



**Volume A Works Requirements
Inver College
Carrickmacross
Co. Monaghan
A81V342
RN: 72180K
Proposed Science Room Refurbishment**



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Electrical Technical Services
Performance Specification

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Part 1

GENERAL ITEMS

SITE DESCRIPTION

Details of the Preliminary Safety and Health Plan for this project are included within the Contract documentation and are available on request or may be inspected at the project manager's offices by appointment.

DESCRIPTION OF THE WORKS

The following is a summary of the works proposed. Refer to sections of this Particular specification and the drawings for more specific details.

The project consists of the refurbishment of 1 No. existing science room & associated prep room as detailed on relevant drawings

Works include

Removal of redundant services

New power supplies to science room

Switchgear, containment & power services to science room area

Relocate existing comms cabinet in science room with cat 6 distribution to fixed (RJ45) outlets

Adaptations to existing fire alarm system

Adaptations to existing intruder alarm system

Extension to class change & PA system

Lighting & Emergency lighting

Mechanical Services wiring

Refer to Part 2 of this specification for description of existing & proposed works

NON-TECHNICAL PARTICULARS

Working Drawings

Installation

The Engineers are not obliged to produce any working drawings and the tenderer should assume that the drawings accompanying this enquiry will not be detailed further.

It is the responsibility of the successful tenderer to produce working drawings, which are detailed sufficiently to allow site operatives to install the services without the necessity for site design.

These drawings shall include the following:

- Ductwork co-ordination and plantroom layouts
- Pipework, mains, cold, hot water, hot water return, cold feed water, equipment layouts, soils and wastes
- Control drawings and schedules

The tendered figure shall include for the development and production of all of the above. Working drawings and associated back-up design data shall be submitted to the Engineers for approval in a timely manner with respect to the project timescale. Allow a minimum of 10 working days response time from the Engineers.

Builder's Work

The Main Contractor is responsible for all builders' works associated with the M&E sub-contract. The builder's work items to be carried out by the Main Contractor include such items as all opes above 32mm diameter, chases, trenches etc. The Main Contractor is also responsible for general access scaffolding and attendance on lifting of large items of plant.

The Contractor is responsible for all opes below 32mm diameter and all opes associated with fixings for the installation. The Contractor is also responsible for all tools, plant, storage facilities and access associated with the installation. Refer to the schedule of preliminaries contained in the Form of Tender.

The main builder's works are included in the Architectural/Structural drawings. Additional builder's works shall be developed by the Contractor and submitted in drawing format to the Design Team for approval. The Contractor shall mark out all builder's work, opes, chases, trenches, etc., on site in accordance with the Contract programme. Responsibility for all aspects of builder's work lies with the Contractor.

Site Meetings

The following information must be presented in writing to the Engineers Office at least 1 full working day prior to the site meeting:

- updated programme
- cost report, including notification of all actual or potential variations
- Site manpower for previous period
- listing of information needed
- Equipment and material status

As-Installed Drawings and O & M Manuals

Four full sets of drawings and manuals in strict compliance with the Reference Specifications shall be required for this project.

Record drawings shall be required as hard copies and on disc in AutoCAD Release 2007 (or later) format.

The Contractor will be supplied with a full set of contract drawings, which shall be retained on site and marked up as the project progresses. The marked-up drawings shall be made available at site meetings for inspection.

Part 2

Electrical Services Specification

GENERAL NOTE APPLICABLE TO ALL PLANT SELECTIONS

**ALL PLANT PROPOSED BY TENDERERS
MUST BE SELECTED FROM THE TRIPLE E
PRODUCT REGISTER AS ACCESSED AT
WWW.SEAI.IE .**

**SPECIFIED PRODUCTS CONTAINED HEREIN
ARE FOR DESIGN DEVELOPMENT PURPOSES
ONLY & ACT ONLY AS AN INDICATION OF
THE STANDARD & STYLE OF THE EQUIPMENT
REQUIRED**

V90 ELECTRICAL INSTALLATION (SELF CONTAINED SPECIFICATION)

100.000 SYSTEM DETAILS

100.020 DESIGN PARAMETERS

All relevant Irish & British Standards, Codes of Practice, current CDM regulations, ETCI regulations together with all associated guidance notes, CIBSE lighting guidelines, Local Fire Authority Requirements, Regulations and Requirements of the local electricity supply company. Note: Any reference to British Standard's within this document shall be taken to mean the corresponding Irish Standard's

100.030 CONTROL REQUIREMENTS

100.040 SYSTEM DRAWINGS

- Refer to the schedule of drawings in the appendices

200.000 GENERAL LIGHTING AND POWER

200.010 REGULATIONS:

Comply with:

- Requirements for the ETCI regulations
- Requirements of the electricity supply company.

200.020 ELECTRICITY SUPPLY:

•The existing 15Kva ESB supply shall be utilised for the proposed works. The contractor shall allow in his tender for removing the existing multi metering set up and for installing a single ESB meter. The contractor shall be responsible for making the ESB application, liaising with ESB to ensure the work is completed in time and for paying the associated capital contribution cost. The contractor shall also allow for assisting ESB personnel on site, and for programming of works to ensure completion in accordance with the proposed programme. Any necessary modifications required to accommodate the proposed installation shall be included within the tender. In addition, the contractor shall take into account all requirements of the electrical supply company including the type of earthing arrangement required, and necessary space requirements etc.

200.030 ARRANGEMENTS OF CIRCUITS:

Divide the installation into separately controlled circuits as detailed on tender drawings, further subdividing where necessary to ensure compliance with ETCI Regulations).

200.035 SAMPLES:

Submit samples of proposed materials and equipment for approval before work is started. Label each sample with name, catalogue number and services in connection with item.

- The contractor shall provide samples and literature of all equipment for review and acceptance by the client, architect and the electrical design engineer prior to installation.

200.040 INSPECTION AND TEST PROCEDURE:

Comply with ETCI Regulations. Provide completion certificates in accordance with ETCI regulations.

- Carry out site testing and inspection and provide test certificates for specialist installations. Record all results and readings. Provide copies of any test and inspection result.
- Check correct operation of devices. Confirm interlocks and sequences operate correctly. Provide test equipment and consumables to complete tests and retest any failed installations following corrective measures. Check and confirm correct sequence in multiphase circuits.

200.050 TESTING FIRE ALARM SYSTEM:

Test the complete installation in accordance with ETCI regulations, BS 5839, IS3218 and appropriate standards. Record all tests.

200.060 IDENTIFICATION - GENERAL:

Apply identification notices in accordance with the ETCI regulations/ BS 7671 (IEE Wiring

Regulations) Clause 514 to all electrical cables plant and equipment.

- Phase colour

- Brown, Black, Grey.

Fix using materials compatible with the notices and fixing surface.

- Obtain approval prior to manufacture of all notices.

- Provide sample for approval.

Apply identification markers in accordance with the ETCI / BS 7671 (IEE Wiring Regulations), Clause 514 to all conductor termination points.

- Phase marking

- L1, L2, L3.

200.070 LABELS

Label all electrical plant and equipment using safety sign 8.A.0044 of BS 5499-5, where voltages above ELV exist.

- Fit labels and notices as shown

- Materials

- Engraved thermosetting plastic laminate.

- Colour

- Background WHITE
 - Lettering RED

- Fixing

- Bolted through complete with washer nut and locking device, size 4M
 - Adhesive BACKING

200.080 ENGRAVED ACCESSORY PLATES:

Engrave accessory plates and specialist items as shown in the Schedules or on the Drawings.

- Use 6mm high letters with engraving coloured red.

- Emergency Lighting Test Switches

200.090 SCHEMATIC DIAGRAMS:

Provide a purpose made schematic diagram permanently fixed showing the connections of the equipment and plant. Diagram to be submitted to Engineer for prior approval.

200.100 DISTRIBUTION BOARDS IDENTIFICATION:

Identify every outgoing way with a renewable circuit chart in a transparent plastic envelope permanently fitted inside distribution board cover. Clearly indicate in typed script, circuit identification number, cable size, fuse or circuit breaker rating and a description of item supplied and area supplied by circuit.

200.110 CABLE IDENTIFICATION:

Provide all cables, other than final sub-circuit wiring with labels fixed at each end of cable, either side of wall and floor penetrations and at approximately 10m intervals. Ensure labels show reference number of cable.

200.120 UNDERGROUND CABLE IDENTIFICATION:

Identify external underground cable routes by means of approved markers along their length at distances not exceeding 50m and where a change of direction occurs.

- Provide cable markers to clearly indicate the following-

- reference of group of cables.
 - reference number of cable.
 - points of termination.
 - size and number of conductors.
 - type of cable and date installed.
 - operating voltage of cable.

- Provide key to any reference system used at

- switchgear.
- Mark and protect direct buried cables with
 - recovered plastic cable tiles
 - plastic tape yellow printed black

200.130 CABLE SHEATH IDENTIFICATION - EXTERNAL:

Identify cable sheaths for various services in accordance with NJUG 7.

200.140 FIXING TO BUILDING FABRIC - PREPARATION:

Mark-out using manufacturer's drawings and templates and fix all items.

Ensure structure and fixings are suitable for items to be fixed. Use largest size of fixing permitted by diameter of hole in item to be fixed.

Provide all assistance to enable any item to be built in by others.

200.150 PLUGS AND SCREWS:

Use plugs of material, size and length, in accordance with the manufacturer's instructions. Use screws to BS 1210. Generally use sherardized steel screws. In damp or exposed situations use brass screws.

200.160 FIXING - WORKMANSHIP:

Drill holes squarely. Use drills of correct size and type. Do not flame-cut holes in metalwork. Comply with manufacturer's instructions for all fixings. Avoid fixing through reinforcement. Do not fix to unsound material.

200.170 FIXING TO THE STRUCTURE:

- Obtain approval to:-
 - Cut holes in the structure.
 - Weld to structural steelwork.

