches, grille and other visible accessories. Provide physical samples of socket blocks with, conduits, data, grid outlet box, grommet and desk top power module to demonstrate desk arrangements

Provide the following drawings as a minimum

- Electrical schematic
- Desk layout or mock up showing grommet, umbilical, data, desktop power
- Mock up or high quality visualisation example of client meeting room with wall mounted screen and layout of sockets, data, tv wall mounting kit, AV containment
- Lighting drawing showing controls, lighting circuits, LCM switches and control zones
- Ductwork drawing
- Detail of return air / section through meeting room wall to show attenuators
- Cold water pipework drawing showing solenoids and pipework sizes
- Comms room drawing - including elevations showing dx, leak detection
- Roof plant layout drawing
- Detailed submission and RAMS for statutory authorities for any new plant at roof.

- RCP showing access panel requirements and including equipment such as smoke head/sounder positions, lighting, grilles, lighting controls, CCTV point and AV equipment
- Low level data and small power
- High level data and small power
- Schematic of fan coil pipework and fan coil system
- Schematic of air systems (noting meeting room air quantities and seats and indicating air speed on ducts to this area)
- Tea point/drainage elevations showing power, ventilation of heat, access for maintenance and pipework including feed from riser, pump locations
- Fire compartment drawings for accommodation stair showing interfaces with fire dampers etc. as required by building control
- Provide a drawing showing grommet and any floor box positions with the desk and furniture layout – and a 3d view showing the arrangements this does not need circuits, circuits or manufacturer details etc. – the drawings purpose is purely to focus on coordination with furniture and to allow a neat appearance.

3.7 CDM

Provide risk assessment and design checklists.
Demonstrate competence of your design team including CVs and qualifications and experience of similar DESIGN work.
A technical services manager or similar services biased professional shall attend project meetings at least monthly in to represent the role of services designer.
Provide risk assessments as required. In particular, roof plant maintenance, installation, DDA requirements, power changeover system operation and reinstatement avoiding paralleling of supplies for comms room via UPS

3.8 Drawings level of detail

The contractor will need investigate, test and supplement the existing information to provide the level of detail required by the final installation which is intended to ease future maintenance. Generally, refer to BSRIA guide BG6 for further detail and examples of drawings content at design and working drawing stage.

3.8.1 Mechanical Services Schematics Minimum Level of Detail

Drawing Content	Detail
Reference Numbers of main plant items/components	✔
System configuration complete with all system components	✔
All pipe work and ductwork sizes	✔
All plant references	✔
Component references such as commissioning sets, supply air grilles, extract grilles	✔
Directional flow arrows on all pipe work and ductwork	✔
Controls sensors	✔
Flow rates at all balancing devices and in main risers and each final connection	✔

3.8.2 Electrical Services Schematics Minimum Level of Detail

Drawing Content	Detail
System configuration complete with all system components	✔
All protective and control relays	✔
All panel lamps	✔
All current transformers and metering requirements	✔
All interlocks/key interlocks	✔
Cable references for all cables, cable lengths, cable sizes, cable type, installation method	✔
All plant/panel/breaker references etc.	✔
Breaker/switch/fuse frame sizes	✔
No. of poles and presence of motor operators	✔
Breaker fault ratings	✔
Breaker types (draw-out/plug-in/fixed)	✔
Breaker normal positions	✔
Protection settings for all protective devices, relays etc.	✔
Settings of time delay control devices	✔
Prospective short circuit currents at all panels	✔
Earth fault and impedance level at all points	✔
Maximum demand values at each panel	✔
Nominal and fault ratings of all busbar systems	✔
Earth bars and arrangements	✔
Neutral sizing and neutral earth links	✔
Surge protective devices	✔
Spare devices/capacity	✔
Interfaces to other panels and systems (BMS/SCADA)	✔
Ancillary equipment (PFC/AHF etc.)	✔

3.8.3 Mechanical Services General Layouts Minimum Requirements

Drawing Content	Detail
Main plant locations	✔
Main service distribution routes	✔
Riser locations	✔
Weights and dimensions of major plant items	✔
All pipe work and ductwork sizes	✔
All plant references	✔
System components such as valves, dampers, grilles, etc.	✔
Component References such as commissioning sets, supply air grilles, extract grilles, etc.	✔
Directional flow arrows on pipe work and ductwork	✔

3.8.4 Electrical Services General Layouts Minimum Requirements

Drawing Content	Detail
Main plant locations & Critical setting out dimensions	✔
Main service distribution routes & sizes	✔
Riser locations & details	✔
Weights and dimensions of major plant items	✔
All cable tray, trunking, etc. size	✔
All plant references	✔
All circuit references	✔
Cable details on containment (i.e. cable numbers to ensure separate routing of A & B system cabling)	✔
Cable references	✔
Light fittings with references, lamp orientation & emergency lighting	✔
Lighting control details with circuit references	✔
Smoke detectors indicating type of detector	✔
Fire alarm sounders, beacons & ancillary devices	✔
HSSD Detection systems	✔
Small power layouts with circuit references	✔
Public Address speakers, microphones & wiring details	✔
SCADA/EMS system equipment locations & wiring details	✔
Sections & details to illustrate coordination	✔
Lightning protection system tape routing, bonding & earth points	✔
Builderswork in connection with services	✔

3.8.5 Plant Room Layout & Sections Minimum Requirements

Drawing Content	Detail
All Plant Positions	✔
All Valves, Dampers, etc.	✔
All Pipe work and Ductwork Sizes	✔
All Plant References	✔
Directional Flow Arrows on Pipe work and Ductwork	✔
Maintenance Access Requirements	✔
Standard Drawing Notes	✔
All Cable References	✔
Sections through Cable Ladders showing Cable Details and Phase Rotation	✔
Switch Panel Elevations	✔

3.8.6 Services General Layouts Minimum Requirements

Drawing Content	Detail
Plant weights and dimensions	✔
All plant references	✔
All circuit references	✔
Sections & details to illustrate coordination	✔
Builderswork requirements	✔

3.9 Approvals

All information associated with the services shall be submitted to the Employers Agent and team for approval prior to any works on the respective systems commencing. At least two weeks for approval should be granted to allow the teams comments to be incorporated and discussed.

Authorities shall be notified as necessary about the connection of electricity / changes to metering arrangements to facilitate back up power as soon as possible to avoid delay to the project.

Any such portion of the works requiring the inspection and approval of such authorities shall not be built in, covered or otherwise obscured until such approval has been obtained. Any additional costs incurred by the contractor for non-compliance with this clause shall be borne by the contractor.

4. Tender Documentation

4.1 Other Documents and Requirements to be met

Refer in detail to the architectural drawings, Room Data sheet Employers Requirements and Architectural ER design statement- these impart a lot of information about the building and requirements and include services items WHICH MAY NOT BE FULLY DESCRIBED WITHIN THIS DOCUMENT AND NEED TO BE INCLUDED

Undertake the works in line with the following hierarchy of

1. Statutory requirements
2. British standards
3. Requirements specifically detailed in this document
4. industry best practice guides, including BCO guide, CIBSE technical memoranda, NICEIC guidance

Actively discuss the works with the landlord team and refer to the landlord documentation including the tenants fit out guide to understand landlord requirements relating to BMS, metering, shutdowns and isolations and the contractor will be deemed to be familiar and included for these requirements.

4.2 Drawings

Refer existing architectural drawings and draft proposed layout included with the employers' requirements

4.3 Authorised Engineer/Permit to Work System

Employ an authorised person to carry out electrical switching on site. This person shall be solely responsible for the switching and safe operation of the electrical systems.

Operate a permit to work system within all electrical switch rooms and plant rooms.

Submit the authorised person's certificate, which must be fully up-to-date, together with curriculum vitae of the persons' experience to the Engineer for approval.

The Client team reserves the right to reject this person without prejudice, if he considers this person inexperienced. The Contractor shall submit an alternative authorised person for approval at no extra cost to the contract. This shall continue until the Engineer is satisfied.

All works into and/or affecting live buildings will be carried out under a permit to work system. The Contractor will be responsible for preparing detailed method statements and associated risk assessments for the works.

The Contractor shall allow a 14-day period to obtain approval of all method statements prior to commencing the associated works.

We suggest that a permit to work system is operated for all risers and plant rooms.

4.4 Design Considerations

No materials shall be specified which are deleterious or harmful to human health or the environment, during either their installation or during long-term disposal or degradation.
All materials and equipment used shall generally have an expected life as appropriate for the system and acceptable International Standards, as detailed in the previous section.
The installations are to take account of the overall appearance of the building in as much as the colour and location of all external components are to be co-ordinated with the external fabric and features.
Services are to be laid out in a neat and logical manner using designated zones and are to be concealed from normal view generally except in plant areas.
All plant and equipment is to be located for safe and proper maintenance.
At an early stage indicate access requirements in key front of house areas – provide visualisation to the client team indicating proposals and showing consideration has been given to services to minimise access panels and site the equipment in a maintainable location where practicable.
Routine maintenance is to be possible without the removal or dismantling of other plant and equipment. The contractor shall allow for the demonstration of all equipment to the Client's Facilities Management team.
All new cable containment is to include spare capacity of at least 20% space. All cables must be fixed onto the cable containment.
Distribution or connection boxes must be accessible for maintenance.
New switchboards and panels must include a 20% minimum spare capacity in regards spare after design current and spare ways across a variety of sizes. Distribution boards for comms server rooms and node rooms will be fully equipped spare to minimise shutdowns for future works - use typical MCB sizes for equipped spares
The Contractor shall ensure that all plant and equipment is installed such that it is fully maintainable. The electrical installation must cater for concurrent maintenance of all equipment and components without affecting the load.
The MEP services installations shall be such to provide a service, which will have a minimum life expectancy of twenty-five years generally – except those components rated less in the CIBSE guide outlining plant life when a planned maintenance programme in in place
The installations shall be such that the equipment shall be easily maintainable using standard tools and equipment. The need to use specialist tools and equipment to carry out maintenance shall be avoided if possible. If special tools and/or equipment are required, the contractor/supplier must highlight this in his tender submission.
All sections of the MEP Services installation shall achieve a standard, which as a minimum provides the following: -

- Conformance with the levels of finish and quality required
- Can be maintained
- Operational safety and hygiene.
- First Class materials which are durable and of proven reliability and performance.
- Systems that maintain their integrity during their operational lives.
- Systems that fully meet the needs and constraints that the property is intended for.

