

Watford Police Station Remodelling

Mechanical, Electrical and Public Health Engineering Specification

Section 1 - Scope of Works

Hertfordshire Constabulary

Project reference: WPS
Project number: 60671544
Document Reference: WPS-ACM-XX-XX-SP-BS-000001

© 2020 AECOM Limited. All Rights Reserved.
This document has been prepared by AECOM Limited ("AECOM") for sole use of our client (the "Client") in accordance with generally accepted consultancy principles, the budget for fees and the terms of reference agreed between AECOM and the Client. Any information provided by third parties and referred to herein has not been checked or verified by AECOM, unless otherwise expressly stated in the document. No third party may rely upon this document without the prior and express written agreement of AECOM.

Hertfordshire Police and Crime Commissioner

Watford Police Station Remodeling
Scope of Works
June 2022

Quality information

Prepared by	Checked by	Verified by	Approved by
Bill Day Darren Mott Pietro Di Maria	Bill Day	Michael Enstone	

Revision History

Revision	Revision date	Details	Authorized	Name	Position
T1	23/06/2022	Tender Issue			

Client: Heartfordshire Constabulary
Stanborough Road
Welwyn Garden City
Hertfordshire
AL8 6XF

Architect: Vincent and Gorbing
Sterling Court
Norton Road
Stevenage
Hertfordshire, SG1 2JY

Quantity Surveyor: AECOM
Marlborough Court
10 Bricket Road
St Albans
Hertfordshire, AL1 3JX

Principal Designer: AECOM
Aldgate Tower
2 Leman Street
London
E1 8FA

MEP Engineer: AECOM
Marlborough Court
10 Bricket Road
St Albans
Hertfordshire, AL1 3JX

Project Manager: AECOM
Marlborough Court
10 Bricket Road
St Albans
Hertfordshire, AL1 3JX

NOTES FOR TENDERERS

This document has been compiled using text from the National Engineering Specification (NES) which is copyright to Trimble. The format and content of the specification has, however being considerably re-arranged and amended from that provided by Trimble.

The technical content of this specification has been prepared using the Common Arrangement of Work Sections for Building Works and is in four sections. Where any British or other standard referred to in the specification is either out of date or superseded by another standard, the most recent version shall apply.

For reference each work section ends with clause 10000. Here is stated the latest revision of the raw NES on which the AECOM specification work section is based.

SECTION 1 – SCOPE OF WORKS (This Section)

A summary description of the Works by Work Section.

SECTION 2 – WORK SECTIONS (Issued under separate cover)

The specification for each Work Section is generally sub-divided into two parts:

Part 1 System objectives

The system objectives are clauses giving details of the performance and/or design parameters.

Part 3 Clauses specific to the system

These clauses are specific to the Work Section concerned.

Where clauses contain "type" references, these are for cross referencing within the specification and do not necessarily relate to manufacturers types.

NB: (*Part 2* relates to the format used in the raw NES and selection schedules for the Y clauses. *Part 2's are not used in AECOM specifications and are replaced by schedules in section 4*)

SECTION 3 – REFERENCE (WORKMANSHIP) SPECIFICATIONS – Y clauses (Issued under separate cover)

These clauses specify items that are common to several systems (for example pipework, ductwork and cabling). The individual clauses are generally arranged in the order of the Common Arrangement "Y" sections from which they originated.

Generally these specifications represent AECOM's standards, contain all contain clauses applicable to each particular category and are not project specific.

Where choices are required, they are made in the Schedules or Scope of Works; otherwise all of the clauses are applicable.

SECTION 4 – SCHEDULES (Issued under separate cover)

This section contains schedules of drawings, manufacturers, equipment duties and selections for plant, ancillaries and system components, specific to this project.

ENQUIRIES TO MANUFACTURERS

Enquiries to manufacturers should include all relevant sections as well as any related contractual information. ie the relevant work section and Y clauses pertinent to the plant item in addition to the plant schedule.

NON-NES CLAUSES

Clauses which are structurally different from NES from which they originated, or are AECOM originated clauses, are generally identified by the clause reference being underlined and/or the last digit of the clause number being increased e.g. 300.010 becomes 300.011.

Contents

FRONT PAGES	1
Front Pages & Instructions to Tenderers	1
SCOPE OF WORKS	6
General	6
R10 - Rainwater Pipework / Gutters	11
R11 – Foul Drainage Above Ground	11
R12 – Drainage Below Ground	13
R20 - Sewage & Effluent Pumping	15
S10 – Cold Water	15
S11 – Hot Water	17
S30 – Compressed Air	19
S32 - Natural Gas	19
S30 – Compressed Air	20
S61 - Dry Risers	20
S63 - Sprinklers	20
T10 - Boilers	22
T20 - Primary Heat Distribution	22
T60 - Central Refrigeration Plant	23
T61 - Primary / Secondary Cooling Distribution	24
T70 - Local Cooling Units / Heat Pumps	24
U10 - Ventilation Supply/Extract	25
U30 - Air Conditioning	28
U70 - Air Curtains and Over Door Heaters	28
V10 - Emergency and Standby Generators	28
V20 - LV Distribution	29
V21 - General Lighting	30
V22 - General Power	33
W12 - Public Address/Sound Amplification	36
W15 - Facilities for the Disabled	37
W40 - Access Control	38
W41 - Security Detection & Alarm	39
W50 - Fire Detection & Alarm	39
W51 - LV Earthing & Bonding	40
W52 - Lightning and Surge Protection	41
W60 - Central Control / Building Management System	42
W70 - Structured Cabling System	43
Structured Cabling Client Specification	44

Scope of Works

General

Project Description

This project involves the remodelling of the existing office building at 3 George Street, Watford, Hertfordshire to become the new Watford Police Station.

The existing building comprises external areas, a Basemet Car Park, Ground, First and Second Floor office and ancillary accommodation for Watford Police with internal Plant Rooms and a flat roof at the third floor

The remodelled building generally comprises office and ancillary accommodation for the police without any custodial facilities.

Existing Services

The existing Building Services are generally thought to be at least 30 years old and are of an age condition where replacement would be considered on the basis of normally accepted life expectancy of equipment.

However as detailed within the specific scope sections of this specification in certain instances elements of the building services are to be retained and integrated into the proposed new installations.

Survey and Validation of Existing Services

At the time of preparing this Specification a full/intrusive survey of the existing Mechanical, Electrical & Public Health Services could not be undertaken.

Immediately on commencement of the works, and with all existing ceilings' raised floor tiles and builders work casings removed, the Contractor shall allow to undertake a detailed survey of all services within the area of the works.

The survey shall establish and record the exact nature, of all mechanical, electrical and public health services within the building and throughout the area of works to allow the preparation of base line drawings indicating the existing installations including location of equipment and routing of services.

The survey drawings shall be used by the contractor to develop the Stage 3 + design proposals detailed within the specification and tender drawings to prepare their working drawings in dwg format for submission to the client team for comment and approval prior to undertaking the installation works.

Upon completion of the installation works the contractors working drawings shall be used to prepare As Installed/Record Drawings for submission at practical completion/handover.

The survey shall also include a dilapidation assessment and identify any works needing to be undertaken to repair the existing installations, where being retained, including all items of equipment, all fittings, supports , etc required to comprise a complete installation.

Any works involving rerouting and/or retaining and/or repairing any of the existing services arising from the survey will be undertaken under instruction against the Provisional Sums included within the A11 Sch3 Analysis of Engineering Services Tender Sum.

Disconnection and Removal of Existing Redundant Services

Any redundant systems identified are to be stripped out in their entirety and any builders works opening to be made good.

Scope of Works

Any dead legs are to be identified and a strategy established regarding whether these are to be isolated and/or stripped out.

Existing Record Information and Provision of New

There are no existing records associated to the existing Building Services such as As Installed Drawings, Operating & Maintenance Manuals, Maintenance Records, etc.

The proposed works shall therefore require the provision of new As Installed Drawings, Operating & Maintenance Manuals, etc. for the complete installation including both the information gained by the survey and validation of the existing services and the new Building Services based on the works having been undertaken at completion.

The proposed works shall therefore include for the provision of new As Installed Drawings, Operating & Maintenance Manuals, etc. for the complete installation including both the information gained by the survey and validation of the existing services and the new Building Services based on the works having been undertaken at completion.

Building Services

This specification is for the modification of the existing and provision of new Mechanical, Public Health and Electrical Services in association with the proposed Architectural modifications being undertaken.

Above Ground Internal Rainwater Pipework
Above Ground Foul Drainage Above.
Cold Water
Hot Water
Natural Gas
Dry Risers
Sprinklers
Boilers
Primary Heat Distribution
Central Refrigeration Plant
Primary / Secondary Cooling Distribution
Local Cooling Units / Heat Pumps
Ventilation Supply/Extract
Air Conditioning
Air Curtains and Over Door Heaters
Emergency and Standby Generators
LV Distribution
General Lighting
General Power
Electric Trace Heating Systems (Surface De-icing and Energy Storage)
Facilities for the Disabled
Access Control
Fire Detection & Alarm
LV Earthing & Bonding
Lightning and Surge Protection
Central Control / Building Management System
Structured Cabling System
Lifts - Traction

Builders Work

Scope of Works

The demarcation of responsibilities for builders work in connection with the engineering services as defined in the Main Contract Preliminaries shall be agreed with the Main Contractor during the tender period and clearly identified in the tender submission.

Whole Building integrated system testing and Black Building testing

If this is required on the project, describe the requirements in the general scope.

Below is sample text - taken from raw NES

Integrated System Testing (IST)

After completion of all commissioning and testing of all M&E systems and plant and all interfaces between systems have been tested and proven (including but not limited to fire alarm and BMS interfaces) undertake IST to prove that all the stand-alone commissioned systems work together to perform the functions as defined in the specifications.

Work to include:

- *Automatic sequential re-starting of systems by the generator following a power failure.*
- *Demonstration of functionality of all plant in conjunction with the BMS in fully automatic operation.*
- *Demonstration of functionality of all plant in conjunction with the fire alarm in fully automatic operation.*

Black Building Testing

Carry out the black building tests at some time during the IST period to simulate the operation of the electrical changeovers in respect of partial and total power failure scenarios and ensure safe operation and integration of the building life safety systems in event of power failure.

The black building tests shall:

- *Simulate a total power failure, leading to a complete power shut-down in the facility, to test the business continuity plan and recovery capabilities in a disaster-like scenario.*
- *Test the functionality of the standby power generators, simulating a total (external) power outage, replaced by generator-provided energy. This shall not touch any equipment except generators, thus not causing any disruption to systems operation.*

Overview of Contractors Responsibilities			
Contractors responsibility	Deliverables	Required at stage	Status
Tender Stage			
Fully understand the tender documents. These consist of this specification (this may be in several volumes) and the tender drawings (see schedule A11sch1)		Tender Stage	
Visit site to make themselves fully aware of the project and site specific issues		Tender Stage	
Request any technical clarifications. Note that any questions raised will be confirmed in writing and issued to all tenderers.	Tender clarification documents	Tender Stage	Required
Carry out initial design work to enable cost estimation for tendering purposes and satisfy themselves of accurate tender.		Tender Stage	
Submit tender. The tender should be broken down into each system as listed in this scope of works. Confirm on the tender that any technical clarifications issued have been taken into account and that the tender is fully compliant (or list any clarifications). Note that it will be assumed that the tender is fully compliant with the tender documents unless specifically stated.	Tender breakdown as schedule A11sch4	Tender Stage	Required

Scope of Works

Pre-start on site Stage			
Visit site to carry out any surveys necessary.	Survey notes	Pre-start on site Stage	Required
Fully understand the remaining mechanical and electrical systems and any temporary works required to allow the rest of the building to continue to operate during the contract.	RFI's as required	Pre-start on site Stage	Required
Test, commission and document existing services including pipework, ductwork and electrical containment to assess current provisions within the site boundary.	Commissioning report	Pre-start on site Stage	Required
Carry out full detailed design of all systems ensuring requirements as detailed in the tender documents are met along the requirements of the individual work sections and A13Sch - Schedule of Common Design Criteria.	Design report. Design Drawings	Pre-start on site Stage	Required
Formulate and issue technical submissions for each item of equipment and each system – agree the list of submissions with the Engineer. Note that all technical submissions should list any deviations from the specification – any items not specifically mentioned will be assumed to be fully compliant with specification. Submissions will be reviewed and given a status: (Status A – no comments, Status B – proceed but taking into account comments or Status C – rejected – re-formulate and re-submit.)	Technical submissions	Pre-start on site Stage	(See Work Sections)
Formulate and issue working drawings for all systems. Note that the use of AECOM drawings on site is NOT acceptable – all drawings used for installation must be working drawings produced by the contractor. To assist in this, AutoCad format AECOM construction issue drawings can be provided but the Contractor must enhance these as required so they are suitable as installation drawings. Working drawings will be reviewed and given a status: (Status A – no comments, Status B – proceed but taking into account comments or Status C – rejected – re-formulate and re-submit.)	Working drawings	Pre-start on site Stage	(See Work Sections)
Produce builderswork drawing and schedule indicating all holes / supports requirements etc	Builderwork drawings Builderswork schedules	Pre-start on site Stage	Required
Produce a commissioning method statement	Commissioning statement	Pre-start on site Stage	Required
Produce all Health and Safety and other method statements as required by the Main Contractor, Client and Engineer.	Health and safety method statements	Pre-start on site Stage	Required
Agree with Client which items of plant or material or fixtures/fittings are to be retained for their stores. (If Stripout)	Schedule of retained equipment	Pre-start on site Stage	Required
Where temporary works are required to allow a system to be removed, document and agree these with the Client prior to carrying these out.	Temporary works Scope document	Strip-out stage	Required
Isolate and make safe the systems to be removed.		Strip-out stage	
Where Client has no use for the material or plant, remove from site and dispose.		Strip-out stage	

Scope of Works

Installation Stage			
Install systems as listed in this scope of works and specification		Installation Stage	
Carryout snagging and rectify snags	Snagging status list	Installation Stage	Required
Offer systems for Engineer review prior to commissioning start	Completion certificate for each system	Installation Stage	Required
Commission all systems and produce report	Commissioning report	Commissioning Stage	Required
Offer results to Engineer for review and sample witnessing of the results	System acceptance sheet	Commissioning Stage	Required
Completion Stages			
Update working drawings to full record drawings taking account of any changes during the installation	Record drawings	Handover Stage	Required
Compile Operating and Maintenance manuals in the format required by the Client	O&M Manuals	Handover Stage	Required
Offer O&M manuals and Record drawings to Engineer for review and comments (status A, B or C will be given)	Electronic copy of documents for review	Handover Stage	Required
Attend site to provide familiarisation sessions with the Users for all M&E systems	Video of training sessions	Handover Stage	Required
Attend handover meetings as required – note that snag free handover is a pre-requisite for the PC certificate to be issued.		Handover Stage	
Provide a quotation for carrying out the maintenance for one year	Maintenance schedule and log	1 st year	Required
Attend site as required to rectify defects that are reported.	Defects completion report	1 st year	Required
At the end of the 12 months defects period, attend site to rectify all remaining defects.	Defects completion report	End of 12 months	Required

Scope of Works

R10 - Rainwater Pipework/Gutters

System Description:

The existing rainwater disposal installation comprises a series of existing eaves gutters at roof level discharging through a series of external façade mounted rainwater down pipes. Refer to architect's specification for details of repairs and/or refurbishment required to these external elements.