200.180 OFF-SITE PAINTING AND ANTI-CORROSION TREATMENTS - GENERAL REQUIREMENTS:

Protect all equipment and ancillaries against corrosion. Protect ferrous metals with coatings at works. Provide all items for decorative finishing primed to suit base material and finish.

200.190 PAINT MATERIALS:

- Type ALUMINIUM
 - Application Paint all couplers, exposed threads, joints to galvanised tray and trunking
- Apply paints in accordance with manufacturer's instructions and to BS 6150.

200.200 SPECIAL PROTECTIVE FINISHES:

- Type A
 - Application coverage of all new steel conduit threads and exposed running treads and the coverage of all cut edges of steel containment.
- Provide special protective finishes in accordance with manufacturer's instructions.

200.210 ELECTRICAL EQUIPMENT SCHEDULES:

- See Schedules in appendices

300.000 CONDUIT AND TRUNKING, LV CABLES AND WIRING - MATERIALS

300.010 STEEL CONDUIT AND FITTINGS:

- Type A
- Application General use containment and cable protection
- Standard
 - BS EN 61386-21.
- Ends
 - Threaded.
 - Plain threadable.
- Size in accordance with BS 7671 (IEE regulations).
- Fittings
 - Use adaptable boxes of 100mm x 100mm x 50mm minimum size.
 - Use couplers and externally screwed brass bushes to connect conduit to loop-in circular conduit boxes.
 - Use washers with flanged couplers.
- Protection class/finish BS EN 61386-1, Table 10
 - Class 4 hot dipped galvanized.
- Mounting/support Spacer bar saddles fixed to the fabric of the building using rawl plugs and screws
- Installation
 - Use maximum practical lengths to minimise number of joints. Form bends by machine and remove burrs from cut ends.
 - Use bends and/or junction boxes at changes of direction. Do not use elbows or tees of any sort without approval.
 - Fix securely with boxes fixed independently of conduit.
 - Tightly screw all joints to ensure electrical continuity, with no thread showing. Use expansion couplings where conduit crosses movement joints in structure.

300.030 STEEL SURFACE TRUNKING:

- Type A
- Application General containment throughout the building
- Type
 - Standard cable trunking.
- Standard
 - BS 4678-1.
 - BS EN 50085
- Size in accordance with BS 7671 (IEE regulations).
- Fittings
 - Hanger brackets.
 - Fire barriers.
- Protection class
 - Class 3.
- Finish
 - Zinc coated to BS EN 10326, BS EN 10327 or BS EN 10143.
- Mounting/support Fix direct to the fabric of the building or with the aid of uni strut and spring loaded fixings.
- Multi-compartmental trunking
 - Provide multi-compartmental trunking with separate compartments for wiring of:-
 - Extra low voltage circuits.
 - Communications.
 - Fire alarm circuits.
- Installation
 - Use proprietary units to form junctions and changes of direction wherever possible.
 - Use mechanical fastenings/fixings; do not weld.
 - Fit a copper link at each joint to ensure electrical continuity.

Fit grommets, bushes or liners to holes through which cables pass.

300.090 FIRE STOPPING OF TRUNKING/DUCTING:

- Application Fire stopping between floors and fire compartments
Where trunking or ducting pass through fire resisting floors, ceilings, cavity barriers, etc., seal internally with
 - packed rock fibre.
 - proprietary intumescent material.

300.100 FLEXIBLE CORDS:

- Type A
- Application Final connections to equipment and luminaires
- BASEC certified.
- Standard
 - Sheathed 300/500V 90°C to BS 6500
 - PVC insulated cord 450/750V to BS 7919

300.110 INSULATED CABLES:

- Type A
- Application General wiring and use within conduit and trunking containment
- Manufacturer and reference Pirelli, BICC
 - Or approved equivalent.
- BASEC certified.
- Type
 - Copper conductors.
 - Single core.
 - Armoured.
 - Unarmoured.
 - Sheathed.
 - LSF.
 - Unsheathed.
- Standard
 - General purpose 450/750V to BS 6004.
 - Internal wiring 300/500V to BS 6004.
 - 600/1000V to BS 6346.
 - Auxiliary 600/1000V to BS 6346.
 - 600/1000V to BS 5467.
 - 600/1000V to BS 6724.
 - 450/750V to BS 7211.
 - Control 300/500 to BS 7629-1.
 - LSOH 600/1000 to BS 7846.
 - BS 8436 for use in walls, partitions and building voids.
- Cable glands
 - BS 6121-2.
 - BS EN 50262.
- Type
 - Complete with earthing lug.
 - Electrical bond for metallic sheath.
- Fire performance to BS 5839-1
 - Standard.

300.150 CABLE JOINTING SUNDRIES:

Use terminations conforming to the BS EN 61238-1. Use tapes to BS 3924 or BS EN 60454.

300.160 CABLE DUCTS - PVC:

- Application To link services as required

Use underground cable duct and fittings to BS 4660, or BS EN 1401-1.

300.180 PERFORATED CABLE TRAY:

Support all cables throughout their length using cable tray, firmly fixed to building fabric.

Ensure cable tray allows for spacing in accordance with BS 7671 for the design current of the cable.

- Standard BS EN 61537

- Classification Medium duty and Heavy Duty

Type

- Return flanged.

Perforations and thickness

- Manufacturer's standard pattern and thickness.

Fittings

Use factory made fittings throughout of same material, type, pattern, finish and thickness as cable tray.

300.190 CABLE CLIPS AND CLEATS:

- Standard BS EN 50368

- Material PVC, Nylon

- Impact resistance Heavy Duty

400.000 CONDUIT AND TRUNKING, LV CABLES AND WIRING - WORKMANSHIP

400.010 INSTALLING CONDUIT IN CONCRETE:

Fix securely to reinforcement and fix boxes to formwork to prevent displacement. Depth of concrete cover not less than indicated for reinforcement.

400.020 INSTALLING TRUNKING:

Remove burrs from cut trunking ends.

400.030 DRAINAGE OF CONDUIT:

Provide drainage outlets at lowest points in conduit installed externally and in locations where condensation may occur.

400.040 APPEARANCE:

Arrange conduit and trunking, plumb where vertical, neatly parallel with other service runs and the structure.

400.050 EXPANSION AND SETTLEMENT JOINTS:

Make provision at expansion and settlement joints for movement. Use manufactured expansion couplings.

400.060 SPACING:

Install conduit, trunking and equipment clear of other services with minimum spacings:-

- to steam - 300mm, other services - 150mm and above radiators - 1000mm.

Ensure trunking and conduit is independently supported from building fabric. Obtain approval for supports.

400.070 ACCESS:

Locate covers on top or sides of trunking to allow access to wiring.

400.080 CABLE ROUTES:

- Ensure cable routes are
 - Straight, vertical or horizontal and parallel to walls.
 - In approved locations where exposed to view. Conceal cables wherever possible.
 - Positioned at least 150 mm clear of other services. Locate cables running parallel and adjacent to heating pipes below pipes.
- Install
 - concealed horizontal runs in walls within 150 mm of ceiling or between 150 and 300 mm of floor.
 - concealed vertical cable runs to wall switches and outlets in line with accessory.

400.090 CABLE INSTALLATION - GENERAL:

- Do not commence internal cabling until the building is enclosed and weatherproof.
- Install cables neatly and securely, adequately protected against accidental damage, adverse environmental conditions, mechanical stress and deleterious substances.
- Install cables without joints other than at equipment and terminal fittings. Do not use junction boxes without approval.
- Sleeve cables passing through masonry walls with conduit bushed at both ends.
- Do not run cables in spaces where they will be surrounded or covered by insulation.
- Install all data and telecommunications cable in accordance with BS 6701 or BS EN 50174-2.

400.100 PROTECTIVE CONDUCTORS:

Use cable conductors throughout; do not use conduit or trunking as protective conductors.

400.110 CABLE INSTALLATION - ARMOURED CABLE:

Handle and install carefully to prevent damage to sheath and armouring.

Do not install if cable and ambient temperature are, or have been for the last 24 hours, below 0°C.

Fit galvanized steel guards where cables are liable to mechanical damage.
Bond armour to equipment and main earthing system.
Make moisture proof connections to apparatus using sealed glands and PVC shrouds.

400.120 CABLE INSTALLATION - PVC SHEATHED CABLES:

Do not install cables when temperature is near or below freezing.
Do not install in cavities of external walls.
Fit insulating cable glands at entries to equipment.
Terminate cable sheaths within boxes.

400.150 CABLES ENTERING BUILDING(S) FROM BELOW GROUND:

Seal both ends of pipe duct, to a depth of not less than 150mm, with

- an approved non-hardening, non-cracking, water resistant compound.
- a proprietary moulded duct sleeve seal.

400.160 CABLES IN PLASTER:

Cover with galvanized steel channel nailed to background.

400.170 CABLES IN VERTICAL TRUNKING/DUCTS:

Support with pin racks or cleats at each floor level or at 5m vertical centres, whichever is less.
Provide and fix heat barriers at not more than 5m centres where fire resisting barriers are not indicated.

400.180 CABLES IN ACCESSIBLE ROOF SPACES:

Cables running across ceiling joists to be fixed to timber battens nailed to joists.

400.190 TESTING BURIED CABLES:

Test continuity and insulation of buried cables immediately before and after back-filling. Test continuity and insulation of buried cables prior to handover.

500.000 LIGHTING AND POWER - PRODUCTS/MATERIALS

500.010 LIGHTING AND POWER SCHEDULES:

- Supply lamps and luminaires as
 - Per Drawings
 - Per Schedule.
 - Supply Main distribution boards and sub distribution boards as per drawing E501
 - Supply electrical accessories as per the schedules & as indicated within the tender drawing.

