Unit A6, M4 Business Park, Maynooth Road, Celbridge, Co. Kildare, W23 VFY7 (Tel: 01-6274103)

RATOATH JUNIOR NATIONAL SCHOOL,
FAIRYHOUSE ROAD,
RATOATH,
CO. MEATH,
DUBLIN 15.
A85 P262.

ROLL NUMBER: 00885T

'VOLUME A2'
OF THE
WORKS SPECIFICATION

PARTICULAR SPECIFICATION

TENDER ISSUE (T1)

Document Control: J26066/T1/VA2

Rev:	Date:	Prepared By:		Quality Check By:	
T1	**02.11.26**	**Robert Whyte**		**Mark Gormley**	

Table of Contents

GENERAL 5
Introduction 5
Site visit 8
Builders work and attendances 8
Cleaning 9
Co-ordination 11
Project Supervisor Construction Stage (PSCS) 12
O&M manuals 13
Timescale and Working Hours 16
Removal of asbestos containing materials 18
(4 -) BUILDING FINISHES 19
42.01 Wall Finishes Internally 19
43.01 New floor covering finishing in the Computer Room 20
(6-) ELECTRICAL WORKS 21
60.0 ELECTRICAL SITE SERVICES 21
60.01 Main earth electrode and earth pit 21
60.02 New sub-mains cabling installed in underground duct between the new main electrical board in the ESB External Store Room and the new main distribution electrical board in the main building 22
61.0 ELECTRICITY CENTRE 23
62.0 POWER DISTRIBUTION SERVICES 24
62.01 Decommissioning of the existing power and general services installation throughout the main building 24
62.02 Decommissioning of the existing sub-distribution electrical boards throughout the main building 24
62.03 Detailed survey of the existing sub-electrical boards in the main building and electrical installation in the building 24
62.04 New sub-distribution electrical boards 26
62.05 Existing main electrical distribution board in the ESB External Store Room 34
62.06 New main distribution metering electrical board (NMDB.01) to be installed in the External ESB Store for the Junior School and the Senior School 36
62.07 Existing ESB Meter in the ESB External Store Room 46
62.08 New ESB meters for the Junior School and Senior School and electrical attendances required for ESB Networks 47
62.09 Electronic surge protection 49
62.10 New LV and ELV cable containment 51
62.11 Cabling, wiring and cable sizes 55
62.12 New sub-mains cables to be supplied and installed 58
62.13 Existing sub-mains cables to be retained and reconnected to the new main distribution electrical board for the Junior School 62

62.14 Internal sockets and spurs....63
62.15 IP66 rated sockets....68
62.16 Dado trunking and sockets....69
62.17 Isolation switch for socket at high level in classrooms for TV....71
62.18 Cooker switch....72
62.19 Existing IT points in the Computer Room....73
62.20 Electrical attendances to the existing MCC controls panel in the boilerhouse....73
62.21 Attendances to the new hand-dryers....74
62.22 Attendances to the existing extract fans in toilets....75
62.23 Attendances to the existing CCTV system....76
62.24 Attendances to the existing intruder alarm system....76
62.25 Attendances to the existing door access systems....77
62.26 Attendances to the existing electric undersink water heaters....77
62.27 Attendances to the existing electric panel heaters....78
62.28 Attendances to the existing two-port valves....79
62.29 Public Address System....80
62.30 Spurs for smart TV....80
62.31 Blank plates on some existing sockets....80
62.32 Earthing and bonding....81
62.33 Testing and commissioning....81
62.34 PC Sum for ESB Capital Contribution....81
62.35 ASD Unit existing power and general services to be rewired....82
63.0 LIGHTING SERVICES....83
63.01 Decommissioning of the existing lighting services installation in the main building....83
63.02 New internal and external task lighting....83
63.03 New lighting switches....94
63.04 Lighting controls for teaching spaces and offices....97
63.05 Lighting controls for corridors....100
63.06 Lighting controls for toilets and stores....102
63.07 Mains and control cabling to the light fittings....105
63.08 Cable carrier system for lighting installation....105
63.09 New external bulkhead lighting attached to the building....105
63.10 Existing CCTV Cameras mounted on the ESB External Store Room....106
63.11 Emergency Lighting....106
63.12 Maintenance of the emergency lighting system....122
63.13 Cabling, wiring and cable sizes....122
63.14 Blanking plates on some of the existing sockets....122
63.15 ASD Unit existing lighting and emergency lighting services to be rewired....122
63.16 Testing & Commissioning....122
64.0 COMMUNICATION SERVICES....123
64.01 New IT faceplates on the existing data points....123
65.0 RESERVED....123

66.0 TRANSPORT SERVICES 123
66.01 Existing lift to be rewired 123
67.0 RESERVED 123
68.0 SECURITY AND PROTECTION SERVICES 123
68.01 Decommissioning and removal of the existing fire alarm system 123
68.02 New fire alarm system 124
68.03 Attendances for new AOV Installation 148
68.04 Aspiration System for the lift 150
68.05 Maintenance of the new fire alarm system 152
68.06 Intruder alarm system 152
68.07 Door access systems 152
68.08 CCTV system 152
68.09 Disable refuge 152
68.10 Emergency call systems 155

GENERAL

Introduction

The intention of this specification issued is to describe and provide for a complete installation. The Contractor is advised that the work to be executed as described in these documents shall be complete in every detail, notwithstanding that every item involved may not be specifically mentioned or described.

The Contractor shall be held to allow for all materials and labour necessary for an entire and complete installation and shall not avail of any unmentioned error or omission should such exist.

Ratoath Junior National School (JNS) is a national school building located in Ratoath, Co. Meath. Ratoath Junior National School shares a campus with another national school, Ratoath Senior National School (SNS). This project entails works in decommissioning and replacing the existing electrical installation throughout Ratoath Junior National School. Refer to the drawings for further information on the works to be carried out.

The scope of the works will be as follows:

- Decommissioning and removal from site of the existing electrical boards throughout the building apart from the cooker board in the Staff Room. All existing electrical boards shall be replaced with new electrical boards apart from the cooker board in the Staff Room.
- Upgrade the existing ESB supply so that the Junior school has its own ESB meter and ESB supply. Separating the ESB supply from the Junior School and the Senior School so that each building has its own independent ESB supply.
- Decommissioning and replacing of the existing power & general services installation throughout the building and installation of a new power & general installation throughout the building.
- Decommissioning and replacing of the existing general lighting installation throughout the building and installation of a new general lighting installation with lighting controls throughout the building.
- Decommissioning and replacing of the existing emergency lighting installation throughout the building and installation of a new emergency lighting installation that shall be compliant with I.S. 3217:2023 throughout the building.
- Decommissioning and replacing of the existing fire alarm installation throughout the building and installation of a new fire alarm installation that shall be compliant with I.S. 3218:2024 throughout the building.

- Supply and installation of a new cable carrier system throughout the school building to cater for the proposed new electrical wiring to be installed.
- The existing ICT system installation, intruder alarm system installation and CCTV system installation shall be retained throughout the school building.
- All electrical works as highlighted on the drawings and the specifications.
- Thorough cleaning of the building once all works are completed so that the building is clean and tidy for re-opening on the building.
- All associated preliminaries for the project.
- All associated decommissioning works.
- All builders' works associated with the above. See 'Builders Work Schedule' in 'Volume C1 – Pricing Schedule' for further details.
- Acting as Project Supervisor Construction Stage for the project.
- Carrying out all works in compliance with current health and safety regulations.
- Any other works associated with the works as identified on the drawings and the specifications.

The Contractor shall be deemed to have carried out a site visit prior to the completion of his tender and ensure that all factors, site conditions and items are taken account of necessary to complete the installation and to leave same in a complete working condition to the satisfaction of the Employer's Representative.

No extras or variations shall be allowed for additional work that could have been ascertained by visiting the site.

Applicants interested in visiting the building will need to contact Ratoath Junior National School at 01-8256639 to arrange an appropriate appointment to visit the site during the tender period. Do not visit the School without prior arrangement with the School.

No extension or significant Architectural works shall form part of this contract.

The Contractor shall appoint a suitably qualified Building Contractor to carry out the builder's works and building finishes works as specified in these documents.

All works shall be in compliance with all relevant Building Regulations, Irish Standards, British Standards, CIBSE Guidelines and Good Engineering Practices.

The Contractor shall be required to ensure all necessary flexibilities & resources are available to the project to meet the deadlines and programmes. The Contractor shall liaise with all his relevant Contractors regarding the programme and order of works and any concerns he may have over the completion date should be raised prior to the awarding of the contract.

The Contractor shall take all reasonable care to ensure all site workers and visitors are not endangered by any element of their works.

The Contractor must ensure that the works are completed as soon as possible and/or within the agreed program time frame.

It is the Contractor's responsibility to raise any concerns over the proposed works with the Employers Representative prior to commencement of works.

Failure to inform the Employers Representative of any such concerns will be deemed that the Contractor has accepted the design and scope of works to be fault free.

This specification will set out in general terms the data to be used by the Contractor in order to submit a tender bid for the works as identified. This shall include the production of a complete set of services installation drawings.

The procurement, delivery, supply, handling, erection, installation and commissioning of the services as there under described as may be seen or inferred from the enclosed documents from the Consulting Engineer.

The Contractor shall satisfy himself that the installation is in accordance with all codes and standards. All works described shall comply with:

i) The Safety, Health and Welfare Act 2005
ii) Requirements of the Health and Safety Authority / SI 138.
iii) Requirements of the Fire Officer.
iv) All Irish Building Regulations including Building Control (Amendment) Regulations (BC(A)R), S.I. 9 of 2014.
v) Factories Act / Statutory Instruments.
vi) Client Safety Protocol.
vii) Client Specifications.
viii) Chartered Institute of Building Services Engineers.
ix) The Tender Drawings.
x) The Contract Preliminaries.
xi) All relevant Irish, British and European Standards and Codes of Practice.
xii) The ETCI National Rules for Electrical Installations.
xiii) All relevant Irish, British and European Standards and Codes of Practice.
xiv) I.S. 10101:2020 National Rules for Electrical Installations.
xv) I.S. 3217:2023 Emergency lighting systems.
xvi) I.S. 3218:2024 Fire detection and alarm systems.

The Contractor shall familiarise himself with the above and the obligations therein.

Site visit

Applicants interested in visiting the building will need to contact Ratoath Junior National School at 01-8256639 to arrange an appropriate appointment to visit the site during the tender period.

If the Contractor cannot get in contact with the Client, please contact Galileo Energy Services so that they can arrange access to the building for the Contractor.

Tenderers shall arrange to visit the site to ascertain for themselves the full extent and nature of the works and to familiarise themselves with the general site conditions, to its accessibility, modifications to existing electrical installations equipment and specialist equipment and the supply of and conditions affecting labour and of executing the contract generally.

As child protection policies and Data Protection policies are deployed in the building, the tendering Contractor MUST NOT arrive to site without prior appointment.

Tenderers shall note that no claim in respect of lack of knowledge of prevailing site conditions, builders work or existing services can be considered.

The tender drawings are based on the best information available at the time of preparation and by visiting the site the Contractor shall satisfy himself of the exact extent and nature of works involved.

Builders work and attendances

All builders work associated with the execution of the works shall be carried out under this contract by the Contractor. The appointed Contractor shall be completely responsible for all builder's work. A suitably qualified Building Contractor shall be employed by the Contractor to carry out the building works and building finishes associated with this contract.

Due allowance for this item must be allowed for in the tender price. **See 'Builders Work Schedule' in 'Volume C1' of this document and this specification for details on all builder's work required and building finishing works required.**

The Contractor shall prepare any working drawings if necessary, agree all details with the Employer's Representative, mark out and be responsible for correctness, and the cost of any unnecessary work due to the Contractor failing to comply with this condition shall be the Contractors responsibility.

The Contractor shall ensure that cutting away and general attendance is reduced to a minimum and must not impede or delay the carrying out or completion or this work. The permission of the Employer's Representative shall be secured before cutting or chasing is commenced.

The Contractor shall be responsible for the preparation of the following:

- All builders work and building finishing works associated with the execution of the works.
- All required opes through walls, roofs, floors, etc. for services.
- All required internal trenching, external trenching, etc. for services.
- Painting.
- Builders work drawings, including all necessary opes for installation.
- Technical submittals, for all items of plant and equipment that vary from the specified equipment herein.
- Ensuring that all services/installation details are completely integrated with all aspects of the building elements, to the satisfaction of the Client.

Cleaning

General:

The Contractor shall be totally responsible for the cleaning and tidy-up of the internal and external areas where all works shall occur, once all works are completed.

The Contractor shall be responsible for the cleanliness of all areas where and surrounding access areas where works are being carried out during the construction period.

The Contractor shall allow for the cleaning of all areas and removal of all rubbish before the anticipated handover date for the project.

All areas where works are to be carried out shall be cleaned and tidied to the satisfaction of the Client and if the cleaning is not to the satisfaction of the Client, the Client shall employ cleaners to complete the cleaning at the Contractor's expense.

All external areas and internal areas shall be cleaned and tidied to the satisfaction of the Client and if the cleaning is not to the satisfaction of the Client, the Client shall employ professional cleaners to complete the cleaning at the Contractor's expense.

Professional contract cleaners:

The Contractor shall allow for employing a professional cleaning company to clean all the internal areas in the building where works are to be carried out. The Contractor shall employ professional contract cleaners to clean all the internal areas in the building where works are to be carried out.

The Contractor shall be responsible for the cleanliness of all areas where and surrounding access areas where works are being carried out during the construction period.

All internal areas where works are to be carried out shall be cleaned and tidied to the satisfaction of the Client and if the cleaning is not to the satisfaction of the Client, the Client shall employ their own professional cleaners to complete the cleaning at the Contractor's expense.

Internal Areas:

For all internal areas, the Contractor shall clean the rooms to ensure the rooms/areas where the Contractor was working is free from all dust and is fit for immediate use once works have been completed in the rooms.

The Contractor shall also be responsible for the removal of rubbish and decommissioned material/equipment from the building and site and providing adequate number of skips to do so.