The rainwater drainage also incorporates some internal rainwater pipes and outlets serving the flat roofs at plantroom level. All rainwater drainage generally collects at high level within the basement level before discharging to below slab or to external drain and is intended to be retained subject to its condition.

The client has engaged with a contractor who will undertake a full survey of the existing system which shall include a visual and CCTV survey, clean, flush and test of the existing pipework system. Any defects found and remedial / repair works required shall be identified and reported to the engineer and client for review.

Any additional works required other than those indicated on the drawings and in this section will be instructed accordingly against a provisional sum.

Record information and layout drawings of the existing rainwater drainage system are unavailable. All existing pipe routes, pipes sizes and classification shall be recorded and utilised by the contractor for the future production of "as installed" record drawings.

Refer to civil/structural engineers drawings and specification for details of works required to the under slab/buried drainage system.

Generally:

All works to the existing system shall be in accordance with the requirements of BS EN 12056 Part 3 and the Building Regulations Part H.

The works include:

Survey, cleaning (ensuring the system is fully cleared of all debris/silt), testing and record of the existing system.

Remedial works approved by the engineer following the initial contractor survey.

Final Testing and commissioning of repaired sections.

R11 - Foul Drainage Above Ground

System Description:

A new system of sanitary pipework and fittings shall be installed to effectively drain all of the sanitary appliances located in toilet areas, tea points etc fully in accordance with the requirements of BS EN 12056 Part 2 and the Building regulations Part H.

The existing foul drainage system comprises a series of vertical stacks located within risers / pipe boxing's or IPS panel systems local to the washroom and tea point areas served. The existing system is predominantly a single pipe drainage system. All existing stacks and vent pipes are arranged to terminate to atmosphere at roof level.

The existing main foul drainage infrastructure of vertical stacks and distribution at basement level and throughout the building is intended to be retained subject to its condition.

Scope of Works

The client has engaged with a contractor who will undertake a full survey of the existing system which shall include a visual and CCTV survey, clean, flush and test of the existing pipework system. Any defects found and remedial / repair works required shall be identified and reported to the engineer and client for review. Any additional works required other than those indicated on the drawings or in this scope will be instructed accordingly against a provisional sum.

Please note, initial results from the above CCTV survey have been received and copies of the report and survey drawings are available from the client. The contractor shall request and obtain copies of this information from the client directly.

The report does not identify any significant defects however it does indicate areas in the basement suspended surface water drainage that are partially blocked with silt/debris. The contractor will therefore allow for full flushing and cleaning of all suspended drainage in the basement including all foul and SW runs to clear all debris and to leave in a good operational order and condition. All silt/debris as a result of cleaning operations shall be cleared and disposed of and not simply flushed downstream to cause future issues.

Existing sanitary fittings in the respective WC and tea point areas inclusive of local soil and waste pipe will be stripped out. Services shall be stripped back to the existing SVP risers and the existing branch connections reused with new pipework extended locally to serve the new fittings as indicated on the drawings. New connections to existing SVP's will be required in some areas as indicated on the drawings.

Record information and layout drawings of the existing foul drainage system are unavailable.

All existing pipe routes, pipes sizes and classification shall be recorded and utilised by the contractor for the future production of "as installed" record drawings. Note sketch drawings from the client initial CCTV survey are available and shall be requested from the client to assist with the production of record information.

Each sanitary appliance will be trapped and all pipework will be accessible behind removable panels.

The new shower facilities at ground floor level will be pumped and the pump located at basement level below. This is proposed as it does not appear feasible to connect the new showers to the gravity drainage running at basement level. A new local packaged drainage pump unit shall be provided. Refer to section R20 and R12 for details.

On the general office floors inc ground/first and second, the existing system of gravity condensate drainage pipework shall be retained to serve all FCUs. Any localised modification will be carried out to suit FCU locations if they required to be relocated.

A new trapped floor drain/gully will be provided in the proposed car wash bay in the ground floor external car park. The gully shall be selected to suit the depth of existing finishes and waterproofing and shall be suitably rated for vehicular traffic loadings accordingly.

For details of the external/under slab drainage and pumping at basement level refer to the drawings and specification clause R12.

Generally:

Falls on soil waste and vent pipes shall not fall below the minimum stated in BS EN 12056-2 Gravity drainage systems inside buildings. All WCs shall be dual flush low volume and therefore drainage gradients/installation shall comply with BS EN 12056-2 system type III.

In all areas drainage pipework shall be accessible. Rodding access must be provided at all floor levels, at all branches and changes of direction and above the connection point to the below ground drainage or high level suspended drainage system.

The soil and waste stacks are housed within purpose-built service ducts with branch connections at each floor level receiving the discharge from the various sanitary appliances. Where pipes pass through fire compartments all penetrations shall be fire sleeved.

Each WC shall be provided with an internal overflow. All sanitary fittings will be provided with a suitable depth water sealing trap to prevent the ingress of foul air and in accordance with BS EN 12056-2

The works include:

Scope of Works

- Supply, storage and installation of all new soil, waste and ventilation pipework and fittings.
- Connection to all sanitary appliances
- All associated steelwork supports
- All associated fire stopping
- Final Testing and commissioning of all above ground soil, waste and ventilation pipework systems

R12 – Drainage Below Ground

System Description:

All underground foul and surface water drainage shall be designed and installed in strict accordance with the requirements of the Building Regulations, Approved Documents H1 and H3, BS EN 752 Drain and Sewer Systems Outside buildings and Sewers for Adoption 6th Edition as the minimum standard, considering all the relevant local drainage authority guidance.

It is understood that there is a separate system of buried surface water drainage that routes via a SW pump station to a dedicated SW outfall pipe at high level in the basement. In addition, there is a system of foul drainage that picks up basement car park and drains at ground floor level and routes through a petrol interceptor to a dedicated FW outfall pipe.

The client has engaged with a contractor who will undertake a full survey of the existing system which shall include a visual and CCTV survey, clean, flush and test of the existing pipework system. Any defects found and remedial / repair works required shall be identified and reported to the engineer and client for review. Any additional works required other than those indicated on the drawings will be instructed accordingly against a provisional sum.

Please note, initial results from the above CCTV survey have been received and copies of the report and survey drawings are available from the client. The contractor shall request and obtain copies of this information from the client directly.

Original Record information and layout drawings of the existing buried drainage systems are unavailable. All existing pipe routes, pipes sizes and classification shall be recorded and utilised by the contractor for the future production of "as installed" record drawings. The sketch drawings from the client initial CCTV survey shall be used for reference to assist with the production of record information.

The CCTV report does identify a defect where the SW outfall pipe has a hole and this is indicated on the drawings. The contractor shall engage with a drain repair specialist and shall carry out a localised lining or patch repair to the existing pipe.

The initial report indicates some section of buried drainage that are partially blocked with silt/debris. The contractor will therefore allow for full flushing and cleaning of all buried drainage in the basement including all foul and SW runs to clear all debris and to leave in a good operational order and condition. All silt/debris because of cleaning operations shall be cleared and disposed of and not simply flushed downstream to cause future issues.

The existing foul and surface water sump pumps are intended to be retained. The contractor will in addition confirm the operation of the pumps including the associated control panels to ensure correct operation of the pumps, discharge pipes and controls. Any defects found shall be reported to the engineer accordingly.

All existing manhole covers shall be retained. The existing covers shall be cleaned of any existing corrosion, grease applied to the seals and reinstated.

Scope of Works

On completion of all remedial works and repairs the contractor shall engage a drainage specialist to carry out a full CCTV of the buried drainage to confirm cleaning flushing and any repairs have been carried out. Results to be submitted to the engineer for review.

Scope of Works

R20 - Sewage and Effluent Pumping / Treatment

System Description

At basement level where indicated on the drawings a new effluent pumping system will be provided to deal with the proposed showers at ground floor.

A packaged drainage pump unit shall comprise a polypropylene storage tank with twin submersible pumps complete with combined discharge pipework and integral float controls for a complete working system. The pump discharge main shall be provided with a non-return valve and isolating valve to connect to existing foul drainage at high level.

Pump mains shall be arranged to have a direct vertical discharge and arranged with a nominal fall back to the connection point to be self-draining. Rodding access must be provided at all changes of direction.

The units shall be provided with a vent pipe which will be extended to high level as indicated on the drawings or fitted with an AAV or carbon filter. All units shall be provided with a local warning and alarm panel.

The installations shall be installed and tested in accordance with BS EN 12056-Part 4, BS EN 752, CIBSE Guide G: Public Health Engineering, current Building Regulations Part H, the requirements of the Local Authority and general industry good practice.

Install pipes, fittings and accessories in fully accordance with manufacturer's recommendations.

For central monitoring and alarm for the new pump unit interface with the buildings BMS system.

S10 - Cold Water

System Description

An existing metered mains water supply enters the basement and extends to roof level as a direct feed to the HWS system with branch connections to existing drinking water outlets and tea points. At basement level a branch connection is provided to serve an existing cold water storage tank. An existing booster pump set provides a supply to a break tank in the roof level plantroom. This existing roof tank feeds the existing cold water down services via a series of risers to serve WC's, washbasins and cleaners sinks in the respective washrooms areas.

The existing cold and mains water supply system shall in general be retained unless indicated on the drawings.

The client has engaged with a contractor who will undertake a full survey of the existing system which shall include a visual survey, clean, flush and test of the existing pipework systems. Any defects found and remedial / repair works required shall be identified and reported to the engineer and client for review. Any additional works required other than those indicated on the drawings will be instructed accordingly against a provisional sum.

Record information and layout drawings of the existing cold and mains water supply system are unavailable. All existing pipe routes, pipes sizes and classification shall be recorded and utilised by the contractor for the future production of "as installed" record drawings.

The existing cold water storage tank and booster pump set at basement level shall be stripped out. The existing mains water riser shall be replaced/upsized from basement up to roof level where it shall be

Scope of Works

reconfigured to supply the roof tank. An existing cold water down service that used to serve macerators in the female WC's shall be stripped out and capped at the roof tank.

Existing sanitary fittings in the respective WC and tea point areas inclusive of local hot and cold water supplies will be stripped out back to the existing risers and the existing valved branch connections reused. New pipework will be extended locally to serve the new fittings as indicated on the drawings. Some new connections to existing risers including providing new mains water supplies to tea points will be required. Pressure reduction valves will be required on new mains supplies to tea points and to the showers on ground floor to limit pressures to within acceptable tolerances.

All existing redundant services shall be stripped out and capped at the main risers leaving as short a dead leg as possible.

Existing valves found to be inoperable or serviceable shall be replaced. Access to all valves shall be provided for future maintenance purposes.

All existing mains water pipework located at basement level is trace heated and insulated for frost protection purposes. The operation of the trace heating shall be checked verified by the contractor.

Any missing sections of insulation, damaged or defective pipe insulation shall be repaired and replaced.

All sanitaryware is as specified by the architect and to be WRAS approved.

New pipework located externally or within exposed unheated areas will be trace heated and insulated for frost protection purposes.

At ground floor level a car wash bay is proposed and shall have a CAT5 water supply for water regulation compliance. In the existing basement tankroom the existing mains water supply shall be modified to serve a packaged CAT5 break tank and pump unit. A CAT5 water supply shall be extended through the basement car park to serve a standpipe outlet located at the car wash bay. The CAT5 supply where running through the basement shall be insulated and trace heated for frost protection purposes.

The new CAT5 plant shall have an interface with the buildings BMS system for central monitoring and alarm purposes.

Generally:

All new Domestic cold and mains water distribution pipework (copper tube) shall be thermally insulated and be complete with identification labels and flow direction arrows to separately indicate each supply system.

Where pipework is exposed locally to appliance connections chrome plated pipework and fittings shall be used in these locations.

All water appliances, sanitaryware etc. shall be individually isolated by a ballofix type servicing valve.

The MEP Contractor shall provide comprehensive data sheets for all water services components to validate specification compliance and for approval, this shall include a valid WRAS (or equal and approved) approval number with expiry date.

System chlorination shall be carried out for the entire domestic cold-water installation. It maybe necessary to chlorinate the entire system several times to generate an acceptable bacteriological test upon completion.

The contractor shall liaise with a suitable water treatment specialist to ensure correct treatment is applied accordingly.

The works shall include the provision and full installation in accordance with BS8558, BS EN 806-2:2005, The Water Supply (Water Fittings) Regulations 1999, HSG 274 (L8) , including system chlorination of the entire domestic hot and cold water installation, Parts G3 and Part L of The Building Regulations and the local water authority byelaws, of:

- Cold water storage tanks complete with all fittings and accessories for WRAS approval.
- All water meters, sub water meters, isolation valves, drain valves, strainers, non-return valves, pressure reducing valves, double check valves, anti vacuum/water hammer arrestors and ancillaries.

Scope of Works

- Pipework distribution to each sanitary fitting.
- Physical water conditioners (electrolytic and electromagnetic scale inhibitors) shall be fitted to the cold water supply prior to Semi-storage units and/or calorifiers.
- Associated support steelwork
- Chemical cleaning of all pipework, components and plant through the provision of a chlorine injection tee on the water supply entry.
- Testing, commissioning and operation demonstration.
- Electrical earth bonding to ensure electrical continuity of all systems in accordance with the *IET* Regulations.
- All builders' work including holes for pipework penetrations.
- Allow for installation of all control valves sensors, pockets, etc in accordance with the controls contractors requirements.
- BMS interfaces. The new CAT5 plant shall have an interface with the buildings BMS system for central monitoring and alarm purposes.

S11 - Hot Water

System Description

An existing metered mains water supply enters the basement and extends to roof level as a direct feed to the HWS system.

An existing direct gas fired water heater is provided in the roof plantroom and feeds a series of existing risers to serve WC's, washbasins and cleaners sinks in the respective washrooms areas. An existing pumped secondary return is also provided.

The existing hot water supply system shall in general be retained unless indicated on the drawings.

The client has engaged with a contractor who will undertake a full survey of the existing system which shall include a visual survey, clean, flush and test of the existing pipework systems. Any defects found and remedial / repair works required shall be identified and reported to the engineer and client for review. Any additional works required other than those indicated on the drawings will be instructed accordingly against a provisional sum.

Record information and layout drawings of the existing hot water supply system are unavailable.

All existing pipe routes, pipes sizes and classification shall be recorded and utilised by the contractor for the future production of "as installed" record drawings.

The existing direct gas fired water heater shall be replaced with an equal and equivalent model and re-connected to existing services in the roof plantroom. A new expansion vessel and unvented kit shall also be installed inclusive of all controls. The contractor shall make an allowance to replace the water heater flue unless it can be verified that the existing can be effectively and safely reused.