500.020 CONSUMER CONTROL UNITS:

- Type A
- Application General power distribution boards.
- Standard - BS 5486-13 and BS EN 60439-3.
- Main control
 - Switch disconnector.
 - Residual current circuit breaker.
- Number of ways.
 - One per circuit plus 25% spare capacity.
- Circuit protection
 - Miniature circuit breakers to BS EN 60898-1.
 - Type B
 - Rating (A) 6A, 10A, 16A, 32A
 - RCD protection required for all ring circuits and circuits which will be used for hand held and mobile equipment
 - To BS EN 61008-1 and BS IEC 1008-2-2.
 - Tripping current 30mA
 - Tripping time Less than 200mSEC
 - Breaking capacity 6kA
 - Overcurrent protection 80A
 - RCBO to BS EN 61009
 - Tripping current 30mA
 - Tripping time 200mSEC
 - Breaking capacity 6kA
 - Overcurrent protection 32A
- Enclosure
 - Degree of protection to BS EN 60529
 - Manufacturer's standard.
 - Enclosure to be lockable

500.030 DISTRIBUTION BOARDS:

- Type A
- Application General distribution of lighting and power circuits
- Standard - BS 5486-11 or BS 5486-12 and BS EN 60439-3.
- Main control
 - Switch disconnector.
 - Residual current circuit breaker.
 - Miniature circuit breaker.
 - Moulded case circuit breaker.
- Number of ways.
 - One per circuit & 25% spare capacity
 - Permanently label each way to identify circuit and rating.
- Circuit protection
 - Miniature circuit breakers to BS EN 60898-1.
 - Type B

- Short circuit capacity kA 10kA
- Rating (A) 6A, 10A,16A,20A, 32A
- RCD protection required for all ring circuits and radial circuits supplying socket outlets
 - To BS EN 61008-1 and BS IEC 1008-2-2.
 - Tripping current 30mA
 - Tripping time 200mSEC
 - Breaking capacity 10kA
 - Overcurrent protection 32A and 20A
- Enclosure
 - Degree of protection to BS EN 60529
 - Manufacturer's standard.
 - Enclosure to be lockable

500.040 FUSES:

Supply fuses including fuse carrier, bases and associated components to BS EN 60269-1 and BS 88.

500.050 ISOLATING SWITCHES:

- Type A
- Application Isolation of supplies
- Standard
 - Utilisation category and making capacity to BS EN 60669-1, with earth terminal in enclosure.
- Switch type
 - Rocker bar.
 - Toggle.
- Rating
 - 16A.
 - 20A.
 - 32A.
 - 45A.
- Pole configuration
 - SP.
 - DP.
- Ancillaries
 - Neon indicator with red lens.
 - Cord outlet with cord grip.

500.055 SWITCHGEAR ACCESSORIES:

- Provide switchgear accessories.
 - Cylinder locks on hinged doors, with 2 keys for each lock.
 - Provide each switchboard with sets of padlocks.
 - Insulating mats to BS 921
 - Along full length of switchboard.
 - Width 1000mm
- Spare fuses.
 - 5% of each rating and type on switchboard.

500.060 LUMINAIRES:

- Type High Frequency Digital Dimmable
- Application General and emergency lighting
- Manufacturer and reference See schedule
 - Or approved equivalent.
- Standard
 - BS 4533
 - Part 102.1:1990

- BS EN 13032-1.
- BS EN 60598.
- Provide exit signs to BS 5499-1 and BS 5499-3.
- Classification
 - BS 4533 or BS EN 60598, Part 2.22:1999
- Ensure luminaires of same types have same photometric performance.
- Accessories
 - Provide secondary support for all components so they are retained when their primary fixing is released.

500.080 CONTROL GEAR AND COMPONENTS:

- Application General and Emergency Lighting
- Manufacturer and reference As supplied with luminaires as specified in Appendices
 - Or approved equivalent.
- Standard
 - Provide fluorescent lamp ballasts to
 - BS EN 61347-2-8 and BS EN 60921.
 - BS EN 61347-2-4, BS EN 61347-2-5, BS EN 61347-2-6, BS EN 61347-2-7 and BS EN 60925 for d.c.supplied electronic ballasts.
 - BS EN 61347-2-3 and BS EN 60929.
 - Supply thermal protectors for ballasts for tubular fluorescent lamps to BS EN 60730-2-3.
 - Provide discharge lamp ballasts to BS EN 61347- 2-9 and BS EN 60923.
 - Provide starters to BS EN 61347-2-1 and BS EN 60927.
 - Provide capacitors to BS EN 61048 and BS EN 61049.
- Terminals
 - Use screw terminals for supply cables and circuit protective conductors, sized to terminate up to three 2.5mm diameter conductors. Provide separate terminal blocks for each incoming circuit.
- Ensure control gear and components are suitable for lamp type, wattage and starting characteristics. Comply with BS EN 55015 for interference.
- Remote control gear
 - Locate remote control gear in separate lockable cabinet of sheet steel with same degree of protection and finish specified for luminaire.
 - Comply with manufacturer's recommendations for maximum cable length between gear and lamp.

500.090 LAMPS:

- Application General and Emergency Lighting
- Manufacturer and reference as detailed within luminaire schedule
 - Or approved equivalent.
- Standard
 - Tungsten filament lamps
 - BS EN 60064.
 - BS EN 60432-1.
 - Fluorescent lamps, BS EN 60081.
 - High pressure mercury vapour lamps, BS EN 60188 and BS EN 62035.
 - High pressure sodium vapour lamps, BS EN 62035.
 - Low pressure sodium vapour lamps, BS EN 60192 and BS EN 62035.
 - Metal halide lamps, BS EN 62035.
- Ensure that lamps of each type are from the same manufacturer.

500.100 LUMINAIRE CONNECTORS:

- Application General and Emergency Lighting
- Rating
 - 2A.
 - 5A.
- Connector type

- Ceiling rose to BS 67.
- 3 pin plug/socket to BS 546.
- Captive cord grip type plug/socket (3 or 4 pin), to BS 5733.
- Luminaire supporting coupler to BS 7001.
- Load carrying capacity

500.110 SUPPORT SYSTEM:

- Minimum 20mm conduit as main conduit.
- 10mm diameter threaded rod.
- Flexible cord
- Wall brackets

500.150 LIGHTING SWITCHES:

- Type Plate and Grid
- Application General and Emergency Lighting
- Standard - BS EN 60669-1, with earth terminal in enclosure.
- Switch type
 - Gang 1, 2, 3, 4, & 6
 - Rocker bar Wide rockers to be installed within all dwellings.
 - Secret key.
 - Pull cord.
 - Press on, press off.
- Rating
 - 5A.
 - 15A.
 - 20A.
- Ancillaries
 - Red indicator, illuminated when 'ON'.
 - Operating keys.
 - Blank inserts.
 - Emergency Test Switch
- Switch mechanism
 - Snap action microgap.
 - Two position.
- Pole configurations
 - Single pole.
 - 2 way.
 - Intermediate.

500.160 SWITCHED FUSE CONNECTION UNITS:

- Type Plate
- Application General Power
 - Or approved equivalent.
- Standard
 - BS 1363-4.
 - Double pole switching.
- Unit type
 - Rocker bar
- Ancillaries
 - Red indicator lamp.
 - Fuses to BS 1362, sized 3A, 5A, 10A, 13A
 - Cord outlet and cord grip.

500.170 SOCKET OUTLETS:

- Type Plate
- Application General Power outlets
- Manufacturer and reference MK- ALM
 - Or approved equivalent.
- Standard
 - BS 1363-2.
 - BS EN 60669.
- Type
 - Socket outlet.
 - Connection unit.
 - Switched.
 - Rocker bar Wide switches centre location
 - DP switch.
- Ancillaries
 - RCD.
 - Fuse
 - Cord outlet.
 - Neon indicator.
 - Plug tops.

500.180 CORD OUTLETS:

- Type Plate
- Application outlets to equipment.
- Standard - BS 5733.
- Rating 20A & 45A
- Pole configuration
 - DP.
- Ancillaries
 - Cord grip.

500.190 TELEPHONE OUTLET SOCKETS:

- Type Plate
- Application Telecoms distribution
- Manufacturer and reference MK-ALM
 - Or approved equivalent.
- Standard - BS 6312.
- Size
 - Standard.
- Circuit configurations
 - Master.
 - Secondary.
- Connections
 - Insulation displacement type.

500.250 ACCESSORIES MOUNTING HEIGHTS:

Provide switches and socket outlets for lighting and other equipment in habitable rooms at appropriate heights between 450mm and 1200mm from finished floor level, in accordance with Building Regulations Approved Document M and BS 8300.

600.000 LIGHTING AND POWER - WORKMANSHIP

600.010 LAMPS AND LUMINAIRES INSTALLATION:

Install luminaires in horizontal plane unless otherwise shown.

Ensure luminaires are clean.

Ensure classification of luminaires is appropriate.

- Install recessed and semi-recessed luminaires as manufacturer's details.
- Install wall mounted luminaires at height 2200mm AFFL unless otherwise stated
- Support and fixing
 - Where luminaire is supported from conduit, provide a conduit box forming an integral part of conduit system at each point of suspension. Where conduit enters luminaire, use backnuts and washers to secure luminaire to conduit.
 - Where luminaire is supported from trunking, use appropriate clamps or brackets.
 - Use washers, nut and lock-nut at top and bottom of rod for rod suspensions.
 - Use hook cover for suspension of chain from circular conduit box.
 - Suspend flexible cord from ceiling rose.
 - Support luminaires directly from building fabric using appropriately sized rawl plugs and screws
 - Support luminaires from hidden grounds within the fabric of the building using appropriately sized screws

Do not support luminaires directly from any flammable non-metal or heat sensitive materials.

Ensure suspensions are vertical unless otherwise shown.

600.020 CONNECTIONS TO LUMINAIRES:

Connect circuit wiring to luminaires. Use grommet where cables enter luminaire body.

Connect the earthing terminal of Class 1 luminaires to the circuit protective conductor of the supply circuit.

Clip loose wiring within luminaire, at 300mm intervals.