4.5 Enhanced Capital Allowances

Where practicable all components or systems associated with the products in this specification that qualify for the Enhanced Capital Allowance (ECA) scheme shall be specifically highlighted as such within the supplier proposal. This shall comprise of a separate schedule of qualifying components/systems accompanied by certificates of compliance.

4.6 Services Consulting Engineers Role

The Services Consulting Engineer is appointed on a Performance Brief basis where the successful services contractors shall be responsible for design. The client's services consultant will not be providing design drawing or calculations, and the contractor should propose solutions and options.

It is important to understand that issues caused by the contractor through error or negligence may result in further time being required by the clients' agents including the Services consulting engineer, and that costs relating to this will be charged to the client but the client may elect to re-charge these costs back to the main contractor.

The services consultant's duties are limited but include the following:

- Providing Employers Requirements document
- Review and comment on M&E Sub-contractor submissions
- Site inspections during the contract and attendance at some workshops
- site inspection / witnessing at end of project – after the contractor has provided his detailed snagging sheets the services consulting engineer will review them – it is not the role of the services consulting engineer to provide quality control or snagging services for the contractor.
- Review of "As Fitted" record drawings and O&M manuals.
- Attendance to witness testing 2 visits (additional or abortive visits will be chargeable to the contractor at a rate of £140 per hour plus travelling time to central London – 1 hour each way) – if for instance the site is not ready for witnessing or if the system fails a test and needs to be repeated

5. Programme considerations

A key item for contractors which may be a risk to programme is the approvals processes of proposals and sign off from the landlord or client team. Also, consider diversions and adaption for accommodation stairs added.
We emphasise the need for the contractor to organise and attend regular meetings with the landlord and client team, representatives and statutory authorities, as required, but including as examples the following;

- Impacts of services to visual appearance
- Clear head heights
- Sign off of samples for lighting, grilles, sockets, controls, and other visible services
- Selection of equipment on long lead and confirmation of order dates and any handling charges
- Impacts from validations and reporting
- Approval of proposals and drawings and some acknowledgement that not every light fitting (for example) will be accepted and a second round of approvals may be required
- New connections or interface with building control / approved inspector
- Air flow measurement, cooling / heating commissioning results and recommendations
- Connection back into landlord water systems and laboratory test result duration
- Fan coil maintenance procedures – confirmation that fan coils may be maintained by from the future maintenance team
- Air systems and cleanliness – protecting extract ducts during work and swab test at completion
- Commissioning and witnessing
- Documentation and O&M manuals including EPC and other mandatory requirements
- The hand over process including client training

Follow good practice and in the baseline option and programme allow for a procedure typically as below

- Submit proposals
- Review by client team
- Forwarding to statutory authorities/approved inspector
- Incorporate comments
- Revise and resubmittal for approval

Target key items such as the air systems and new plant for early submission to landlord and client team.

Take note of the following when developing a programme for the works

- Validations
- Submittals, including drawings, long lead schedules, samples and calculations
- Design reviews
- Use of incumbent contractors
- Method statement for water treatment regime
- Noisy works outside hours
- Testing, commissioning and witnessing
- Early hand over of comms room systems – contractor to agree with client

5.1 Noisy Works

Highlight any noisy works at an early stage and agree a time with the contractor
Fixings for fan coils and services should use non drilled type fixings as far as practicable and unistrut or similar used to allow some flexibility to move drop rod positions / allow for future fixings.

5.2 Existing / Incumbent contractors

Investigate using existing contractors familiar with the systems on site and include for costs and attendances

Thoroughly investigate the incumbent contractors' ability and resources to meet programme and quality requirements and report to the client team any issues. Actively manage these subcontractors.

Identify any costs for ongoing maintenance of systems for the client but do not include in the tender sum

Incumbent contractor may include the following systems – liaise with the landlord team to agree the works

IAT for Fire Alarm works 0208 546 1100 – Ask for Joseph

PES for Access Control – Ask for Mike Millard or Steve Brixey

AC system – suitable person for Panasonic system

6. Site Phase

6.1 Validation and testing at start of contract

Undertake the following validations of services at the start of the contract and report any issues

- Simple test of drainage in toilets and where future connections will be made to determine if drainage systems are clear and not leaking
- Photographic survey and record of front of house areas key parts of the demise, entrance core areas noting damage before protection applied, and of the roof round pipework, and insulation to show any damage before our works commence.
- Test the water pressure for the landlord boosted cold water system to see if it will be adequate for boiling water taps, showers or other devices which have a minimum pressure at the point of use.
- Take water quality samples from potable water source and obtain a water quality test from lab and comment to client team on results
- Test that the fire alarm cause and effect is working and fire alarm has no faults
- Test disabled toilet alarms
- Test emergency lighting duration for any lighting to be retained
- Obtain commissioning information and validate a 4 number number of fan coils,
- Test air flow air flow volumes onto floor and at spigot of 4 number fan coils and compare to commissioning data. Obtain commissioning data from landlord
- Check that there are fan coils and volume control dampers to match landlord drawings
- Engage commissioning engineer to verify air flow rates on Supply & Extract at each of the main risers on each floor and report against commissioning data, note the main AHU fan setting in the report
- Operation of controls system to change fan coil temperature set points and other plant on floor. provide a single page report simply stating what was tested and whether it failed
- Undertake a test of the existing electrical circuits where there is no circuit chart or where any part of the circuit chart is in error or unreadable. Trace any unidentified circuits at the start of the project. Highlight and issues in a report and set out proposed solutions

6.2 Strip Out Works

Strip out any equipment made redundant by the work or by agreement leave in situ in an appropriate manner where it could assist with future works or reducing dilapidation costs to the tenant.

7. Electrical Services

7.1 Distribution Boards and sub mains

No new distribution boards are anticipated. Adapt the existing CAT A distribution boards and provide new circuits to suit using RCBO to feed busbars underfloor in accordance with IET and NICEIC recommendations.

For the tea point provide local isolation in the form of an isolator switch bank located discretely inside a cupboard – do not locate isolators on the splash back.

Develop comms room power requirements with client IT dept. but generally a new distribution board, tap off unit and separation from the tenant distribution board is not required in the base scheme – feed ups from

Provide power supplies to the comms room cooling plant at roof using armoured cable from the tenant distribution board

7.2 Meters

Take meter readings at the outset of the project, including recording mpan number for the O&M manual

Provide landlord approved meters on water systems if required.

Link any meters new and existing to the BMS / EMS system only if required by the landlord

7.3 Comms room power

Feed the comms room UPS directly from the tenants distribution board (via commando socket) and label the circuit clearly, adding a large RED engraved laminated plastic label, screw fixed to the board with m4 instrument head screws stating “Feed to comms room supply and cooling– do not isolated without express written permission”

Provide a commando socket to allow UPS to be disconnected without electrical wiring.

The ups will feed the power distribution strips in the rack.

Lighting in comms room will be fed from general distribution - not the UPS - in the event of power failure comms room will have emergency lighting only

Liaise with the client to accurately estimate the power of the racks. It is currently anticipated that 1 racks will be required, and for the purposes of tender they shall be assumed to be 3kW load

Provide an earth bar in the comms room and link to main house system

Provide small power in comms room for DX cooling and for each rack from a dedicated circuit board and circuit and label at the board

Discuss commando sockets and rack power arrangements with client and split of works between IT, data, client and electrical teams.

7.4 UPS system

The client will free issue a UPS. Actively liaise to integrate this into the scheme in technical details and with regard to programme and move weekend.

7.5 Small power

Adapt and supplement existing small power systems to provide small power throughout to suit the new layout and requirements.

As a baseline for compliance with latest IET regulations allow for RCD at the distribution board for each small power circuit. This may require the distribution board to be changed if single module RCBO are not available to fit within existing – include within the tender for this as necessary

All visible / wall fixed accessories are to be brushed stainless steel high quality flat plate, ideally with concealed screws

At each meeting room table provide a 4 module floor box containing 2 twin power and data and 1 outlet for display port, HDMI , VGA, noting that cables might rise up leg of table rather than terminating into floor box. Develop design with client.

Discuss future uses of the rooms and layouts with the client and propose small power layout to suit giving consideration to grommets, floor boxes, screed, future use and neat routes from the floor void to the top of tables, desk, workstations, cubicles etc. and avoidance of tangling with chair legs and general neatness. This matter is critical to the success of the project and the design team, furniture selection and IT/AV team need to coordinate to get the best for the client.