Existing sanitary fittings in the respective WC and tea point areas inclusive of local hot and cold water supplies will be stripped out back to the existing risers and the existing valved branch connections reused. New pipework will be extended locally to serve the new fittings as indicated on the drawings. All concealed HWS pipework shall be thermally insulated.

All existing redundant services shall be stripped out and capped at the main risers leaving as short a dead leg as possible.

Existing valves found to be inoperable or serviceable shall be replaced. Access to all valves shall be provided for future maintenance purposes.

Any missing sections of insulation, damaged or defective pipe insulation shall be repaired and replaced.

Scope of Works

New or replacement double regulating valves installed on the secondary hot water service return shall be suitable for ultra low flow. Hot water shall be generated and stored at a minimum temperature of 60 degrees Celsius and shall be distributed a minimum of 55 degrees Celsius. The secondary return system shall be rebalanced on completion of works.

All wash basins shall be provided with thermostatic temperature control which shall be TMV3 compliant. Where brassware does not have integral thermostatic temperature control separate TMV3 compliant thermostatic mixing valves shall be fitted to limit hot water temperatures to 41°C for basins.

On the ground floor electric showers will be provided fed from the mains water system to ensure adequate supply pressure. These shall be as Triton "Amore" 8.5Kw including shower head, rail and accessories or similar and approved.

At the respective tea points an electric water boiler will be provided. This will be as manufactured by Lincat and will be a counter top model as Ref: EB3FX for up to 155 cups per hour including built in water filtration or equal and approved.

Generally:

All new Domestic hot water distribution pipework (copper tube) shall be thermally insulated and be complete with identification labels and flow direction arrows to separately indicate each supply system.

Where pipework is exposed locally to appliance connections chrome plated pipework and fittings shall be used in these locations.

Hot water storage shall be capable of maintaining designated temperatures on a constant 24 hour basis.

All sanitaryware is as specified by the architect and to be WRAS approved.

All water appliances, sanitaryware etc. shall be individually valved by a ballfix type servicing valve.

The MEP Contractor shall provide comprehensive data sheets for all water services components to validate specification compliance and for approval, this shall include a valid WRAS (or equal and approved) approval number with expiry date.

System chlorination shall be carried out for the entire domestic hot water installation. It may be necessary to chlorinate the entire system several times to generate an acceptable bacteriological test upon completion. The contractor shall liaise with a suitable water treatment specialist to ensure correct treatment is applied accordingly.

The works shall include the provision and full installation in accordance with BS8558, BS EN 806-2:2005, The Water Supply (Water Fittings) Regulations 1999, HSG274(L8), including system chlorination of the entire domestic hot water installation, Parts G3 and Part L of The Building Regulations and the local water authority byelaws, of:

- Hot water generation units and associated expansion vessels and ancillaries, safety valves etc.
- Pipework distribution from the water heaters to each sanitary fitting.
- Thermal insulation of all hot water distribution pipework
- All stop valves, pressure reducing valves, double check valve, NRV's, strainers and ancillaries.
- Physical water conditioners (electrolytic and electromagnetic scale inhibitors) shall be fitted to the boosted cold water supply prior to Semi-storage units and/or calorifiers.
- Associated support steelwork
- Chemical cleaning of all pipework, components and plant through the provision of a chlorine injection tee on the water supply entry.
- Testing, commissioning and operation demonstration.
- Electrical earth bonding to ensure electrical continuity of all systems in accordance with the IET Regulations.
- All builders' work including holes for pipework penetrations.

Scope of Works

- Allow for installation of all control valves sensors, pockets, etc in accordance with the controls contractors requirements.
- BMS interfaces. The replacement water heater shall have an interface with the buildings BMS system for central monitoring and alarm purposes.

S30 -Compressed Air

System Description

A local air compressor shall be provided for local use within the basement car park for use in association to the maintenance of police vehicles.

Full details of the air compressor and it's location is to be confirmed by the Client.

The contractor shall allow for liaison with the client to develop a suitable design for the compressed air system for submission and approval by the client .

For the purpose of tendering a provisional sum of £2000.00 shall be included within the tender for the supply and installation of the final approved system which will be undertaken under client instruction

S32 - Natural Gas

System Description

The existing incoming gas supply enters the basement area from George Street and is routed at high level to a gas meter cupboard located beneath the external escape stairs adjacent to the building entrance.

The gas meter cupboard is provided with fixed access/natural ventilation security grillage on both sides.

From the gas meter cupboard, the gas main is routed at high level to a ventilated riser location within the central core area to connect to the gas fired boiler plant and HWS Generator within the boiler plant room at roof level.

Subject to any remedial works arising from the survey and validation of the existing Mechanical, Electrical & Public Health Services it is proposed that the existing Gas installaton be retained with the exception of the following works.

Replacement of the existing emergency gas shut off valves located on the incoming gas main at basement level and within the roof top boiler room.

Disconnection of the existing gas supply to the existing LTHW Boiler plant and HWS Generator and reconnection to the new equipment.

Provision of new interface between the existing gas meter and emergency shut off valves to the BMS/Fire Alarm systems

The complete natural gas system to be inspected and validated by a gas certified engineer prior to completion

Scope of Works

S61 - Dry Risers

System Description

In the car park to the rear of the building an existing dry riser landing valve on a pipe upstand is installed and this is directly connected to the existing fire main supply to act as an effective charged “wet” riser.

This shall be retained as instructed by the client however shall be noted as not required in the buildings fire strategy.

The existing pipework and valve shall be checked by the contractor for operation and condition. Any existing insulation to the supply pipe at basement level shall be repaired where required and the existing trace heating shall be energised and checked for operation.

S63 - Sprinklers/Deluge System

System Description

There is an existing sprinkler system protecting the basement car park and this system shall be retained. The fire strategy being prepared for the building indicates that the sprinkler system shall be retained as an integral element of the fire safety measures required.

It is understood that the existing system is direct mains fed from a dedicated fire main connection in the basement.

The mains supply feeds into an existing dry valve set. Record information and layout drawings for the system are not available however it is understood that the existing system is an OH2 Hazard > 15m system suitable for car park protection and is believed to be a life safety installation.

A specialist LPCB approved sprinkler specialist has been engaged by the client to undertake a full survey of the existing system, visually reviewing the layout, condition of pipework and all components and carrying out any tests required to check and verify the systems design, installation and designed hazard rating for its continued operation.

Any defects found and remedial / repair works required shall be identified and reported to the engineer and client for review. Any additional works required other than those indicated on the drawings will be instructed accordingly against a provisional sum.

The existing sprinkler pipework distribution within the confines of the basement and downstream of the main control valve will be cleaned up/de rusted and painted red by the contractor.

Record information and layout drawings of the existing sprinkler system are unavailable.

All existing pipe routes, pipes sizes and classification shall be recorded and utilised by the contractor for the future production of “as installed” record drawings.

Where wet fire mains run at basement level these are protected from freezing by insulation and trace heating. The contractor will be required to replace insulation where missing or requiring repair. The existing trace heating system will be energised and the operation checked and verified by the contractor. Any faults shall be reported to the client and engineer.

Fire alarm interfaces with the sprinkler system will be retained and modified and/or replaced as required to suit communication with the replacement fire alarm system. Any BMS requirements such as existing monitored valves, water pressure or temperature in sprinkler valve room will also be interfaced with the buildings BMS system.

Scope of Works

The contractor will be expected to provide a fully operational and verifiable sprinkler system upon completion and will provide certification of conformity against the original design and installation standards for inclusion in the O&M manuals. Any tests or activities necessary in order to verify this will be deemed to be included.

All works to the existing system shall be in accordance with the requirements of the Fire Strategy, BS EN 12845 and the LPC rules for automatic sprinkler systems and any specific client and their insurers requirements

Scope of Works

T10 - Boilers

System Description

The existing LTHW Heating is provided to the building by means of 4 No gas fired Stelrad Concord Super modular boilers located in the Boiler Room at roof level connected to a single vertical flue rising through the roof to atmosphere.

The existing boiler plant is thought to have total rated output of 200kW.

The boilers connect to a pressurised LTHW Primary Heating Flow & Return circuit with a single head circulation pump thought to operate at 80/60 deg C.

The LTHW Primary Heating Flow & Return circuit serves a Constant Temperature (CT) and a Variable Temperature (VT) Circuit, both of which are provided with in-line twin headed circulation pumps.

It is proposed that the existing boiler plant and its associated flue system be disconnected and removed and replaced with new plant.

The new boiler plant is to comprise 4 No boiler modules of the EVOMAX Cascade type each with a rated output of 60 kw (total output 240 kw), each boiler to be complete with factory fitted matched shunt pump supported and connected within an EVOMAX Cascade free standing frame and header kit in back to back configuration as manufactured by Ideal Heating or equal and approved.

A new Evomax Multiline Flue Kit matched to the boiler plant shall be provided discharging the flue gases through the roof to atmosphere.

The new boiler plant to be interfaced to the new BMS system for control monitoring and alarm facility

T20 - Primary Heat Distribution and Local Heating Units (Incorporating T30, T31 and T42)

The existing LTHW Heating distribution system comprises a pressurised LTHW Primary Heating Flow & Return circuit with a single head circulation pump, serving a Constant Temperature (CT) and a Variable Temperature (VT) Circuit.

Both the existing CT & VT Secondary circuits are fitted with twin headed run and standby circulating pumps.

The CT Heating Pump Circuit connects to heating coil within the Core Area Supply Air Handling Unit located within the boiler room and the Office Supply Air Handling Unit located within the ventilation plant room.

The existing VT Pump Circuit is routed to the Ground, First and Second Floors through the main vertical builder's work riser cupboard with branches into the ceiling void to the perimeter of the building from which the heating pipe work rises/drops adjacent to column locations to the floor void connecting to perimeter radiators fitted with Thermostatic Radiator Valves (TRVs) within the general office accommodation at each floor level of the building.

Subject to any remedial works arising from the survey and validation of the existing Mechanical, Electrical & Public Health Services it is proposed that the existing LTHW Heating Distribution installation be retained with the exception of the following works.

It is proposed that the existing boilers, pumps, pressurisation/make up unit and ancillary equipment within the boiler room are all to be disconnected, removed and replaced with new equipment together with the LTHW pipework, valves and fittings to the point of exit from the boiler room.

Where twin headed CT & VT run and standby pumps are being replaced the new pumps are to be of the single head type in accordance with the clients requirements.

Scope of Works

Specific duties of the existing pumps is not available.

For preliminary design purposes the pump duties have been assessed to be as follows;

CT Pumps 1.5 l/sec against 200 KPa

VT Pumps 2.8 l/sec against 250 KPa

All pumps to have lever ball valve isolating valves.

Multiple pump installations to be fitted with a non-return valve (NRV) on outlet to each pump.

Pressure gauges to be fitted to inlet and outlet of pumps.

Blanking plates to be supplied for each pump type

As part of the design development it is the responsibility of the contractor to undertake a detailed calculation of the actual required duties for selection of the pumps based on the developed design and working drawings

The tender package includes an existing print of the heating services within the roof plant rooms which generally indicates the existing layout of heating services.

This has been marked up showing the design intent of the extent of the services to be replaced .

As detailed elsewhere in this specification the contractor is to undertake a survey of the installed systems to validate the details shown on the existing drawing to enable the preliminary designs to be developed

The Contractor shall be responsible for developing the new LTHW Heating pipe work layouts within the boiler room associated to the new system from the point of connection into the retained pipe work systems at their point of exit in accordance with the proposed LTHW Heating Schematic .

The existing LTHW distribution system from the point of exit from the boiler room up to and including the radiators are generally to be retained unless otherwise indicated on the tender drawings.

The existing TRVs and isolation valves are to be replaced on all radiators being retained.

In certain locations where radiators are directly in front of full height windows, they are to be replaced with new floor mounted radiators selected to visually match the existing with a lower profile.

Where the location of existing radiators clashes with new partition walls they are to be relocated to suit.

Within the new WBC area, the existing heating system is to be replaced by VRF/VRV type Air Conditioning units. In this instance the existing radiators are to be isolated from their pipe work connections and drained down.

The new boilers, pumps, pressurisation/make up unit, etc to be interfaced to the new BMS system for control monitoring and alarm facility

T60 - Central Refrigeration Plant

System Description

An existing Trane Chiller Unit with an output of 200kw is located within an external screened compound at roof level.

The existing chiller unit connects to a pressurised chilled water flow and return pipe work system which is thought to operate at 6/12 deg c routed to the ventilation plant room within which a twin head pump set, pressurisation / make up unit and ancillary equipment is located.

It is proposed that the existing chiller unit is to be removed and replaced with a new chiller with an output of 200kw.

The new chiller plant is to comprise a single chiller unit in a similar location as the existing.

Scope of Works

The clients preferred supplier for the new chiller is Airdelle

The new chiller unit is to be interfaced to the new BMS system for control monitoring and alarm facilities

T61 – Primary / Secondary Cooling Distribution

System Description

The existing Chilled Water distribution system comprises a single pressurised Chilled Water Flow & Return circuit with twin headed run and standby circulating pumps, pressurisation/make up unit and ancillary equipment located within the Ventilation plant room .

The Chilled Water flow and return circuit connects to a cooling coil within the Office Supply Air Handling Unit located within the ventilation plant room and to the Ground, First and Second Floors via the main vertical builder's work riser cupboard with branches into the ceiling void to serve cooling only fan coil units. at each floor level of the building.

It is proposed that the existing chiller, pumps, pressurisation/make up unit and ancillary equipment including valves within the plant room are all to be disconnected, removed, and replaced with new equipment.

The chilled water twin headed run and standby pumps are to be replaced with new single head type pumps in accordance with the clients requirements.

Specific duties of the existing pumps is not available.

For preliminary design purposes the pump duties have been assessed to be as follows;

Chilled Water Pumps 8 l/sec against 250 KPa

As part of the design development it is the responsibility of the contractor to undertake a detailed calculation of the actual required duties for selection of the pumps based on the developed design and working drawings.

The tender package includes an existing print of the chilled water services within the roof plant room which generally indicates the existing layout of heating services.

This has been marked up showing the design intent of the extent of the services to be replaced .

As detailed elsewhere in this specification the contractor is to undertake a survey of the installed systems to validate the details shown on the existing drawing to enable the preliminary designs to be developed

The Contractor shall be responsible for developing the new chilled water pipe work layouts within the plant room associated to the new system from the point of connection into the retained pipe work systems at their point of exit in accordance with the proposed chilled water Schematic .

Subject to any remedial works arising from the survey and validation of the existing Mechanical, Electrical & Public Health Services it is proposed that the existing Chilled Water pipe work distribution system and existing fan coil units be retained except for the following works.

The existing local controls are to be replaced on all the retained fan coil units.

An existing fan coil unit within the new WBC area requires to be relocated to the adjacent WPS area.

All other fan coil units within the new WBC area together with their local distribution pipe work connections although being retained in situ are to be isolated from the pipe work distribution system and drained down.