- Direct to trunking
 - Application General Use
 - Terminate in terminal block in an adaptable box located on side of trunking. Use flexible cord from terminal block to luminaire.
 - Terminate circuit wiring at supply terminals of luminaire.
- Recessed
 - Terminate at plug and socket to BS 546, located not more than 500mm from the access through the ceiling. Use flexible cord from plug to supply terminals of luminaire.
 - Terminate in terminal block within conduit box. Install flexible wiring to luminaire.
- Direct fixing
 - Luminaire supporting coupler to BS 7001.

600.030 ELECTRICAL ACCESSORY INSTALLATION:

Provide CPC between earth lug on metal box and accessory except for plastic accessories.

Ensure there is no damage to accessories during installation.

Protect surface mounted accessories from painting. Install front plates of flush mounted accessories after painting.

Align accessories to building finishes. Mount grouped accessories in line, parallel and equidistant.

700.000 MISCELLANEOUS ELECTRICAL EQUIPMENT

700.011 INSTANTANEOUS WATER HEATER(S):

- Type - electrical contractor to provide supplies only for all existing water heaters. Water Heaters to be controlled by a new 24 hr, 7 day timeclock at each distribution board. Allow for final connection.

700.016 HAND DRIERS:

- Not Used .

700.020 VENTILATION:

- Type A
- Application Provide supply for and rewire all existing electrical Fans and Fan Controls etc. Provide electrical supplies with local isolation and attendances. All wiring to be as per manufacturers recommendations.

700.040 HVAC:

- Application- Contractor shall allow for all wiring associated with the new heating controls. It is the responsibility of the contractor to appraise themselves of the mechanical drawings to ascertain the full scope of works. All wiring to be in accordance with ETCI guidelines.

800.000 SPECIALIST SYSTEMS

800.010 EMERGENCY LIGHTING SYSTEM:

- Application - Emergency & Escape Lighting.
- Manufacturer and reference As per schedule
 - Or approved equivalent.
- Standards
 - BS 5266.
 - BS EN 50171.
 - BS EN 50172.
 - BS EN 60598-2-22.
 - ICEL 1006.
 - CIBSE LG 12.
 - the requirements of the Local Authority.
 - manufacturer's instructions.
- Mode of operation
 - Self contained luminaire.
 - Battery powered.
 - Non-maintained operation.
 - Maintained.
 - Sustained.
 - Combined.
- Type
 - Luminaire.
 - Illuminated sign with appropriate legend
 - Conversion unit.
- Lamps
 - Fluorescent
- Illumination of signs
 - Illuminate exit, emergency exit and escape route signs so that they are legible at all times, with:-
 - Lamps contained within sign.

800.040 TELECOMMUNICATIONS SYSTEM:

- Application - all existing telephone & ISDN lines are to be maintained.

800.105 STRUCTURED CABLING:

Upgrade the existing structured cabling system in accordance with BS EN 50173-1, BS EN 50174-1 and BS EN 50174-2,

800.150 FIRE ALARM SYSTEM:

- Application: Provide a new Fire Alarm System as detailed on the tender drawings and detailed here after
 - Specialist - VIS, Derry or equivalent
- Develop design, supply and install fire alarm system to
- BS 5839-1.
 - BS 5839-6.
- Fire Authority requirements.
- Provide fire alarm system to
- Enhance safety of occupants.
 - Reduce loss of property.

800.160 CONNECTION TO LOCAL AUTHORITY FIRE BRIGADE:

Provide connection to local authority fire brigade:-

- Direct to fire brigade.
- Via commercial central fire alarm.

800.170 FIRE ALARM SYSTEM - ZONES:

- Application Fire alarm Installation
- Install system with zones as per system specialist instructions
- Indicate the location of zones by
 - Specially prepared plan of building.

800.190 FIRE ALARM SYSTEM - MANUAL CALL POINTS:

- Type Addressable, c/w anti vandal Stopper
- Application Fire alarm Installation
 - .
- Standard
 - BS EN 54-11
 - Mode of operation
 - Type A.
 - Type B.
- Mounting
 - Flush
 - Surface.
- Protection against accidental operation
- Switch contact
 - Make.
 - Break.

800.200 FIRE ALARM SYSTEM - HEAT DETECTORS, POINT TYPE:

- Type Addressable c/w protective cage
- Application Fire alarm installation
- Standard
 - BS 5446-2.
 - BS EN 54-5.
- Heat sensitive element
 - Rate-of-rise of temperature and fixed temperature element.
- Temperature setting
 - 43°C.

800.210 FIRE ALARM SYSTEM - SMOKE DETECTORS:

- Type Addressable c/w protective cage
- Application Fire Alarm Installation
- Standard
 - BS 5446-1.
 - BS 5446-3.
 - BS EN 54-7.
- Type
 - Point.
 - Sampling.
- Class
 - Ionisation chamber smoke detectors.
 - Optical detectors.

800.220 FIRE ALARM SYSTEM - SOUNDERS:

- Type Addressable c/w protective cage surround
- Application Fire Alarm Installation
- Standard - BS EN 54-3.
- Type

- Low energy Electronic Sounder to give 100dB at 1000mm
- Colour
 - Fire red.
- Finish
 - Internal.

800.225 FIRE ALARM CONTROL PANEL:

- Type The contractor shall install an addressable Fire Alarm panel within the School
- Application Fire Alarm Installation
- Standard
 - BS 5839-1.
 - BS EN 54.
- Functional requirements
 - Standard functions.
- Colour Red
- Power supply
 - Integral.
- Zone indication
 - Integral with CIE.
- General
 - Microprocessor based.
 - Modular software
 - Real time clock
 - System fault protection
 - Remote inputs to CIE
- System configuration
 - Capable of operating
 - Analogue addressable detectors.
- System Management System, available at levels as required by BS EN 54.

800.230 FIRE ALARM SYSTEM - RECORD DRAWINGS AND OPERATING INSTRUCTIONS:

Provide instructions on use of installation to person responsible for use of premises. Supply the user with a logbook certificate of installation and commissioning and record drawings in accordance with BS 5839-1 /IS3218

- Circuit diagrams of fire alarm system.

800.240 EXISTING INSTALLATIONS EARTHING AND BONDING:

Check earth continuity conductors and loop impedance values of complete installation. Report defects and elements not in accordance with BS 7671 (IEE Regulations 16th Edition)/ETCI regulations.

800.250 ELECTRICAL INSTALLATION METALWORK:

Bond together all exposed conducting parts with joints of negligible impedance. Carry out work in accordance with BS 7671 (IEE Regulations), BS 7430, Electricity Safety Quality and Continuity Regulations, and Local Electricity Supply Authority Requirements.

- Comply with the requirements of BS EN 50310.

800.260 EXTERNAL SOCKETS AND EQUIPMENT:

Provide each circuit serving external socket outlets and sockets for external use of equipment with high sensitivity residual current device, earth leakage tripping current not exceeding 30mA.

800.270 PROTECTIVE CONDUCTORS:

- Application Earthing and bonding

Provide protective and equipotential bonding conductors. Size in accordance with the ETCI /BS 7671 (IEE Wiring Regulations).

- Material

- Copper PVC to BS 6004.
- Copper LSF to BS 7211.
- Armouring or sheathing of cables.
- Protective conductor of multi-core cable.

800.310 BUILDING INCOMING SERVICES:

Bond incoming services at building entry point to main earth terminal.

- Water.
- Gas.
- Fuel Oil.
- Heating pipework.
- Metallic cladding.
- Cable Sheaths of TV and Radio cables.
- Sheaths of LV and ELV cables.

800.320 BUILDING SERVICES:

Bond to protective conductor system, all metallic building services in:-

- Kitchens, bathrooms and shower rooms.
- Boiler houses.
- Plantrooms.
- Wet and damp process areas.

800.330 EQUIPOTENTIAL BONDING:

Provide main and supplementary equipotential bonding conductors in accordance with BS 7671 (the IEE Wiring Regulations).

BS APPENDIX

BS 1210:1963

Specification for wood screws.

Current, Work In Hand, Obsolescent

BS 1362:1973

Specification for general purpose fuse links for domestic and similar purposes (primarily for use in plugs)

BS 3924:1978

Specification for pressure-sensitive adhesive tapes for electrical insulating purposes.

Current but partially replaced by Parts of BS EN 60454-3

BS 4660:2000

Thermoplastics ancillary fittings of nominal sizes 110 and 160 for below ground gravity drainage and sewerage.

Partially replaced by BS EN 13598-1:2003

BS 546:1950

Specification. Two-pole and earthing-pin plugs, socket-outlets and socket-outlet adaptors.

If required, see also Supplement No 1:1960 Specification for plugs made of resilient material

BS 5467:1997

Electric cables. Thermosetting insulated, armoured cables for voltages of 600/1000 V and 1900/3300 V

BS 5486-11:1989

Low-voltage switchgear and control gear assemblies. Part 11 Specification for particular requirements of fuse boards

BS 5486-12:1989

Low-voltage switchgear and control gear assemblies. Part 12 Specification for particular requirements of type-tested miniature circuit-breaker boards

BS 5499-1:2002

Graphical symbols and signs. Part 1 Safety signs, including fire safety signs. Specification for geometric shapes, colours and layout

BS 5499-5:2002

Graphical symbols and signs. Safety signs, including fire safety signs. Part 5 Signs with specific safety meanings

BS 5733:1995

Specification for general requirements for electrical accessories

BS 5839-1:2002

Fire detection and alarm systems for buildings. Part 1 Code of practice for system design, installation, commissioning and maintenance

BS 5839-3:1988

Fire detection and alarm systems for buildings. Part 3 Specification for automatic release mechanisms for certain fire protection equipment

BS 5839-5:1988

Fire detection and alarm systems for buildings. Part 5 Specification for optical beam smoke detectors

BS 5839-6:2004

Fire detection and alarm systems for buildings. Part 6 Code of practice for the design, installation and maintenance of fire detection and fire alarm systems in dwellings

BS 5839-8:1998

Fire detection and alarm systems for buildings. Part 8 Code of practice for the design, installation and servicing of voice alarm systems

BS 5839-9:2003

Fire detection and alarm systems for buildings. Part 9 Code of practice for the design, installation, commissioning and maintenance of emergency voice communication systems

BS 6004:2000

Electric cables. PVC insulated, non-armoured cables for voltages up to and including 450/750 V, for electric power, lighting and internal wiring

BS 6150:1991

Code of practice for painting of buildings

BS 6312-1:1994

Connectors for analogue telecommunication interfaces. Part 1 Specification for plugs.