The Contractor shall allow for the hoovering and cleaning of all floors where works are to be carried out in the building by the Contractor.

The Contractor shall allow for the following works in all internal areas where works are to be completed:

- Immediately after all builders works, decommissioning works or installations works are carried out, the Contractor shall allow for the cleaning up and making good of all floors, walls and windows to remove all dust, rubble and dirt.
- Removal of all rubbish and decommissioned material/equipment from area building and areas where works shall be completed.
- Hoovering and cleaning of all floors throughout the areas where works are to be completed.

- All debris, packing cases, excess materials, plant and materials are to be removed off the site entirely.
- All marks, scratches and minor defects are to be made good
- Decoration to be finally inspected and touched up as required
- All fittings such as electrical items, mechanical items and sanitary ware to be cleaned down completely.
- Where opes are bored through internal and external walls, the walls shall be washed down and cleaned
- All tiled surfaces are to be cleaned of all grit washed as directed and polished to manufacturer's recommendations
- All painted work is to be cleaned down and washed

External Areas:

For external areas, the Contractor shall allow for removing any debris, materials, rubbles, dust, etc. where works have been carried out to ensure the external areas where the Contractor was working is clean and is fit for immediate use once works have ended prior to opening of the building.

The Contractor is to ensure that all external areas where works have been carried out, are to be left free of all dirt and debris and builder's materials and parking of construction vehicles, etc. and the roadways are to be thoroughly cleaned as and when required.

The Contractor shall also be responsible for the removal of rubbish and decommissioned material/equipment from the rooms/areas identified and providing adequate number of skips to do so.

Co-ordination

The Contractor shall act as lead co-ordinator for the entire project i.e. all building works, electrical works, mechanical works, etc. required to complete the project.

The Contractor shall be responsible particularly for the detailed installation design and co-ordination with other services and structures for the entire installations.

The co-ordination of the builders works, electrical installations and mechanical installations shall be the sole responsibility of the Contractor.

The Contractor shall agree all methods, sequences timing and all relevant details of the works within his contract with the Employers Representative in advance and shall not deviate from this agreement unless otherwise agreed in writing with the Employers Representative.

No adjustments will be made to the contract sum where additional work is required due to poor co-ordination or where the Employer's Representative has not been informed in good time of a co-ordination difficulty that could have been resolved by a design decision had the issue and its full implications been advised to the Employer's Representative in good time. The Contractor shall liaise with all other trades when co-ordinating their works.

The Contractor is deemed to have included all costs associated with co-ordination of each service and the building fabric. These costs shall be deemed to include all necessary pipework offsets, containment offsets, re-routing, etc. No claims for additional costs shall be accepted after receipt of tenders.

Project Supervisor Construction Stage (PSCS)

The successful Tendering Contractor shall act as the Project Supervisor for Construction Stage (PSCS) and the cost to fulfill this role shall be included in the Contractors submitted tender price. The role of the PSCS is to manage and co-ordinate health and safety matters during the construction stage.

The PSCS shall be appointed by the Client/School Authority to carry out the role as PSCS for the project.

The successful Contractor is to appoint competent persons as Supervisor for the Construction Phase (PSCS) in accordance with the current Health & Safety Legislation, with particular regard to the Safety, Health and Welfare at Work (Construction) Regulations 2006 and the Health & Safety Act 2005.

The duties of the PSCS include the following:

- Advise the Client of the requirements of the Construction Regulations
- Identify hazards arising from the design or from the technical, organisational, planning or time related aspects of the project.
- Where possible, eliminate the hazards or reduce the risks, in advance & during, the construction stage (by implementing the General Principles of Prevention).
- Coordinate the implementation of the construction regulations by contractors, welfare facilities on site & safe working procedures.
- Organise the required co-operation between contractors.
- Ensure all workers have appropriate safety training, including Safe Pass & CSCS.
- Communicate necessary control measures, safety management systems and safety principles to contractors & workers.
- Cooperate with the PSDP & Design Team to ensure safety.
- Prepare a written Construction Stage Safety and Health Plan for the project, from the Preliminary/ Design Process Safety Plan.

- Coordinate the implementation of Temporary Work Certification.
- Collect & prepare information for the Safety file for the completed structure and give it to the PSDP.
- Notify the Health & Safety Authority and the client of non-compliance with any written directions issued.
- Coordinate the reporting of accidents to the HSA.

The Project Supervisor Construction Stage must notify the Health and Safety Authority of any site where:

- The construction work is planned to last longer than 30 working days; or
- The volume of construction work is scheduled to exceed 500 person-days.

A working day is any day where the construction work is carried out, even if the work is of short duration, or the day is a holiday, or over a weekend. A person day is one individual, whether they be supervisors or other employee(s), carrying out work for one normal shift.

The notice must be submitted before the commencement of work on site.

The particulars required to be notified are set out in the Approved Form AF2.

O&M manuals

General:

The Contractor shall allow for supplying and providing an Operation & Maintenance (O&M) manual for the works to be carried out in the building.

O&M Manuals:

As highlighted above, the Contractor shall provide a Class D Operating & Maintenance manual for the works carried out in the building.

The Contractor shall allow for the supply and installation of a hard and soft copy of the O&M manual to the building. For a soft copy, the Contractor shall install the O&M manual on a USB stick that shall be included in the hard copy to be handed over to the Client.

All operation and maintenance manuals along with their associated record drawings shall be prepared in accordance with the requirements of BSRIA document 1/871 Operating and Maintenance Manuals for Building Services Installations.

The manuals must therefore contain all necessary technical information on each item of equipment and the associated components which have been used to assemble and construct the system(s).

Three no. hard copies and three no. soft copies of the final approved O&M documentation will be required.

In addition, manuals for each system must contain information on the design intent of the system, commissioning and testing results and reports of how the components of the system are adjusted to achieve the design intent, line diagrams to show how the system is arranged in the building giving the location of all equipment and components, its control system, how the system must be set in the normal operating mode and in the event of any emergency, routine check that must be made and a list of spares which should be kept and a list of any special tools which may be required.

The manuals must be prepared in such a way that an Engineer without any previous knowledge of the Project may use them to operate and maintain the system.

Contents of Manual of each manual:

Each Operating and Maintenance Manual shall be specific in respect of the complete Contract Works and shall include the following sections:

- Section 1 Description
- Section 2 Plant and Engineering Systems
- Section 3 Operating and Maintenance Procedures
- Section 4 Commissioning and Testing
- Section 5 As-Built drawings

Section 1 – Description

This section shall comprise:

- A detailed description of each building services system
- General description of all plant and equipment
- Design data for the system and for each item of plant which affects the performance of the system.

Section 2 - Plant and Engineering Systems

This section shall comprise:

- Detailed technical information as published.
- Manufacturers drawings (where applicable) showing all components of the plant item with each component number in accordance with parts list.
- Parts list for each item of plant.
- Manufacturers addresses and telephone numbers.
- Complete instructions for ordering replacement parts in a manner that will prevent errors/misunderstanding including order number for plant.
- Colour coding identification schedule for each building services system.

Section 3 - Operating and Maintenance Procedures

- A step-by-step method of starting, operating and shutting down a system and how this affects other systems. The procedure for an emergency shut-down.
- A list of routine checks that should be made and frequency of the checks.
- A comprehensive schedule of routine maintenance based on Manufacturer's recommendations for items of plant etc. This program should state clearly what work should be done for each day, week, month, year or given number of hours.
- A list of tools and keys which will be required in the operation and maintenance of the systems.
- Fault finding procedures.

Section 4 - Commissioning and Test Report

The report for each system shall contain a record of all the parameters which affect the performance of the system at the time of commissioning.

The report shall be comprehensive and shall contain a record of the settings of all valves and controls and any other adjustable components so that the system may be reset to the commissioned state by reference to the report.

Presentation

- Indexing System

  Each volume shall be numbered and shall be divided into sections using an appropriate numbering system.

- Paper Sizes

  The manual will contain manufacturer's literature which will be different sizes. Large pages will be folded and small pages will be fitted in plastic pockets with a reinforced edge punched for filing in A4 lever arch files. The page size shall be standardised for all volumes using A4 paper (210 x 297mm) with four holes punched centrally in the longer side 80mm apart.

- Section Dividers

  Stiff cardboard section dividers with extended tabs shall be used; these shall be SUMMIT Ring Book Guides or equivalent.

- Files for Manual

  A4 lever arch files with rigid plastic coated covers shall be used which shall be EMGEE or equivalent. Inlaid lettering on the front cover shall indicate the title, i.e. Operating and Maintenance Manual, the Name of the Project and Volume Number.

  A label shall be fitted in the window on the spine of the file listing its contents.

Section 5 – As-built Drawings

The Contractor shall include for a complete set of as-built drawings which shall incorporate all works carried out and completed by the Contractor. All services, trunking/tray, routes and circuits within the building shall be identified on these drawings. To facilitate submission of record drawings, the Contractor shall keep on site a complete set of all drawings used on the Contract Works, on which he shall mark alterations to the designs shown thereon as such alterations are carried out.

Timescale and Working Hours

The proposed and anticipated timescale for the project is as follows:

- Anticipated Project Start Date: *Monday 1st February 2027*
- Anticipated Project Completion Date: *Friday 20th August 2027*

It will be a condition of appointment that the Contractor can meet this programme.

It is proposed that discussions on programme will be held between all parties prior to any works commencing to agree an overall programme and timescales.

The Contractor shall take this into consideration when tendering this project for all out-of-normal working hours and all costs associated with it included within their tender.

Each tendering contractor should allow fully with his tender price for sufficient resources for the safe execution of the contract for the anticipated programme as outlined above.

The project is programmed to be completed within a short timeframe and the Contractor must allow for the necessary resources to complete the works within this timeframe.

The Contractor shall be responsible to resource the project so that all works as identified on the tender drawings and specifications are completed in a safe and satisfactory manner before the proposed completion date.

In any event, the Contractor must allow for sufficient resources to complete all the works identified for the project and hand over to the client before the dates highlighted.

No additional cost will be paid for overtime working. The Contractor's Tender is deemed to include for the cost of all necessary overtime, attendances and all other expenses that may be necessary to execute and complete the works within the Contract Period.

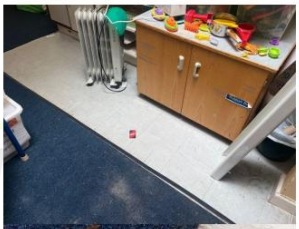
Removal of asbestos containing materials

There is asbestos in the building but it will not be disturbed or removed as part of the works. Refer to the Refurbishment Demolition Asbestos Survey (RDAS) for locations of the asbestos.

8. Asbestos Data Sheets

ASBESTOS SAFETY DATA SHEET

Survey No.	A-06147
Survey Type	RDAS
Survey Date	10/09/2026
Surveyor	Thomas Tiernan
Client Name	Galileo Energy Services
Site Address	RATOATH JUNIOR NATIONAL SCHOOL FAIRYHOUSE ROAD RATOATH CO MEATH
Location	Ground Floor Classroom 10 (005) - Vft/wb
Sample Range	S004
Extent	6 m²





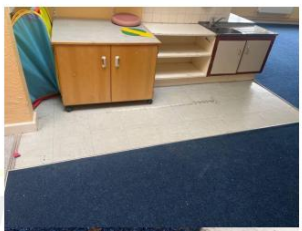
MATERIAL ASSESSMENT ALGORITHM

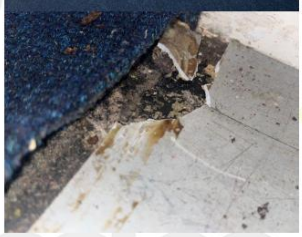
Product type	Vinyl Floor Tiles with Bitumen	Score	1
Extent of damage/deterioration	Good condition	Score	0
Surface treatment	Composite	Score	0
Asbestos type	Chrysotile	Score	1
		Total	**2**

RECOMMENDATIONS	Remove if likely to be disturbed by works

ASBESTOS SAFETY DATA SHEET

Survey No.	A-06147
Survey Type	RDAS
Survey Date	10/09/2026
Surveyor	Thomas Tiernan
Client Name	Galileo Energy Services
Site Address	RATOATH JUNIOR NATIONAL SCHOOL FAIRYHOUSE ROAD RATOATH CO MEATH
Location	Ground Floor Classroom 9 (006) - Vft/wb
Sample Range	X004
Extent	6 m²





MATERIAL ASSESSMENT ALGORITHM

Product type	Vinyl Floor Tiles with Bitumen	Score	1
Extent of damage/deterioration	Good condition	Score	0
Surface treatment	Composite	Score	0
Asbestos type	Chrysotile	Score	1
		Total	**2**

RECOMMENDATIONS	Remove if likely to be disturbed by works

(4 -) BUILDING FINISHES

General

The Contractor shall be responsible for all building finishes works and shall ensure that the full price for this work is included in the tender price. The Contractor shall employ suitably qualified personnel to carry out all necessary building finishes for this project. The Contractor shall ensure that the full price for this work is included in the tender price.

This section of the specification outlines the building finishes installation and describes the particular requirements of the building finishes to be installed. This section is intended to be read in conjunction with all other technical and non-technical sections of the specification and with the tender drawings. Where this section is at variance with any other sections of the tender documents, the tenderer shall obtain clarification from the Employers Representative before tendering. Failure to do so will be deemed to imply that the most onerous requirements have been included for.

A number of building finishes shall be carried out to the School as indicated on the drawings and the Contractor shall include for these works.

42.01 Wall Finishes Internally

The Contractor shall repair a masonry internal wall within the corridor at the entrance to the gym 2900mm long by 3650mm high.

The Scope of Works are as follows:

- Removal of loose, hollow, damp, or blown plaster/paint back to a solid substrate (masonry backing or sound plasterboard).
- Surface stabilization, priming, and joint/crack reinforcement.
- Application of a two-coat gypsum finish skim (2–3 mm total thickness).
- Controlled drying, light sanding, and a full multi-stage paint finish (mist coat + top coats



43.01 New floor covering finishing in the Computer Room

General:

New floor covering shall be installed in the computer room as indicated on the drawings. The floor area of the computer room is 56.5m^2.