The new chiller, pumps, pressurisation/make up unit, etc to be interfaced to the new BMS system for control monitoring and alarm facility

T70 - Local Cooling / Heat Pump units

System Description

Scope of Works

At ground floor level existing cooling is provided to 4 rooms within the existing medical area by means of split system Daikin DX cooling system comprising internal units of the wall mounted type and external units located within the basement area below complete with interconnecting refrigeration pipe work, power & control wiring.

At second floor level cooling is provided to a single Data Room by means of a split system Daikin DX cooling system comprising an internal unit of the wall mounted type and external unit of the floor mounted type located within the existing chiller compound complete with interconnecting refrigeration pipe work, power & control wiring.

Both existing systems are to be disconnected and removed.

A new cooling system is to be provided to the new Comms Room at Ground Floor level comprising 3 no split system Daikin DX cooling systems comprising internal units of the wall mounted type with matched wall mounted external units located at high level on the core area wall within the basement area below complete with interconnecting refrigeration pipe work, power & control wiring.

The client has a preference for the cooling equipment to be of the Daikin or Mitsubishi type.

Each unit should be capable of providing a cooling load of 2 kW

The units to be arranged and controlled to operate on an N +1 basis (2 running 1 Standby)

The new cooling system shall be designed, supplied installed, tested, commissioned and set to work by a Specialist Sub Contractor as part the the Mechanical Services Sub Contract Works.

Condensate from each unit to drop to the basement below connecting into a suitable drain point

The new cooling system shall be interfaced to the new BMS system for control, monitoring and alarm facility

As part of the WBC Fit out works a new VRV/VRF Heat Pump system is being provided.

It is proposed that the new WBC heat pump external unit be located within the Chiller compound at roof level in a similar location to the existing external cooling unit that is being removed.

As part of this project the contractor shall allow for providing a designated route for the interconnecting refrigeration pipe work, power & control wiring between the WBC internal and external equipment.

Control Requirements

Details of all the controls for this Work Section associated with the central control system are described in Work Section W 60 – Central Controls

Pol 01 - Impact of Refrigerants

All systems using refrigerants shall have a permanent automated refrigerant leak detection system installed OR an in-built automated diagnostic procedure for detecting leakage installed

The leak detection system installed shall be capable of automatically isolating and containing the remaining refrigerant(s) charge in response to a leak detection incident.

The refrigerants used shall have a Global Warming Potential (GWP) ≤10

U10 - Ventilation Supply/Extract

System Description

Scope of Works

Existing Mechanical Supply & Extract Ventilation is provided to all occupied areas of the building by the following central ventilation systems.

A full fresh air supply system is located at high level within the Boiler Room at roof level providing tempered air to the Central Core/Toilet area comprising an air intake louvre, filter, heating coil and fan.

The Central Core/Toilet supply duct work system drops from the boiler room through the floor slab to a builders work riser with branch connections to the ceiling void at each floor serving ceiling mounted grilles and diffusers.

A full fresh air supply system is located at high level within the Ventilation Plant /Water Tank Room at roof level providing treated air to the General Office areas comprising an air intake louvre, filter, heating coil, cooling coil, humidifier and fan.

An exhaust air system is located at high level within the Ventilation Plant /Water Tank Room at roof level providing extract from the General Office areas comprising a fan and air exhaust duct terminating above the plant room roof.

An exhaust air system is located at high level within the Ventilation Plant /Water Tank Room at roof level providing extract from the Toilet accommodation comprising a fan and air exhaust duct terminating above the plant room roof.

An exhaust air system is located at high level within the Ventilation Plant /Water Tank Room at roof level providing extract from a Kitchen comprising a fan and air exhaust duct terminating above the plant room roof.

The above mechanical office supply and extract ventilation systems are provided with galvanised duct work systems routed through vertical builder's work risers to the ceiling void at each floor serving bell mouth supply and extract terminals with VCDs in ceiling voids and ceiling mounted grilles & diffusers.

Motorised fire/smoke dampers are provided where vertical ductwork passes through the line of fire compartmentation at each floor slab and where horizontal ductwork passes through the line of fire compartmentation between the service core and surrounding office accommodation.

The proposed works to the mechanical ventilation systems is based on the following design intent.

It is proposed that the existing mechanical ventilation ductwork systems within the roof plant rooms are to be retained together with the vertical duct work risers and branch connections to ground first, and second floor ceiling voids up to and including any installed fire/smoke dampers.

It is proposed that the following existing ventilation systems located within the plant rooms are to be modified to allow certain individual items of equipment to be replaced with new equipment having a minimum duty of the existing plant being removed;

- The existing Supply Fan and LTHW Heating coil to be replaced within Central Core/Toilet Supply AHU system
- The existing Fan, LTHW Heating coil and Chilled Water Cooling coil to be replaced the within General Office Supply AHU system
- The existing Fan to be replaced the within General Office Extract system
- The existing Fan to be replaced the within Toilet Extract system
- The existing Fan to be replaced the within Kitchen Extract system

Scope of Works

The existing electric humidifier associate to the General Office Supply AHU system is to be removed without replacement.

As part of the previously detailed survey and validation of the existing systems the contractor shall establish the operating duties of the existing plant and equipment to allow the specific details to be used in selection of the new equipment to replace the existing.

It is intended that wherever feasible the existing supply and extract duct work and fan coil units in the false ceilings above the occupied areas at each floor level are to be retained in their current locations unless otherwise indicated or required.

The supply air duct work from the plenum box on each fan coil unit up to and including the ceiling mounted diffusers are to be removed and replaced.

New 600 x 600 diffusers with plenum boxes are to be located within the ceiling grid to suit the new room layouts with new ductwork incorporating vcds from the existing connections on the fan coil unit plenum boxes.

The general design intent as indicated on the drawings is that the supply air from each fan coil unit is distributed to each room served such that the room receives an adequate volume of air to meet with fresh air requirement for occupancy and cooling purposes.

Recirculation grilles/diffusers are to be provided within the ceiling grid to provide an air passage into the ceiling void for recirculation back to the fan coil unit intake and to the extract bell mouth

Local ceiling mounted extract grilles/diffusers are to be provided above tea points and printer locations with direct ductwork connection to the office extract ductwork.

The existing Office supply and extract ductwork serving the fan coils in the proposed WBC area at second floor level is to be removed back to a suitable location and replaced with single supply and extract ducts capped off for future connection as part of the WBC fit out works to provide fresh air for occupancy purposes.

As part of the works within the car park there is an option for the larger of the two grilles at the front of the building to be blanked off reducing the free area of existing natural ventilation.

The tenderer is advised that as part of the proposed works a new fire strategy has been introduced for the building which includes the introduction of additional fire/smoke compartmentation within the general office areas at each floor level as indicated on the Architects layouts.

Where existing ductwork is being retained and/or new duct work is being installed fire dampers are to be provided on penetration of 30 minute fire barriers and smoke dampers are to be provided on penetration of 60 minute fire barriers.

As part of the previously detailed survey and validation of the existing systems the contractor shall validate the actual routes of all ductwork to enable the specific location that fire & smoke dampers are to be provided

Car Parking Ventilation U13

The Basement Car Park is provided with existing Natural Ventilation comprising a system of horizontal air intake grilles direct to atmosphere at the front of the building.

These grilles are open to the elements with the potential of ingress of rain and deleterious materials.

A vertical air intake grille is located on the side wall of the car park to the ramp.

Scope of Works

Horizontal air grilles direct to atmosphere are located at the rear of the car park providing cross ventilation.

The horizontal grilles are open to the elements with the potential of ingress of rain and deleterious materials.

The Car Park Natural Ventilation system is supplemented at the rear and sides of the car park by 2 number mechanical exhaust ventilation systems comprising high- and low-level intake grilles connecting to a duct work system with inline fans.

The exhaust ventilation duct work rises vertically from the car park to discharge to atmosphere adjacent to the boundary wall.

However as part of the works within the car park there is an option for the larger of the two grilles at the front of the building to be blanked off reducing the free area of existing natural ventilation.

As previously stated there is a new fire strategy for the building.

If the above option in reducing the current provision of natural ventilation is adopted this would dictate that the current method of providing ventilation to the car park be upgraded to a ventilation system that provides both car park ventilation and smoke clearance in accordance with the fire strategy .

To meet with this strategy the 2 existing car park ventilation systems will require to be replaced with a new systems incorporating high temperature fans and fire rated ductwork supplementd with an additional system in the location where the existing ventilation grille is being blocked off as indicated on the drawings.

The contractor is to include for developing a design to meet with the above requirements including all necessary contrla interfaces with the fire alarm system to allow the client decide whether to adopt the proposed option.

If the above option was not adopted it would be intended that the existing car park ventilation system be retained with the existing fans being replaced with new fans capable of a duty equal to or greter than the existing.

U70 - Air Curtains and Overdoor Heaters

System Description

The existing main entrance doors to George Street are being replaced as part of the Architectural Works

A new over door electric heater be provided above the new door to minimise cold drafts when the doors are open.

V10 – Emergency and Standby Generators

System Description

The Contractor shall engage a generator specialist to test, install, and commission the existing generator set currently serving Watford Borough Council (WBC) CCTV control room. The existing generator enclosure and associated equipment shall be provided as free issue by WBC.

The main Contractor shall include within their Tender, to supply and install commission a 63A 4 Pole ATS changeover switch to serve the WBC CCTV room Distribution Board located at Second floor level. The Contractor shall supply and install the new distribution board and associated wiring and control wires as required. Refer to schematic drawing. All final circuits and wiring from Distribution Board shall be done by fitout contractor under separate contract.

Scope of Works

The Contractor is to survey the existing generator installation at Shady Lane, Watford, and confirm if any associated equipment will need to be re-proposed and incorporated within the new site.

The Contractor shall allow within their Tender for a provisional sum of £3k, to allow for the installation of a generator exhaust flue from car park Basement level to 1m clear above Roof level. Refer to Architects layout for setting out.

The Contractor shall allow within their Tender for a provisional sum of £2k, to allow for the installation of a new generator fill point system located externally at Ground floor level to the rear of the building.

The existing generator is complete with acoustic enclosure and fuel storage day tank. There are no proposals for installing separate bulk fuel storage tank on this scheme.

Contractor shall include for installing, testing and commissioning a generator for the purpose of supplying WBC secondary backup power supplies for their CCTV room services and equipment.

Include all wiring, cables, supports, accessories and any works not described above necessary to form a complete installation.

Include first fill of fuel oil.

Contractor to install all new cabling from the mains service head to ATS and generator supply output to the essential side of the ATS. All fire rated cabling and containment associated with the these supplies shall be provided by the Contractor.

Contractor shall allow for load bank testing the generator to validate the operation and controls prior to final connection to the building.

There are no requirements for this generator to be paralleling with the building mains supply.

V20 – LV Distribution

System Description

The existing incoming electrical supply enters the building via the back wall of the basement car park from the external vehicle access route at the rear of the building, from which point it is routed at high level through the car park to the main Electric Intake and Meter /Switch Board within the Electrical Switch Room.

The Contractor shall liaise with the Utility Providers, UKPN, and provide a split metered service head to serve the Watford Police Station and Watford Borough Council (WBC) CCTV control room. The anticipated Max. Demand for WPS is 240kVA and 40kVA for WBC.

The Main incoming supplies serving WPS serves an existing LV Panel which in turn provides multiple switched Fused circuit breakers to various items of electrical equipment, mechanical control panels, distribution boards etc. throughout the building. The contractor shall retain the existing LV Panel, test and validate current condition. Provide all necessary supply characteristic for External Earth Fault Loop Impedance and supply fault levels.

The Contractor shall incorporate a new Surge Protection device within the panel, provide proposals if this can be retrofitted or located external from the panel.

The Contractor shall provide all new outgoing circuits and cabling from the Main LV Panel as indicated on the LV schematic drawing. Contractor shall install all new containment runs from the existing Electrical Switchroom within the Basement and run at high level new cable tray and ladder fit for purpose.

Circuits serving the upper floors are routed through vertical risers to each floor level and Roof.

Scope of Works

It is proposed that the split metered supply serving WBC will serve the generator ATS control panel located adjacent to the main Electrical Switch Room within the Basement. This will form part of WBC demise area. Contractor to install all cabling to and from ATS and terminate at Second floor level, WBC CCTV control Hub room.

The Contractor shall supply and install new 12-way TP&N Distribution Boards serving the various small power circuits on each floor level as indicated on design intent LV schematic.

The small power circuits from the Distribution Boards serving the lighting and high-level equipment are routed through the ceiling voids.

The small power circuits from the Distribution Boards serving electrical underfloor power tracks and low-level outlets are routed through the raised floor. Refer to small power and containment drawing layouts.

As previously detailed the new CCTV Control Room is to be provided with a new independent incoming metered electrical supply to meet with the specific requirements of the Client.

The contractor shall allow for the necessary fire stopping where cables and containment routing passes through fire barriers. The Contractor is to coordinate containment and cable routes with the architect and in conjunction with the fire strategy drawings.

V21 – General Lighting

System Description

The existing general and emergency lighting throughout the building is provided by inefficient fittings with fluorescent tubes to suit the current floor layouts. The Contractor shall strip out all existing lighting, wiring and controls throughout the building and Basement level and provide a new energy efficient LED lighting scheme.

These works shall include for the design, supply, delivery, offloading, installation, testing and commissioning of the complete lighting installation, including all luminaires, lamps, controls and ancillary equipment required to provide a fully operational system.

Luminaires shall be provided within all areas using energy saving LED lamp technology. The extent of LED lamp technology to be adopted shall be dependent on the final requirements of Part L of the building Regulations.

All office areas shall be provided with luminaires complying with the requirements for CIBSE LG7 respectively. The general purpose office accommodation shall generally be provided with recessed light fittings, incorporating integral daylight sensing and providing wiring routes for power and data to high level.

All luminaires and lighting components (ballasts, transformers, drivers and lamps etc.) shall be compatible and suitably controllable from the basic lighting control system provided as part of these works.

Luminaires shall be provided in accordance with the indicative lighting layouts and luminaire schedule of symbols. All luminaires unless indicated otherwise shall be fully dimmable and linked to the centralised lighting control system.

New lighting shall comprise modern, energy efficient luminaires that complement the areas in which they are installed. The lighting design will be further developed with the Architect during the next design stage of the project. LED light sources shall be utilised wherever possible.

The Contractor shall ensure the lighting installation complies with the following:

- In areas with accessible ceilings, or with adequate access when the luminaire is removed, the final power connection to luminaires shall be via flexible cabling from plug-in ceiling roses. The ceiling rose shall be mounted within 300mm of the aperture when the luminaire requires to be removed for access. Control cable connections to luminaires shall be facilitated by means of plug-in connectors to enable removal of

Scope of Works

the luminaire.