Replaces BS 6312:1985 which remains current as it is cited in legislation.

BS 6312-2.1:1994

Connectors for analogue telecommunication interfaces. Part 2.1 Sockets for use with plugs specified in BS 6312:Part 1. Specification for sockets. General requirements

BS 6312-2.2:1997

Connectors for analogue telecommunication interfaces. Part 2.2 Sockets for use with plugs specified in BS 6312:Part 1. Particular requirements for fixed socket-outlets used in permanent wiring installations

BS 6346:1997

Electric cables. PVC insulated, armoured cables for voltages of 600/1000 V and 1900/3300 V

BS 6500:2000

Electric cables. Flexible cords rated up to 300/500 V, for use with appliances and equipment intended for domestic, office and similar environments

BS 67:1987

Specification for ceiling roses

BS 6701:2004

Telecommunications equipment and telecommunications cabling. Specification for installation, operation and maintenance

BS 6724:1997

Electric cables. Thermosetting insulated, armoured cables for voltages of 600/1000 V and 1900/3300 V, having low emission of smoke and corrosive gases when affected by fire

BS 7001:1988

Specification for interchangeability and safety of a standardized luminaire supporting coupler

BS 7211:1998

Electric cables. Thermosetting insulated, non-armoured cables for voltages up to and including 450/750 V, for electric power, lighting and internal wiring, and having low emission of smoke and corrosive gases when affected by fire

BS 7430:1998

Code of practice for earthing

BS 7629-1:1997

Specification for 300/500 V fire resistant electric cables having low emission of smoke and corrosive gases when affected by fire. Part 1 Multicore cables

BS 7671:2001

Requirements for electrical installations. IEE Wiring Regulations. Sixteenth edition

BS 7846:2000

Electric cables. 600/1000 V armoured fire-resistant cables having thermosetting insulation and low emission of smoke and corrosive gases when affected by fire

BS 7919:2001

Electric cables. Flexible cables rated up to 450/750V, for use with appliances and equipment intended for industrial and similar environments

BS 8300:2001

Design of buildings and their approaches to meet the needs of disabled people. Code of practice

BS 88-2.2:1988

Cartridge fuses for voltages up to and including 1000 V a.c. and 1500 V d.c. Part 2.2 Specification for fuses for use by authorized persons (mainly for industrial application). Additional requirements for fuses with fuse-links for bolted connections

BS 88-5:1988

Cartridge fuses for voltages up to and including 1000 V a.c. and 1500 V d.c. Part 5 Specification of supplementary requirements for fuse-links for use in a.c. electricity supply networks

BS 88-6:1988

Cartridge fuses for voltages up to and including 1000 V a.c. and 1500 V d.c. Part 6 Specification of supplementary requirements for fuses of compact dimensions for use in 240/415 V a.c. industrial and commercial electrical installations

BS 921:1976

Specification. Rubber mats for electrical purposes

BS EN 10143:1993

Continuously hot-dip metal coated steel sheet and strip. Tolerances on dimensions and shape

BS EN 10326:2004

Continuously hot-dip coated strip and sheet of structural steels. Technical delivery conditions

BS EN 10327:2004

Continuously hot-dip coated strip and sheet of low carbon steels for cold forming. Technical delivery conditions

BS EN 1401-1:1998

Plastics piping systems for non-pressure underground drainage and sewerage. Unplasticized poly vinyl chloride (PVC-U). Part 1 Specifications for pipes, fittings and the system

BS EN 50173-1:2002

Information technology. Generic cabling systems. Part 1 General requirements and office areas

BS EN 50174-1:2001

Information technology. Cabling installation. Part 1 Specification and quality assurance

BS EN 50174-2:2001

Information technology. Cabling installation. Part 2 Installation planning and practices inside buildings

BS EN 50310:2000

Application of equipotential bonding and earthing in buildings with information technology equipment

BS EN 50350:2004

Charging control systems for household electric room heating of the storage type. Methods for measuring performance

BS EN 50368:2003

Cable cleats for electrical installations

BS EN 54-1:1996

Fire detection and fire alarm systems. Part 1 Introduction

BS EN 54-10:2002

Fire detection and fire alarm systems. Part 10 Flame detectors. Point detectors

BS EN 54-11:2001

Fire detection and fire alarm systems. Part 11 Manual call points

BS EN 54-12:2002

Fire detection and fire alarm systems. Part 12 Smoke detectors. Line detectors using an optical light beam

BS EN 54-2:1998

Fire detection and fire alarm systems. Part 2 Control and indicating equipment

BS EN 54-3:2001

Fire detection and fire alarm systems. Part 3 Fire alarm devices. Sounders

BS EN 54-4:1998

Fire detection and fire alarm systems. Part 4 Power supply equipment

BS EN 54-5:2001

Fire detection and fire alarm systems. Part 5 Heat detectors. Point detectors

BS EN 54-7:2001

Fire detection and fire alarm systems. Part 7 Smoke detectors. Point detectors using scattered light, transmitted light or ionization

BS EN 55015:2001

Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment

BS EN 60081:1998

Double-capped fluorescent lamps. Performance specifications

BS EN 60188:2001

High-pressure mercury vapour lamps. Performance specifications

BS EN 60192:2001

Low pressure sodium vapour lamps. Performance specification

BS EN 60269-1:1999

Low-voltage fuses. Part 1 General requirements

BS EN 60335-1:2002

Specification for safety of household and similar electrical appliances. Part 1 General requirements.

BS EN 60335-2-21:2003

Specification for safety of household and similar electrical appliances. Part 2-21 Particular requirements. Particular requirements for storage water heaters

BS EN 60335-2-23:2003

Specification for safety of household and similar electrical appliances. Part 2-23 Particular requirements for appliances for skin or hair care

BS EN 60335-2-26:2003

Specification for safety of household and similar electrical appliances. Part 2-26 Particular requirements for clocks

BS EN 60335-2-30:2003

Specification for safety of household and similar electrical appliances. Part 2-30 Particular requirements. Particular requirements for room heaters

BS EN 60335-2-35:2002

Specification for safety of household and similar electrical appliances. Part 2-35 Particular requirements. Particular requirements for instantaneous water heaters

BS EN 60335-2-43:2003

Specification for safety of household and similar electrical appliances. Part 2-43 Particular requirements for clothes dryers and towel rails

BS EN 60335-2-61:2003

Specification for safety of household and similar electrical appliances. Part 2-61 Particular requirements for thermal-storage room heater

BS EN 60335-2-73:2003

Specification for safety of household and similar electrical appliances. Part 2-73 Particular requirements for fixed immersion heaters

BS EN 60335-2-80:2003

Specification for safety of household and similar electrical appliances. Part 2-80 Particular requirements for fans

BS EN 60439-3:1991

Specification for low-voltage switchgear and control gear assemblies. Part 3 Particular requirements for low-voltage switchgear and control gear assemblies intended to be installed in places where unskilled persons have access to their use. Distribution boards

BS EN 60454-1:1995

Specifications for pressure-sensitive adhesive tapes for electrical purposes. Part 1 General requirements

BS EN 60529:1992

Specification for degrees of protection provided by enclosures (IP code)

BS EN 60669-1:2000

Switches for household and similar fixed electrical installations. Part 1 General requirements

BS EN 60898-1:2003

Circuit-breakers for over current protection for household and similar installations. Part 1 Circuit-breakers for a.c. operation

BS EN 60923:1996

Auxiliaries for lamps. Ballasts for discharge lamps (excluding tubular fluorescent lamps). Performance requirements

BS EN 60927:1997

Specification for auxiliaries for lamps. Starting devices (other than glow starters). Performance requirements

BS EN 61008-1:1995

Residual current operated circuit-breakers with integral over current protection for household and similar uses (RCBOs). Part 1 General rules

BS EN 61009-1:2004

Residual current operated circuit-breakers with integral over current protection for household and similar uses (RCBO's). Part 1 General rules

BS EN 61009-2-1:1995

Specification for residual current operated circuit-breakers with integral over current protection for household and similar uses (RCBOs). Part 2-1 Applicability of the general rules to RCBOs functionally independent of line voltage

BS EN 61048:1993

Specification for capacitors for use in tubular fluorescent and other discharge lamp circuits. Performance requirements

BS EN 61049:1993

Specification for capacitors for use in tubular fluorescent and other discharge lamp circuits. Performance requirements

BS EN 61238-1:2003

Compression and mechanical connectors for power cables for rated voltages up to 36 kV ($U_m = 42$ kV). Part 1 Test methods and requirements

BS EN 61347-2-1:2001

Lamp control gear. Part 2-1 Particular requirements for starting devices (other than glow starters)

BS EN 61347-2-3:2001

Lamp controlgear. Part 2-3 Particular requirements for a.c. supplied electronic ballasts for fluorescent lamps

BS EN 61347-2-4:2001

Lamp control gear. Part 2-4 Particular requirements for d.c. supplied electronic ballasts for general lighting

BS EN 61347-2-5:2001

Lamp controlgear. Part 2-5 Particular requirements for d.c. supplied electronic ballasts for public transport lighting

BS EN 61347-2-6:2001

Lamp control gear. Part 2-6 Particular requirements for d.c. supplied electronic ballasts for aircraft lighting

BS EN 61347-2-7:2001



Lamp control gear. Part 2-7 Particular requirements for d.c. supplied electronic ballasts for emergency lighting

BS EN 61347-2-8:2001

Lamp control gear. Part 2-8 Particular requirements for ballasts for fluorescent lamps

BS EN 61347-2-9:2001

Lamp control gear. Part 2-9 Particular requirements for ballasts for discharge lamps (excluding fluorescent lamps)

BS EN 61386-1:2004

Conduit systems for cable management. Part 1 General requirements.