The existing floor in the computer room where new floor covering is to be installed is in poor condition. The Contractor shall allow for removing the existing carpet flooring and associated underlay and installing the new 50cm X 50cm moduler modular carpet flooring covering in its place.

Works:

The Contractor shall allow for supplying and installing a new 50cm X 50cm modular modular carpet flooring in the computer room as indicated on the drawings.

The Contractor shall allow for the following in each room:

1. Thoroughly clean the existing floor in each room and preparing the floor as identified under 'Base Preparation' below.

2. Apply moisture barrier/damp proof membrane (DPC) throughout the existing floor in each room as identified under 'Levelling Compound' in below. Floor supplier to advise type of moisture barrier/damp proof membrane (DPC).

3. Apply levelling compound /screed throughout the existing floor as identified under 'Levelling Compound'. Floor supplier to advise type of levelling compound.

4. Backing System: Avoid traditional bitumen backing where possible. Specify modified bitumen, polyurethane, or eco-cushion backings that are 100% PVC-free, provide enhanced underfoot comfort, and contribute further to sound absorption.

5. Lay new floor covering using adhesive to manufacturer's recommendations.

(6-) ELECTRICAL WORKS

GENERAL

The Contractor shall be responsible for all electrical works as identified on the drawings. The Contractor shall employ a suitably qualified Electrical Contractor to carry out all necessary electrical works identified for this project. The Contractor shall employ a suitably qualified electrical contractor (RECI qualified and a member of the ECSSA) to carry out all necessary electrical work. The Contractor shall ensure that the full price for this work is included in the tender price.

This section of the specification outlines the electrical services installation and describes the particular requirements of the electrical services to be installed and the works carried out. This section is intended to be read in conjunction with all other technical and non-technical sections of the specification and with the tender drawings. Where this section is at variance with any other sections of the tender documents, the tenderer shall obtain clarification from the Employers Representative before tendering. Failure to do so will be deemed to imply that the most onerous requirements have been included for.

60.0 ELECTRICAL SITE SERVICES

60.01 Main earth electrode and earth pit

General:

An earth pit and main earth electrode shall be installed in the external ground beside the location of the new main-distribution electrical board (NMDB.02) for the building. The new main electrical board is located in the Main Junior School Building as indicated on the drawings .

See detail on drawing 60(E001) for the main earth electrode and earth pit. Size of cable required is highlighted on the electrical schematic drawing 61(E001). Allow for the supply and installation of the main earth electrode and the earth pit.

The Contractor shall allow for the supply and installation of the main earth electrode and the earth pit.

At least 1 no. copper or galvanised iron earth electrode shall be driven vertically at least 1800mm underground, outside the building, adjacent to the new electrical board. See detail on site services drawing for further information.

The earth lead shall be connected to the electrode by means of a substantial non-ferrous clamp to B.S. 951, which shall be protected against corrosion by denso tape. The resistance between any metals to the earth and the main earthing terminal shall not exceed 0.5 ohms. Sufficient electrodes spaced 3600 mm apart shall be used to obtain a satisfactory earth.

Trenching and underground ducting:

All trenching and underground uPVC ducting required for the new underground earth cable shall be completed by the Contractor as part of these works. The Contractor shall allow for all attendances, labour, materials, etc. in excavating the underground trench and supply of the necessary uPVC ducting in the trench. Include for draw wires in the ducting so that cables can be pulled through the ducts at a later stage.

See detail on drawing 60(E001) for information on the existing underground ducting for the earth rod and the trench for the earth cable.

The Contractor shall allow for all attendances, labour, materials, etc. in installing the cable in the underground trench in the existing ducting and shall provide all cable supports and cable glands necessary for correct installation and termination of the cables.

60.02 New sub-mains cabling installed in underground duct between the new main electrical board in the ESB External Store Room and the new main distribution electrical board in the main building

General:

As highlighted in section 62.0, 7no new distribution electrical boards shall be installed in the main building (1no. main distribution board and 6no. sub distribution boards) to cater for the electrical supplies in the main building.

The main distribution board in the main school building shall be supplied by a sub mains cable from the main distribution board in the External ESB Store Room. This cabling shall be installed in an existing underground duct which shall also be reused by the Contractor as part of these works.

Refer to the site services drawing 60(E001) for further information on routes and layout of the existing underground ducting installed between the External ESB Store Room to the Main School Building for the new underground sub-mains cable. Refer to drawings for routes and locations of equipment.

From the main distribution board in the main school building the 6no. sub distribution boards, the Contractor will need to install sub-mains cabling between the main board and the 6no. sub-distribution boards throughout the building.

The Contractor shall allow for the supply and installation of this sub-mains cable as specified in section 62.12.

See electrical schematic on drawing 61(E001) for details on the electrical boards and the sub-mains cabling required.

Existing underground ducting:

See detail on drawing 60(E001) for information on the existing ducting to be reused for the underground cabling.

The Contractor shall allow for all attendances, labour, materials, etc. in installing the cable in the existing underground ducting and shall provide all cable supports and cable glands necessary for correct installation and termination of the cables.

61.0 ELECTRICITY CENTRE

Refer to section 62.0 below.

62.0 POWER DISTRIBUTION SERVICES

62.01 Decommissioning of the existing power and general services installation throughout the main building

The Contractor shall allow for the decommissioning and removal of the existing power and general services installation throughout the main building. This includes all electrical boards, sockets, spurs, cabling, isolators, etc. throughout the main building. Refer to the drawings for further information.

A new power and general services installation shall be installed throughout the main building as indicated on the drawings apart from the ASD area where the general services fitting, sockets, spurs shall be retained but re-wired from the new SDB-06.

62.02 Decommissioning of the existing sub-distribution electrical boards throughout the main building

As indicated in 62.01 above, the existing power and general services installation throughout the main building (apart from the areas as indicated on the drawings) shall be decommissioned and removed.

As part of these decommissioning works, the Contractor shall also allow for the decommissioning and removal of the 5no. existing sub-distribution electrical boards in the main building.

New electrical boards shall be installed in the main building as indicated on the drawings.

62.03 Detailed survey of the existing sub-electrical boards in the main building and electrical installation in the building

In the main building where the existing power and general services installation is to be decommissioned and removed, there are five existing sub-distribution electrical boards. The existing sub distribution board for the new ovens shall be retained. Before the existing electrical boards and the existing power and general services installation in the main building is decommissioned and removed, the Contractor shall carry out a detailed survey of the existing sub-distribution electrical boards and the existing electrical installation throughout the main building. On this survey, the Contractor shall complete the following works:

- Note the locations of all existing wiring, sub-mains cabling, etc. to and from the five sub-distribution boards in the building.

- Carry out a load test on the five existing sub-distribution boards in the building to see what electrical load each board is pulling.
- For each board, measure the total load per phase by means of load monitor for one week continuous.
- Note the quantity of circuit breakers, MCB's, RCB's, switch fuses, etc. in the existing sub-distribution electrical boards.
- Carry out a survey on the existing electrical installation in the main building to ensure all electrical supplies are accounted for in the new electrical boards and the new installation.
- Identify the best location for the sub-distribution electrical boards in the location as indicated on the drawing.
- Any other works deemed necessary

The existing sub distribution board for the new ovens shall be retained as indicated on the drawings.



62.04 New sub-distribution electrical boards

General:

As indicated in Section 62.02 above, the 5no. existing sub-distribution electrical boards in the main building shall be decommissioned, stripped out and removed from site.

In replacement, 6no new sub-distribution electrical boards shall be supplied and installed in the main building in the locations as indicated. Refer to the electrical schematic drawing 61(E001) for details on the new sub-distribution electrical boards to be supplied and installed by the Contractor in the main building.

New sub-distribution electrical boards (6no):

In total, there are six new sub-distribution electrical boards to be supplied and installed in the main building as part of the electrical upgrading works. Refer to the electrical schematic and electrical drawings for locations, quantities, details, etc. of the two sub-distribution electrical boards to be supplied and installed in the main building.

The Contractor shall allow for the supply, installation and wiring of the six new sub-distribution electrical boards in the main building as indicated on the drawings.

The Contractor shall supply, install, connect, test and commission all the new sub-distribution electrical boards in the main building in the locations as indicated on the drawing. Refer to the electrical schematic drawing for details on the new sub-distribution electrical boards to be supplied and installed.

The assembly of the new sub-distribution electrical boards shall adhere to the following specifications and shall have the following specifications:

- Wall mounted.
- The protection rating of the enclosure shall be minimum IP40 in accordance with IEC144.
- Board shall be supplied with a moulded case circuit breaker incomer.
- Sheet steel cubicle with MCCB type cubical construction. The enclosure framework shall be of sheet steel construction, minimum of 2.5mm thickness, sprayed and stove enamelled. Doors and panels shall also be of sheet steel construction and be 1.5mm minimum thickness.
- The protection rating of the enclosure shall be minimum IP40 in accordance with IEC144.
- Board shall be supplied with a moulded case circuit breaker incomer.
- Type tested assembly.

- 630A rated busbar.
- The board shall be extensible at both ends and shall be of MCCB type wall mounted cubical construction.
- All panel sections providing direct access to live assemblies shall be openable only with a special tool.
- All panel sections accessing shrouded MCBs shall be provided with a handle for opening.
- The board shall be manufactured to 'Form 2A' separation in accordance with IS EN 60439.
- The board shall be compliant with I.S. 10101:2020.
- Shall be suitable for a voltage of 630/230V (3 phase)
- Electronic surge protection shall be provided on the incoming mains as detailed in item '62.09'.

The Contractor shall provide with his tender the manufacturer's name and the overall dimensions of the new sub-distribution electrical boards they propose to supply and install. Detailed schematics shall be approved by Employer's Representative, prior to ordering of boards.

The Contractor shall not make site alterations unless authorised by the Employer's Representative. Where site modifications to assemblies are authorised, they are to be carried out in accordance with manufacturer's certified drawings and instructions. Ensure that modifications made comply with type test certificate obtained for arrangement of components.

Site visit and survey by the Contractors proposed boards manufacturer:

The manufacturer of the new sub-distribution electrical boards will need to visit the site with the Contractor to survey the proposed location and layout of each new sub-distribution electrical board. As highlighted in Section 62.03 above, the Contractor is to carry out a detailed survey of the electrical installation in the building and this shall be carried out in conjunction with the Contractors proposed board manufacturer.

The new sub-distribution electrical boards shall be installed in the building as indicated on the drawings.

The space for each electrical board is restricted so the dimensions and location of each board will need to be discussed in detail between the Contractor and their board manufacturer before proceeding to the making of each electrical board.

Testing of the new electrical boards:

The new electrical boards shall go through a rigorous pre-test check list and a thorough testing procedure to ensure that the product reaches the expected standards and safety expected.

Test certificates shall be completed for all switchgear involved in this project and shall be signed off by both the switchboard technician that built the switchboard and the test engineer before final signoff by the director of the company.

All test certification, copies of test sheets records and results associated with this project shall be submitted both in hard copy to form part of the O&M manual and electronic copy

Miniature Circuit Breakers (MCB's):

The Contractor shall supply, install, connect, test and commission all the main circuit breakers as indicated for the new sub-distribution electrical boards.

All circuit breakers shall generally by 'Type B' rated to at least 10kA, unless highlighted otherwise. They shall conform to BS 3871 Part 1 and be of the sizes indicated in the drawings or accompanying schedules and be suitable for DIN rail mounting.

Where the prospective short circuit current exceeds the breaking capacity of the circuit breaker, back up protection by means of fuses shall be provided in accordance with Manufacturer's Recommendations.

Where possible, circuit breakers shall be of plug-in type, to allow replacement without undue difficulty.

Circuit breakers shall be Type B, C and D to ISEN60898 to the following table:

MCB'S SHALL BE TYPE B,C,D TO ISEN 60898 TO THE FOLLOWING TABLE

TYPE	INSTANTANEOUS TRIP CURRENT	APPLICATION
B	5 x In	RESISTIVE LOADS
C	10 x In	DISCHARGE LIGHTING, SMALL MOTORS ETC.
D	20 x In	LARGE INDUCTIVE LOADS, LARGE MOTORS, WELDING PLANT, ETC.

NOTE: SIZES OF EARTHS TO CONFORM WITH THE FOLLOWING TABLE.

CROSS SECTIONAL AREA OF CONDUCTOR. S sqmm	CROSS SECTIONAL AREA OF CORRESPONDING PROTECTIVE CONDUCTOR.
S < 16	S
16 < S < 35	16
S > 35	0.5S

Residual Current Breakers with Over-Current (RCBO's):

The Contractor shall supply, install, connect, test and commission all the RCBO's as indicated for the new sub-distribution electrical boards.

Combined MCB/RCD units shall be of the same manufacturer as the MCB's as identified above. They shall be double pole operated and protect against, overload, short circuit and earth leakage currents.

The RCD shall be electro-magnetically operated and comply with all relevant sections of BS 4293 and BS 3871. RCD's shall operate at 30mA.

Moulded Case Circuit Breaker (MCCB's):

The Contractor shall supply, install, connect, test and commission all the moulded case circuit breakers as indicated for the new sub-distribution electrical boards.

MCCBs shall comply fully with IS EN 60947-2:2006 or equal and approved. The internal trip unit for the Main Incomer shall be electronic. Their contacts shall be capable of inspection.

When used as a main incoming device, MCCB's shall have a rated prospective short circuit current of not less than 40 kA at a power factor of 0.2, the internal

trip unit for the Main Incomer shall be electronic and shall be tested to P2 category IEC157-1.

Load Break Switches

The Contractor shall supply, install, connect, test and commission all the load break switches as indicated for the new sub-distribution electrical boards.

Load break switches shall be of the rotary air-break type and shall comply fully with IEC 408 or equal and approved.

Their prospective short circuit current rating shall be adequate for their duty. (For guidance see below) They shall have on/off indication and be complete with door interlock to prevent inadvertent contact with live parts and must be lockable in the off position.