- Alternatively the final connections to the luminaire may be by means of a proprietary pre-manufactured flexible cabling system (modular wiring system) complete with proprietary connectors. This system may combine power and control system wiring.
- Maximum length of any flexible cable from a plug-in ceiling rose/proprietary connector to the luminaire shall be 1.5m, providing adequate access to the BESA box is available.
- Where the final connection to the luminaire shall be by via a plug in rock rose and flexible multicore cable, a stuffing gland shall be fitted on the luminaires to facilitate cable passage into the luminaire enclosure.
- Only one flexible cable shall be allowed to enter the luminaire, The Contractor shall not 'loop' any luminaires from one to another using flexible cable, regardless of the load.
- The Contractor shall supply and install all trunking, tray, conduit, supports, wiring, luminaires and control components necessary to derive the complete system.
- Loop in / loop out conduit boxes shall be utilised where luminaires are to be installed in / on inaccessible ceilings. The containment shall be arranged such that rewiring is possible without access.
- Fire barriers shall be provided in all areas where trunking penetrates a fire zone.
- The Contractor shall be responsible for the installation of any independent supports required for luminaires e.g. where the ceiling system cannot support the weight.
- Separate CPC's shall be installed for all circuits.
- The electrical installation shall not compromise the integrity of the buildings fire compartments. Re-usable fire barriers shall be used where necessary.
- All luminaires where possible shall be supplied with a suitable plug-in socket(s), ready for LSOH multicore flexible cords and connectors (Weiland or similar) for interconnection between the lighting control system components and the luminaire, as per the requirements of the controls manufacturer unless indicated otherwise.
- Where dimmable lighting or controlled lighting is identified / described, all equipment to provide a fully working system shall be provided.

All components shall be provided to complete the lighting system including end caps, solid & wire suspensions, etc.

The Contractor shall ensure that details of all luminaires are provided to the Architect for comment and acceptance prior to ordering.

Refer to Scope Clause V40 for details of emergency / safety lighting.

The Contractor shall submit samples of the following for Approval:

- Each type of proposed luminaire, including emergency versions of normal luminaires. Samples shall be 'working', fitted with the lamps, remote control gear (where required) and proposed fixings. Full photometry with electronic TM14 data shall also be provided for assessment of the fixture.
- Each type of switch, pushbutton and lighting control device (i.e. PD's), .

Upon completion of the project, The Contractor shall ensure that all diffusers and lamps are clean and free from dirt. All specular louvers and reflectors must be free from fingerprints.

Scope of Works

The lighting installation shall be tested and commissioned in accordance with CIBSE Commissioning Code L:2003.

The Contractor shall allow for measuring illumination levels of the installation prior to Handing Over. Measurements shall be carried-out in accordance with the SLL Code for Lighting, sections on Instruments and Field Surveys.

The WCs will be provided with presence detectors, also linked into the fully addressable system. The LCMs in the WCs will also switch the local extract fans on. The timeout will be set to 15 minutes.

Dimmable Plug & Play LCM.

The LCM will provide 10 individual outputs and 8 SELV switch inputs. The connection to the outputs is via a 6 pole Wieland style connector with the option of side or top entry for low ceiling voids, and will provide Live, Neutral, Earth and Permanent Live, Dimming D1(+) and Dimming D2(-). All connections to the luminaire will be via a suitable multi core flex.

For clear identification of luminaire types, the emergency plug will be red and the standard luminaire plug will be white.

A mechanical latching arrangement on the plug will prevent accidental removal from the weight of the flex.

The dual function occupancy/photocell detectors will be connected by a Cat5e patch lead to the nearest lighting control module. The occupancy/photocell detector should be located in line with the window row luminaires to measure the combination of natural and artificial light in the area where the luminaires are required to dim.

The presence detector timeout period will be adjustable between 1 and 99 minutes in 1 minute increments.

Commissioning

A full set of pre-addressed drawings and schematics will be supplied for installation purposes. These drawings will become part of the operation and maintenance manuals.

On completion of the works training will be included for so the operatives will be knowledgeable and conversant with how the front end works and monitors the building.

Containment

The building shall include a number of vertical and horizontal primary containment routes. The main horizontal containment routes are intended to be run within raised access floors and where available, ceiling voids/ceiling distribution zones.

External Lighting

External lighting shall be provided to the WPS building.

Amenity lighting to all external plant areas and entrance/exits from and into the building shall be provided. This is to be developed by the Contractor in line with the Architects requirements.

Emergency lighting is to be provided to each exit entrance to the building in accordance with BS5266.

The design of all external lighting shall be in accordance with the CIBSE lighting guide 6 `The Outdoor Environment` and the ILE (Institution of Lighting Engineers `Guidance notes for the reduction of obtrusive light`.

External lighting shall be provided such to allow safe access/egress from the pedestrian and vehicular entrances to the WPS building.

Where external signage lighting is required, contractor to provide the necessary power supply requirements.

Scope of Works

The installation shall comply with the minimum requirements for effective CCTV coverage and shall meet the requirements dictated by the Local Authority. The light source provided shall be white and uniform throughout.

All external lighting shall be controlled via a photocell and will include a timer to allow the lighting to be automatically switched off between 2300hrs and 0700hrs, except for safety and security lighting. The installation shall be linked to the internal lighting control system to provide this functionality.

Safety / security lighting to be used between 2300hrs and 0700hrs will comply with the lower levels of lighting recommended during these hours in Table 1 of the ILE's Guidance notes.

The Contractor shall ensure that the external lighting installation complies with the following:-

All external light fittings for the building, access ways and pathways have a luminous efficacy of at least 50 lamp lumens/circuitWatt when the lamp has a colour rendering index (Ra) greater than or equal to 60. **OR** 60 lamp Lumens / circuitWatt when the lamp has a colour rendering index (Ra) less than 60.

All external light fittings to car parking areas, associated roads and floodlighting have a luminous efficacy of at least 70 lamp lumens/circuitWatt when the lamp has a colour rendering index (Ra) greater than or equal to 60. **OR** 80 lamp Lumens / circuitWatts when the lamp has a colour rendering index (Ra) less than 60.

All external light fittings for signs and uplighting have a luminous efficacy of at least 60 lamp lumens/circuitWatt when the lamp wattage is greater than or equal to 25W. **OR** 50 lamp lumens/circuitWatt when the lamp wattage is less than 25W.

Refer to latest Room Data sheets appended to Schedules section of this specification for lighting design criteria.

V22 – General Power

System Description

All electrical installations shall be designed and installed in full compliance with the 18th Edition of the IEE Wiring Regulations (BS 7671:2018+A2:2022).

Dedicated electrical riser cupboards shall be provided as indicated on the layout drawings.

The building shall include a number of vertical and horizontal primary containment routes. The main horizontal containment routes are intended to be run within raised access floors and notional corridor ceiling voids. The main vertical containment routes shall be located within designated electrical riser spaces.

Main and sub-main armoured cabling from the main building switchboard to risers serving upper floor general power and lighting distribution boards. The containment shall either be MDRF galvanised ladder rack or MDRF galvanised cable tray

Main armoured cabling from the mechanical motor control centres to mechanical plant, the containment shall be MDRF galvanised cable tray

Fire alarm cabling from the main fire alarm panel to the fire alarm equipment and apparatus, the Containment shall be MDRF galvanised cable tray

Lighting and small power cabling from the local distribution board to final outlets / equipment. The containment shall be single compartment galvanised trunking, or tray with multicore cables.

Scope of Works

C.C.T.V / Alarms / BMS controls cabling from the equipment to the source, the containment shall be galvanised cable basket tray

Segregated containment shall be provided for the following systems and contained by galvanised or PVC conduit and basket throughout:

Emergency lighting
Lighting controls
Fire
Voice / Data
C.C.T.V
Alarms
BMS

Small Power

Local socket outlets shall be provided as indicated on contract drawings and RDS.

Local socket outlets shall be provided in all areas to suit the need for mobile appliances such as computers, printers, ancillary user equipment etc. This provision shall vary greatly depending on the type of space concerned. The method of small power distribution shall be by one of the following methods:-

Raised access floors with grommets or floor boxes
Perimeter trunking
Flush mounted outlets

Local power supplies shall be provided within all spaces for all fixed equipment including but not limited to the following types of equipment:-

Local mechanical plant such as extract fans/ VRF units
Specialist equipment
Audio-visual equipment
Fixed equipment, vending machines, fridges etc.
Cleaners outlets
Trace heating
Disabled call systems
Hand dryers
Power assisted doors

RCD protection shall be provided as necessary to comply with the IEE Wiring Regulations. The contractor shall provide a risk assessment as required by the IEE Wiring Regulation to clearly define areas where RCD protection is not being provided and has been risk assessed out.

All general-purpose/cleaner's circuits serving socket outlets shall be 30mA RCD protected.

Small power socket outlets for use by Cleaners are to be served by distribution circuits separate from those intended for general use. Generally all rooms shall be provided with a cleaners outlet with circulation routes e.g. corridors etc associated outlets located at approximately every 10 metres nominally.

All multiple socket outlets circuit (circuit serving two or more sockets) shall be of the ring type with circuits feeding specific single fixed equipment items via spurs from distribution boards being radials.

The indicative extent of provision and distribution of small power socket outlets is as defined within the room data sheets and layout drawings contained within this tender package. The Contractor shall be responsible for

Scope of Works

engaging with the Client (WPS) to complete the briefing to determine all small power servicing requirements for the refurbished building.

The provision and specification of all small power and 'clean' earthing connections to secondary comms rooms shall be agreed with the WPS IT department.

Underfloor Power

Power supplies to floor outlet boxes shall be derived from plug-in busbar systems installed within the raised floor void.

Underfloor plug-in busbar trunking shall be 3-pole (L,N&E), 63A rated of standard lengths. Busbar trunking shall be fixed to the floor slab by means of manufacturer's proprietary brackets. Cables feeding the busbar shall be minimum of 10mm² 3 core, XLPE insulated, armoured, the third core and armour forming parallel earth paths. Each conductor shall be colour coded at each end.

The cables shall be installed on medium duty cable trays fixed to shallow channel support brackets. Underfloor busbar trunking, cable trays and cables shall occupy the lower 50mm of the raised floor voids, to enable IT basket trays, supported on 50mm legs to crossover.

Underfloor socket outlets in the comms room, patch rooms and equipment rooms shall comprise 32A rated 2P+E BS EN 60209 (Commando) socket outlets wired as radial circuits. Each socket outlet shall be provided with a plug.

Floor Grommets

Recessed floor grommets shall be provided in the floor tiles to enable cables to pass through to furniture mounted equipment.

Floor grommets shall be of polycarbonate/ABS construction, with a lid mounted cable entry foam insert.

Grommets shall be installed in an unobtrusive position below furniture.

Furniture Mounted Outlets

Where socket outlets are to be furniture mounted the Contractor shall allow for co-ordinating the installation with the furniture manufacturer. All necessary components to provide a complete working and integrated system shall be provided.

Dado Trunking

Dado trunking shall be 2-compartment white plastic of nominal dimensions 220mm X 65mm, with integral segregation between power and IT cabling. Power supplies to dado trunking socket outlets shall be derived from the underfloor plug-in busbar trunking using power supply leads comprising 3no. LSF insulated single-core cables installed in a metallic flexible conduit and a 13A fused plug-in busbar tap-off.

Power Outlets/Fused Connection Units.

Wall mounted power outlets/fused connection units shall be flush mounted with wiring concealed within the fabric of the building.

Outlets/fused connection units installed at low level or dado level shall be wired using 3-core XLPE/LSF/SWA cables routed through the floor void on medium duty cable trays and rising up the wall in partitions. Where outlets are installed in masonry walls armoured cables shall be glanded under the floor with internal cores rising to the outlet box through steel conduit.

Wiring, containment and accessories shall generally be installed within the floor void, ceiling void and the fabric of walls and partitions. It should be noted that partitions are generally of high acoustic integrity, with 30mm plasterboard linings. Recessed backboxes shall be of sufficient depth to finish flush with the face of partitions and allow connection/glanding of cables/containment within the partition void.

All backboxes shall be metallic and shall not be installed back to back with other accessory boxes within partitions. Seal backboxes within partitions with acoustic putty pads as "Hilti CP 617" or equal and approved, installed in accordance with manufacturer's instructions. Provide timely information to the main contractor to enable the provision of suitable noggins.

Scope of Works

The Contractor shall allow for appropriate electrical supplies for hand driers. Allow 3 no. to each WC containing cubicles. Provide 1 no. to all other WC's.

Power Supplies

The Contractor shall be responsible for producing Final Distribution Board Schedules from the tender drawings.

Generally electrical accessories will be standard white plastic all finishes to be confirmed by the Architect.

Accessories and Wireways

Refer to the Y74sch1.

W12 – Public Address/Sound Amplification

System Description

The Contractor shall appoint a specialist contractor Johnson Control (Tyco) to supply, design, install, test, commission and set to work a complete Public Address system for WPS building.

Contact details for Johnson Controls:

Dan Campbell

PAVA & PA Sales Representative

Johnson Controls

Tel: 07929 768295

E-mail: daniel.munro.campbell@jci.com

Tyco Fire and Integrated Solutions

Spector House

Dabell Avenue

Blenheim Industrial Estate

Nottingham

NG6 8WA

The specialist contractor shall install a PA system complete with ceiling mounted, wall mounted and external IP65 speakers as indicated as design intent services drawing.

Contractor to allow for all necessary power supplies, interfaces with fire alarm panel and containment.

Where volume restoration on volume controls are being used in certain areas (such as meeting rooms), a recommendation of 4 core 1.5mm cable (stranded) for speaker circuits. Specialist contractor to confirm final cable selection.

General circuits where no volume restoration is required, a standard 2 core 1.5mm (stranded) cable will be required. Specialist contractor to confirm final cable selection.

Where cable lengths exceed routes from the amplifier to the furthest speaker exceeds 200 meters, consider using a 2.5mm cross sectional cable, specialist contractor to confirm final cable selection.

Microphones shall utilise CAT5 cable, final cable selection to be confirmed by specialist contractor.

The following PA zoning indicated below is indicative, final designs and recommendations is to be provided by the specialist contractor.

WPS PA System Zoning

Ground Floor - Public	1
Ground Floor -Staff Areas	2
Ground Floor - Fitness	3
External by Staff Entrance	4
First Floor	5

Scope of Works

Second Floor - Office	6
Second Floor - Main Break Out	7
Second Floor - WBC Area	8

W15 – Facilities for the Disabled

System Description

Male, Female and Disabled Toilets at Ground, First and Second Floor levels are provided with WCs and WHBs.

Disabled Toilet Alarms

The Contractor shall supply, install, test and commission an alarm system within each disabled toilet giving a local visual and audible alarm to enable disabled persons to summon assistance by means of a pull cord.

Local Alarm and Indicator:

Upon activation of the pull cord switch, the local reassurance light shall be illuminated until the system is reset.

A red lamp/buzzer unit shall be provided above the door to each disabled toilet/shower. This shall be activated in the event of the appropriate pull cord being activated.

A local reset unit shall be provided within each disabled toilet to allow the system to be reset from within the toilet from which the alarm was raised. No other facilities for resetting the system shall be provided. The system shall be provided with battery back-up for 24hrs.