Supersedes BS EN 50086-1:1994 which remains current.

BS EN 61537:2002

Cable tray systems and cable ladder systems for cable management

BS EN 62035:2000

Discharge lamps (excluding fluorescent lamps). Safety specifications

Appendices

- A APPENDIX A – ELECTRICAL SWITCHGEAR**
- B LOW VOLTAGE SMALL POWER INSTALLATION**
- C LIGHTING INSTALLATION**
- D INFORMATION COMMUNICATION TECHNOLOGY**
- E FIRE ALARM SYSTEM**
- F SCHEDULE OF PREFERRED SUPPLIERS AND MANUFACTURERS**

APPENDIX A – ELECTRICAL SWITCHGEAR

General

The works include the following

- Replace existing distribution board in science room area and retain existing sub mains cable
New boards to be sub metered in accordance with Part L requirements.

Contractor to survey as part of the tender process the existing board in the sports hall & determine the size & extent of the new switchboard. There will be no variations allowed due to failure to survey existing sports hall services & submit a tender with lack of site knowledge.

The new switchboards will incorporate the requirements of Building Regulations Part L metering requirements.

Provide Earthing and Bonding in accordance with ETCI requirements.

Allow for removing all redundant electrical switchgear

ELECTRICAL SUPPLY

New low voltage supplies shall be obtained from new MCCB's boards

Include for the installation of a temporary check-meter on the existing main switchboard for a period of one week at the start of the project, to ascertain the existing electrical demand of the existing development.

SWITCHGEAR

Supply and install all switchgear. Refer to drawings for details of the various distribution switchgear.

Switchgear shall comply with the following schedules:

Main Switchgear - MSB

Sub-Distribution Boards - SDB

Unless otherwise specified, RCD units shall be the thermal/magnetic protection as Type 1,2,3,4 as specified, rated at 30mA with a short circuit breaking capacity of 15kA, and shall be combined with the final sub-circuit MCB as an MCB/RCD protective device. All RCD units shall be equipped with a test button to simulate operation of the device.

Trunking and basket headers

Provide adequately sized trunking/basket headers at each switchgear position, extending above and to the sides of the switchgear.

Surge Protection

The main distribution board and all submain distribution boards shall be fitted with suitable surge protection as indicated on the drawings. Surge arrestors shall be as "Furse ESP" or equal and approved.

All surge arrestor's shall be manufactured by "MEM" or "FURSE" or equal and approved. The surge arrestor shall have a peak surge current of 80kA and shall be rated for the size of the distribution board, c/w visual status indication and shall be IP66. All surge arrestors to sub distribution boards shall have a peak surge current of 40Ka, rated the size of the distribution board c/w visual status indication and shall be IP66 rated. All surge arrestors shall have a 20 year free replacement warranty.

Manufacturer

The MSD and all SDB's shall be constructed by an Accredited System Builder for Cubic Modular Systems.

Motor Control Panels

Contractor to all for all wiring associated with the new Boilerhouse Control panel as indicated on relevant mechanical drawings. Provide local isolation. Allow for liaison with the selected panel/control system fabricator.

Miniature Circuit Breakers

General - SP, DP or TP as called for and to be 9kA current limiting type with thermal/magnetic protection as Type 1, 2, 3 or 4 as specified.

In general, lighting, general service socket outlets and small power final sub-circuits not serving motive power loads shall use Type 2 MCBs.

Motive power final sub-circuits shall use Type 3 MCBs.

Unless otherwise specified:

- Lighting final sub-circuits shall be protected by 10 amp MCBs.
- G.S. and small power final sub-circuits shall be protected by 20 amp MCBs with integral 30mA, RCD protection (where earth leakage protection is specified).

Earthing & Bonding

Allow for earthing and bonding of full installation to ETCI standards.

Separate earth wires to be run for all final sub-circuits.

Provide separate earth bar at each MSB/SDB location.

Supply and install earth pits as necessary to achieve proper earth, adjacent to main incomer position.

Labeling

Circuits - All devices to be provided with engraved plastic circuit labels. All label script must be approved in advance by the Engineer.

All covers, doors and complete FBAs to be provided with suitable warning labelling.

A main label to be provided in accordance with IEC 439, which gives details of voltage rating, current rating, class of equipment, fault rating and serial number.

Every separate switchboard shall have a permanent label stating the cable colour code used.



Where two separate cable colour codes exist in the one installation, a label must be fixed to the outside of the switchgear stating:

WARNING - THIS PANEL CONTAINS WIRING SYSTEMS WITH BOTH BLUE AND BLACK NEUTRAL WIRES CONCURRENTLY IN USE. SOME CABLES HAVE BEEN SLEEVED. EXTREME CAUTION TO BE USED.

Inspection and Tests

Testing and Inspection shall comply with the Switchgear COP. The Engineer reserves the right to witness tests. The Contractor must supply written certification of tests.

Inspection and tests to ensure equipment is operating functionally correctly are to be carried out by the Contractor. Tests to include:

- Checking for compliance with drawings.
- Insulation - 2500V for 10 seconds.
- Functional tests on all devices.

APPENDIX B – LOW VOLTAGE SMALL POWER INSTALLATION

GENERAL

Wiring is generally XLPE/SWA/LSF cabling on cable tray between the Main Board and sub-Distribution Boards and LSF cabling in steel conduit & trunking to all electrical outlets.

Include for all power supplies and alarm cabling associated with the fire alarm installation and CCTV installation etc.

CABLE & DISTRIBUTION SYSTEMS

Sub Mains Cables

Sub-mains cables shall be 4 Core Cu-LSF XLPE SWA with separate CPC's for cables over 16.0sq.mm, and 5 Core Cu-LSF SWA for cables of 16.0sq.mm or less. Cables shall be sized as scheduled on drawings.

Sub-mains cables shall be fixed to cable tray or in builders ducting. Cable tray shall be Perforated type, galvanised medium gauge sheet steel, as Excel from Electrofast Limited, or equal and approved.

Sub-mains cables shall be installed on cable trays at a spacing of twice the diameter of the larger adjoining cable with nylon cable ties as manufactured by BICC Limited unless otherwise directed.

Trunking

Primary trunking routes are shown on the drawings. This contractor may augment or revise same with the Engineer's approval for practical wiring considerations and site conditions. Such amendments will not be considered as extra cost justification. Circuits within trunking, cable tray or conduit systems shall be grouped together with tie tags and circuit identification levels at all outlets, switches, terminations and at appropriate locations along the length of the trunking/tray to allow circuit identification.

Trunking shall be galvanised sheet steel as Excel from Electrofast Limited, or equal and approved.

Three-compartment dado trunking is to be provided as indicated, and rises to the ceiling above. Refer to the power & data layout drawings. Dado trunking shall be 3 compartment white PVC type 170mm x 57mm as MK Prestige Technical 3D

Where trunking or cable tray systems pass through fire compartment boundaries, the Contractor is responsible for the internal fire stopping with a suitable approved material, and also the provision of a lid to cover cable tray at such points.

Cable capacities of conduit and trunking systems shall not exceed the requirements of the ETCI Specifications. It is the responsibility of the Contractor to verify that the trunking system as designed, satisfies these regulations. If cables will exceed the trunking capacities, the Contractor must bring this to the attention of the Engineer prior to order or installation of the trunking system.

Trunking and cable tray systems shall be free of sharp corners, edges or burrs, where cable insulation could be damaged. Cables shall be installed in a manner that will not damage or put undue physical strain on them.

FINAL SUB CIRCUIT

All final sub circuit wiring is LSF insulated copper cable in trunking and/or medium gauge steel conduit with separate earth wires.

The number of power outlets per circuit shall be limited in order that the calculated volt drop is less than 2% of the declared nominal voltage drop. No more than 5 No. computers shall be wired on any given circuit. Socket outlets shall be installed at 450mm AFFL or 150mm above bench level, unless otherwise indicated. All computer sockets shall be dual earthed.

All circuits serving socket outlets shall be wired in radial 4.0 sq.mm. LSF insulated cables in galvanised steel trunking and conduit and protected by a 20A MCB/RCD.

Cooker outlets shall be wired in 3 core 10.0 sq.mm LSF insulated cables in galvanised steel trunking and conduit.

Cooker Isolator units shall be 45 Amp double-pole, with neon indicator type as MK Metalclad Plus, or equal and approved.

Socket outlets shall be a standard 13A, 3pin without manufacturer's knockouts where surface mounted, as follows:

General Sockets Ground Floor: MK Metalclad Plus, ref. ALM

All Computer Sockets: MK Logic Plus, ref. WHI (switched)

All fused spur outlet shall be as MK ALM, with neon indicators and shall be switched unless otherwise noted. (except where mounted on data trunking)

Final connection to all heat emitting equipment shall be heat resistant cable to BS 6141 marked "Heat Resisting 85".

All 20A D.P Switches shall be wired in 3 core 4 s.q. mm LSF insulated cables in Galvanised steel conduit from a 20A MCB.