- Switch Current Rating (Rated Current)
- Symmetrical Withstand
- Current (RMS – 1s)
- Up to 63 Amp 2.5kA
- Up to 100 Amp 4.0kA
- Up to 160 Amp 9.0kA
- Up to 250 Amp 13.0kA
- Up to 400 Amp 13.0kA

Contactors:

Contactors shall comply fully with IEC158-1 or equal and approved.

They shall be rated for AC3 Category and shall have at least 1 N/O and 1 N/C spare auxiliary contacts.

Motor Starters:

Starters shall comply fully with IEC292-1 or equal and approved.

They shall incorporate the following protection features: -

- Thermally delayed over-current release on all poles set to trip at 120% full load in two hours and incorporating temperature compensation.
- Positive protection against single phasing in the form of an extra differential tripping bar or similar approved device.
- Manual reset with protection against premature re-closing.

Push Buttons and Control Switches:

Push buttons shall be in accordance with IEC337 and IEC144 and have a protection rating of IP65.

They shall be colour coded as follows:

- Start/On -Green.
- Stop/Off -Red.
- Reset -Yellow/Black.

Pilot Lights and Indicators:

Pilot lights shall be LED Type and in accordance with IEC337 and IEC144 and have a protection rating of IP65. Their maximum Voltage shall be 230V Volt but where possible they shall be of either 110 Volt or 24Volt, as specified. Neon indicators shall not be used.

Pilot lights shall either be of LED, Transformer type or Series Resistor type.

Time Switches:

Time switches shall be digital 7-day, 24-hour type, complete with day omission and 36 hour spring reserve.

Instrumentation:

Instruments shall be provided where indicated and shall comply with IEC473 in all respects. They shall be of minimum 96mm x 96mm unless agreed otherwise with the Engineer and contain a modbus communication module.

Instrument Transformers shall comply in terms of rated Current, rated Voltage, limits of error etc., with VDE 0414 and IEC 185.

Terminals:

Terminals shall be provided at top or bottom of cubicle as specified and shall comply with IEC 61032:1997.

All items of equipment shall be wired to these terminals and they shall be capable of accepting the incoming cable sizes as specified. They shall be of PVC grade and be identified by means of terminal numbers. The Manufacturer shall provide a terminal list, or numbered Drawing.

Push-in type terminals are not acceptable.

Labelling:

All MCCB's, circuits and devices shall be provided with engraved plastic circuit labels. 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.

Labels shall be provided on all chambers inside and outside the panel, indicating the function of every item. Labels shall be 'Traffolyte', black on white, screw on type, and shall be subject to the Engineer's approval.

Every control centre sub-circuit shall be labelled to indicate its function and rating and shall be suitably indicated on heat sealed chart.

Construction:

Busbars - To be manufactured from HDHC Copper and housed in separate compartments. Secondary busbars are considered a part of the main busbar system. All busbars shall have bolted joints. Phase and neutral busbars shall be fully rated throughout the length of the assembly.

Connections - To be HDHC Copper.

The structure is to be manufactured from sheet steel formed or folded to give an inherently rigid design.

Fuse Switches, MCCBs, Motor Starters and similar devices shall be designed on a common modular dimension and shall be dimensionally interchangeable.
Segregation shall be provided between devices.

Finish - All main steelwork to be epoxy powder finish. Nuts, bolts and fasteners to have zinc plated finish. Main steelwork to be finished Light Grey (or otherwise approved).

Earthing:

Earth Continuity - The main structure together with devices shall be provided with earth continuity in the form of copper bonding tape or cable connected to the earth busbar. Earth Busbar - A copper shall run the length of the FBA.

A main HDHC Earth Busbar shall run the full length of the switchboard and all metalwork shall be bonded to this. Doors shall be bonded by 1.5 sq.mm cross section minimum size flexible cable.

The size of the busbars shall be in accordance with the Switchgear COP and I.S. 10101:2020.

New Incoming and Outgoing Sub-Mains Cables:

The Contractor shall supply, install, connect, test and commission the new incoming and outgoing sub-mains cabling to and from the new sub-distribution electrical boards as indicated.

Refer to the electrical schematic for details and sizes on all sub-mains cabling. Refer to the electrical drawings for lengths required and proposed routes of all sub-mains cabling.

Digital electrical check meter:

An electricity check meter shall be installed in the each sub-distribution electrical board as indicated on the electrical schematic drawing. This meter shall be digital and shall be supplied and installed as part of the electrical board.

The Contractor and his/her board supplier shall include for all provisions in respect of the above, whether explicitly stated or not, regarding connection of meter and no claims for extras, resulting from a lack of sufficient information at tender stage, will be entertained at a later date.

Meters shall be as PowerLogic PM5000 series, or equivalent.



The digital meter shall have the following functions and capabilities:

- Three phases, neutral and ground to be monitored simultaneously.
- Power quality measurements.
- Data recording.
- Graphical display, menus.
- Text in 8 selectable languages.
- Highly accurate devices with global billing certifications.
- IP52 front display.

- Single 96 x 96 mm unit.
- large characters and powerful backlighting.
- Easy to understand

Connection to the new main distribution electrical board in the corridor:

All new sub-distribution electrical boards in the main building shall be supplied and fed from the new main distribution electrical board for the Junior School building which shall be installed in the corridor as indicated on the drawings.

62.05 Existing main electrical distribution board in the ESB External Store Room

General:

Currently, the Junior School building and the Senior School building are supplied by a shared ESB meter and shared main distribution electrical board. The existing ESB meter and main distribution electrical board for both schools are located in the ESB External Store Room.

As part of these works, it is proposed to split that existing ESB supply and install a dedicated ESB meter for each School building so there will now be two ESB meters in the ESB Extenal Store Room; one ESB meter for the Junior School and one ESB meter for the Senior School.

A new ESB meter shall be installed in the ESB External Store Room and this new meter shall be a dedicated ESB meter for the Junior School. The existing ESB meter that is currently there shall then become the dedicated ESB meter for the Senior School.

As a result of installing a new dedicated ESB Meter for the Junior School, a new main distribution electrical board will need to be installed in the ESB External Store Room for the Junior School. Refer to section 62.06 for further details.

Existing main electrical board and ESB Meter:

Once the new ESB Meter and new main distribution electrical board is installed for the Junior School, the existing ESB Meter and existing main distribution electrical board in the ESB External Store Room shall then become the dedicated ESB Meter and main board for the Senior School.

Survey:

The Contractor shall carry include for a detailed survey of the existing main distribution electrical board in the ESB External Store Room and altering works are carried out to the existing ESB supply and existing main board. On this survey, the Contractor shall complete the following works:

- Note the locations of all existing wiring, sub-mains cabling, etc. to and from the board.
- Distinguish the services that are serving the Junior school and which ones are serving the Senior School.
- Any other works deemed necessary.

Re-routing sub-mains cabling from the existing main distribution electrical board to the new main distribution electrical board for the Junior School:

As the existing main distribution electrical board in the ESB External Store Room was a shared main electrical board for the Junior School and the Senior School, some existing sub-mains cabling will need to be disconnected from the existing main electrical board (which will become the Senior Schools main electrical board) and shall be reconnected to the new main distribution electrical board for the Junior School building.

The Contractor shall allow for moving and re-routing the following items and subsequent sub-mains cabling from the existing main distribution electrical board to the new main distribution electrical board for the Junior School:

- Existing sub-mains cabling for the main building.
- Existing sub-mains cabling for the existing sub-distribution electrical board in the ESB room for power supply to CCTV mounted on the External ESB Store.
- Existing sub-mains cabling for the existing electrical board for the external lighting in the ESB room.

Refer to section 62.13 below for further information.

62.06 New main distribution metering electrical board (NMDB.01) to be installed in the External ESB Store for the Junior School and the Senior School

General:

As indicated in 62.05, new dedicated ESB meters and subsequent main electrical metering board shall be supplied and installed in the External ESB Store for the Junior School and Senior School.

The new main distribution electrical board (NMDB.01) shall be supplied and installed by the Contractor in the ESB room in the External ESB Store in the location as indicated on the drawings.

The Contractor shall allow for the supply, installation and wiring of the new main distribution metering electrical board to house the ESB meters for the Junior School and Senior School as indicated on the drawings.

Refer to the electrical schematic drawing for details on the new main distribution electrical board to be supplied and installed by the Contractor in the External ESB Store for the Junior School.

New main-distribution electrical metering board (NMDB.01):

The Contractor shall supply, install, connect, test and commission a new main distribution electrical metering board in the ESB room for the Junior School and the Senior School. Refer to the electrical schematic drawing for details on the new main distribution electrical metering board to be supplied and installed.

The assembly of the new main distribution electrical board shall adhere to the following specifications and shall have the following specifications:

- Floor mounted.
- Sheet steel cubicle with MCCB type cubical construction. The enclosure framework shall be of sheet steel construction, minimum of 2.5mm thickness, sprayed and stove enamelled. Doors and panels shall also be of sheet steel construction and be 1.5mm minimum thickness.
- The protection rating of the enclosure shall be minimum IP40 in accordance with IEC144.
- Board shall be supplied with a moulded case circuit breaker incomer.
- Type tested assembly
- 630A rated busbar
- The board shall be extensible at both ends and shall be of MCCB type wall mounted cubical construction.

- All panel sections providing direct access to live assemblies shall be openable only with a special tool
- All panel sections accessing shrouded MCBs shall be provided with a handle for opening.
- The board shall be manufactured to 'Form 4A (Type 1)' separation in accordance with IS EN 60439.
- The board shall be compliant with I.S. 10101:2020.
- Shall be suitable for a voltage of 630/230V (3 phase)
- Electronic surge protection shall be provided on the incoming mains as detailed in item '62.09'.

The Contractor shall not make site alterations unless authorised by the Employer's Representative. Where site modifications to assemblies are authorised, they are to be carried out in accordance with manufacturer's certified drawings and instructions. Ensure that modifications made comply with type test certificate obtained for arrangement of components.

Site visit and survey by the Contractors proposed board manufacturer:

The manufacturer of the new main distribution electrical board will need to visit the site with the Contractor to survey the proposed location and layout of the new main distribution electrical board.

As highlighted in Section 62.05 above, the Contractor is to carry out a detailed survey of the existing main distribution electrical board and this shall be carried out in conjunction with the Contractor's proposed board manufacturer.

A site visit and survey by the board manufacturer is required as they will advise on the specific arrangement and layout of the new main distribution electrical board.

Location:

The new main distribution electrical board shall be installed in the External ESB Store in the location as indicated on the drawings. The space is restricted so the dimensions and location of the board will need to be discussed in detail between the Contractor and their board manufacturer.

ESB meter:

Currently, the Junior School building and the Senior School building are supplied by a shared ESB meter and shared main distribution electrical board. The existing ESB meter and main distribution electrical board for both schools are located in the External ESB Store as indicated on the drawings.

As part of these works, it is proposed to split that existing ESB supply and install a dedicated ESB meter for each School building so there will now be two ESB meters in the External ESB Store; one ESB meter for the Junior School and one ESB meter for the Senior School.

A new ESB meter shall be installed beside the existing ESB meter in the External ESB Store and this new meter shall be a dedicated ESB meter for the Junior School. The existing ESB meter that is currently there shall then become the dedicated ESB meter for the Senior School.

As a result of installing a new dedicated ESB Meter for the Junior School, a new main distribution electrical board will need to be installed in the Externsl ESB Store for the Junior School. Refer to section 62.06 for further details.

The new ESB meter for the Junior School building shall be installed remotely from the new main distribution electrical board for the Junior School building. The new ESB meter will therefore need to be cabled back and wired back to the new main electrical board.

Refer to electrical schematic on the size and type of sub-mains cable to be installed between the new dedicated ESB meter for the Junior School and new main distribution electrical board for the Junior School.

The Contractor shall include for all provisions in respect of the above, whether explicitly stated or not, regarding sealable chambers and trunkings for ESB, meters, cabling, etc. and no claims for extras, resulting from lack of sufficient information at tender stage, will be entertained at a later date.

ESB Networks will require a number of items to be completed so the Contractor shall allow for completing the following:

- Obtaining the ESB's approval on the the ESB meter location.
- Supply and installation of approximately 10metres of 50mm x 50mm galvanised steel trunking for ESB cabling.

Testing of new electrical board:

The new electrical board shall go through a rigorous pre-test check list and a thorough testing procedure to ensure that the product reaches the expected standards and safety expected.

Test certificates shall be completed for all switchgear involved in this project and shall be signed off by both the switchboard technician that built the switchboard and the test engineer before final signoff by the director of the company.

All test certification, copies of test sheets records and results associated with this project shall be submitted both in hard copy to form part of the O&M manual and electronic copy.

New Supply Cables:

The Contractor shall supply, install, connect, test and commission the new supply cables from the board.

Cables shall be XLPE/EPR and of the size indicated on the drawings. The Contractor shall provide all cable supports and cable glands necessary for correct installation and termination of the cables.

A separate CPC shall be installed with every sub-mains feed and should be of the size detailed in the distribution drawings. The amour of the cable should also be bonded at both ends to the distribution equipment by means of a nut and bolt through a tab linked to the earth bar.

New Incoming Supply Cables:

The Contractor shall supply, install, connect, test and commission the new incoming supply cables from the new sub-distribution boards, etc. to the new main distribution electrical board as indicated on the drawings.

Cables shall be XLPE/EPR and of the size indicated on the drawings. The Contractor shall provide all cable supports and cable glands necessary for correct installation and termination of the cables.

A separate CPC shall be installed with every new sub-mains feed and should be of the size detailed in the distribution drawings. The amour of the cable should also be bonded at both ends to the distribution equipment by means of a nut and bolt through a tab linked to the earth bar.

New Incoming and Outgoing Sub-Mains Cables:

The Contractor shall supply, install, connect, test and commission the new incoming and outgoing sub-mains cabling to and from the new main-distribution electrical board as indicated.

Refer to the electrical schematic for details and sizes on all sub-mains cabling. Refer to the electrical drawings for lengths required and proposed routes of all sub-mains cabling.