Audio Induction Loop Systems

The Contractor shall employ a specialist contractor to design, supply, install, test and commission audio induction loop systems to serve the refurbished WPS building.

The areas to be covered are to be clarified with the client as part of the detailed design process.

It is envisaged these areas shall include but not be limited to:-

- Reception
- All Interview room and Breifing spaces.

The Contractor shall allow for the provision of 3 no. fixed induction loops.

Portable induction loops for use within multi use rooms shall also be considered subject to the conclusion of the briefing process.

The Contractor shall allow for the provision of 3 no. portable induction loops.

Disabled Refuge Intercom system

The Contractor shall supply, design, install, test, commission and set to work a complete disabled refuge 2-way intercom system including all necessary power supplies and fire rated cabling. The system shall be wired in fire rated cabling. The installation shall comply with BS5839 Pt 9.

All disabled refuges throughout the building shall be included. A link shall be provided back from each disabled refuge intercom unit to a central station unit positioned in the reception area.

The control unit shall be suitable for desk mounting.

Scope of Works

W40 – Access Control

System Description

The Contractor shall supply, design, install, test, commission and set to work a complete access control system for WPS building.

The full extent of the access control works required to the building shall be further developed through Contractor/Client consultation during the next stage 4 of the project. New system hardware shall be included within the building for all of the systems. This will include power supply units, control units, card readers, mag. locks/door hardware etc.

Liaison shall be required with the client existing incumbent security specialists / system maintainers.

The security systems briefing has yet to be fully concluded and therefore this undertaking shall form part of the detailed design to be completed by the Contractor.

Anticipated security systems shall include (subject to conclusion of security briefing with the client WPS):

1. Door monitoring (via door contacts)
2. Access Control system including intercom units
3. Security barriers
4. RFID Readers

Indicative provisions are indicated on the drawings for review, further development and sign off with the client as part of the briefing process to be undertaken.

The access control system shall operate as an integrated part of the security systems with all access control events being monitored. The system shall control access to areas but shall not be limited to as follows:

To all External main entrance doors

IT Hub Rooms

Stairwells leading to upper floors

Designated rooms to be confirmed by the client

Lift

The system shall be of modular design to allow for future expansion.

The systems shall generally be fail safe to open, in the event of system fault or power failure.

All access control card reader units shall be of the "proximity" card reader type. The readers would be set to security levels to restrict access as necessary.

System Interfacing

The access control readers shall be configured to accept alarm input signals from the fire alarm detection system relay modules and relay output alarm signals to the main security system and closed circuit television (CCTV) system.

The alarm output signals via relay modules from the fire detection system shall be configured to disable the door locks to a "fail safe" status allowing the emergency escape doors to be opened without an access card. This facility shall be limited to access controlled doors within the fire alarm affected zone(s) only and only if the door is required to be opened to provide access to a fire escape route.

Scope of Works

W41 – Security Detection & Alarm

System Description

The Contractor shall appoint a specialist contractor to supply, design, install, test, commission and set to work a complete Affray Alarm system for WPS building.

The specialist contractor shall install an affray alarm system with the main control panel located behind reception desk and affray strips as indicated on Architects GA plans. Final locations to be confirmed by the client.

The following areas shall be covered with affray strips but not limited to;

Interview Room
PJ Room
Reception

W50 - Fire Detection and Alarm

System Description

The existing Fire Alarm Panel is of the HAES type located adjacent to the main entrance doors within the Reception area and provides cover for the following Zones:

Sprinkler Zone
Basement Zone
Ground Floor Zone
First Floor Zone
Second Floor Zone
Plant Room (Roof Zone)

The existing fire alarm cabling to smoke detectors, sounders and call points is routed through vertical builder's work risers to each floor level serving the various outlets throughout the building. Contractor shall strip out all existing FA devices, wiring and panel as part of the works.

The Contractor shall design, supply, install, commission and set to work a fully analogue addressable fire alarm system for the refurbished WPS building.

The system shall be fully analogue addressable designed to meet the Standards and Guidance detailed within this document including the buildings fire strategy and include the specific requirements of Approved Inspector, the Fire Authority. The system shall provide coverage to category 'L2' of BS 5839 "Fire detection and alarm systems for buildings") and the WPS building fire strategy recommendations.

The fire alarm design will also comply fully with the requirements as prescribed under BS 9999: 2008, Approved Building Document Part B and M, Clients Insurers, Fire Officer, End users Fire Officer and Local Building Control Requirements.

The new system shall consist of automatic smoke/heat detectors, break glass units, sounders and flashing beacons as necessary to meet the requirements of DDA.

The fire alarm shall be interlinked to the following but shall not be limited to as follows:-

- a) Sprinkler System
- b) To the mechanical plant to shut down on alarm.
- c) Gas shut-off valves to close on alarm.
- d) PA System
- e) Disabled Refuge Alarm
- f) Access Control

Scope of Works

- g) Lift
- h) Motorised smoke dampers, Basement Smoke extract fans
- i) AV system

As isolation-test key will be provided to prevent ancillary devices/outputs operating on routine test.

The Electrical Services Contractor shall allow to wire and connect to all systems in order to provide a complete operational system of interfaces. Exact positioning of all devices shall be agreed on site, particularly attention being paid to smoke detectors on ceiling adjacent to light fitting, ventilation diffusers, etc. to ensure they are not in direct air flows.

A full wiring diagram and cause/effect chart shall be provided by the Electrical Services Contractor for approval to the Engineer prior to commencing any cabling.

The Electrical Services Contractor shall confirm with the Specialist during tender period the requirements and locations of 230V power supplies for the fire alarm equipment. The fire alarm system shall be commissioned to meet the specific requirements of the client's fire alarm management response.

Fire Alarm Sub Contractor will connect the fire alarm system back to the end users monitoring station. This shall be achieved using an auto-dialler within the main fire alarm panel connected to a British Telecom RedCare line.

The Contractor shall develop a Fire Alarms Cause and Effect Matrix to meet the fire strategy and client management/security requirements as necessary.

W51 – LV Earthing and Bonding

System Description

The Contractor shall supply, design, install, test, commission and set to work a complete LV Earthing and Bonding system for WPS building.

The earthing and bonding shall be provided in accordance with:

BS 6701	Code of practice for installation of apparatus intended for connection to certain telecommunication systems
BS 7430	Code of practice for earthing
BS EN 62305	Protection of Structures against Lightning.
BS 7671	Requirements for electrical installations. IEE Wiring Regulations. Current update
BS EN 50310	Application of equipotential bonding and earthing in buildings with information technology equipment

Bond and connect to earth all exposed conductive parts of the electrical installation and all extraneous conductive parts so that in the event of a fault of negligible impedance, disconnection will take place in a manner and in such time as to ensure no danger arises.

Provide the earthing system as shown on the drawings.

Bond all services entering the building as close to the entry point as possible Telecommunication service bonding to be agreed with service provider.

Provide supplementary equipotential bonding as defined in W51txt to the following buildings / zones / locations / items of equipment :

Scope of Works

The building will have an earthing network provided to comply with BS7430.

All exposed conductive parts of the electrical installation and all extraneous conductive parts will be bonded so that in the event of a fault of negligible impedance, disconnection will take place in a manner and in such time as to ensure no danger arises.

New earth bars within each of the main electrical risers will connect all mechanical and electrical equipment on that particular floor. Each earth bar will then be connected to the main earth bar within the electrical switch room by means of a copper earth cable.

Supply install, test and commission a complete earthing system. Bond and connect to earth all exposed conductive parts of the electrical installation and all extraneous conductive parts so that in the event of a fault of negligible impedance, disconnection shall take place in a manner and in such time as to ensure no danger arises.

Protective Equipotential Bonding

Protective equipotential bonding shall ensure that all extraneous conductive parts are bonded to the main earthing system.

An earth bar shall be supplied and installed at each floor level within each electrical riser for equipotential bonding to extraneous metalwork including but not limited to raised floors, dropped ceiling supports and metallic parts of partition walls, mechanical services, metallic cladding etc.

The Contractor shall liaise with the Main Contractor and the various manufacturers of raised floors, suspended ceilings, partitions and cladding containing metallic parts to ensure that sufficient terminals are provided by the manufacturers to allow the M&E sub-contractor to bond onto them.

The M&E sub-contractor shall also request written statements on the electrical continuity of all assemblies be provided by manufacturers to determine the number of bonding terminal points required.

For tender purposes allow for bonding 1no. pedestal per 100m², with a minimum of one per room. In IT rooms, i.e. the secondary hub rooms each pedestal shall be bonded to the earthing system.

Supplementary Bonding

Supplementary equipotential bonds shall be made to interconnect all simultaneous accessible conductive parts to the protective conductor system. This shall generally be undertaken in bathrooms, shower rooms, boiler rooms, calorifier rooms, all other plantrooms and wet and damp process areas such as kitchens.

Clean Earth Bars

A dedicated clean earth bar shall be supplied and installed within the secondary hub rooms connecting back to the main switch room earth bars in green/yellow sheathed cable.

Earthing for the Installation of Equipment having High Protective Conductor Conductors

A high integrity earthing system in accordance with Section 543.7 of BS 7671 shall be provided for:

- 13A socket outlet circuits
- BS EN 60309-02 socket outlets serving equipment racks in the IT Patch Rooms and Equipment Rooms

The specialist earthing installer shall test all earth electrode resistances.

W52 – Lightning and Surge Protection Systems

System Description

Scope of Works

The Contractor shall employ a specialist to design, supply, install, test, commission and set to work a complete Lightning Protection system for WPS building.

A lightning protection system will be provided to comply with the requirements of British Standard BS EN 62305, to provide adequate protection of the building against damage from lightning, and to minimize the risk to human life in the event of lightning.

The contractor shall allow within their Tender to carry out a lightning protection survey and validation of the existing LPS for WPS building. The contractor shall allow for any remedial works required to integrate existing lightning protection system with any new bonding requirements as part of these works. The below list is for reference only but shall not be limited to:

Lightning Protection System Bonds

- Steel structural frame
- Reinforcement bars in concrete
- Metallic roof coverings
- Services
- Television and radio aerials and supports
- Metal flues and flue lining
- Dry risers
- Water services
- Air ductlines
- Gas services
- Masts (3rd Party)
- Roof level plant rooms
- Water tanks
- Raised floor footings

The Contractor shall incorporate a new Surge Protection device within the panel, design and provide proposals if this can be retrofitted or located external from the existing main panel.

Contractor to adhere to current IEE Wiring Regulation (BS 7671) 18th edition and current amendments and comply to sections **534 Devices for protection against overvoltage** and **534.4.4 Selection and Erection of SPD's** as necessary.

Contractor shall provide

On completion of the lightning protection works, the Contractor shall provide a completion certificate with appended test results and shall form part of the O&M manual.

W60 - Central Control /Building Management System

System Description

The existing BMS Systems, MCCs and Mechanical Services Control Panels are all thought to be of original installation and of an age and condition where replacement is necessary

The design intent is that the existing BMS Systems, MCCs and Mechanical Services Control Panels replaced with new systems to provide full control, monitoring and alarm facilities of all new and existing plant and equipment incorporated into the final scheme to meet with and accord to the clients standard requirements.

Scope of Works

The Contractor shall employ a Specialist Sub contractor to be responsible for the supply, design, installation, testing, commissioning and setting to work a complete BMS System for WPS building.

The BMS controls shall generally be based on Trend equipment

The Specialist Sub contractor undertaking the works to be approved by the client

W70 – Structured Cabling System

The Contractor shall engage a Data specialist contractor to supply, design, install, test, commission and set to work a complete structured cabling system and electrical Comms room fitout for WPS building.

A structured wiring system in accordance with the Heatfordshire Constabulary data cabling specifications shall be provided to the WPS building, appended within the back of this specification.

UTP final outlet cabling shall consist of Category 6 LSZH cable.

All cables above walkways and fire routes are to be secured using appropriate fire rated ties (stainless steel) and fixings. Contractor to allow for any fire stopping where cabling is routed through fire barriers.

The structured wiring shall be installed on a containment system consisting of a cable basket network system and conduit links to each outlet position

UTP cabling to each and every final outlet position (this shall include the final termination of each outlet at both outlet and termination rack end) including all associated back boxes and faceplates.

UTP circuitry shall not exceed 90 metres. All such equipment shall be located within secure locations.

The cabling system shall be 100 percent tested and visually examined and the results recorded. The test instrument used must as a minimum comply with the accuracy requirements of ANSI/TIA/EIA 568-B Level III. All test results shall be recorded and presented within the O&M manual.

**** End of Scope Sections ****

Below is the Client's Standard Specification for structured cabling.

Structured Cabling Client Specification

ICT Cabling Specification

Watford Police Station Remodelling_Scope (17-03-22 12-01)

Beds, Cambs, Herts

© Bedfordshire Police, Cambridgeshire Constabulary & Hertfordshire Constabulary 2014

No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means without the written permission of Bedfordshire Police, Cambridgeshire Constabulary & Hertfordshire Constabulary

Structured Cabling Client Specification

Distribution

Name	Job Title

Document Control

Version	Description	Release Date	Reason For Change
0.1	Initial Draft		
1.0	Working copy		
2.1	Version 2.1		
2.2	Version 2.2	10/2/2020	Equipment Manufactures Updated. Changes to 18 th Ed.

Prepared By

Name	Contact Details
Neil Edgley	Neil.Edgley@cambs.pnn.police.uk

Glossary

Term	Description
Baseline Architecture	The infrastructure, components and services that form the current solution.
Target Architecture	The infrastructure, components and services that form the proposed solution.

Related Documents

Document	Description

Structured Cabling Client Specification

Table of Contents

1.	SCOPE OF WORKS	48
2.	Legislation, REGULATIONS AND STANDARDS	48
3.	OPERATION & MAINTENANCE MANUALS	49
4.	Communications Equipment Rooms	50
4.1	Single Cabinet	50
4.2	Double Cabinet	51
4.3	Triple Cabinet	51
5	COMMUNICATIONS CABINETS	52
6.	PATCH PANELS – Twisted Pair	55
7.	CABLING - Twisted pair	55
8.	DATA OUTLETS – twisted pair	56
9.	VOICE CABLING	56
10.	PATCH PANELS – FIBRE OPTIC	57
11.	FIBRE OPTIC CABLE	57
12.	FIBRE OPTIC TERMINATION	58
13.	CABLE ROUTES	58
12.1	WALLS AND FLOORS	59
12.2	CONTAINMENT	Error! Bookmark not defined.
12.3	PVC containment	59
12.4	Metallic Containment	60
13	Grounding Bonding and Protection	60
14	UPS	60
15	LABELLING OF COMPLETED SYSTEM	61
16	UTP LABELS	61
17	FIBRE LABELS	61
18	TESTING & COMMISSIONING	62
19	PATCH CORDS / FLYLEADS	64
20	GENERAL INFORMATION	64
21	Reference Documentation	67

1. Scope of works

The scope of this project is to provide a structured cabling network. Data Contractors shall put forward a Category 6 solution unless otherwise specified.