Avoid three compartment white plastic trunking and offer design using conduits within partitions wherever practicable to neaten the installation

Minimise / avoid works to the screed, the routing of cables in the ceiling void is permitted – include for suitable containment and consider modular wiring systems

Consider providing a small consumer unit in the kitchenette to ease future changesand provide simple isolation.

The coffee machine on the pantry worktop is a “flavia dispenser”. Discuss connection with client and arrange neatly I isolator for water should be accessible but below worktop

The small power works generally include the following;

- In pantry provide small power outlets for
  - commercial dishwasher
  - 1 fridges
  - 1 microwave
  - 2 twin socket on splashback with integrate USB power outlets x2 on each twin socket.
  - 1 ipad screen
  - 1 chilled water point
- At copy point provide power for 2 printers at 2 separate floor boxes or wall mounted – develop the design with the client
- Provide all relevant circuits with RCD or RCBO at 30mA.
- Adapt and reuse existing circuits where practicable. Advise if there is to be any supply of more than 4 offices or 16 desks on a single circuit (although the 32A circuit can take more load it would be bad practice to lose power to too many desks in the event of a single circuit failing)
- Use a maximum of 32A RCBO to feed each busbar circuit. Do not use type B breakers.
- For all small power tap offs use 5m length leads – unfused and rated to 32A to coordinated with 32A RCBO supply. The 5m lead is particularly well suit to grommets and feeding several desks from a single grommet.

- Arrange busbars in locations where they can be accessed for yearly maintenance
- Avoid routing power and data cables through areas of the ceiling where there is limited or no access
- Determine if the client requires powered desks to raise and lower and design the grommet position and coordinate the power and data arrangement to suit
- Note desktop convenience and 2 USB power outlets will be provided by the client / in furniture package- clarify in tender but allow for suitable power connection and earthing of desk and RCD protection.
- Provide power at resource points / reprographic areas for shredders
- Provide power for glass fronted fridges in meeting rooms behind credenza locations and coordinate position of this with joiners/ future
- Provide small grommets or floor boxes by discussion with the client for new meeting / rooms with desktop presentation and cables rising discreetly in the furniture
- Provide dedicated 32A RCBO circuits for reprographics areas and small tea points splash back power– DO NOT SHARE TEA POINT CIRCUITS WITH DESKS.
- Provide power in each reprographics / resources area for shredders. Also provide power for shredders in HR, Legal, finance, consulting, sales and marketing
- Provide power, water and drainage for one cycle full sizes dishwashers in the pantry
- Provide general use sockets for cleaners use throughout to match finish of local accessories and a socket for xmas tree in reception. Provide cleaners sockets are separate power circuit – not fed from busbar but use a normal pin configuration
- Provide fused connection units for each repositioned/new fan coil unit and adapt existing circuits to suit. No more than 5 fan coils per circuit will be permitted and existing circuits may be extended up to this limit
- Provide fused connection units for new access control doors as required as and liaise with security specialist and determine if more than one door can be served by one fused connection unit. Ensure these are accessible but not visible.
- No power for CCTV cameras – assume PoE and assume CCTV head end is in comms room
- Provide new small power for new condensers for comms room or as required to cope with cooling for dense occupation in meeting rooms if required – subject to your calculations
- Where sliding folding walls are proposed, consider small power arrangements for each permutation
- Provide general use power sockets not fed from the underfloor busbar – for cleaning and general use – these are to be wall mounted where partitioning allows – show a single socket in grommet to client for approval of other areas where wall finishes are sensitive and do not suit sockets
- Pantry / breakout – provide dedicated circuits and do not mix circuits with underfloor busbar which feeds desks. Provide a cable way / services zone at rear of breakout cabinets
- Provide local isolation switch bank in discreet location for all break out spaces
- Provide dedicated circuits to the fridges and have neon light on fused connection unit to identify if power has failed to fridge
- Provide small power above credenza units in meeting rooms.

Note the comms rooms racks will have rack mounted UPS included and this will be provided by the client.
All new visible accessories will be brushed stainless steel MK edge range or similar flat plate by approval – note that set point adjuster, sockets and light switch should match.

The accessories must match – highlight any discrepancies anticipated before second fix. Lighting switches, thermostats and socket finishes and plates must match including insert colour which should be white or black throughout

7.6 Desk Power and Data Arrangements

A circuit breaker at each desk is not required.

Provide a 2 socket and 2 USB power unit for convenience on top of the desk. This is to be part of the furniture package but will plug into the sockets in tray below desk. Test 5% of the convenience sockets and USB power after connecting using a martindate and check the voltage.

Liaise and input into the furniture selection process to make the power and data arrangement understood.

Provide a drawing showing grommet and any floor box positions with the desk and furniture layout – and a 3d view showing the arrangements this does not need circuits, circuits or manufacturer details etc. – the drawings purpose is purely to focus on coordination with furniture tea and to allow a neat appearance.

Provide grommets to serve the general power and desks. Design the system is to minimise the number of floor boxes and grommets by providing a single large grommet for desks. This will have 1 x 8 outlet. This means that for a group of 4 desks there will be

- Either 2 or 4 power conduits depending on whether one tray and socket block can feed desks back to back. Less conduits are prefeed to block of 10 sockets would suit two desks.
- 8 data cables – in either 1 or 2 conduits

Arrange the grommets and provide a lid as below. Provide a sponge / foam type seal so there is not a gap where conduits pass through grommet. If possible provide grommet option to match floor colour

Figure 1 large grommet holding several conduits

Figure 2 Data outlet gop plates / pods

Figure 3 Typical convenience socket with USB power

Discuss the provisions for power and data at each desk with the client including those for future desk position using the following as a starting point

- 0 UPS maintained sockets
- 4 non-maintained power sockets per desk. One of these will have the desk top convenience plugged into it.
- 2 sockets and 2 USB power outlets easily accessible for personal use – as part of furniture package and plugged into the socket block in tray
- 2 data outlets per desk into an RJ45 LJ6C outlet-presented at a GOP box (develop proposals with IT consultant and client)
- Supply and installation of patching cables from the GOP box to telephone, and GOP to pc will be by the contractor NOT client IT team. Install cables ready for use and use colour coding on patch cables to indicate which is to phone and which is from phone. Agree colours and numbering nomenclature with client IT team.
- Voice over IP telephone system is going to be used
- Provide a flexible metallic conduit to afford protection for power and data through grommet and up to tray

Arrange desk power to use a single large grommet for a group of desk to reduce grommet quantities and ease coordination and improve neatness, especially in areas where future use is to be considered. The image below indicates typical locations of grommets to sever the desks. Key points

1) The grommet / umbilical is never towards the corridor or visible
2) Co-ordination with furniture package is critical
3) Accurate floor grid survey is required
4) Templating of desks is required.

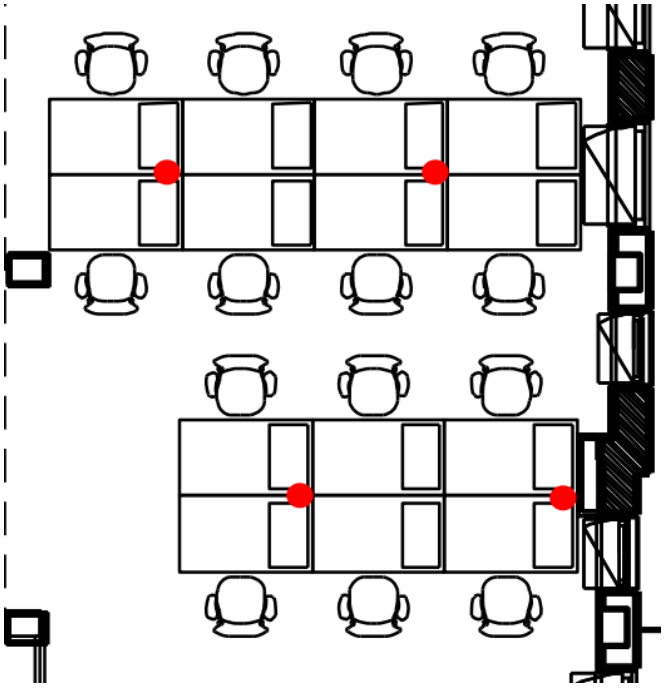

Figure 4 typical grommet arrangement

If fuses are provided in the socket they should be rated at 3.15 or 5A. Discuss socket options with client and present advantages and disadvantages. Comply with BS 6396:2008

Figure 5 Typical socket block with fuses, switch and 5th outlet is rotated to provide flexibility.

7.7 Other small power

At the pantry area the furniture is loose. Provide 2 number wall mounted twin sockets each incorporated two USB power outlets to allow some working / phone charging in the pantry.

Provide small power and USB power for visitor to reception.

7.8 Lighting

Comply with requirements for lux levels and best practice set out in the documents listed earlier in this specification, but create a scheme with visual interest particularly in areas such as pantry and reception

As a base line include to re-use existing lighting and to supplement with feature lighting as detailed in the architectural package. Allow for additional emergency lighting and escape signage as required to suit new layouts

All LED and fluorescent lighting shall have a matching colour temperature unless specifically directed by the architect. Include for 3000°K and confirm with architect prior to order, and provide a sample of 3000°K, 3500°K and 4000°K to allow client to choose. Take extra care with LED circuits lengths from drivers/transformers and colour temperature.