Miniature Circuit Breakers (MCB's):

The Contractor shall supply, install, connect, test and commission all the main circuit breakers as indicated for the new electrical board.

All circuit breakers shall generally by Type B rated to at least 10kA, unless highlighted otherwise.
They shall conform to BS 3871 Part 1 and be of the sizes indicated in the drawings or accompanying schedules and be suitable for DIN rail mounting.

Circuit breakers shall be Type B, C and D to ISEN60898 to the following table:

MCB'S SHALL BE TYPE B,C,D TO ISEN 60898 TO THE FOLLOWING TABLE

TYPE	INSTANTANEOUS TRIP CURRENT	APPLICATION
B	5 x In	RESISTIVE LOADS
C	10 x In	DISCHARGE LIGHTING, SMALL MOTORS ETC.
D	20 x In	LARGE INDUCTIVE LOADS, LARGE MOTORS, WELDING PLANT, ETC.

NOTE: SIZES OF EARTHS TO CONFORM WITH THE FOLLOWING TABLE.

CROSS SECTIONAL AREA OF CONDUCTOR. S sqmm	CROSS SECTIONAL AREA OF CORRESPONDING PROTECTIVE CONDUCTOR.
S < 16	S
16 < S < 35	16
S > 35	0.5S

Where the prospective short circuit current exceeds the breaking capacity of the circuit breaker, back up protection by means of fuses shall be provided in accordance with Manufacturer's Recommendations.

Where possible, circuit breakers shall be of plug-in type, to allow replacement without undue difficulty.

Residual Current Breakers with Over-Current (RCBO's):

The Contractor shall supply, install, connect, test and commission all the RCBO's as indicated for the new electrical board.

Combined MCB/RCD units shall be of the same manufacturer as the MCB's as identified above. They shall be double pole operated and protect against, overload, short circuit and earth leakage currents. The RCBO shall be electro-magnetically operated and comply with all relevant sections of BS 4293 and BS 3871. RCBO's shall operate at 30mA.

Moulded Case Circuit Breaker (MCCB's):

The Contractor shall supply, install, connect, test and commission all the moulded case circuit breakers as indicated for the new electrical board. MCCBs shall comply fully with IS EN 60947-2:2006 or equal and approved. The internal trip unit for the Main Incomer shall be electronic. Their contacts shall be capable of inspection.
When used as a main incoming device, MCCB's shall have a rated prospective short circuit current of not less than 40 kA at a power factor of 0.2, the internal trip unit for the Main Incomer shall be electronic and shall be tested to P2 category IEC157-1.

Load Break Switches

The Contractor shall supply, install, connect, test and commission all the load break switches as indicated for the new electrical board. Load break switches shall be of the rotary air-break type and shall comply fully with IEC 408 or equal and approved.

Their prospective short circuit current rating shall be adequate for their duty. (For guidance see below) They shall have on/off indication and be complete with door interlock to prevent inadvertent contact with live parts and must be lockable in the off position.

- Switch Current Rating (Rated Current)
- Symmetrical Withstand
- Current (RMS – 1s)
- Up to 63 Amp 2.5kA
- Up to 100 Amp 4.0kA
- Up to 160 Amp 9.0kA
- Up to 250 Amp 13.0kA
- Up to 400 Amp 13.0kA

Contactors:

Contactors shall comply fully with IEC158-1 or equal and approved.

They shall be rated for AC3 Category and shall have at least 1 N/O and 1 N/C spare auxiliary contacts.

Motor Starters:

Starters shall comply fully with IEC292-1 or equal and approved. They shall incorporate the following protection features: -

- Thermally delayed over-current release on all poles set to trip at 120% full load in two hours and incorporating temperature compensation
- Positive protection against single phasing in the form of an extra differential tripping bar or similar approved device
- Manual reset with protection against premature re-closing.

Push Buttons and Control Switches:

Push buttons shall be in accordance with IEC337 and IEC144 and have a protection rating of IP65. They shall be colour coded as follows:

- Start/On -Green
- Stop/Off -Red
- Reset -Yellow/Black

Pilot Lights and Indicators:

Pilot lights shall be LED Type and in accordance with IEC337 and IEC144 and have a protection rating of IP65. Their maximum Voltage shall be 230V Volt but where possible they shall be of either 110 Volt or 24Volt, as specified. Neon indicators shall not be used.

Pilot lights shall either be of LED, Transformer type or Series Resistor type.

Time Switches:

Time switches shall be digital 7-day, 24-hour type, complete with day omission and 36 hour spring reserve.

Instrumentation:

Instruments shall be provided where indicated and shall comply with IEC473 in all respects.

They shall be of minimum 96mm x 96mm unless agreed otherwise with the Engineer and contain a modbus communication modual. Instrument Transformers shall comply in terms of rated Current, rated Voltage, limits of error etc., with VDE 0414 and IEC 185.

Terminals:

Terminals shall be provided at top or bottom of cubicle as specified and shall comply with IEC 61032:1997.

All items of equipment shall be wired to these terminals and they shall be capable of accepting the incoming cable sizes as specified. They shall be of PVC grade and be identified by means of terminal numbers.

The Manufacturer shall provide a terminal list, or numbered Drawing. Push-in type terminals are not acceptable.

Labelling:

All MCCB's, circuits and devices in the new electrical board shall be provided with engraved plastic circuit labels.

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.

Labels shall be provided on all chambers inside and outside the panel, indicating the function of every item. Labels shall be 'Traffolyte', black on white, screw on type, and shall be subject to the Engineer's approval.

Every control centre sub-circuit shall be labelled to indicate its function and rating and shall be suitably indicated on heat sealed chart.

Construction:

Busbars - To be manufactured from HDHC Copper and housed in separate compartments. Secondary busbars are considered a part of the main busbar system. All busbars shall have bolted joints. Phase and neutral busbars shall be fully rated throughout the length of the assembly.

Connections - To be HDHC Copper.

The structure is to be manufactured from sheet steel formed or folded to give an inherently rigid design.

Fuse Switches, MCCBs, Motor Starters and similar devices shall be designed on a common modular dimension and shall be dimensionally interchangeable.
Segregation shall be provided between devices.
Finish - All main steelwork to be epoxy powder finish. Nuts, bolts and fasteners to have zinc plated finish. Main steelwork to be finished Light Grey (or otherwise approved).

Cabling:

Glands and Sockets - To be provided by the installation Contractor and not by the switchgear manufacturer. Gland plates which shall be provided by the switchgear supplier, to be steel for multi-core cables and brass for single-core cables.

Load cables to ESB whole current meters or CT's must be of stranded copper conductor and not multi-stranded flexible cable.

If multi-stranded flexible cables must be used they must be fitted with suitable copper ferrules.

Earthing:

Earth Continuity - The main structure together with devices shall be provided with earth continuity in the form of copper bonding tape or cable connected to the earth busbar. Earth Busbar - A copper shall run the length of the FBA.

A main HDHC Earth Busbar shall run the full length of the switchboard and all metalwork shall be bonded to this. Doors shall be bonded by 1.5 sq.mm cross section minimum size flexible cable.

The size of the busbars shall be in accordance with the Switchgear COP and ETCI Wiring Regulations.

Digital electrical check meter:

An electricity check meter shall be installed in the new main distribution electrical board for the building as indicated on the electrical schematic drawing. This meter shall be digital and shall be supplied and installed as part of the electrical board.

The Contractor and his/her board supplier shall include for all provisions in respect of the above, whether explicitly stated or not, regarding connection of meter and no claims for extras, resulting from a lack of sufficient information at tender stage, will be entertained at a later date.

Meters shall be as PowerLogic PM5000 series, or equivalent.



The digital meter shall have the following functions and capabilities:

- Three phases, neutral and ground to be monitored simultaneously.
- Power quality measurements.
- Data recording.
- Graphical display, menus.
- Text in 8 selectable languages.
- Highly accurate devices with global billing certifications.
- IP52 front display.
- Single 96 x 96 mm unit.
- large characters and powerful backlighting.
- Easy to understand

Connection to the new sub-distribution electrical boards in the building:

There are a number of new and existing distribution electrical boards to be supplied and installed by the new main distribution electrical board. These new and existing sub-distribution electrical boards shall be supplied and fed from the new main distribution electrical board as indicated on the drawings.

Re-routing sub-mains cabling from the existing main distribution electrical board to the new main distribution electrical board for the Junior School:

As the existing main distribution electrical board in the External ESB Store was a shared main electrical board for the Junior School and the Senior School, some existing sub-mains cabling will need to be disconnected from the existing main electrical board (which will become the Senior Schools main electrical board) and shall be reconnected to the new main distribution electrical board for the Junior School building.

The Contractor shall allow for moving and re-routing some existing sub-mains cabling from the existing main distribution electrical board to the new main distribution electrical board for the Junior School. Refer to section 62.13 below for further information.

62.07 Existing ESB Meter in the ESB External Store Room

General:

Currently, the Junior School building and the Senior School building are supplied by a shared ESB meter and individual isolator switches for the Junior School Building and Senior School Building. The existing ESB meter and individual isolators for both schools are located in the ESB room in the External ESB Store Room.

As part of these works, it is proposed to split that existing ESB supply and install a dedicated ESB meter for each School building so there will now be two ESB meters in the ESB room in the External ESB Store Room; one ESB meter for the Junior School and one ESB meter for the Senior School.

New ESB meter shall be installed within a new main distribution board in the ESB Room and these new meters shall be a dedicated ESB meters for the Junior School and the Senior School. The existing ESB meter that is currently there shall then become decommissioned. Refer to section 62.06 for further details.

Existing main electrical board and ESB Meter:

Once the new ESB Meters and new main distribution electrical board are installed for the Junior School and the Senior School, the existing ESB Meter and existing main isolation switch boards for Junior School and Senior School in the ESB Room in the remote ESB External Store Room shall then be decommissioned.

See photos below of the existing ESB meter and the existing isolation switches for the Junior School and the Senior School.



62.08 New ESB meters for the Junior School and Senior School and electrical attendances required for ESB Networks

General:

Currently, the Junior School building and the Senior School building are supplied by a shared ESB meter and shared main distribution electrical board. The existing ESB meter and main distribution electrical board for both schools are located in the ESB room in the ESB External Store Room.

As part of these works, it is proposed to split that existing ESB supply and install a dedicated ESB meter for each School building so there will now be two ESB meters in the External ESB Store; one ESB meter for the Junior School and one ESB meter for the Senior School.
The new ESB meters for the Junior School and Senior School shall be installed remotely from the new main distribution electrical board for the Junior School building. The new ESB meter will therefore need to be cabled back and wired back to the new main electrical board.

Refer to electrical schematic on the size and type of sub-mains cable to be installed between the new dedicated ESB meter for the Junior School and new main distribution electrical board 02 for the Junior School.

Electrical attendances required for ESB Networks:

ESB Networks will require a number of items to be completed so the Contractor shall allow for completing the following:

- Obtaining the ESB's approval on the the ESB meter location.
- Supply and installation of approximately 10metres of 50mm x 50mm galvanised steel trunking for ESB cabling.

The Contractor shall allow for liaising with ESB Networks to get the new ESB meter for the Junior School installed.

The Contractor shall include for all provisions in respect of the above, whether explicitly stated or not. No claims for extras, resulting from lack of sufficient information at tender stage, will be entertained at a later date.

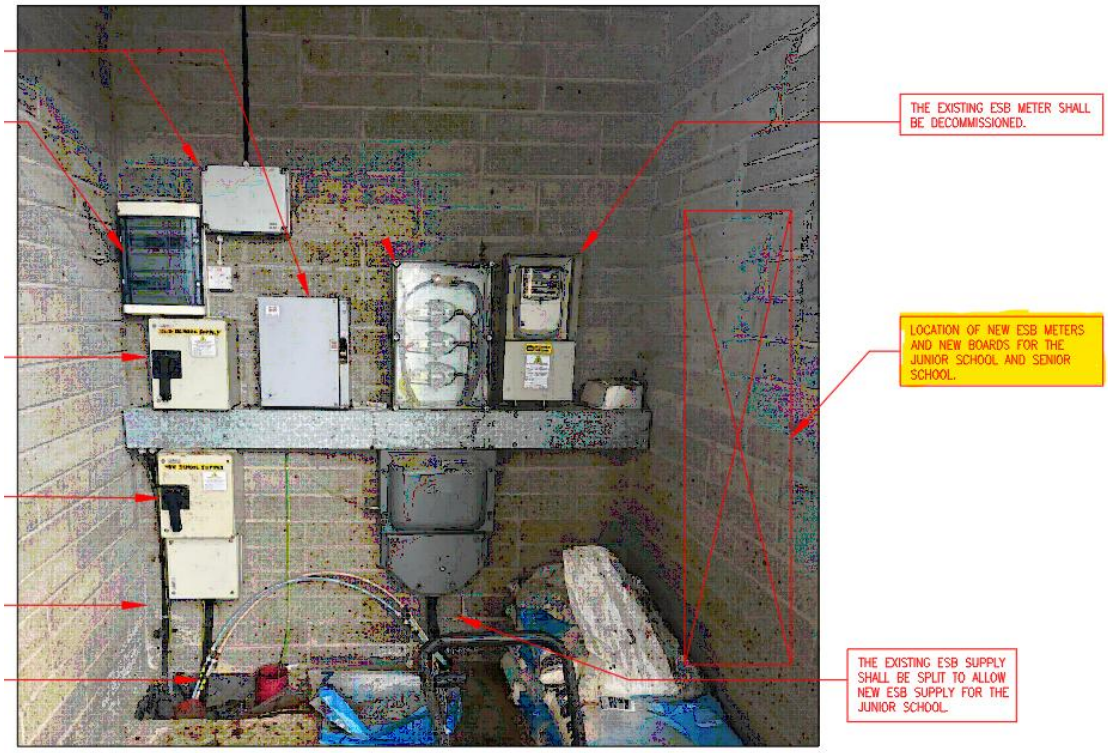
The Contractor shall be responsible for liaising with ESB Networks on getting the new ESB meter installed.