To achieve a completely functional, fully adjusted and ready to use system for the client the provision of operational and maintenance manuals, the final drawings, supply of spare parts and special tools and the training of staff shall also be provided in accordance with the details outlined in this specification.

All works shall generally include all of the items detailed within this specification, together with the full requirements of all other sections of this specification/tender documentation.

All submitted contracts shall cover the preparation of all construction drawings, including all necessary schedules and site attendance for testing and commissioning phases of each separate installation.

2. Legislation, REGULATIONS AND STANDARDS

Contractors shall adhere to the following legislation: Control of Pollution Act 1974; The Construction (Health, Safety and Welfare) Regulations 1961 and 1966; The Factories Act 1961; The Health and Safety at Work Act 1974 and the COSHH Regulations 1999 and CDM Regulations 1994.

The data communications installation has been designed using the general standards listed below:

The installation shall comply with this specification, with all British Standards and Codes of Practice and with all other relevant statutory instruments and regulations current at the date of works (unless stated otherwise in this design brief) and in particular with the following, where applicable:

- BS EN 50174 Parts 1, 2 & 3:2000
- EN 50288-1
- EN 50288-2
- EN 50130:2000
- EN 61000-2-2
- ISO/IEC 11801:2002
- BS EN 50173:2002
- ANSI/EIA/TIA 568-B
- ANSI.EIA/TIA 568-B.2
- ISO/IEC 60603-7-8
- BS EN61280-4-2:2000
- BS 6701

3. Operation & maintenance manuals

The O&M manuals will be supplied within 7 days of completion, and will include the following

- Test results
- Guide to understanding the test results
- Testing Equipment Calibration Certificate
- Marked up drawings indicating cable routes, outlet ID numbers and communication room locations. These will be supplied in CAD format (dxf or dwg) together with two (2) hard copies
- Schematic diagram
- Cabinet layout diagram
- List of components used
- 25 Year Warranty certificate
- Photographic and documentation of all fire stop seals
- Approval and acceptance from a Cambridgeshire constabulary authorised officer.

4. Approved Equipment Manufacturers

The following Supplier products have been approved for use across BCH Sites However please ensure that individual requirements are checked in the specific Scope of works for each project for any local variances.

4.1 Communication Equipment Cabinets

Communication cabinets will be manufactured by the below, and will be a minimum of 800*800mm, fitted with Mesh doors front and rear. and painted black and will be fitted at point of install with Dirak Eline MLR 5000 KP handles.

- U Systems and come from the 4210 range
- DataRacks and come from the 303 eco server range.
- Prism

4.2 Copper and Fibre Cabling

Copper and Fibre cabling and associated equipment shall be manufactured by one of the below, but should be consistent across both Copper and Fibre installation and may be subject to local variances to ensure consistent delivery of service to site.

- Panduit
- Leviton/Brand Rex
- HT data

Structured Cabling Client Specification

4.3 Electrical Systems

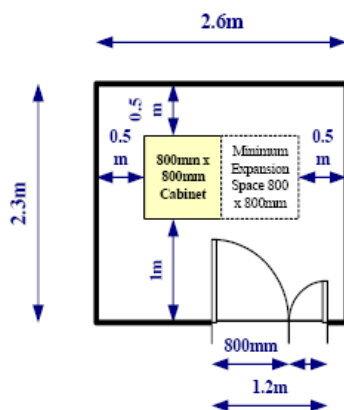
- Schneider
- Eaton
- Riello
-

5. Communications Equipment Rooms

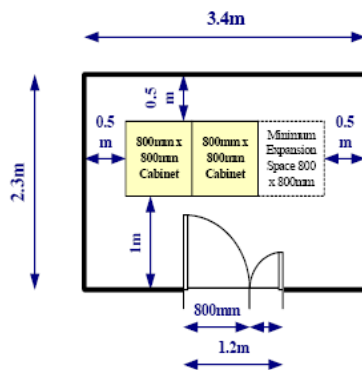
Each communication equipment room should comply too the following specification.

- Construction: To provide a minimum 1 hour fire rating
- Wet services : not within room footprint
- Room height :2.4m minimum
- Floor covering: Antistatic Covering
- Temperature:18 degrees C to 24 degrees C
- Humidity : 30% to 55% non condensing
- Lighting: A minimum of 500 lux measured at the point of termination
- Cable entries: All cable entries to be sleeved and fire stopped
- Electrical supplies: 2 number 16 amp BS EN.60309-2/bs4343:1992 commando outlets each to be supplied from a dedicated supply from the EDB
- 2 number 13 amp switched sockets fitted into appropriate trunking.
- Earths: 1 number telecommunications earth to comply with BS 6701 and fitted to a TMGB as detailed, and 1 number electrical safety earth.
- Security: to have swipe access to entrance doors.

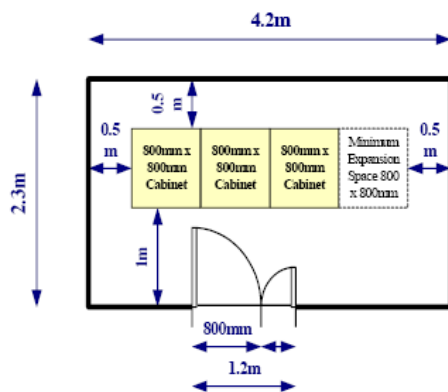
5.1 Single Cabinet



5.2 Double Cabinet



5.3 Triple Cabinet



6 Communications cabinets

Freestanding communication cabinets normally supplied will be a minimum 42U, 800mm wide, 1000mm deep, unless otherwise stated. Wall-mounted communication cabinets are to be 800mm deep and fitted to the fabric of the building at a safe and suitable height. All cabinets are to be supplied with a Dirak HID direct locking system fitted into a 1U panel.

Floor standing communications cabinets will be supplied with at least the following unless specified elsewhere:

- Lockable Vented front door
- Lockable Vented rear Door
- Lockable, removable steel side
- Two (2) 300mm*50mm cable trays
- UPS bypass Switch to support up to 3000va load.
- One (1) 10 way Vertical 13a plug PDU fitted with C20 Plug and connected to the Ups bypass switch
- Fixed plinth and levelling feet unless specified differently.
- 100mm cable management arms for vertical cable retainment
- front and rear mounting angles.

Wall mounted communications cabinets will be supplied with the following:

- Lockable front door
- One (1) 5-way vertical power distribution unit
- All communications cabinets will follow the details given in the grounding bonding and protection section of this specification for the local earthing requirements.

Structured Cabling Client Specification

6.1 Cabinet layouts

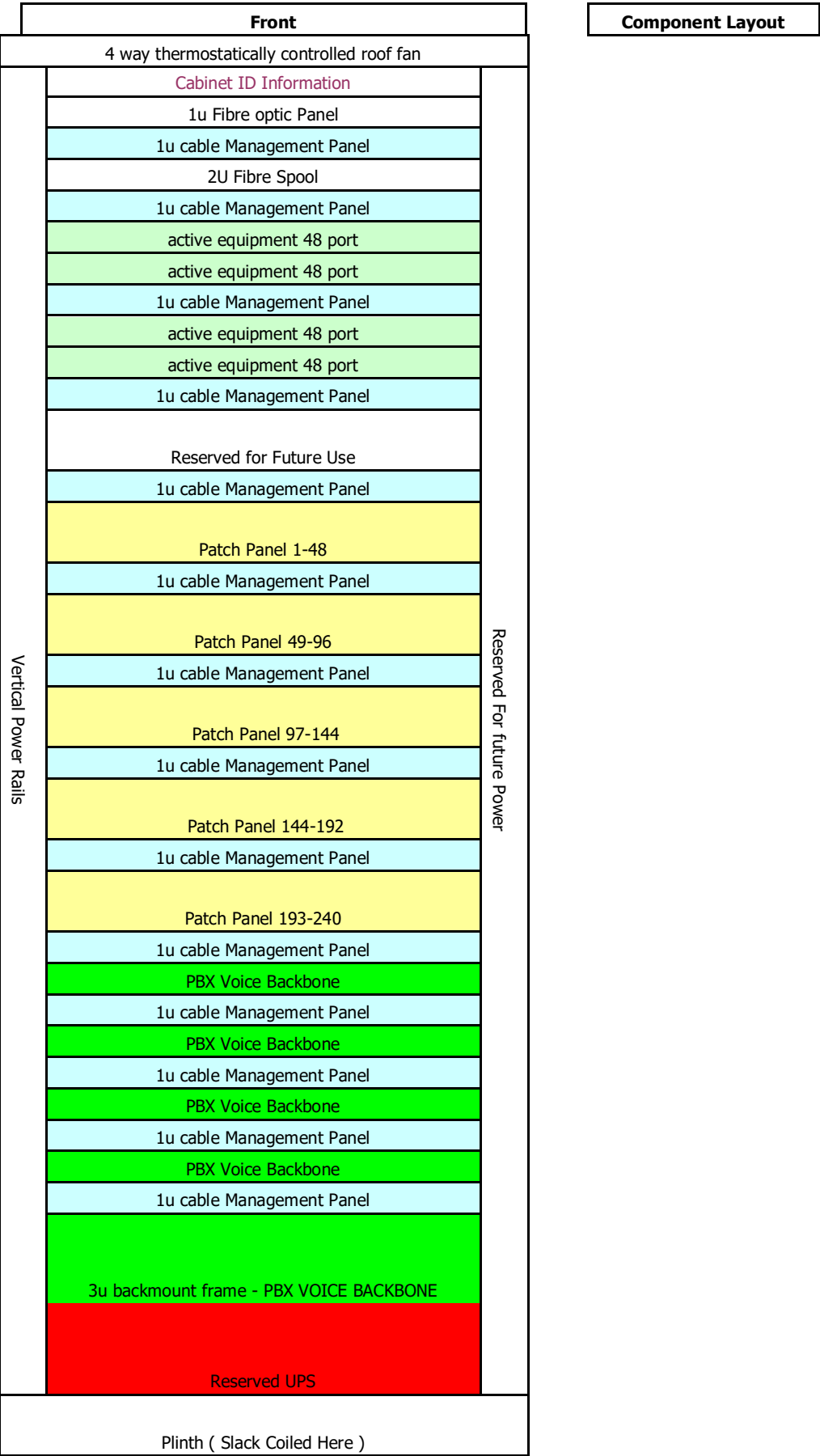
4 way thermostatically controlled roof fan		TOP	TOP
1	Cabinet ID Information	TOP	TOP
2	1u Fibre optic Panel	FIBRE	
3	1u cable Management Panel		
4	2U Fibre Spool		
5	1u cable Management Panel		
6	active equipment 48 port		
7	active equipment 48 port		
8	1u cable Management Panel		
9	active equipment 48 port		
10	active equipment 48 port	ACTIVE EQUIPMENT	
11	1u cable Management Panel		
12	Reserved for Future Use		
13	1u cable Management Panel		
14	Patch Panel 1-48		
15	1u cable Management Panel		
16	Patch Panel 49-96		
17	1u cable Management Panel		
18	Patch Panel 97-144		
19	1u cable Management Panel		
20	Patch Panel 144-192		
21	1u cable Management Panel		
22	Patch Panel 193-240		
23	1u cable Management Panel		
24	Patch Panel 193-240		
25	1u cable Management Panel		
26	Patch Panel 193-240		
27	1u cable Management Panel		
28	Patch Panel 193-240		
29	1u cable Management Panel		
30	Patch Panel 193-240		
31	1u cable Management Panel		
32	Patch Panel 193-240		
33	1u cable Management Panel		
34	Patch Panel 193-240		
35	1u cable Management Panel		
36	Patch Panel 193-240		
37	1u cable Management Panel		
38	Patch Panel 193-240		
39	1u cable Management Panel		
40	Patch Panel 193-240		
41	1u cable Management Panel		
42	Patch Panel 193-240		
	3u backmount frame - PBX VOICE BACKBONE		
	Reserved UPS		
	Plinth (Slack Coiled Here)	BOTTOM	BOTTOM

Horizontal Cabling

Labelling Scheme: Cabinet /Socket Number e.g. M/55

Copper Voice Backbone

Structured Cabling Client Specification



7 Patch panels – twisted pair

Individual Enhanced Category 6 data patch panels shall be configured to 258A/568B schedule and will be supplied and installed for the termination of all data cables within the communication cabinets. When terminating cables within 24-way patch panels the contractor is to loom 24 cables from either side of the cabinet, unless 2u panels are used where every 2u panel should be fed from different sides. Where UTP data cables are terminated on the patch panels in the communication cabinets a rear cable manager shall be used. Patch Panels shall be fixed to the communication cabinet mounting frames with appropriate inserts and have a clear labelling system.

All patch panels are to be earthed.

A 1U horizontal cable management bracket is to be installed underneath every two (2) 24 way patch panels.

All unused ways are to be fitted with blanks.

8 Cabling - Twisted pair

All copper data cable supplied will be Category 6 LSOH.

All data cables will be loomed within the communication cabinets, presented and terminated onto 24-port 19-inch rack mounted patch panels. All cable looms inside the cabinet shall be protected inside a braided sleeving prior to being secured to the appropriate containment system.

There shall be no junctions or splices in the cable between the patch panel and the outlet. If cables are damaged along the run of cable then they must be removed and replaced with new cable.

There shall be no twists or kinks along the length of the cable.

The twists in each pair must be maintained up to the point of termination as required by ISO/IEC 11801:2000. This specification requires a maximum untwist of 13mm from the point of termination.

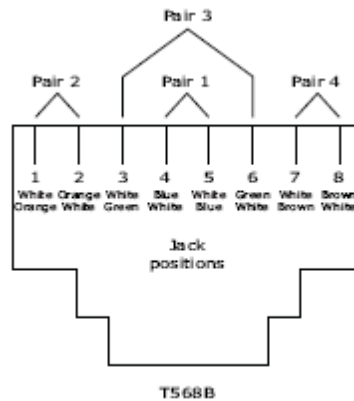
The cable sheath shall not be stripped back more than necessary.

All cable will be secured using Velcro cable ties where suitable, no nylon ties are to be used in the installation.

All four pairs of the twisted pair cable shall be terminated at either end

Structured Cabling Client Specification

The cables are to be terminated as per the EIA/TIA wiring scheme so that presentation is as follows



All twisted pair cables should be labelled at each end with a wrap around label printed with the circuit ID, the label should be located near the point of termination at either end such that it can still be seen if termination is removed.

Twisted pair cabling type will be defined within the ITT requirements for each project.

9 Data outlets – twisted pair

All data outlets supplied shall be Category 6 RJ45 modules and shall be configured to 258A/568B schedule.

Where outlets are fixed into a floor box, 6c style modules shall be utilised.

Data outlets shall be supplied with a slide label system.

All outlets are to be provided with shutters that automatically close when device leads are removed.

Data outlets shall be mounted into quad faceplates to ensure the correct bend radii is utilised.

10 Voice cabling

All voice cabling installed will be CW1308 LSZH or CW1308b.