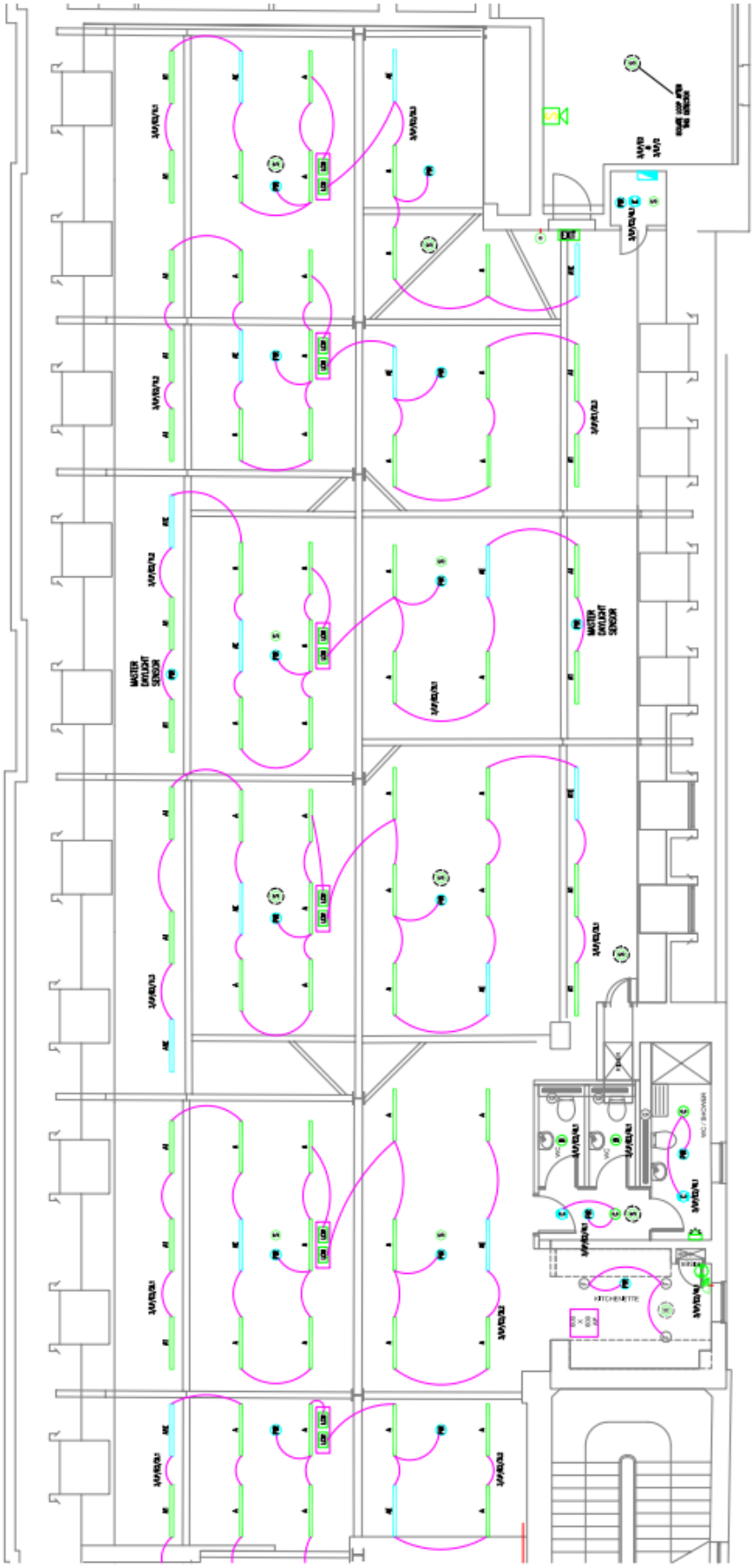

Figure 6 Existing lighting and fire alarm layout

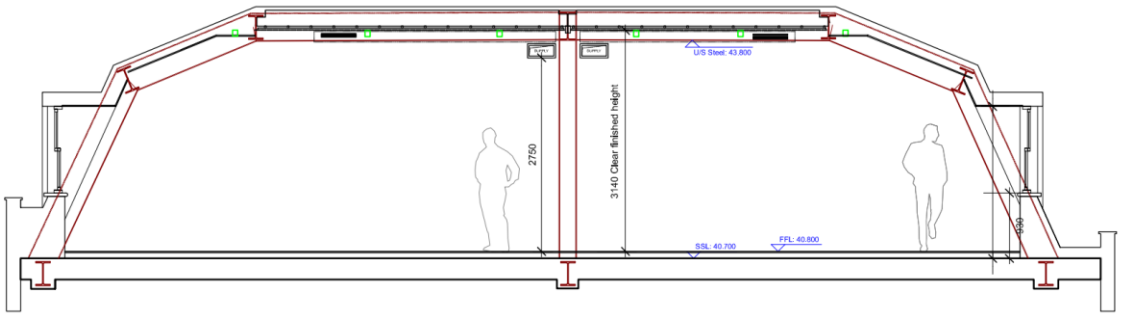

Figure 7 Section through space showing lighting

All new lighting to be dimmable LED unless it's a key design feature to use a warmer colour lamp / incandescent feature lamp

Present options for the lighting scheme

7.8.1 Meeting rooms

Present options for meeting room lighting. The large meeting room near reception has video conference. Provide dimmable lighting to the large 14 person meeting room near reception and provide a 4 button scene set to control the lighting. Commission buttons to provide 500lux, 400 lux, 300 lux and off

Liaise with the client to establish the need for supplementary lighting in the room – speak to the manufacturers / AV consultants of the video conference system and satisfy yourself that it will work

Advise on black out blind noting the glazing facing the video conference screen

7.8.2 Cellular Offices

Generally re -used the Cat A lighting and provide presence detection and configure to work in presence detection mode

7.8.3 Pantry and other break out areas

At pantry, reprographics and break out areas such as include for LED strips under cupboards and some lighting to create visual interest and avoid dull / dark back of house areas . Link these to the lighting control system and match the colour temperature of the under counter LED strip to the local lights.

The LED strip is to be within an aluminium extrusion with and opal or polycarbonate diffuser – securely fixed / siliconed into position. This is to prevent the "tape" type glues only lighting strips peeling off and diffusers falling out over time. These will be positioned such that they are not visible when viewed in normal conditions, either by recess or use of a cornice

Provide 5Amp lamp sockets as required to key areas such as reception and key break out areas such as pantry to allow lamps to be part of the lighting scene and give visual interest and allow feature lighting scheme to be controlled. These should be linked to the lighting control system and allow the lamps to be configured as part of the scene set

7.8.4 Comms room

Provide PIR in comms room to control the lighting

Re-use existing fittings or provide new linear industrial fittings mounted to provide 500 lux on the vertical surface of the patch racks and 400 lux at floor level.
Lighting may be surface fixed or suspended or other means to allow some flexibility and ease maintenance of local plant / dx cooling units. Use luminaire couplers to allow lights to be replaces in a simple manner

Provide a calculation showing lux on vertical face of rack and floor of comms room

FEED THE COMMS ROOM LIGHTING FROM THE UPS. The client may need to switch or control rack equipment during a power failure to reduce load to UPS and therefore the room need to be useable when power has failed

7.8.5 Open plan desk areas

Re-use the existing lighting and re configure controls to suit.

Configure PIRs throughout the open plan area and create notional corridors and hold offs so out of hours the lighting control system does not result in a person sitting in a small pool of light.

During normal working hours for the client the open plan areas are to be switched on

7.8.6 Stores

Re-use the CAT A lighting and provide PIR control or use a batten luminaire with diffuser.

7.9 Emergency lighting

Use self-contained batteries with 3-hour duration. Re use and supplement existing emergency lighting to suit
Provide directional exit signage using LED lights with stainless steel frame / to match the look and feel

Do not use a second set of emergency lighting (even the small point LEDs) – wherever possible integrate emergency lighting into the normal lighting system. It is understood that buying a set of small lights and adding them is simple but this does result in more equipment at ceiling and is not desired for this project.

Undertake a full duration battery test at the end of the project. To be undertaken during darkness so lux level can be measured. Record values and provide a drawing indicating the tested emergency lighting lux level in each area / room and for each 20m² of area in open plan – generally at locations remote from the emergency light to give the lowest illuminance in emergency conditions. Invite building control to witness the test

Integrate testing of emergency lighting into the lighting control system to satisfaction of the landlord.

7.10 Lighting Control

Commission the lighting throughout the floor to suit the client after the work – this means returning to site after 2 weeks of occupation and adjusting scene sets.
Provide additional LCM as necessary and generally locate outside to minimise access into meeting room ceiling
“Daisy chaining” will be allowed with no more than 3 lights per port providing LCM power limit is not exceeded and Dali /control system can work with daisy chaining

Refer to lighting section for controls to each room type

Allow for two return visits post contract for the lighting control commissioning engineer to revisit and tweak to suit client requirements.
Discuss absence detection vs. presence detection with the client before commissioning.

7.11 Fire Detection and Voice Alarm

Extend the existing fire alarm system and use sensor sounder unit to achieve sound levels. Generally, provide a smoke detector and sounder in each cellular space.

If the landlord system is capable, provide multi sensor head near tea points and kitchenettes and have these devices favour heat detection during working hours to minimise risk of false alarms from toast etc.

Consider part M, DDA and provide flashing beacons to meet requirements of building control noting client meeting areas and breakout space which may have people unfamiliar with the building

Provide a fire alarm interface unit to shut down any AV / sound systems and any air movement plant

Develop the cause and effect as required including AV shutdown and any flashing beacons and shutdown of boosted extract for pantry.