The Contractor shall be responsible for completing the following tasks in order to get the new ESB meter installed for the building:

- On appointment to liaise with the ESB on getting the new ESB meter installed.
- Liaise with the ESB Networks to ensure any capital contributions due are paid in good time so as not to delay the completion of the project.
- Liaise with ESB Networks on all required works.
- Liaise with the Employer's Representative to sign any paperwork required and forward all of same to the ESB.
- Provide for all necessary liaisons and attendances to ESB staff.
- Arrange for the ESB meter to be installed.
- Provide ETCI completion certificate to the ESB in sufficient time to enable the electrical supply to be obtained in accordance with the programme.

Proposed location of the new ESB meter:

The existing ESB meter is indicated in red (yellow text) in the image below and it is proposed to install the new ESB meter for the Junior School in the location indicated by the red box in the image below.



62.09 Electronic surge protection

Electronic surge protection shall be installed in the new electrical boards to provide surge protection on all incoming lines and devices into the building.

The services in the electrical boards that will require surge protection devices (SPD's) and the type required are highlighted below:

- TP & N incomer on the new Main Electrical Distribution Board (NMDB.01) - (Type 1 & Type 2 combined lightning & SPD). (External ESB Store)
- TP & N incomer on the new Main Electrical Distribution Board (NMDB.02) - (Type 1 & Type 2 combined lightning & SPD). (Corridor School Building)
- TP & N incomer on the new sub-distribution electrical board (NSDB.01).
- TP & N incomer on the new sub-distribution electrical board (NSDB.02).
- TP & N incomer on the new sub-distribution electrical board (NSDB.03).
- TP & N incomer on the new sub-distribution electrical board (NSDB.04).
- TP & N incomer on the new sub-distribution electrical board (NSDB.05).
- TP & N incomer on the new sub-distribution electrical board (NSDB.06).

Surge Protection Devices (SPD's) shall be installed at distribution panels as shown on drawings.

Where equipment/panels are more than 30' from service entrance SPD, additional local protection shall be provided in the form of distribution panel protection.

Distribution branch circuits that feed equipment that generates electrical disturbances shall have additional SPD protection to prevent this noise feeding back onto other circuits. Additionally, SPDs may be used where sensitive electronic equipment is located more than 30' from the closest upstream SPD.

Surge protection devices shall adhere to the following specifications:

- Shall be capable of handling both direct lightning current of 25kA 10/350µs per pole and maximum discharge currents of 40kA 8/20µs per pole.
- Type 2 arresters shall have a maximum discharge current of 40kA 8/20µs waveform per pole 160kA 8/20µs, TP+N system.
- The arrester shall be fully co-ordinated between lightning and surge currents. The arrester shall be fully energy co-ordinated to work correctly in conjunction with other surge protection devices from the same manufactures range.
- The arresters shall be of the pluggable type to facilitate easy removal and replacement of defective modules. Locking modules with quick easy release button. The unit shall have easy hot-swop replacement cartridges.
- Must have remote interrogation IR.
- The arresters shall have international test approvals either UL or KEMA.
- The arrester shall comply with the Surge Protection Device standard EN 61643-11 and shall be tested for vibration and shock proof characteristics in accordance with EN 60068 – 2.
- The arrester shall have a maximum let through voltage of less than 1.5kV even in the case of direct lightning.
- The arrester shall be able to withstand multiple direct strikes without damage.
- The arresters shall have visual indication of status. Green - ok. Red – defect.

- The arrester shall have thermo dynamic control which disconnects the device from the supply in case of defect.
- Arresters to be equipped with a optional fault alarm changeover contact to remotely signal device failure.

- To easily distinguish the arrester from circuit breakers and RCD's they shall be coloured red.

- Disconnect fusing shall be installed where required in accordance with the SPD instructions.

- Shall have a UP value of <1500.

- Shall have a 10 year warranty.

- The values for the SPD must follow the definition 3.1.30 of the standard IEC 61643-12 (and also the definition 3.7 of IEC 61643-1), the SPDs protective components may be connected line to line or line to earth or line to neutral or neutral to earth and combination therefore. These paths are referred to as modes of protection. IEC 61643-1.

- Accepted manufacturer's of surge protection are Furse, Dehn & Sohn, or equivalent.

62.10 New LV and ELV cable containment

General:

The Contractor shall allow for supplying and installing new cable containment and cable carrier system for the new electrical services throughout the building. Refer to the drawings for further information.

Existing cable containment in the buildings:

Where possible, providing that it is in good condition, the Contractor can re-use the existing conduit drops and trunking in the building.

Trunking and Tray:

The primary trunking and cable tray routes for the building are as indicated on the drawings but these primary electrical routes are to be finalised and decided by the Contractor in conjunction with the Engineer. All new cable containment shall be installed in compliance with I.S. 10101:2020.

All power, lightings, circuit wiring, etc. in the building shall be installed in metal conduit, trunking, tray, etc. as described below.

All sub-mains cabling in the building shall be installed on suitably sized tray as described below. The new containment routes on the drawings are indicative only.

The Contractor shall allow for all necessary bends, offsets, crossovers, additional labour, etc. in installing the new cable containment in conjunction with the existing structure and existing services in the building.

The Contractor shall allow for visiting the site during the tendering period to review all necessary works that are involved in supplying and installing the necessary cable containment for the new electrical services.

The Contractor shall allow for all necessary brackets, unistrut, threaded rod, etc. in hanging the cable containment. Cable containment shall be properly aligned and securely fixed at regular intervals at 1000mm on straight runs. Where bends, angles or offsets occur, additional fixings shall be supplied at a distance not exceeding 150mm on each side of the accessory.

A space factor of minimum 40% must be allowed in all carrier systems. Overloading and under sizing of the cable carrier system will not be permitted.

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.

Before setting to work, the Contractor shall confirm with the Engineer the exact routes for conduits and final location of all wall-mounted devices. Particular care shall be taken to co-ordinate all services on site with the Consulting Engineer before commencing work.

A system of galvanised steel cable tray and trunking shall be installed to distribute sub mains, general and emergency lighting, power, fire alarm, public address and mechanical services control wiring throughout the building. Separate trunking shall be provided for data. Separate systems shall be segregated in accordance with I.S. 10101:2020.

Cable containment shall be Uni-trunk or equivalent.

Cable capacities of conduit and trunking systems shall not exceed the requirements of I.S. 10101:2020. It is the responsibility of the Contractor to verify that the trunking system as designed satisfies these regulations.

If cables 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.



Conduits:

All of the electrical installation in the buildings shall be surface mounted and as a result, all conduits shall be surface mounted throughout the building.

All surface mounted conduit to be installed in the building shall be steel conduit. Location of all surface mounted conduits to be discussed on site.

All conduits shall be galvanised welded steel to BSS 31 Class E for heavy gauge tubing as manufactured by ASCM or approved equal. 16mm outside diameter is the minimum size to be used. All inlet boxes, conduits shall be plugged or capped whilst waiting for further items to be attached.

The ends of every fitting, tube length or nipple are to be reamed and all threads to be coated with aluminium paint after assembly. All fittings shall be installed so as to facilitate easy re-wiring. Inspection fittings shall be fitted at all bends, tees and elbows. Back entry elbows or tees shall be used, if necessary, to enable easy of accessibility without disturbing any plasterwork.

Inspection fittings shall be flush with the plasterwork and floorboards over conduit fittings shall be screwed in position. The complete conduit installation shall be finished before any wiring is pulled through.

Allow for all junction boxes for jointing of conduits. The minimum spacing of conduit supports shall be as follows:

Nominal Conduit Size	Spacing of Supports
25 mm. and less	1.75 metres
25 mm. to 40 mm.	2.00 metres
Exceeding 40 mm.	2.50 metres





Conduit Fixing and Fittings

Surface conduit, where used, shall be run parallel to building elements and shall be fixed to the structure by means of galvanised spacing saddles affording a clearance of 3mm min. and spaced at 100mm min.

Saddles shall be fixed with wooden plugs or rawl plugs as the surface permits. Where conduit is to be concealed in plasterwork, it shall be fitted using galvanised pipe hooks. Conduit boxes shall be fitted using brass round head screws.

Where conduits are fixed under flooring, which is supported on joists, cutting away shall be kept to an absolute minimum.

Hanging of cable containment:

The Contractor shall allow for hanging the new cable containment from the existing steel beams and concrete beams in the building.

The Contractor shall install suitable supports in order for the tray/trunking to be installed. Refer to drawings for the size, quantity, layout and routes of the cable containment.

In order to install the cable containment at high level from the existing steel beams, the Contractor shall allow for the following:

- Dropping 10mm threaded rod from the steel at 1000mm distances over the length of the containment run.

- The threaded rod shall be hung from the steel via 10mm G-Clamps or other suitable clamps.
- The base supports for the cable containment shall be single channel unistrut. Supports shall be placed at 1000mm distances over the length of the containment run.
- Allow for connecting the threaded rods to the single-channel unistrut.

62.11 Cabling, wiring and cable sizes

Existing cabling/wiring:

The Contractor shall allow for decommissioning and removing all the existing cabling and wiring to all devices, sockets, hand-dryers, water heaters, etc. throughout the main building where refurbishment works are to be carried out apart from the ASD area where the power and general services devices, sockets, hand-dryers, water heaters, etc shall be retained and re-wired.

The main building shall be totally re-wired and while the some of the existing items i.e. hand-dryers, CCTV, intruder alarm, etc. shall be retained, the Contractor shall allow for new power wiring to all these items.

The Contractor shall carry include for a detailed survey of the existing electrical installation in the building prior to any decommissioning works to ensure that the rewiring of all items and devices in the building is included for. Refer to 62.03 for further information.

The Contractor shall include for all provisions in respect of the above, whether explicitly stated or not, regarding the survey of the existing electrical installation in the building and no claims for extras, resulting from lack of sufficient information at tender stage, will be entertained at a later date.

General installation:

All final sub-circuit cables for lighting, power, etc., shall adhere to the following specifications:

1. All cabling shall be run in metal cable containment and shall be run in conduit, trunking, tray etc. See section 62.10 for further information.

2. All final sub-circuit cables for lighting, power, etc., shall be single core low smoke and zero halogen (LSZH) insulated type, flame retardant to BS 4066, with stranded copper conductors, thermosetting insulation type E1.5 to BS 7655 all complying with BS 7211. All cabling shall be LSZH sheathed cable.

3. All cables to be class Cca-s1, d2, a1. All cables to be CPR 2017 compliant.

4. Multicore unscreened cables for control and signalling requirements shall be of the unarmoured type with copper conductors, PVC insulation and PVC sheath to BS 7655 all in accordance with BS 6004/BS 6346 (as appropriate).

5. All cables shall be 450/750 volt rated and no cable less than 2.5mm^2 in cross section shall be used without the permission in writing of the Engineer.

6. Only insulated cables shall be installed in conduit and/or trunking and cabling for different services shall not be installed in the same conduit without the permission in writing of the Engineer.

7. Joints on cables in trunking shall not be permitted. The cables of different circuits run in trunking shall be taped together at not greater than 3 metre centres.

8. Cables in excess of 10 sq. mm cross sectional area shall not be installed in trunking with smaller cables. In addition MICS LSF or armoured cables shall not be installed in trunking with other cables.

LSZH Cabling:

All final sub-circuit cables for lighting, power, etc., shall be single core low smoke and zero halogen (LSZH) insulated type, flame retardant to BS 4066, with stranded copper conductors, thermosetting insulation type E1.5 to BS 7655 all complying with BS 7211.

All electrical cabling shall comply with I.S. 10101:2020. All cabling shall be LSZH sheathed cable.

All LSZH or LSOH cabling shall adhere to the following specifications:

Product features:

- Flame-retardant according to IEC 60332-1-2 (flame spread on a single cable)
- No flame-propagation according to IEC 60332-3-22 and IEC 60332-3-24 respectively IEC 60332-3-25 (Flame spread on vertical cable or wire bundle)
- Halogen-free according to IEC 60754-1 (amount of halogen acid gas) Corrosiveness of combustion gases according to IEC 60754-2 (degree of acidity)

- Low smoke density according to IEC 61034-2
- UL Cable Flame Test.
- All cables to be class Cca-s1, d2, a1. All cables to be CPR 2017 compliant.

References/Approvals:

- UL AWM style 21089.
- Based on EN 50525-3-11.
- Based on EN 50525-2-51.

Product Make-up:

- Fine-wire strand made of bare copper wires
- Core insulation: Halogen-free
- Cores twisted in layers
- Outer sheath: Special halogen-free compound, grey (similar to RAL 7001).
- All cables to be class Cca-s1, d2, a1. All cables to be CPR 2017 compliant.

Cable Sizes

All conductors carried in conduits shall be single core LSZH cabling as specified in 'point 2' above. All cable sizes are to be a minimum of 2.5mm^2. Conduit capacities as set down in Appendix 12 of the I.E.E. regulations latest edition are not to be exceeded. Joints in conductors between terminating points will not be permitted. See also electrical schematics for specific cable sizes.

Cable sizes shall be as follows:

- *Lighting final circuits (1kW max load):* 2.5mm^2/2.5mm^2 CPC
- *Emergency light fittings:* 2.5mm^2/2.5mm^2 CPC
- *20amp radial circuits (6no sockets max):* 4.0mm^2/4.0mm^2 CPC
- *20amp radial circuits (general power):* 4.0mm^2/4.0mm^2 CPC
- *32amp radial circuits (non-cooker):* 6.0mm^2/6.0mm^2 CPC
- *Cooker:* 10.0mm^2/10.0mm^2 CPC
- *10amp radial circuit (general):* 2.5mm^2/2.5mm^2 CPC

- *10amp radial circuit (lighting, facade):* 2.5mm^2/2.5mm^2 CPC
- *10/16 amp radial circuit (exterior lighting, columns):* 6.0mm^2/6.0mm^2 CPC
- *Undersink electric water heaters:* 4.0mm^2/4.0mm^2 CPC

Sub-mains cabling:

Refer to section 62.12.