Generally All 13A Fuse Units shall be wired in 2.5 s.q mm LSF insulated cables from a 16A MCB

Unless otherwise specified elsewhere, wiring shall be carried out using LSF insulated cables in conduit and/or trunking. Circuiting shall be as indicated on the drawings with each circuit protected by an appropriately rated MCB. The default circuit wiring and MCB sizes for single phase circuits wiring and MCB sizes shall be as follows:

- 1.5 sq.mm for 6 amp rating with 10 amp MCCB
- 2.5 sq.mm for 16 amp rating with 16 amp MCCB
- 4.0 sq.mm for 20 amp rating with 20 amp MCCB
- 6.0 sq.mm for 30 amp rating with 30 amp MCCB
- 10.0 sq.mm for 45 amp rating with 45 amp MCCB
- 6.0 sq.mm for 50 amp rating with 50 amp MCCB
- 4.0 sq.mm for 20 amp TP&N rating with 20 amp TPN MCCB
- 6.0 sq.mm for 30 Amp TP&N rating with 30 amp TPN MCCB

HVAC AND MOTIVE POWER ELECTRICS

Refer to associated mechanical drawings for details of the mechanical wiring requirements associated with the boiler house control panel

Provide a local isolator to all HVAC mains power device.

Contractor to include for cable distribution system in plant areas augmented as necessary to allow for final plant and control devices positions. Complete installation shall be carried out in

galvanised steel conduit & trunking.

Include for wiring and fixing of all control devices provided “free issue” by the Mechanical Contractor. Terminations and testing of cables is by the Electrical Contractor.

Devices, which have both electrical and mechanical connections, will be erected by the Mechanical Contractor with wiring terminations by the Electrical Contractor.

Provide galvanised flexible conduit from local isolator units to all items of mechanical plant within the boiler house.

It is the responsibility of the Electrical Contractor to confirm all wiring details with his selected Mechanical Contractor and controls supplier, in a timely manner. Any costs incurred as a result of lack of co-ordination between the contractors will not be entertained as possible variation claims.

SUNDRY SYSTEMS

Power Supplies:

Provide power supplies to all devices specified on drawings including: fire alarm panels, Fire Alarm Interface Units, security alarm panels, CCTV cameras etc.

LABELLING

Label all circuits with permanent identification on the socket or outlet box cover. Use Critchley HSI or approved equal.

Label all cables at both ends using Critchley cable tags.

Provide warning labels on all switchgear.

Provide rubber insulating mat on switchroom floor covering all areas in front of switchgear.

TESTING AND COMMISSIONING

Test and commission full installation to ETCI Regulations. Provide test results for each circuit within the O&M manuals.

APPENDIX C – LIGHTING INSTALLATION

GENERAL

Include for all sub-circuit wiring from Sub-Distribution Board MCCBs to luminaires. Supply, delivery and installation of luminaires, lamps, switching systems and devices.

LIGHTING SYSTEM

Allow for the supply, delivery, wiring, device erection and connection of all luminaires and emergency luminaires.

The Schedule of Luminaires must be priced in tender as per the following schedules.

Final sub-circuit wiring shall be 2.5 sq.mm LSF insulated cable in conduit with 10A MCB protection.

Luminaires shall be supplied complete with:

- Louvres, diffusers, lampshades, transformers, lamps, mounting brackets and accessories as specified in the luminaire schedule.

Final connection to luminaries shall be via a “KLIK” type connector junction box with 3 core 1.5 sq.mm heat resistant flex (maximum length 0.75m) as final connection – Where ceiling void Exists. Where a ceiling void does not exist i.e. final connection shall be directly into the fitting via a suitable outlet block.

Luminaires erected prior to the completion of wall, floor and ceiling finishes must be sealed from dust/dirt and protected from damage. Such luminaries may not be used for temporary lighting of the works unless approved.

All Luminaries shall be supplied by one of the following manufacturers, product references noted on relevant drawings & schedules are for guidance only and indicative of a measure of performance & quality:

- Tamlite
- Thorn
- Ansell
- Or equal and approved

The contractor shall include for providing samples of each luminaire type early on in the project for approval by the Engineer/Architect.

The Lighting Suppliers must provide documentary evidence from BSI or equivalent body that

- Hold a ENEC licence – having been assessed against the requirements of CENELEC for compliance with the LUM Agreement
- Have been certified by BSI or equivalent body as conforming with BS4533:102.5/EN60 548 – 2-5 and BS4533:102.1/En60598-2-1
- Provide documentary evidence from a Certified body that the product specified complies with the relevant data sheet specified

- Provide documentary evidence from BSI or approved Certified body that the products conform with EN55015, EN61547, EN 6100-3-2, EN 60598-1, EN 60598-2-1, EN 60598-2-22.
- Hold a quality management system (ISO 9001:2008) accredited by BSI or equivalent
- Hold a quality management system (ISO 9001:2008) accredited by BSI or equivalent

SPARES

Supply 10% of each lamp type rounded up to nearest standard pack, as spares on the date that Practical Completion for the project is attained.

LIGHTING CONTROLS

The lighting control within the school shall be controlled as follows:

In teaching spaces and offices automatic lighting controls shall be based on manual on/off switching, absence detection and daylight sensing so that luminaires will need to be switched on manually and will dim/ turn off automatically depending on the signals from the automatic controls.

Each PIR sensor shall be capable of covering 24m dia, c/w time delay of 4-30 minutes and a switching capacity of 4 amps. Sensor must be suitable for the proposed ceiling height of the space to be installed. Contractor to include for all 0-10V control cabling associated with installation and with all unidentified powers additional power supplies required to ensure the complete and proper operation of the system

Lighting Controls in Corridors/Stores & Toilets shall consist of Combined PIR detection and Photocell detection. If lighting levels are below a predetermined level, the lighting will be activated upon entry to the corridor space. Each PIR sensor shall be capable of covering 15m dia, c/w user friendly time delays and a switching capacity of at least 4 amps. Each Sensor must be suitable for the proposed ceiling height of the space to be installed. Contractor to include for all 0-10V control cabling associated with installation and with all unidentified additional power supplies required to ensure the complete and proper operation of the system. The exact location of lighting sensors shall be agreed with lighting manufacturer. Include for switched fused spur outlets at high level to isolate lighting circuits for maintenance purposes. (Spurs Not shown for Clarity)

LIGHT SWITCHES

Standard light switches shall be 10A gridswitch type as MK metalclad Plus (ALM Finish)

Supply and install external solar photocell and seven-day timer within main distribution board for external lighting, as SELK manufacture or equal and approved.

TESTING AND COMMISSIONING

The installation shall be fully tested and commissioned by the Contractor. Include for specialist testing and Commissioning of all lighting control systems as required after each works section

The Contractor shall perform a 3 hour duration test on the emergency luminaires and provide the Engineer with at least 5 working days notice of this test after each works section.

A test/commissioning certificate in the format of the IS 3217 Model Form, must be submitted to the Engineer after each works section. Lighting schedules are on relevant drawings

APPENDIX D – INFORMATION COMMUNICATION TECHNOLOGY

GENERAL

The existing ICT infrastructure is to be retained & works are restricted to the science room of the installation to provide additional telephone, computer points & provision for poe wifi routers
The existing hardware will be retained & capacity increased as necessary and is to be relocated as detailed on drawings

REFERENCE STRUCTURED CABLING GENERAL SPECIFICATION

Introduction

Performance Objectives

The design intent is to provide an extensive and versatile 100Mbit/s structured cabling installation supporting Gigabit Ethernet capable of being easily modified and extended to accommodate future changes with minimal interruption to service and capable of supporting a multi-vendor, multi-product environment.

Design Parameters

The design parameters are defined within ISO 11801 (1999) BS EN 50173 and BS7718 TIA/EIA 568A.

The IT shall consist of horizontal UTP copper data cabling from distributed patching locations to the desktop or other final outlets as indicated in the system drawings.

Wiring Closets

Existing to be retained

All room outlets shall be terminated on to patch panels back at the wiring closet.

UTP Cabling

The complete UTP infrastructure; patch panels, cabling, outlets, patch cords etc must comply must comply as a minimum to Cat 6e, 1000Mbit/s standards and be installed to TIA 568-A-5 and TSB95 standards with channel performance specified up to 100Mhz.

The system will be required to support, as a minimum, the following.

- Token Ring 4,16,32, and 100 Mbps
- Ethernet 10 BaseT
- IBM 3270 SNA
- IBM S/36,38 AS/400
- RS 232
- ISDN
- TPDDI
- 100 Base-T Ethernet
- 1000 Base-T Ethernet

The wiring convention to be used throughout is AT&T 258B.

UTP cables shall be terminated on wall mounted patch panels at the distribution patching locations as described above. Wiring tie bars shall be used to relieve the strain on the connectors.



The distance between the distributed patching panel location and the room outlet must not exceed 90 Meters as measured by a micro test / fluke Cat 6e test instrument with the NVP set to the manufacturer's recommended value.

The maximum distance of the horizontal subsystem channel, end to end including patch cords, must not exceed 100Meters.

Cabling shall be terminated using the manufacturer's recommended method and tools only.

Labelling

Patch panels, cables and outlets shall all be indelibly labelled using proprietary cable marking system of rings or tags. The format of which shall be agreed with the engineer.

Testing and Commissioning

The UTP system shall be tested using specialist test equipment to prove that: -

- There is cable pair continuity
- That cable pair polarity has been maintained i.e. that the two cables within the pair are not reversed.
- Cable pair shorting, both within a particular pair and between adjacent pairs, does not exist.

The installation will be capable of operating in excess of 1000Mbit/s.

The cable meets the manufacturer's performance characteristics.

All pairs in the cable shall be subjected to the following CAT 6 LINK tests which shall performed at least 250MHz:

Length All pair lengths are to be measured in Meters with an agreed NVP.

- Delay
- NEXT
- Attenuation
- ACR
- Impedance
- Return Loss
- PSACR
- PSNEXT
- Pair Loop Resistance
- Capacitance
- ELFEXT
- PSELFEXT

Each test result shall be identified by a three-digit cable number, padded with leading zeros where appropriate.

The contractor shall also prove that:

- The cables are correctly installed with respect to strain relief and bend radius.
- All labelling at both ends of each cable has been completed.
- Appropriate Test Certificates and Certificates of compliance shall be provided for all the above for each system together with a twenty year full system manufacturer's warranty.