Undertake a noise level test and provide a drawing detailing sound level in each cellular space and every 30m sq of open plan. Note that the landlord may require this test to be undertaken outside working hours due to its extended duration

7.12 Incoming data / fibre

The client will place an order direct for incoming data connections. Currently BT and OBS are submitting costs, liaise with them and include for coordination of the incoming fibres and 12 pair supplementary copper to the comms room, provide containment from riser to comms room.

Provide containment routes using a suitably sized (50mm x 50mm minimum) metal trunking from each incoming data point to the proposed comms room.

Actively liaise with the clients chosen IT provider to procure services for the client – the client will pay the fees but the contractor will need to liaise and coordinate. Report on the progress of this in the monthly report

7.13 Phones and Data on Floor

All data on floor is to be CAT 6 Provide data for the following systems

- 2 data to fax machine
- 2 data to franking machine
- 2 data points to each printer location – currently 2 near HR
- Room booking system data points for future are not required
- 2 extra data for a Creston or AMX system or similar for the main meeting room in addition to the other data points
- Wifi points x POE- quantity of access point and data per access point as per wi-fi section
- CCTV to entrance, exit, comms rooms POE
- Each TV 2 data points, display port HDMI and VGA to centre of table. no coax is required
- Meeting room 2 to centre of table (2 extra for main meeting room)
- 6 data points minimum to reception desk – develop the design to agree requirements for alarms
- 4 data points per seat at IT build area and 3 twin sockets per seat wit 2 USB power outlets per seat
- State the total number of data points allowed in the tender.

Design the data strategy in regards comms room locations and quantity to keep data lengths to less than 75m to the desk / final point of use, but to minimise the space taken by comms and patch rooms.
The telephone system will be VOIP. Software and rack equipment for this will be provided by the client.

Total Oil require 1 rack 800w x 1000deep x 2200 high in the comms room– including AV equipment.

Identify if there are any pipes in the ceiling above the comms room proposed location and provide an “umbrella” metal tray over the rack and UPS and batteries in the risers. Ideally this will overlap the equipment in plan view by a sufficient distance to prevent any liquid dripping on the equipment

Install the rack to allow equipment to be inserted and removed 1000 space front and 900 back is required for the comms room and reduced allowance will be accepted for patch racks based on available space. Please note that this is the initial design brief and include for interface with client team to develop the design and propose efficient solutions – that minimise the use of net lettable area.

Note position of bunding for tea points etc. and areas of inaccessible floor on the data drawings and ensure the data cable routes can be re-wired. Draw the bunding areas as hatched on the data point plan

Provide data outlet pods as described in desk arrangement section of this document using a metal housing and conduit similar to picture below. Liaise with client and show mock up of the two following systems;

1) pod or gop located under floor with patch leads running through grommet to phone then computer or
2) pod or gop in desk tray with patch leads running from to phone and then computer

In option 2 provide a protective conduit for the last 3 meters of data cable to the pod/gop to protect it from damage. In option 1 the patch cables will need a protective conduit and will be longer.

Figure 8 example of data outlets fed via grommet

Figure 9 example of grommet serving several desks

Figure 10 Typical neat power data and USB outlet for reception or breakout area

The above product can be found at http://www.onlinereality.co.uk/prod/26313/power-zone-power-and-dual-smart-charge-usb-1/-811-1-1
Offer options and examples to the client

Provide a numbering system for the data outlet pods/ gop plates and agree this system with the client

Where structured cabling is used for point to point audio visual applications carrying video, it should be a minimum 10gigabit capable of Category 6 structured cabling with a shield installed to

the ANSI/TIA/EIA 568-C series of standards. Cables should be terminated onto RJ45 presentation modules at either end and presented in suitable faceplates. All cables should be fully labelled and tested. Equipment cords and fly leads should match the installed permanent link.

Segregation distances from other services should be maintained as per ANSI/TIA/EIA 568-C.

Comment on routes and containment systems. Provide plastic matting for new data cables in floor void and cable loops/hangers at appropriate distances may be used in ceiling void

Strip out any redundant data cables found, taking care not to impact BMS, lifts, lighting controls and other systems using data cables.

Data is to be neatly bundled and generally routed to avoid underfloor busbar and to run in accessible locations as picture below

Figure 11 Data bundles - do not provide matting

7.14 Wi-Fi

The client will undertake a heat map to determine best locations for wifi after partitions have been built. Indicate this on the programme
At the time of tender include for 8 ceiling mounted wi-fi points each with 2 data points – and no local power – power over ethernet.

7.15 AV

For details of the AV systems refer to the AV specification document developed by the client

Provide small power and data for the AV systems including

- The boardroom near reception (14 person) will have video conferencing

- The 6 person meeting room is to have TV
- Exec office is to have a tv

Arrange the electrical supply for sound systems to be on dedicated circuits to reduce electrical interference and noise through speakers

Develop the AV requirements with the AV specialist including
- containment in meeting room walls, routes from tables in floor void to wall, and to computer/av equipment and to ceiling speaker
- wooden partition walls to allow strength of fixing where TV will be fixed or future av anticipated
- containment from floor to ceiling at TV positions
- containment from credenza to screen in meeting rooms
- access to containment where plasterboard ceiling and or inaccessible floors are present

Ensure AV equipment is adequately ventilated and cooled (including inside credenzas/cupboard)– the electrical load of equipment in cupboard is to be passed to cooling specialists. Liaise with joinery company or furniture specialist to design ventilation / cooling and access to electrical equipment

Provide containment for new each meeting room and to suit AV requirements. Confirm AV requirements prior to construction of partitions and show this in programme. Generally, this will be 40mm waste pipe rising from floor to ceiling with a 90degree bend in the floor void to assist the feeding of large connectors such as vga connectors to AV equipment by the AV contractor.

Actively liaise to understand the furniture type and how the power and data / AV cables will neatly arrive at table top, desk, credenza equipment (inside table leg or discreetly located with elephants' trunk type umbilical)

7.16 Access control

Extend the landlords access control system to include
- Entrance from core
- comms rooms
- Emergency exit

Provide a door release button on reception to allow each receptionist to open the main doors from the core. Configure the access control system not to alarm if the main entrance doors are held open during the day

Create a hierarchy to prevent unauthorised access to comms room. Liaise with client team to develop access control requirements

Integrate with intruder alarm if practicable and this option is required by the client

Provide and programme 1 cards per desk and office seat shown on the plan plus 5 extra to allow the client staff to access the building. 2 of these shall be able to access the comms room.

Integrate the access control neatly into the doors and provide a sample and images of what the access control and local pushbuttons will look like.

Liaise with building control to agree positions of any push to exit buttons as required

Interface the new access control units with the fire alarm system so that they fail safe.

7.17 Intruder Alarm

Provide an intruder alarm system to cover the whole of Total Oil demise as follows;

- Liaise with client to identify any insurance requirements
- Provide a separate route through reception for exit entry on the intruder alarm
- Provide a keypad discreetly within the reception desk and discreet passive infra-red, anti-vibration and contacts to cover the space.

The intruder alarm panel may be integrated with CCTV but not the landlord access control

Discuss the system design with the clients' insurance company.

7.18 DDA compliance

Comply fully with the requirement of building control and part M of the building regulations

Coordinate and include for the following, including suitable power, data containment, access etc. to provide fully working and maintainable systems
The list below is indicative as a starting point for consideration

- The client will provide a kiosk type induction loop to the reception desk and main meeting room as required. Provide a power point for this including power and grommets in desk plus coordination
- Provide flashing beacons on fire alarm system as required by building control but as a minimum one in reception, and one in open plan office

7.19 Final Circuit Wiring

Provide all final circuit wiring in a neat manner and generally do not allow cables to lay on ceiling tiles for more than a meter. Use cable ties as appropriate. Where ceiling is removed to create interest or industrial feel all cables are to be secured with metal clips to prevent a hazard in a fire

Provide 450/750V grade LSF ZH insulated cable having copper conductors and installed within cable trunking and conduit. 450/750V grade XLPE/SWA/LSF insulated or similar, cable having copper conductors shall be utilised and installed on cable tray, or ladder or basket.

Double insulated cables on cable tray or cable hangers are acceptable.

All general-purpose socket outlets and lighting supplies shall be provided utilising single LSZH insulated cables enclosed within continuous trunking or conduit.
Hot dipped galvanised conduits/trunking or suitable armoured cables shall be used within all plant rooms and areas exposed to the atmosphere.

7.20 Earthing & Bonding

Provide an earthing system to comply with wiring regulations and allow the safe disconnection of supply under earth fault conditions and to fulfil the protective requirements of the relevant regulations and standards; to provide an adequate earthing system to ensure correct operation of the controls and instrumentation equipment; and to prevent potential differences occurring between simultaneously accessible conductive parts. The system shall also address the functional, static and electromagnetic performance needs.

Provide a clean earth bar in the comms room/ Links to the IT build room will be provide be the client team in future if required

Earth floor pedestals in comms room. Use RCBO for small power.

Earth the furniture as required with due consideration to the use of RCBO.

7.21 Lightning Protection

Provide bonds to the existing lightning protection system for the protection of any external equipment roof level from lightning strike.

Comply with International Standards and EN 62305:2011

Bond any NEW roof plant, services, ductwork, metallic screens, hand rails and metalwork located at roof level to the existing lightning protection system as required.