Trunking, tray and conduits:

Refer to Section 62.10.

62.12 New sub-mains cables to be supplied and installed

New sub-mains cabling:

The Contractor shall supply, install, connect, test and commission all new sub-mains distribution cables from the new main distribution electrical board (NMDB.01) for the Junior School to all the necessary items as indicated on the drawings. The new main distribution electrical board shall be installed in the External ESB Store.

Refer to drawing 61(E001) for the information on the type and size of all sub-mains cabling to be provided from the new main distribution electrical board (NMDB.01) for the Junior School to the different items in the building. Also refer to drawings for the location of all plant and equipment.

For reference, the Contractor shall allow for the supply and installation of the following sub-mains cabling in the building (refer to drawings for location of all items):

- 1no 4core 95mm^2 sub-mains cable (sub-mains cable as specified below) with separate 95mm^2 earth between the new main distribution electrical board (NMDB.01) in the External ESB Store and the new main-distribution electrical board (NMDB.02) in the main school building building. Refer to drawings for the locations of each board and the exact length of cable required. Allow for a cable length of 80metres.

- 1no 4core 35mm² sub-mains cable (sub-mains cable as specified below) with separate 35mm² earth between the new main distribution electrical board (NMDB.02) in the main school building and the new sub-distribution electrical board (NSDB.01) in the main building. Refer to drawings for the locations of each board and the exact length of cable required. Allow for a cable length of 60metres.
- 1no 4core 25mm² sub-mains cable (sub-mains cable as specified below) with separate 25mm² earth between the new main distribution electrical board (NMDB.02) in the main school building and the new sub-distribution electrical board (NSDB.02) in the main building. Refer to drawings for the locations of each board and the exact length of cable required. Allow for a cable length of 30metres.
- 1no 4core 25mm² sub-mains cable (sub-mains cable as specified below) with separate 25mm² earth between the new main distribution electrical board (NMDB.02) in the main school building and the new sub-distribution electrical board (ESDB) (Cooker Boars) in the main building. Refer to drawings for the locations of each board and the exact length of cable required. Allow for a cable length of 40metres.
- 1no 4core 35mm² sub-mains cable (sub-mains cable as specified below) with separate 35mm² earth between the new main distribution electrical board (NMDB.02) in the main school building and the new sub-distribution electrical board (NSDB.03) in the main building. Refer to drawings for the locations of each board and the exact length of cable required. Allow for a cable length of 90metres.
- 1no 4core 35mm² sub-mains cable (sub-mains cable as specified below) with separate 35mm² earth between the new main distribution electrical board (NMDB.02) in the main school building and the new sub-distribution electrical board (NSDB.04) in the main building. Refer to drawings for the locations of each board and the exact length of cable required. Allow for a cable length of 200metres.
- 1no 4core 35mm² sub-mains cable (sub-mains cable as specified below) with separate 35mm² earth between the new main distribution electrical board (NMDB.02) in the main school building and the new sub-distribution electrical board (NSDB.05) in the main building. Refer to drawings for the locations of each board and the exact length of cable required. Allow for a cable length of 100metres.
- 1no 4core 35mm² sub-mains cable (sub-mains cable as specified below) with separate 35mm² earth between the new main distribution electrical board (NMDB.02) in the main school building and the new sub-distribution electrical board (NSDB.06) in the main building. Refer to drawings for the locations of each board and the exact length of cable required. Allow for a cable length of 70metres.

- 1no 4core 35mm^2 sub-mains cable (sub-mains cable as specified below) with separate 25mm^2 earth between the new main distribution electrical board (NMDB.02) in the main school building and the exsiting electrical board in the ESB External Store. Refer to drawings for the locations of each board and the exact length of cable required. Allow for a cable length of 100metres.

Sub-mains cable specification:

Cables shall be of type and size indicated on the drawings and shall be laid on cable trays or run in pipe ducts over the entire length of the cable run.

The Contractor shall provide all cable supports and cable glands necessary for correct installation and termination of the cables.

Sub-mains cable shall adhere to the following specifications:

- Composition: Manufactured to BS 6724 Table 6 (2 Core) Table 8 (3 Core) Table 10 (4 Core) Table 13 (5 Core)
- Type: Plain Annealed Copper Conductor / XLPE Insulated / LSNH Bedded / Galvanised Steel Wire Armour / LSNH Sheathed. 600/1000V
- Conductor: Plain Annealed Copper Class 2 Stranded to BS EN 60228
- Insulation: Thermosetting XLPE Type GP8 to BS 7655-1.3
- Bedding: Compatible LSNH Polymeric Material (LSNH)
- Steel Wire Armour: Galvanised Steel Wire
- Sheathing: LSNH Type LTS1 to BS 7655-6.1
- Current Ratings: For current ratings refer to table 4E4A of BS7671 IEE Wiring Regulations Seventeenth Edition.

Sub-mains cables and sub-distribution cables shall be 4 Core CU/XLPE/LSHN/SWA/LSNH with separate CPC's for cables over 16.0 sq.mm, and 5 Core CU/XLPE/LSHN/SWA/LSNH for cables of 16.0sq.mm or less. Cables shall be sized as scheduled on the electrical drawings.

Internal sub-mains cables and sub-distribution cables shall be fixed to cable tray. Cable tray shall be perforated type, galvanised medium gauge sheet steel. Sub-mains cables and sub-distribution cables shall be installed on cable trays at a spacing of twice the diameter of the larger adjoining cable with nylon cable ties.

Sub-mains cable distribution within the building shall be XLPE insulated, steel wire armoured, LSNH sheathed cable that shall be installed directly on steel cable tray.

A separate CPC shall be installed with every sub-mains feed and should be of the size detailed in the distribution drawings. The amour of the cable should also be bonded at both ends to the distribution equipment by means of a nut and bolt through a tab linked to the earth bar.

The objective of the system is to provide an efficient and effective system for the distribution and support of small power requirements.

The design parameters are defined within the ETCI National Rules for Electrical Installations.

All cables shall have stranded or flexible copper conductors and LSF or heat resisting insulation to suit the particular application.

Cable carriers for incoming mains cables must be complete with lid. Under no circumstances will exposed cables be acceptable in any location throughout the building.

Segregation, Concealment and Re-Wiring:

The Contactor shall comply with I.S. 10101:2020 when wiring installations. Circuits shall be segregated as indicated. Draw wires shall be left within empty conduits for use of specialist installers. Draw wires comprising nylon tapes with fitted eyelets shall be used by the Electrical Contractor.

For concealed conduit the Contractor shall ensure that the system is installed to enable re-wiring to be carried out from boxes for fittings or accessories only. Draw-in boxes will only be permitted with prior permission in writing. The Contractor shall not use tallow or any other substances to facilitate drawing-in of cables.

Cable containment:

Suitable cable tray shall be supplied and installed for all new sub-mains cabling in the building. Refer to section 62.10 for further information.

62.13 Existing sub-mains cables to be retained and reconnected to the new main distribution electrical board for the Junior School

General:

The Contractor shall allow for moving and re-routing the existing sub-mains cabling as listed below from the existing main distribution electrical board to the new main distribution electrical board for the Junior School. Refer to 60 (E001) drawing for underground cable route from the NMDB-02 to the consumer board in the ESB External Store.

Existing sub-mains cabling for the existing electrical board in the External ESB Store for the CCTV Cameras mounted on the roof of the External ESB Store:

The Contractor shall allow for moving and re-routing the existing sub-mains cabling that is currently connected to the existing electrical board for the CCTV Mounted on the roof of the External ESB Store. This existing sub-mains cable is a 4core 10mm^2 sub-mains cable with separate 10mm^2 earth.

This existing cable may need to be extended so for tendering purposed, include for the supply of 5metres of 4core 10mm^2 sub-mains cable with separate 10mm^2 earth and jointing this to the existing cable in order to reconnect the cable to the new main distribution electrical board for the Junior School.

See red circle in image below which highlights the location of existing sub-distribution external lighting board in the External ESB Store.



62.14 Internal sockets and spurs

Existing sockets and spurs:

As highlighted in 62.01, the existing power and general installation throughout the main building shall be decommissioned and removed by the Contractor as part of these works. This includes all the existing sockets, spurs, associated cabling, containment, etc. throughout the main building.

New sockets and spurs shall be installed throughout the building as indicated on the drawings.

Standalone internal sockets:

The Contractor shall allow for the supply and installation of all new standalone internal sockets in the building as indicated on the drawings.

See drawings for quantities and the locations of the new power and general services that are to be installed in the building.

Sockets that are to be installed on dado trunking are highlighted in 62.16 below.

The Contractor shall supply, install, connect, test and commission the standalone general service socket outlets installation as indicated on the drawings for the building.

General services wall/floor mounted outlets shall be single or twin switched 13A 3 pin type mounted on suitable conduit boxes. Sockets are to be located 450mm generally above finished floor level and 200mm above worktops.

The main earth terminal on all sockets shall be connected to the earth terminal in the conduit box.

All conduits throughout the building shall be exposed and surface mounted. Therefore, all standalone electrical sockets, spurs, isolators, etc. shall be surface mounted.

Wiring to the sockets shall be as highlighted below.

The new electrical distribution system shall be installed in a steel conduit/trunking system throughout.

Surface mounted switched socket outlets shall be from the MK Albany Plus (Brushed Stainless Steel) range as K2958 BSS (1 gang) or MK Albany Plus K2947 BSS (2 gang), or equivalent. Mounting boxes to be K829 ALM (1 gang) or K830 ALM (2 gang), or equivalent.

Please note that all new sockets shall adhere to Building Regulations Part M.



Therefore, all new sockets shall adhere to the following specification:

- Single socket shall be as K2958 BSS, or equivalent.
- Double socket shall be as K2947 BSS, or equivalent.
- All sockets shall be of brushed stainless steel finish.
- Surface mounting box for single socket shall be as K829 ALM, or equivalent. Mounting box to be supplied without knockouts.
- Surface mounting box for double socket shall be as K830 ALM, or equivalent. Mounting box to be supplied without knockouts.
- All double sockets shall have outboard rocker switches as highlighted in image below.
- All rocker switches shall have neon indicators in the switch rockers to indicate that they are on.
- The rockers on the socket shall contrast with the colour on the socket.

Sockets below counters:

Where new sockets are to be located below counters and in presses, the Contractor shall include for the supply and installation of a double pole isolation switch for each socket above the counter and connection of that switch to the socket for isolation. All isolators shall be as manufactured by MK Albany Plus and finished in brushed stainless steel, or equivalent.

Wiring to the sockets shall be as highlighted below.

All double pole isolation switch shall adhere to the following:

- Isolation switch shall be as K961 BSS, or equivalent. All switches shall be of brushed stainless steel finish.
- Supplied with 13amp fuse with fuse holder.

- Isolation switch shall have a neon indicator in the switch rocker to indicate that they are on.
- Surface mounting box for single switch shall be as K829 ALM, or equivalent. Mounting box to be supplied without knockouts.



Unswitched fused spur outlets:

The Contractor shall include for the supply, erection and wiring of all new unswitched fused spur outlets for connection to electrical control/equipment panels throughout the building.

All spur outlets shall be as manufactured by MK Albany Plus and finished in brushed stainless steel, or equivalent.
All unswitched fused spur outlets in the building shall adhere to the following:

- Spur outlet shall be as K978BSS, or equivalent. All spur outlets shall be of brushed stainless steel finish.
- Supplied with 13amp fuse with fuse holder.
- Supplied with flex outlet.
- Fused spur outlet shall have a neon indicator to indicate that they are on.
- Surface mounting box for single switch shall be as K829 ALM, or equivalent. Mounting box to be supplied without knockouts.

Connection to all equipment shall be by fixed spur outlet, mounted in line with the equipment on the drawings. Wiring to the fused spurs shall be as highlighted below.



Switched fused spur outlets:

The Contractor shall include for the supply, erection and wiring of all new switched fused spur outlets for connection to electrical control/equipment panels throughout the building.

All spur outlets shall be as manufactured by MK Albany Plus and finished in brushed stainless steel, or equivalent.

All spur outlets in the building shall adhere to the following:

- Spur outlet shall be as K961 BSS, or equivalent. All outlets shall be of brushed stainless steel finish.
- Supplied with 13amp fuse with fuse holder.
- Isolation switch shall have a neon indicator in the switch rocker to indicate that they are on.
- Surface mounting box for single switch shall be as K829 ALM, or equivalent. Mounting box to be supplied without knockouts.



Connection to all equipment shall be by fixed spur outlet, mounted in line with the equipment on the drawings. Wiring to the fused spurs shall be as highlighted below.

Isolators

A number of single phase and three phase isolators shall be installed in the building as indicated on the drawings. The Contractor shall allow for the supply, installation and cabling of these isolators as indicated on the drawings.

All three-phase and single-phase isolators shall have a red lockable switch on a yellow enclosure. The isolators shall also have an on/off indicator.

The housing shall be ABS enclosure and shall be flame retardant. Isolators shall be as Santon, or equivalent.

Refer to the drawings for the size and fuse rating of the isolators.



Wiring:

All new wiring shall be carried out in radial circuits. Refer to section 62.11 for details on the new cabling and wiring required. All final sub-circuit cables for power shall be single core low smoke and zero halogen (LSZH) insulated type cable.

Circuiting shall be as indicated on the drawings and each circuit shall be protected by a 20A RCBO.

The maximum no. of sockets shall be 5no. twin sockets per final circuit. All wiring shall be carried out to current standards and regulations.

All final circuit wiring for internal sockets shall be completely enclosed in surface-mounted conduit or in dedicated mains only trunking system.

Cable sizes shall be as follows:

- *16amp radial circuits (sockets):* 4.0mm2/4.0mm2 CPC
- *20amp radial circuits (sockets):* 4.0mm2/4.0mm2 CPC
- *32amp radial circuits (sockets):* (non cooker) 6.0mm2/6.0mm2 CPC

All general power circuits shall be provided with combined MCB/RCDs giving distinction between MCB and RCD tripping. All circuits supplying socket outlets shall be individually protected by a 30 mA RCD.