Cables will have 2-pairs terminated at both the patch panel and the 237a Test Jack Frame. The 2 pairs will be connected to pins 4 and 5 of the patch panel

The strips 237a will be labelled with the appropriate strips designation designed for the purpose they will include a printed face label giving the final location of the cable and also

Structured Cabling Client Specification

include the pair count. The reverse side shall be fitted with a plain white insert. Both sets of labels will be covered with a clear plastic strip.

Telephone Patch panels will 25 port. A 1U horizontal cable management bracket is to be installed underneath every 25 port patch panel.

11 Patch panels – fibre optic

Individual patch panels will be supplied and installed for the termination of all fibre-optic cables within communication cabinets.

Every panel shall be equipped with a slide and tilt drawer that allows easy access to the inner patch panel during and after installation and an internal fibre organiser to maintain fibre bend radius.

Patch Panels shall be fixed to the communication cabinet mounting frames with Rack-Snap style inserts.

All fibre-optic connectors will be **LC**.

All patch panels are to be earthed

All unused ways are to be fitted with blanks.

A 1U horizontal cable management bracket is to be installed underneath each patch panel.

A 2U fibre tidy shall be provided below the management bracket

12 Fibre optic cable

All fibre-optic cables supplied will be a minimum of 16-core internal/external tight buffered and shall be capable of supporting 10Gbs and will typically be OM4 Multimode 50/125uM

Please refer to table below for exact cable type:

Structured Cabling Client Specification

Application/Interface Information					Fibre Type						
Standard	Bit Rate	Wavelength	Fibre Cores Required	Note	FDDI Grade	OM1	OM2	OM3	OM4	OS1	
				Fibre Core Size		62.5/125	62.5/125	50/125	50/125	50/125	9/125
				Modal Bandwidth			200MHz-km	500MHz-km	2000MHz-km	4700MHz-km	1db/km
				Frequency Bc							
10BASE-T	10Mb/s	Not supported	Not supported		Not supported	Not supported	Not supported	Not supported	Not supported	Not supported	
100BASE-SX	100Mb/s	850nm	2		550m	550m	550m	550m	550m	Not supported	
100BASE-FX	100Mb/s	1310nm	2		2km	2km	2km	2km	2km	Not supported	
100BASE-BX	100Mb/s	1310/1550nm	1		2km	2km	2km	2km	2km	10-40km	
100BASE-LX10	100Mb/s	1310nm	2		Not supported	Not supported	Not supported	Not supported	Not supported	10km	
100BASE-T	100Mb/s	Not supported	Not supported		Not supported	Not supported	Not supported	Not supported	Not supported	Not supported	
1000BASE-SX	1Gb/s	850nm	2		220m	275m	550m	550m	550m	Not supported	
1000BASE-LX	1Gb/s	1310nm	2		550m	550m	550m	550m	550m	5km	
1000BASE-LX10	1Gb/s	850nm	2		Not supported	Not supported	Not supported	Not supported	Not supported	10km	
1000BASE-BX10	1Gb/s	1310/1490nm	1		Not supported	Not supported	Not supported	Not supported	Not supported	10km	
1000BASE-ZX	1Gb/s	1550nm	2	Not an IEEE Standard	Not supported	Not supported	Not supported	Not supported	Not supported	70km	
1000BASE-T	1Gb/s	Not supported	Not supported		Not supported	Not supported	Not supported	Not supported	Not supported	Not supported	
10GBASE-SR/SW	10Gb/s	850nm	2		26m	30m	82m	300m	400m	Not supported	
10GBASE-LR/LW	10Gb/s	1310nm	2		Not supported	Not supported	Not supported	Not supported	Not supported	4.2km	
10GBASE-LRM	10Gb/s	1310nm	2		220m	220m	220m	220m	220m	Not supported	
10GBASE-LX4	10Gb/s	1310nm	2	Not In General Use	300m	300m	300m	300m	300m	4.2km	
10GBASE-ER/EW	10Gb/s	1550nm	2		Not supported	Not supported	Not supported	Not supported	Not supported	8.9km	
10GBASE-ZR/ZW	10Gb/s	1550nm	2	Not an IEEE Standard	Not supported	Not supported	Not supported	Not supported	Not supported	Not supported	
10GBASE-T	10Gb/s	Not supported	Not supported		Not supported	Not supported	Not supported	Not supported	Not supported	Not supported	
25GBASE-T	25Gb/s	Not supported	Not supported		Not supported	Not supported	Not supported	Not supported	Not supported	Not supported	
40GBASE-SR4	40Gb/s	850nm	8		Not supported	Not supported	Not supported	100m	150m	Not supported	
40GBASE-LR4	40Gb/s	1310nm	8		Not supported	Not supported	Not supported	Not supported	Not supported	4.7km	
40GBASE-T	40Gb/s	Not supported	Not supported		Not supported	Not supported	Not supported	Not supported	Not supported	Not supported	
100GBASE-SR10	100Gb/s	850nm	20		Not supported	Not supported	Not supported	100m	125m	Not supported	
100GBASE-LR4	100Gb/s	1295/1310nm	2		Not supported	Not supported	Not supported	Not supported	Not supported	8.3km	
100GBASE-LR10	100Gb/s	1310nm	2	Not an IEEE Standard	Not supported	Not supported	Not supported	Not supported	Not supported	8.3km	
100GBASE-ER4	100Gb/s	1295/1310nm	2		Not supported	Not supported	Not supported	Not supported	Not supported	16km	
100GBASE-T	100Gb/s	Not supported	Not supported		Not supported	Not supported	Not supported	Not supported	Not supported	Not supported	

An option for a diverse route should also be shown separately.

At riser positions fibre optic cabling will be marked with labels, stating the importance of not disturbing this cable route.

13 Fibre optic termination

All fibre-optic cores shall be terminated utilising the fusion splice method. Fibre termination will only be accepted from panel to panel – no extra joins. Pigtailed will be LC and match the rest of the installation

14 Cable routes

All UTP cable is to be run internally to the building and must not run between buildings. No UTP cabling is to be run on the exterior of any building, unless prior written consent is given.

Structured Cabling Client Specification

No cabling to be run in plenum rated spaces, note there are various hazards that need to be taken into account including asbestos but all hazards are recorded on the risk register found at all buildings.

Cable routes are to be agreed prior to commencement on site.

All vertical cables shall be secured to installed containment systems as recommended by cabling manufacture.

14.1 Walls and floors

Cables that pass through the infrastructure of the building will be suitably protected against damage. Through walls and floors this will involve an appropriate type of sleeve, extending at least 50mm either side. Through any form of metalwork or stiff plastic then a rubber grommet will be used and suitable fire stopping as detailed below.

14.2 Containment

Generally the incumbent contractor will supply and install all containment. However

All cables shall be contained within containment, which may take the form of PCV trunking, cable tray, Basketwork, steel trunking or steel conduit.

All containment in corridors or fixed to ceilings shall be metallic.

All new cables contained within containment shall exceed 45% of the internal CSA.

All cables within a room must be contained within white PVC trunking.

Cables should not be left lying on the top of a suspended ceiling.

All cables above walkways and fire routes are to be secured using appropriate fire rated ties (stainless steel) and fixings.

14.3 PVC containment

All containment in offices shall normally be from the MK prestige two com range, 210mm*60mm two compartment.

All PVC containment shall include all necessary fittings to include tees, bends and end caps. All fittings shall be from the same range as the PVC containment.

Structured Cabling Client Specification

All PVC trunking (including mini trunking) shall be securely fixed with screws, it will not be acceptable to use self adhesive trunking.

14.4 Metallic Containment

All containment shall be free from sharp edges and projections likely to cause damage to the contained cables.

All bends, tees, etc shall be radius or gusset type suitable to allow the installation of the cables without exceeding the cable bend radius.

All fixings shall be spaced according to manufactures guidelines.

All lengths of steel containment shall be earth bonded with suitable lugs to meet the IEE 18th Edition regulations

15 Grounding Bonding and Protection

The Data/Comms installer is to make sure that a zero volt earth connection is available that is to be presented onto a telecoms main grounding bonding (TMGB) connector before being connected to equipment or patch panels within the communications cabinet.

The TMGB is to have minimum dimensions as follows 6.3mm thick by 101mm wide by appropriate length. All connection are to be double bolted. A clear and concise label is to be fixed adjacent to the TMGB stating its purpose.

The sizing of the bonding conductor should follow the recommended sizing calculations as given by the current electrical installation standards. but should be a minimum of 16mm providing the length does not exceed 30.5m.

All equipment / patching frames within the communications cabinet are to be earthed to the local earthing point within the communications cabinet, all connections within the cabinet are to be of the shortest possible length and follow the most direct route.

All lengths of steel containment shall be earth bonded with suitable lugs to meet the IEE 18th Edition regulations

the installer should also provide the grounding resistance measurement as part of the operation and maintenance manuals.

16 UPS

Structured Cabling Client Specification

A rack mountable line interactive UPS unit is to be included in all itemised quotes. The ups should be capable of supplying power to the active equipment located within the communications cabinet. It should also provide remote management via a simple network management protocol interface.

If The site a site wide UPS then this should be used to provide a dedicated supply to the Comms room directly, and additional power requirements will need to be include providing a non-maintained supply to the room as well.

17 Labelling of completed system

All labelling is to show cabinet number and outlet number.
The communication cabinet is to be labelled with a unique identifier.

18 UTP labels

Each UTP circuit contains a unique identifier that consists of 2 parts:-

- Each communications equipment room has a unique alphanumeric
- Each socket in a patch panel has a unique number starting at 1

Ie M/1 – signify cabinet M / pair 1

All labels are to be etched or engraved White backgrounds with Black lettering traffolyte labels that should fit exactly into the correct faceplate location. Dymo labels will not be accepted as part of the final installation.

Cable labels are to be self laminating wire wraps when fitted

All UTP cables should be labelled at each end with a wrap around label printed with the circuit ID, the label should be located near the point of termination at either end such that it can still be seen if termination is removed.

19 Fibre labels

Structured Cabling Client Specification

Each fibre will be assigned a unique number, the number will be pre fixed by an alpha character to signify:-

H	A horizontal infrastructure Fibre
V	A vertical infrastructure Fibre
P	A point to point Fibre
X	An external fibre

These alpha characters will be followed with the cabinet reference number and pair number

Ie H/M/1 – to signify horizontal / Cabinet M/ Pair 1

Along side this a local database will be maintained to show the following for all fibres

- A end Location
- B end Location
- No of cores
- Colour of outer jacket
- Type (multi or single)

The labelling scheme shall be agreed before any works are started.

20 Testing & commissioning

All completed installations shall be fully tested in accordance with ISO/IEC 11801:2002, which details the specification requirements for Category 6 performance.

If required, adequate notice will be given to the client of the dates for testing and commissioning of the system so that the appointed representative may be present to witness the testing.

Every copper UTP cable will be tested for at least the following properties:

- Wire-map
- NEXT
- PS-NEXT
- ELFEXT
- PS-ELFEXT
- ATTENUATION
- ACR
- PS-ACR
- PROPAGATION DELAY
- DELAY SKEW

Structured Cabling Client Specification

- RETURN LOSS
- LENGTH
- IMPEDENCE

All fibre optic cable will be tested for length and link loss using either an OTDR or light source & power metre; at 850nm & 1300nm (for multimode fibres) and 1310nm & 1510 nm (for singlemode fibres). This test is to be carried out in both directions. This will ensure that the loss budget of the link is within specifications.

For all tests using an OTDR 50M (minimum) launch leads will be used.

The cabling system shall be 100 percent tested and visually examined and the results recorded. The test instrument used must as a minimum comply with the accuracy requirements of ANSI/TIA/EIA 568-B Level III. All test results shall be recorded and presented within the O&M manual.

All Voice cables will be tested for continuity between ends, to ensure that both ends pair counts match i.e. 1-1

Any cables or components that fail the test/examination process shall be replaced at no additional expense.

21 Patch cords / flyleads

Patch and fly leads will be supplied only and for the purposes as outlined here. If required as part of a tender process the data contractor shall allow 2-metre lengths at the patch panel and 3-metre lengths at the data outlet.

Colours and exact sizes of patch leads to be supplied are to be taken from the ITQ.

22 General information

Risk Assessment / Method Statement

Five working days prior to work commencing on site, the successful contractor shall submit a detailed risk assessment and method statement.

Waste removal from site

All debris and packaging shall be removed from site and disposed of in the appropriate manner.

Contractor Approval

Prior to any works commencing on the project the appointed data contractor shall provide copies of valid Construction Installation (Infrastructure) under the construction Skills Certification Scheme (CSCS). The data cabling contractor shall also provide the appropriate manufacture training certificates.

Installation Engineers

All installation Engineers on site must ensure they wear the appropriate safety equipment and company identifiable clothing and ID badges with photographs.

Working Hours

All work shall be undertaken between the hours of 07:00 a.m. and 19:00, Monday through Friday. No additional payments will be made for working out of these hours unless agreed in writing.

Warranty

All materials and workmanship shall be guaranteed for 12 months following completion of the cable installation and acceptance by Cambridgeshire Constabulary. Installers shall conform that physical defects shall be repaired free of charge for materials and labour during the warranty period.

Structured Cabling Client Specification

UTP cabling shall also have a long term manufacture support guarantee. The installer is to supply details of who underwrites the warranty and full details of the warranty and what to do in the event of a claim. The guarantee shall normally be for a period of not less than 15 years.

Project Management

A project Manager shall be nominated prior to work commencing on site and the appointed person shall be responsible for liaison with the main contractor, and or the single point of contact within the constabulary

Changes to the contract

Any changes to the scope of works (as a result of unforeseen circumstances) once work has started on site, must be communicated to the main contractor or nominated contact as soon as possible.

Cable protection / Fire stopping

Cables that pass through the infrastructure of the building will be suitably protected against damage. Through walls and floors this will involve an appropriate type of sleeve, extending at least 50mm either side. Through any form of metalwork or stiff plastic then a rubber grommet will be used and suitable fire stopping as agreed with the client's representative.

Any fire stopping will display a warning that will include the installers name and date of installation along with the ul number and F rating of the material used. All labels to be photographed and included in the completion manuals

No expanding foam type product are to be used in any installation.

Floor and Ceiling tiles

The contractor will be responsible for the take up, removal and reinstatement to the original condition, of any tiles and panels required to perform the installation.

Witness Testing

Upon the request by the client, a representative from either the client or the approved manufacturer's will attend site to visually inspect the installation and witness test the testing to ensure compliance with the manufacturer's installation guidelines.

Active equipment

All active equipment is to be supplied by Cambridgeshire Constabulary

Personnel Vetting

Structured Cabling Client Specification

All personnel attending site must have completed the appropriate Cambridgeshire Constabulary Security Forms and received clearance.

Structured Cabling Client Specification

Health and Safety

All contractors working on site must have read and understood the health and safety requirements on site.

Any questions concerning this documentation will need to be raised via the document issuer

Responses to data /comms specification

All responses will be returned to the issuer within 10 working days of issue and will be in a fully itemised format detailing all sections of the specifications

23 Reference Documentation

End of Specification

This is the final page of the specification.