7.22 CCTV

Provide a high quality, high resolution of at least 1080p CCTV system. Provide one camera in discrete dome to match ceiling colour where practicable

- facing each entrance
- Facing emergency exit
- outside comms room

Provide one 21 inch colour screen with 2k resolution screen and small control keyboard at reception and multiplex 4 images onto it. The colour and style of this screen is to match other reception screens and be visually acceptable for high quality reception. Visitors should not be able to readily view the scree so consider setting at a lower level within the desk.

Provide advice and include appropriate signage of quality to suit

The cctv system should be able to be viewed remotely within a web browser with suitable security and password

Provide software as required
In regards camera image quality, a fixed camera coving only the door is to be provided so a high rating on rotakin index is both expected and required.

Cameras are to be powered over Ethernet

8. Mechanical

8.1 Mechanical System design criteria

The following shall be used in the designs being undertaken

8.1.1 External temperature:

Winter	-4°C db. 100% RH (Fabric heating)
	-4°C db. 100% RH (Air Handling systems)
Summer	30°C db. 21°C wb (design)
	35°C db (heat rejection)

8.1.2 Internal temperature:

Internal office

Summer / winter	23°C ± 2°C Fan coil units
Humidity	Space provision only for 45% RH ± 10% RH

*Summertime maximum room dry bulb temperature 24°C

Assumptions to be made for incoming tenant design

Toilet Areas	19°C (min), 25°C (max) air drawn from adjacent office
Staircases & Circulation	uncontrolled
Reception	20°C to 26°C db (No RH control)

8.1.3 Occupancy for fresh air calculation and balancing.

Liaise with the landlord to ascertain if a small additional quantity of fresh air can be obtained to assist with meeting rooms or as required.

Liaise with the client team and note the clients out of hours' requirements and refer to BMS section when considering fresh air.

Submit fresh air calculations in excel formal showing how the available air will be divided over each floor / fresh air supply. The excel sheet calculations shall list

- Each room or open plan area as a row
- A summation row to show the fresh air proposed to all the areas/zones fed from each supply air duct and a statement of the landlord proposed air to identify any shortfall
- Number of seats in each area zone
- Frequency of use / typical duration – typically long / short/ constant / low med high just to give an idea if a meeting room is occupied most of the day or if there are periods between meeting when fresh air might "replenish"
- Number of permanently occupied seats/desks
- Fresh air rate in room/zone proposed per person in permanent occupation
- Fresh air rate in room/zone proposed per seat if all seats 100% occupied
- Absenteeism assumed

The above calculation / schedule will give an understanding of how the air is balanced and allow consideration of best use and client team will be able to direct the design to prioritise some areas with more fresh air if required.

Fresh air calculations are to be based upon all desks and meeting rooms being occupied - i.e. 1 person per seat. Some diversity may be applied but should be developed with client as part of design process

Clearly set out the fresh air provisions after commissioning in a document and drawing which match schematics and plans

8.1.4 Ventilation Rates

Offices: provide 10 litres second per person where possible diversify below 10 litres per second per person if air is shared / limited by availability - and discuss the possible issues with the client - submit a calculation stating the design intent for the air system and air design rate for each zone or room

Meeting rooms -: generally assess the number of seats and diversify

Pantry break out :provide a dedicated extract fan or boosted extract and connect to local bell mouth to give 20 air changes an hour for the tea point and servery area. Consider the existing system and avoid the recirculation of cooking smells / hot food smells and the energy costs of high extract volumes
Provide a fault alarm for extract fan
Provide and arrange make up air to the break out areas with careful consideration to pressurising the space to avoid smells breaking out into the remainder of the office.
Avoid directing any particularly smell extracts to bell mouths and favour the dedicated landlord extract system instead.
The extract ductwork is to be fire rated if required by building control / if it passes through more than one fire compartment, and designed to meet building control requirements.

8.1.5 Filtration standard

Office areas Class F7 (AHUs)
Class G3 (FCUs)
Note any air intake from location where people may smoke will require suitable filtration and odour removal

Include to vacuum all fan coil filters at the end of the project

8.1.6 Internal Heat Gains

Calculate heat loads based upon the finally agreed layout drawings and seats / computers rather than an area per square meter of an open plan layout.

Submit a calculation showing all heat gains – including solar loads, laptops in meeting rooms and computers, av equipment and actively liaise with client to understand the loads in each space

The calculation should be based upon the proposed installation not upon generic rates per m^2

Ascertain / state assumptions about glazing specification and detail the solar loads in the calc.

During the design process consider any enclosed area with fridges – normal fan coils will be switched off at night and this can result in an unacceptably hot pantry type area when staff arrive early in morning. Boosted extract is anticipated for these areas and this should be controlled by a separate time and have an alarm link fault to alert of failure

8.2 Fresh air

Although the total quantity of people on floor is less than seats shown, the fresh air system needs to be designed to deliver fresh air to every seat all the time because the air system cannot know where people are (Unless a co2 monitoring system is provided)

The key to understanding fresh air requirements and allowances is recognising that air must be delivered to meeting rooms and desk based and alternate arrangements based on the number of seats in a space IN THE WORST CASE CONDITOON.

Rather than 12 litres a second it is suggested that your designer uses 10 litres a second per person and reports any diversities that have been applied within a simple calculation in excel format with columns showing air required for each are, number of people, and diversities required. This should be completed prior to schematics and detailed ductwork drawings

Submit a simple calculation with list of rooms and the fresh air proposed, number of people and any diversity applied. This should be presented alongside a ventilation schematic

Provide a fully functional fresh air system from the existing system adapting existing ductwork as required. Supplement the existing system as required

Liaise with the client to understand durations of use in meeting rooms and add this to the excel calculation in an occupancy type column with long short / constant type phrase to generally allow understanding if there are gaps between use anticipated

8.3 Ventilation and Air Conditioning

Re-commission the existing perimeter induction fan coil units to suit the new layout.

Provide boosted extract fan at the pantry as required to avoid odours permeating the office and avoid smells of toast / microwaves.

The pantry extract will run during normal working hours and outside office hours will be based on timer PIR override and 1 hour over run

Noise transfer between rooms needs to be considered as follows
All meeting rooms and cellular spaces are to be “Private” as defined by British Council of Offices. – it is anticipated that attenuators and suitable partitions with careful planning of cut outs will be required to achieve this.

Provide additional fan coil unit to match existing to each new cellular space which does not have a fan coil, noting impact onto space will need to be resolve. Alternatively provide a discreet fan coil integrated into the scheme.

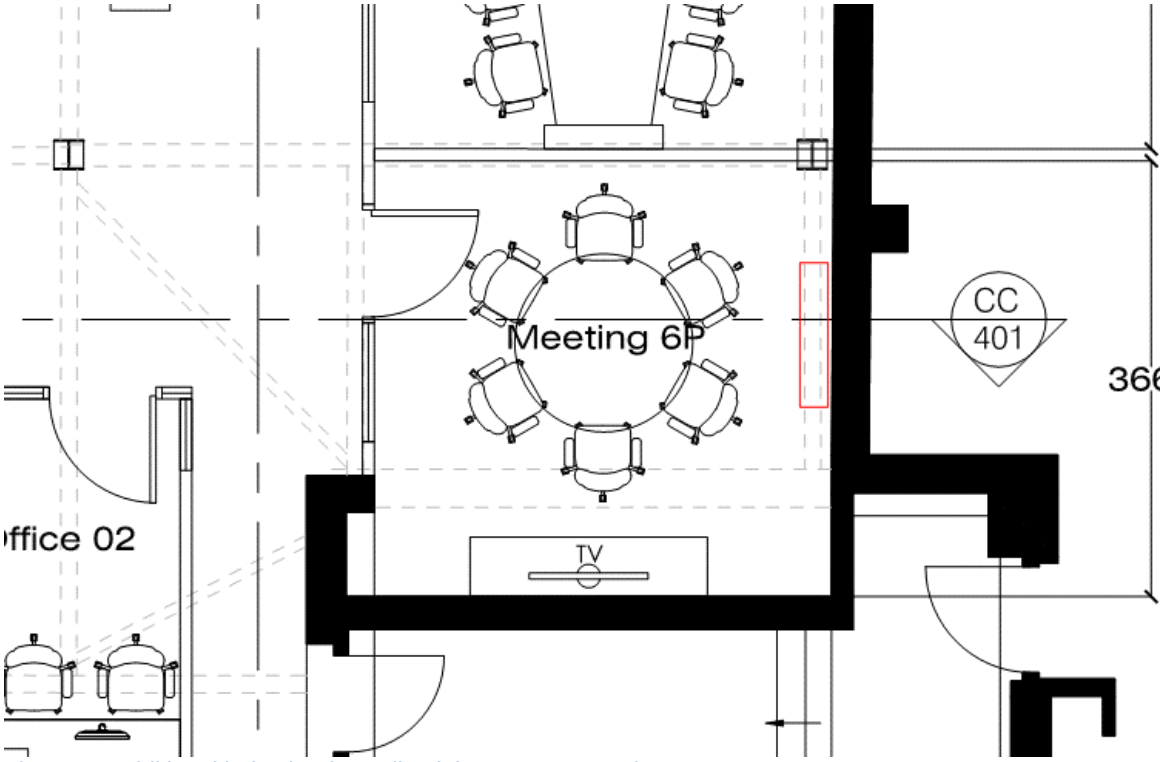

Figure 12 Additional induction fan coil unit in 6 person meeting room

Provide a simple calculation demonstrating that the existing fan coils are suitable for each room and supplement as required

Note the acoustic requirements and size ductwork / secondary ductwork and new fan coils / attenuators to suit.