Accessories

The electrical contractor shall supply and install the faceplates complete with suitable cut outs for the installation of the room outlets.

The cut out dimensions shall be agreed with the specialist cabling installer prior to the installation, but in general should comply with the European LJU6C Standard.

Voice System Backbone Cabling

The specialist shall allow for a multi-pair cable for voice purposes and should be agreed on site with the engineer and telephone specialist. The multi-pair should have a capacity for up to three pairs for every telephone outlet.

The IT cabling specialist will install and terminate these cables at the patch panel end. These cables will be terminated at the PABX end by others.

Patch Cords

Patch leads shall complete the UTP cabling installation and shall be manufactured from the same manufacturer as the UTP cable to ensure end-to-end continuity of the installation.

The patch leads shall be provided for each room outlet and at each patch panel cabinet for patching to voice/data panels.

Wireways

All UTP and fibre optic cabling shall be installed between the distributed patching locations and room outlets in a system of galvanised steel basket and trunking in the ceiling void and extending to the room outlets in conduit.

Cable basket, trunking and conduit shall be installed by the electrical contractor who shall liaise with the specialist cabling installer to agree suitable routes and bending radius.

All UTP and fibre optic cabling shall be tie wrapped at 2m intervals to provide a tidy and unstrained presentation.

Cable routes for the UTP cabling should be separated as far as reasonably possible from high electrical loads, power cables, Lift Machine Rooms and Lighting Electronic ballasts which may cause interference.

System Warranty

Upon Practical Completion, the IT Sub-Contractor will be required to warrant the installed system against defects of workmanship or materials for a period of not less than 20 years from the date of Practical Completion.

The specialist cabling installer must be able to provide a full 20-year channel warranty for the system installed and must therefore be a System Installer.

Training

The contractor shall include for training with the end user to cover all aspects on the IT installation.

Operating and Maintenance Manuals

The contractor shall include for two full sets of operation and maintenance instruction manuals. The documentation, which shall describe in detail all aspects of the IT installation, will be in an agreed word processing package.

The documentation shall include a set of record drawings which shall incorporate all changes and



alterations that have occurred subsequent to project commencement. The contractor shall keep on site a complete set of up-to-date prints which a drafts copy will initially be submitted two weeks before completion to the consultant engineer for comment before submission to the client.

System Installer

The system installer must be capable of providing full end-to-end system warranty based on this specification and on the contract drawings.

To this end, the specialist must show evidence of having attained 'approved system installer' for the manufacturer as per the schedule of materials

APPENDIX E – FIRE ALARM SYSTEM

FIRE ALARM AND DETECTION SYSTEMS

System Type

The main fire alarm system is to be modified to provide additional devices in the science room area and all systems are to be fully compatible to provide seamless operation

The scope of works are as follows

1. Provide additional devices to protect ceiling voids & escape routes

Installation Classification

The installation shall comply with IS 3218 protection level L2/3.

The existing Fire Alarm System is addressable Open Protocol. The contractor will engage a specialist 'Open Protocol' installer shall carry out the actual commissioning of the fire alarm installation in the works area & to recommission the entire system upon completion. The owner of a system using an open protocol can freely choose a different company to service the system or to supply different upgraded equipment.

The fire alarm system shall comply with IS3218, "L2/3" conforming to IS 3218 and shall be compatible with the existing installation

The fire alarm specialist shall be a member of FESA.

System of Wiring

All Cabling shall be provided and installed by the electrical contractor

Each looping system (unless the Specialist Installer advises otherwise) shall be complete with sounder / beacon wired on the same circuits/loops as the detectors and break glass circuits/loops.

The zoning of the building shall be as agreed with the Fire Alarm Manufacturer.

All cable routes to be agreed on site with the Engineer prior to installation.

Local isolation shall be provided by means of a 20 amp DP Key switch adjacent to each fire alarm panel.

A system wiring diagram shall be obtained from the manufacturer prior to commencement of work. A separate full set, in duplicate of all relevant maintenance manuals and systems wiring diagrams are to be provided and handed over to the Engineers on completion of the work. The complete fire alarm system shall be tested and commissioned by the manufacturers after each phase of works has been completed and a typed certificate issued to this effect.

Equipment Details

The main control panel shall be located in the main entrance lobby as indicated on the layout drawings. The system shall be linked to the digital communicator of the intruder alarm system.

Refer to drawings for quantities and types of devices.

Activation of the system shall cause:

- Shut down of Mechanical Control Panel
- Alarm to be raised in remote monitoring centre.

- Activation of Intruder alarm system.

The system shall have capacity for the following:

- 4 loop panel

The system supplier shall include for the following:

- Testing, commissioning and certification to IS 3218, of the complete installation. Final testing must be in accordance with the project programme and issue of certification must be within 24 hours of final testing/commissioning.

Installation

Wiring to be carried out in 4 sq.mm. FP200 Gold cabling in metal conduit, to a D.P pole Switch with neon indicator light located adjacent the fire alarm panel.

Cable System

Wiring to device and sounder circuits shall be in 1.5sq.mm FP200 Gold cabling in galvanised conduit, secured at 250mm centres by means of fire rated clips.

Test all wiring circuits

Provide trunking headers as required for cable entry to control panels.

Provide permanent labels on all devices. Reference system to be approved in advance by the Engineer.

The Contractor is wholly responsible for the overall installation and the co-ordination of, and attendance on, systems suppliers.

Should a fire call be generated during a system fault then the fire call should over-ride the fault.

Fire Alarm Sensors

The smoke, heat and multi sensors detailed on the drawings shall use a common base to allow interchanging of equipment if necessary.

The smoke sensors shall be of the optical type complete with sensor base. Smoke sensors shall have the necessary protocol to enable the fire alarm panel to interrogate and decide if the sensor has a fire call, a pre-alarm call or a fault call to report. Two spare detectors shall be provided under this contract.

The heat detector shall incorporate two temperature responsive elements mounted on a ceramic substrate, so that one element is in immediate contact with the surrounding air and the second is in contact through a slower heat path. Two spare detectors shall be provided under this contract.

The multi sensors shall be of the optical type combined with independent temperature sensing complete with sensor base. Multi sensors shall be utilised within public areas and shall be programmed by the Specialist Installer to provide coverage as necessary. Multi sensors shall have the necessary protocol to enable the fire alarm panel to interrogate and decide if the sensor has a fire call, a pre-alarm call or a fault call to report. Two spare detectors shall be provided under this contract.

Call Points

The call points shall conform to IS 3218. They shall be of the Thermo-plastic, press to break type and have an integral addressable module to enable the panel to identify the exact location. The call point shall have an LED to indicate operation. 20 spare call points shall be provided and handed over to the Client on completion of the works. All Call Points must be fitted with spring hinged lids.

Call points should be positioned so that the top of the unit should be 1200 mm above finished floor.

Interface Relay Units

All interface units shall be soft addressable pattern and contain all necessary micro-processors, electronic components/circuitry required to form an addressable device for direct connection to the 4 wire loop circuits and operate in conjunction with the system circuitry/operational requirement.

Visual Indicators

Each of the sounder bases are to have an integral beacon base as part of its aesthetics as per IS3218/ BS 5839 Part 3 and EN 54. They shall be of the addressable type, thermoplastic. They shall be suitable for flush mounting.

Sounders

The sounders shall be of the analogue addressable type and be complete with an internal volume and pitch control. External sounders shall be weatherproof to IP44 c/w gasket. Sounders are to be mounted at 2100 mm from FFL.

Isolators

An isolator is to be fitted after every 20 devices. Each zone is to have its own isolator. The device shall, in the event of a short circuit or earth fault, isolate the sections of cable affected.

Commissioning And Testing

Commissioning certificates in the form of the IS3218 Model Form must be fully completed by both the systems and wiring contractors before Practical Completion will be awarded.

The contractor shall perform audibility tests as part of the commissioning of the system and present the results to the Engineers in tabular format.

Allow for installation, testing and commissioning of the system in 2-phases.

Manuals And Drawings

The user shall be instructed in the operation of the system at Practical Completion or shortly thereafter. At this time, a commissioning certificate, user logbook, zone chart, as-installed drawings and an operations manual must be handed over.

Three further copies of the above must also be included in the O& M manuals.

Allow for a subsequent instruction session with the Client when the facility is operational.

**** The Tenderer shall include in his tender for a one-year monitoring and maintenance contract from the Manufacturers.**

APPENDIX F – INTRUDER ALARM INSTALLATION

The existing system is to be adapted to suit the refurbishment works which includes relocation of key pad & new PIR in science room

The electrical contractor shall employ a suitably licenced & named specialist to provide a standalone intruder alarm system with network connections to the existing schoolwide intruder alarm system generally as indicated on the drawings and detailed with in this specification. Any diversions to facilitate works are deemed to be included in the tender

APPENDIX G - PA & CLASS CHANGE SYSTEM

The contractor shall employ as specialist supplier to extend the existing school wide PA/Class Change system

- 3.1 Extend the existing PA/class change installation to serve the science room, all as indicated on the drawings and detailed here after.
- 3.2 The electrical Contractor shall employ a suitable PA specialist to undertake all works
- 3.3 The Public Address / Class Changing system shall be designed and installed to provide the following:
 - One way communication between all teaching spaces, offices and general purpose rooms. One way communication to all corridors.
 - A class change system.
- 3.4 Existing control to be retained – amplifiers, microphones, class change module etc

Field mounted equipment shall comprise:-
Wall mounted one way speakers -6 Watt, 100V, Sabre Cat No. CH-502T or be equal and approved.
The system shall be tested and commissioned by a specialist supplier.
The system shall be wired by the Specialist

WIRING SYSTEM

The Contractor shall liaise with his Specialist Installers to ensure the type and make of cable for each system is established.

The main cables shall be enclosed in dedicated trunking systems to avoid interference. Any wiring drops shall be linked to loudspeaker and microphone points via 20mm diameter galvanised steel conduits.