Provide flexible connections and attenuators to pantry boosted extract fan

8.4 Roof Plant

There is not a specific roof plant space formally agreed, however considerable plant space appears to be available and the contractor should propose plant locations to suit the final design – minimising pipework routes for the comms room cooling

Provide a drawing showing the proposals and liaise with the landlord team to formally agree the space. Seek input and approval from the client team prior to seeking formal landlord approval

Provide a drawing showing the roof plant and routes to the tenant floor and submit to landlord for approval

Bond roof plant

8.5 Diffusers

Submit RCP showing ductwork (new and existing) aligning with lighting, smoke detectors etc. to give a neat layout

The existing perimeter induction units will be re-used

All grilles location shall be consistent with the architectural reflected ceiling plan and should be carefully designed to align with other elements on RCP.

Provide linear slot grilles of trimless type or to match any existing grilles

8.6 Critical cooling

Provide a dedicated DX n+1 cooling system to comms room, allowing 3.5kW cooling load for tender.
Assess rack loads and arrangements and determine if patching could be cooled by boosted extract fan. Include for DX cooling as part of tender

In the comms room - no ceiling is required and the ceiling can be removed to ease coordination for cooling and spatial coordination with cooling and tray. The doors must open so wall mounted dx may need to be above the 2.4 high rack… note the restrictions of the space and ceiling height and plan out drawing before construction

Liaise with client IT department to confirm equipment load in room and offer alternative solution if low load means that this room could be ventilated by extract fan / door grille

Include for cooling of UPS as required.

Provide an independent high temperature sensor and alarm in the comms room.

Avoid pumped drainage and consider the route of condensate when laying out room – the condensate cannot be routed over racks or electrical distribution equipment.

8.7 Acoustics

Levels of attenuation of sound. Key rooms for acoustic attenuation are;

- meeting rooms to be BCO standard “private”

Noise Ratings – the sound level in the room in use –
Generally as per CIBSE guide recommendations

- Open plan offices NR38
- Entrance lobby NR40
- Toilets NR45
- Circulation spaces NR40
- Meeting rooms NR35
- Boardroom NR35
- Phone booths NR35

Backboxes for power, data and AV should not be cut in the same location on both walls even if set out by architect / design manager.

Provide ceiling void mounted cross talk attenuators, generally at each cellular space requiring acoustic separation – offices, client suit and meeting rooms – to maintain high acoustic integrity between cellular spaces.

Provide cross-talk attenuators across new office/meeting room partitions to ensure that the supply and return air paths are maintained and to provide a good level of acoustic treatment to each of the individual rooms.

- All attenuators shall be supplied by Caice or equal and approved.
- Submit design calculations/ specifications/ selections for approval.
- The Contractor shall order the attenuators, and shall check finalised drawings and equipment noise levels to the attenuator the selections prior to manufacture.

- The attenuator supplier shall then undertake acoustic calculations to ensure that the attenuators achieve the specified noise criteria, based upon the finalised information.
- A Technical Submittal comprising acoustic calculations and a finalised schedule of attenuators shall then be issued to the Consultant for final approval.
- Pressure losses are stated in accordance with ISO 7235, which is based on laminar airflow conditions. The system designer shall make allowance for increased attenuator pressure losses where turbulent airflow conditions exist on the attenuator entry or exit.
- Unless stated otherwise all attenuators shall be constructed as follows: Galvanised sheet steel casings with 30mm profile flanges that are fully compliant with DW/TM1 at a high-pressure rating (+2000/-750Pa). Profile flanges shall be compatible with Doby, Mez & Metu flanging systems. Elements shall be installed in the vertical plane, with side elements provided as standard, and all elements shall have aerodynamic inlet and outlet fairings. Element facings shall be constructed from expanded galvanised steel mesh with fibre glass tissue bonded to the inner face. Mineral wool infill shall be overpacked to minimise voids due to settlement. Attenuator ends shall be protectively wrapped, and all attenuators shall be delivered to site on pallets and individually labelled.

Design and provide cross talk attenuators where ducts cross a wall across new office/meeting room partitions.

Provide suitable attenuation, flexible connection and enclosures for any new FCU and boosted extract fans of pantry

8.8 BMS and controls

Adapt the existing Panasonic control system for the fan coils and update the control strategy and graphics for the retained FCU's and extend to new fan coils, provide new graphics and new items of plant to give a system which can be used by the client to undertake minor changes and view alerts

For the open plan office, control via existing system

Each individual cellular space shall be controlled locally by a wall hung set point adjuster incorporating thermostat to set the temperature. This controller shall be linked to the control system. Return air temperature is preferred vs thermostats mounted on wall
Note faceplates are to match lighting and sockets.

For the tender, all the room mounted controllers shall be brushed stainless steel flat plate type milled to match other electrical accessories. Obtain a flat plate and have it milled and drilled to ensure controllers match other electrical accessories
The FCU's shall work under a timer program adjustable from the Panasonic control system.

Update the control system and as required

8.8.1 Alarms

Provide the following alarms via BMS, netbox / GSM autodialler or other system to suit client – include for one within tender

- a comms room high temperature alarm
- a fault alarm on the comms room cooling system
- leak detection general fault
- mains failure in comms room
- solenoid valve operation
- access control alarm or fault

9. Public Health

9.1 Drainage

Undertake a site survey and determine the position of soil stacks and vents

For the breakout spaces/tea the drainage shall be gravity drained where practicable pumped drainage is to be avoided, noting that drainage to ground floor from first floor via drilling through slab is not permitted

Provide power, water and drainage for future commercial dishwasher in pantry.

Provide the pantry with drainage for future dishwasher. Drainage pipework is to be designed to cope with drainage water temperatures circa 85° C. push fit and such drainage will not be permitted and the high temperature drainage is to be maintained to the landlords core

Any pump will need to have a signal to shut down water supply via solenoid valve upon fault or leak and to raise alarm.

Avoid condensate lift pumps where possible.
It is suggested that condensate discharges by gravity into open tundish / gullies.

Provide a vent for the drainage at each tea point. Any air admittance valves proposed should strictly adhere to the requirements and guidelines of WRAS on this matter so that the air admittance valve is above the highest overflow of the items connected to it

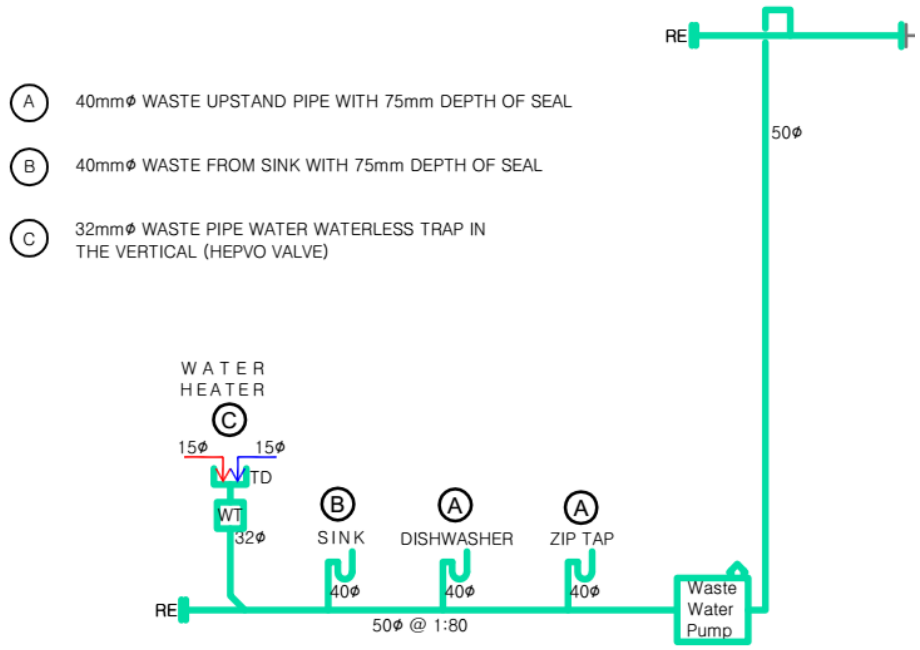

Figure 13 Notional pumped drainage if required

Notional Drainage for a typical tea point - contractor to develop design. Vent not shown.

Runs of condensate drainage shall be securely fixed at no more than 1.5m intervals for plastic pipework to prevent sagging and stagnant water dwelling for extended periods in the pipe. Position new fan coils to minimise impact of condensate pipe on height and avoid lift pumps where practicable. Use a waterless trap for connection of condensate into the main system.

Take clear note of the recommended inlet height for any pump proposed and the possible need to site these on the floor slab. Always provide suitable acoustic damping for pumps which may

include neoprene, springs or a concrete base. In addition to acoustic seals on doors such as cupboard doors in tea point and consideration of heat build up and method of venting heat, noting possibility of coffee machines, electric water heaters and fridges,

All drainage is to have rodding eyes, especially those from tea points where coffee grinds and other similar detritus is often emptied into the drains.

Use natural vents rather than air admittance valves and carbon filters wherever practicable.

9.2 Comms Room drainage

Comms room cooling is to be wall mounted at high level so the bottom of the unit and its drip tray are higher than the 42U high racks in the room and do not impeded door or clear distances of 1m to front and rear of the racks

Avoid condensate and water being routed above the comms racks / equipment.

If a gravity drainage solution is not practicable for comms room condensate ensure that the pump is fed from resilient circuit / suitably labelled to allow it to continue pumping for a short while after a power failure and avoid a leak of condensate.

9.3 Leak detection and bunding

Provide leak detection and bunding at pantry and Comms room, as required by landlord and building control

Provide leak detection linked to central panel located in suitable back of house area to be agreed with client during the design process. The leak detection panel shall undertake an automatic shutdown of boosted cold water supplies to each local area via the local solenoid valve. Include for local solenoid valves to each tea point so that only one tea point is affected by a leak and so that toilets etc, are no affected by a leak at the tea point.

Provide a leak detection system which can determine the position of the leak such as the FG-EG cables from TTK.

Provide bunding around each area at least 50mm, noting carefully the floor tiles position which cannot be lifted because they are fixed by partitions and the need to be able to access tape afterwards and to be able to test and replace the tape. Survey the floor grid setting out at an early stage to establish any odd tile arrangements - especially around columns.

Coordinate the position of the bunding with routes of data and power cables

The bund must be larger than room to ease above considerations. It is anticipated that a 50mm angle fixed with resin and a bituminous paint will be used for each bund.

This complete liquid leak detection system shall be based on a digital monitoring unit, addressable sense cables, jumper cables and all required auxiliary equipment. This system shall detect and locate multiple leaks simultaneously as well as cable break faults.

In the event of leak, an audible alarm is to be triggered and the dry contact activated. The panel's display must the time and date of the alarm, the type of fault and the location of the leak to the nearest metre for areas of 15m² or more. A simpler system is acceptable for smaller leak detection zones.

A power failure relay shall be activated for leak detection system panel general fault. The alarm shall be raised at BMS if landlord is agreeable and general fault alarm at reception. Include for BMS connection at tender.

Provide a method of testing the leak detection, this may include access though the pan/floor of cupboards – coordinate with the joinery at an early stage and indicate access on drawings. Note any floor finishes which are not accessible

9.4 Hot water

Provide local electric point of use water heater for each sink to suit anticipated usage, and liaise with architect/main contractor to agree the use of vented taps and low flow taps.

Investigate possible use of the existing central hot water system which serves the toilets to serve the new tea/coffee points.

To ensure that the sinks receive hot water in a short duration (less than 12 seconds) after activation of the tap provide either

- a local electric hot water heater/tank or
- a circuit from a central system with recirculation and short final leg.
- A circuit from a central hot water system with suitable heat maintenance tape.

For any central system the and hot water tap should have a local mixing valve to reduce temperature to below 43 degrees Celsius and temperature in the main run at suitable level to minimise legionella risk. The final leg from mixing valve should be no longer than 1.2m

Provide heat maintenance tape and design the piping arrangements to minimise legionella, and use mixing valves, and other best practice to reduce legionella. Include heat maintenance tape for any no circulated hot water run greater than 1.2m

Provide a solenoid at the water supply and link to leak detection system, and alarm.

9.5 Cold water

Provide boosted cold water supply to pantry and to board room. For the board room

Include for a solenoid valve to isolate water supplies to whole floor upon leak detection at the pantry. Solenoid should not isolate water to toilets.

Avoid expansion vessels and use vented taps for electric domestic hot water.

Provide local isolators at each water connection including

- Taps
- Electric Hot water heaters for sinks
- Water points
- Future dishwasher at a nominated location to be agreed
- Coffee machine supplies

Provide double check valves as recommended by WRAS including

- Hot water heaters
- Dishwashers
- Water points

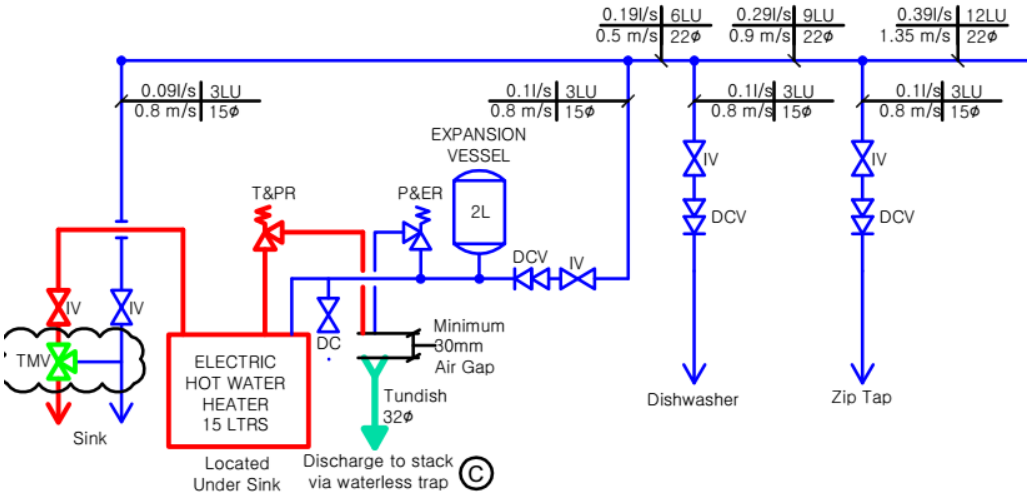

Figure 14 Notional pantry water arrangement

Notional arrangement for pantry – contractor to develop design noting no zip tap and dishwasher is future.
Note blending valve to be provided if necessary for legionella

10. Validation & testing at end of contract

Adopt and track this list into a checklist with dates and space for employers' agent to sign off
Submit drawings and O&M information prior to practical completion for comment

Item	Requirement	Date submitted	Status	Signature
A	Operation and maintenance manual			
1	Submit drawings and O&M information prior to practical completion for comment			
2	Electrical test certificate			
3	Distribution board Chart			
4	Fire alarm test certificate			
5	Emergency lighting test certificate			
6	Commissioning data			
7	As built drawings			
8	O&M other general items			

Item	Requirement	Date submitted	Status	Signature
B	Site items			
1	Prepare snag sheets for each room and actively close out snag items raised. Populate with snags prior to offering to client team for snagging. Keep and organised snagging system ready for sign off for each item when client team is satisfied.			
2	Swab test 2 locations of ductwork chosen by employers' agent and demonstrate that it is appropriately clean			
3	Lighting louvers/reflectors are to be clear of visible finger prints and dust			
4	Demonstrate programmable logic control functions for every permutation of every sliding folding wall – including for lighting and HVAC			
5	Demonstrate BMS system graphics and changes to fan coil temperatures			
6	Demonstrate control system for fan coils relating to sliding folding wall permutations			
7	Demonstrate fan coil control system and alarms including set point adjustment			
8	Test and demonstrate Acoustic level for fire alarm sounders and record on drawing and submit this to employers' agent			
9	Test and demonstrate noise levels for fan coils and air conditioning systems and record on drawing and submit this to employers' agent			
10	Test emergency lighting duration during hours of darkness and take lighting levels at end of 3-hour test. Submit drawing showing measured values of emergency lighting to employers' agent			
11	Check condensers and comb out minor damage to fins take photos and submit to employers' agent			

Item	Requirement	Date submitted	Status	Signature
12	Test and measure time and report if taps at sinks in toilets and at tea point are getting hot water in appropriate time at a safe temperature report for each toilet. Report on legionella issues.			
13	Test that the fire alarm has no fault light indications and the cause and effect is documented			
14	Prepare documentation recording the witnessed commissioning data for air flow rates such fan coil or AHU, at toilets and from tea points			
15	Document in a report format and demonstrate Lighting control settings including dimming and settings for each space with sliding folding wall in each position			
16	Document and demonstrate the operation of leak detection systems			
17	Risers are swept out cleaned and photographed with a date stamp.			
18	Demonstrate filters for equipment are clean for a sample of on floor fan coil units any new AHU			
19	Pump drainage unit operation (if any pumps are provided) and fault shut off of associated solenoid valve. Record noise level when pump running. Demonstrate access for maintenance			

Item	Requirement	Date submitted	Status	Signature
C	As part of the IST;			
1	Turn off mains power and witness lighting, operation, any emergency sockets still have power?, is cooling working?			
2	Report on what happens when mains is restored after a failure of electrical to cooling units and UPS. Note alarms are required when cooling unit power fails			
3	Test alarms from UPS when they are low on power / nearly depleted			
4	Fail one part of the comms room cooling system by isolating its fused connection unit and report the impacts and if second cooling unit picks up load and if an alarm is raise for unit failed			
5	UPS load tests for comms room duration and return to mains and bypass operation –			
6	Test of comms room high temperature alarm - using a hair dryer or electrical heater			
7	Test comms room cooling capacity using plug in electrical heaters equivalent to load of rack			

11. Pricing document

Refer to the latest documentation from Colliers when pricing the document. Prices muse be split and broken down as per the document including labour materials and quantities
Price a compliant bid and offer any saving or additions below the line for client consideration.

Break out the following items so they can be omitted if required by value engineering

1. Omit power and water and drainage for future dishwasher in pantry
2. Omit cold water feed to the main meeting room in reception
3. Omit attenuators on ductwork for cellular space except main meeting room
4. Omit CCTV system and its associated data, small power, screen
5. Omit Intruder alarm system and its power supply
6. Omit Access control system - only include card for landlord system
7. Omit new induction fan coil unit to meeting room
8. Add small dx cooling unit for 6 person meeting room – if connected to comms room system it must have separate control / time clock

12. Existing information

O&M information is available at the following location
https://1drv.ms/f/s!Ani9QWufrUibmK94G0mEOSLtHRVUwQ