62.15 IP66 rated sockets

IP66 rated sockets

Some IP66 rated sockets shall be installed externally as indicated on the drawings. See drawings for locations of where the new IP66 rated sockets are to be installed in the building. The Contractor shall supply, install, connect, test and commission the IP66 rated service socket outlets as indicated on the drawings for the areas.

All IP66 rated electrical sockets shall adhere to the following specification:

- IP66 rated.
- Two gang switched plug socket with a current rating of 13amp and voltage raring of 250VAC.
- Grey in colour.
- Patented gel seal.
- Manufactured from recycled polycarbonate for impact and environmental protection.
- Number of poles are 2.
- Complies with ANSI/ESD S20.20:2014.
- Complies with BS EN 61340-5-1:2007.

IP66 rated sockets shall be as MK Masterseal Plus K56482GRY (2 gang), or equivalent.



Wiring:

Sockets are to be located 450mm generally above finished floor level.

Wiring shall be carried out in radial circuits. Refer to section 62.11 for details on the cabling and wiring required. All final sub-circuit cables for power shall be single core low smoke and zero halogen (LSZH) insulated type cable.

62.16 Dado trunking and sockets

General:

Some new dado trunking with new electrical sockets shall be installed throughout the building in the locations as indicated on the drawing. Refer to the drawings for locations, quantities, routes, etc.

The Contractor shall supply, install and fit the new dado trunking installation as indicated on the drawings.

All new dado trunking shall be 3-compartment dado trunking arrangement. Refer to the drawings for quantity, locations, drops, etc. for the new dado trunking installation arrangement throughout the building.

New dado trunking shall generally be wall mounted which shall be mounted and fixed directly to the wall. Allow for new dado trunking drop from ceiling void to low level dado trunking.

Where new dado trunking is to be installed above desks, the bottom of the dado trunking shall be 150mm above desk height. Refer to the drawings for the height that the dado trunking is to be mounted at.

Refer to the drawings for dado trunking arrangement for the teaching walls and heights that the dado trunking is to be mounted at.

New dado trunking:

The Contractor shall allow for the supply and installation of all new dado trunking as indicated on the drawings. New dado trunking shall adhere to the following specifications:

- Wall mounted dado trunking shall be MK 'Prestige 3D Compact' (or equivalent).
- 3-compartment dado trunking (140mm x 45mm)
- Dado trunking shall complete with all necessary corner pieces, stop ends, couplers etc.
- Allow for all additional lengths of vertical trunking required to route cabling to ceiling level to distribution board.



Sockets on dado trunking:

The Contractor shall allow for the supply and installation of all new sockets on the dado trunking arrangement as indicated on the drawings. Refer to the drawings for quantities, locations and types of sockets required on the dado trunking.

All new double sockets installed on the new dado trunking shall have outboard rocker switches as highlighted in image below. Please note that all sockets shall adhere to Building Regulations Part M.

Therefore, all sockets shall adhere to the following specification:

- Single socket shall be as MK Logic Plus K2757 GRA, or equivalent.
- Double socket shall be as MK Logic Plus K2746 GRA, or equivalent.
- All sockets shall be recessed into the dado trunking.
- All sockets shall be of grey graphite finish.
- Mounting frames/boxes shall be VCT-121 WHI (1 gang) or VCT-121 WHI (2 gang), or equivalent.
- All double sockets shall have outboard rocker switches as highlighted in image below.
- All rocker switches shall have indicators in the switch rockers to indicate that they are on.



Spur outlets on dado trunking:

The Contractor shall allow for the supply and installation of all new spur outlets on the dado trunking arrangement as indicated on the drawings. Refer to the drawings for quantities, locations and types of spurs required on the dado trunking.

All new spurs and outlets shall have a grey graphite finish to match the finish of the new sockets on the dado trunking. Refer to 62.14 for details on switched and unswitched spurs.

Wiring:

Wiring for power supplies to sockets shall be carried out in radial circuits. Refer to section 62.11 for details on the cabling and wiring required.

All final sub-circuit cables for power shall be single core low smoke and zero halogen (LSZH) insulated type cable.

The maximum no. of sockets shall be 5no. twin sockets per final circuit and each circuit shall be protected by a 20A RCBO. All wiring shall be carried out to current standards and regulations.

All final circuit wiring for internal sockets shall be completely enclosed in a conduit or in dedicated mains only trunking system.

62.17 Isolation switch for socket at high level in classrooms for TV

In each classroom, there is a double socket installed at high level at the teachers wall as indicated on the drawings. This double socket is for the power supply to the TV.

However, this socket is located at high level and out of reach for the teacher. As a result, a double pole isolation switch shall be installed at low level on the dado trunking arrangement for isolation power to the socket at high level.

All isolators shall be as manufactured by MK Logic Plus and finished in grey plastic, or equivalent.

All double pole isolation switch shall adhere to the following:

- Isolation switch shall be as K370 WHI, or equivalent. All switches shall be of grey graphite finish
- Supplied with 13amp fuse with fuse holder.

- Isolation switch shall have a neon indicator in the switch rocker to indicate that they are on.
- Mounting frames/boxes shall be VCT-121 WHI (1 gang), or equivalent.

62.18 Cooker switch

There one existing cooker in the Staff Room as indicated on the drawings. A new cooker switch and associated cabling shall be installed the cooker as indicated on the drawings (1no in total).

The Contractor shall therefore include for the supply, erection and wiring of these 1no new cooker point/switch outlet for the existing electrical cooker in the Staff Room. Each cooker switch shall be as manufactured by MK Albany Plus and finished in brushed stainless steel, or equivalent. Each cooker switch shall adhere to the following:

- Cooker switch shall be as K5114 BSS, or equivalent. All outlets shall be of brushed stainless steel finish.
- Supplied with 40amp fuse with fuse holder.
- Surface mounting box to be supplied without knockouts to suit the new cooker switch



Wiring:

The Contractor shall include for the following electrical attendances for the installation of each cooker switch (1no in total):

- Supply and installation of the cooker switch and mounting box as specified above for each existing cooker.
  - Supply and installation of a 3core 16mm^2 sub-mains cable (sub-mains cable as specified below) between the new sub-distribution electrical board (NSDB.01) and the new cooker switches as indicated on the drawings. Allow for a cable length of 35metres for the cooker switch. Refer to section 62.12 for specification on the sub-mains cable required.

- Allow for the supply and installation of a 3core 16mm^2 sub-mains cable (sub-mains cable as specified below) between each cooker switch and each existing cooker (1no in total)
- Allow for connection of each sub-mains cable to the new sub-distribution electrical board and the relevant cooker switches.
- Testing of each cooker switch to ensure that it is fully operational.
- Any other works deemed necessary.

62.19 Existing IT points in the Computer Room

There are a number of existing IT points installed on the existing dado trunking in the Computer Room. This existing dado trunking is to be decommissioned and removed and shall be replaced with new dado trunking as specified in 62.16.

Consequently, the Contractor shall allow for installing new IT faceplates on the new dado trunking and connecting the existing cabling that was in place for the existing IT points to the new IT points on the new dado trunking.

Refer to drawings for quantities and locations.

The Contractor shall allow for the supply and installation of the new face plates on the new dado trunking and for connecting the existing IT cabling to these new face plates.

The finish on the new IT face plates shall be grey graphite finish to match that of the new sockets that will be installed on the dado trunking as highlighted in 62.16.

62.20 Electrical attendances to the existing MCC controls panel in the boilerhouse

General:

There is an existing MCC controls panel in the boilerhouse for the Junior School's heating system. This is currently wired and cabled from the existing main distribution electrical board but shall now be supplied and cabled from the new main distribution electrical board 02 that will be installed in the Junior School.

Therefore, the Contractor shall allow for the supply and installation of a new sub-mains cable from the new main distribution electrical board to the existing MCC controls panel for the Junior School in the boilerhouse.

The Contractor shall allow for the supply and installation of a new 4core 25mm^2 sub-mains cable (sub-mains cable as specified below) with separate 25mm^2 earth between the new main distribution electrical board (NSDB.01) in the Store Room and the existing MCC controls panel for the Junior School in the boilerhouse. Refer to drawings for the locations of each board and the exact length of cable required. Allow for a cable length of 25metres.

Allow for all necessary cable containment for the new sub-mains cable installation.

62.21 Attendances to the new hand-dryers

General:

There are existing hand-dryers installed in some toilets in the building. These hand-dryers shall be replaced but shall be rewired with new cabling from the new sub-distribution electrical boards in the building. Refer to the drawings for locations and quantities.

Therefore, the Contractor shall allow for the supply and installation of a switched fused spur in the staff toilet areas for any existing hand-dryers as indicated on the drawings. Attendances have also been allowed in some toilets for the future installation of hand-dryers.

Wiring:

The hand-dryers shall be wired using 3core 2.5mm^2 in LSZH (in conduit) c/w double pole switched fused spur with a rating of 13 amps and be exactly to suppliers instructions. Refer to section 62.11 for details on the cabling and wiring required.

A switched fused spur outlet shall be installed for all existing and future hand-dryers in the location as indicated on the drawings. Refer to section 62.14 for further information on the switched fused spur outlets.

Allow for a fused spur at high level for the isolation of each existing hand dryer. The switched fused spur outlet shall be located at high level at approximately 1200mm above finished floor level.

Allow for cabling from the new fused spur to the existing hand-dryer.

ATC Tiger Eco hand dryer — Z-3145M

Tender specification

Supply, install and commission an ATC Tiger Eco Z-3145M high-speed electric hand dryer, or equivalent, with a wall-mounted brushed stainless-steel casing, automatic infrared activation and tamper-resistant cover screws. Provide a 230 V single-phase supply, local isolation and circuit protection in accordance with I.S. 10101 and the manufacturer's instructions. Set the mounting height to suit the intended users and coordinate the location with the washroom layout and accessibility clearances.

Item	ATC published specification
Power	650 W with heater off, 1,400 W with heater on
Drying time	15 seconds
Sound level	70 dB(A) at 1 m
Safety	Motor and heater thermal protection, 45-second automatic shut-off
Filtration	Optional HEPA filter
Warranty	2 years



62.22 Attendances to the existing extract fans in toilets

General:

There is existing extract fans installed in some toilets in the building. All these existing extract fans shall be retained but shall be rewired with new cabling from the new sub-distribution electrical boards in the building. Refer to the drawings for locations and quantities.

Therefore, the Contractor shall allow for the supply and installation of a switched fused spur to any existing extract fan as indicated on the drawings.

Wiring:

The existing extract fans shall be wired using 3core 2.5mm^2 in LSZH (in conduit) c/w double pole switched fused spur with a rating of 13 amps and be exactly to suppliers instructions. Refer to section 62.11 for details on the cabling and wiring required.

Allow for a fused spur at high level for the isolation of each existing extract fan. The switched fused spur outlet shall be located at high level at approximately 2500mm above finished floor level. Refer to section 62.14 for further information on the switched fused spur outlets. Allow for cabling from the new fused spur to the existing extract fans.

62.23 Attendances to the existing CCTV system

General:

There are a number of existing electrical spurs in place for the existing CCTV cameras and system. These existing 13amp electrical spurs shall be replaced.

62.24 Attendances to the existing intruder alarm system

General:

The existing intruder alarm system throughout the building shall be retained. The existing spurs that are in place for all the existing intruder alarm panel shall be replaced and re-wired. Refer to the drawings for locations and quantities.

Therefore, the Contractor shall allow for the supply and installation of a switched fused spur to any existing intruder alarm panel as indicated on the drawings.

Wiring:

The existing electrical spurs shall be wired using 3core 2.5mm^2 in LSZH (in conduit) c/w double pole switched fused spur with a rating of 13 amps and be exactly to suppliers instructions. Refer to section 62.11 for details on the cabling and wiring required.

A switched fused spur outlet shall be installed for all existing intruder alarm panels. Refer to section 62.14 for further information on the switched fused spur outlets.

Allow for cabling from the new fused spur to the existing intruder alarm panels.

62.25 Attendances to the existing door access systems

General:

There are a number of existing door access systems installed on some doors throughout the building. These existing door access systems shall be retained but the existing spurs that are in place for all the existing system panels shall be replaced and re-wired. Refer to the drawings for locations and quantities.

Therefore, the Contractor shall allow for the supply and installation of a switched fused spur to any existing door access system panels as indicated on the drawings.

Wiring:

The existing electrical spurs shall be wired using 3core 2.5mm^2 in LSZH (in conduit) c/w double pole switched fused spur with a rating of 13 amps and be exactly to suppliers instructions. Refer to section 62.11 for details on the cabling and wiring required.

A switched fused spur outlet shall be installed for all existing door access system panels. Refer to section 62.14 for further information on the switched fused spur outlets.

Allow for cabling from the new fused spur to the existing power source for the door access systems.

62.26 Attendances to the existing electric undersink water heaters

General:

There are existing electric undersink water heaters installed in rooms in the building.

These electric undersink water heaters shall be retained but shall be rewired with new cabling from the new sub-distribution electrical boards. Refer to the drawings for locations and quantities. Therefore, the Contractor shall allow for the supply and installation of a new switched fused spur to any existing electric undersink water heaters as indicated on the drawings.

There shall be a specific circuit in the new sub-distribution electrical board for electric water heaters. This circuit shall be controlled by a hand-off-auto switch and timeclock arrangement.

Wiring:

The existing electric undersink water heaters shall be wired using 3core 4.0mm^2 in LSZH (in conduit) c/w double pole switched fused spur with a rating of 13 amps and be exactly to suppliers instructions. Refer to section 62.11 for details on the cabling and wiring required.

A switched fused spur outlet shall be installed for all existing electric undersink water heaters. Refer to section 62.14 for further information on the switched fused spur outlets. The switched fused spur outlet shall be located at low level at approximately 500mm above finished floor level.

Allow for cabling from the new fused spur to the existing electric undersink water heater.

62.27 Attendances to the existing electric panel heaters

General:

There are existing electric panel heaters installed in rooms in the building. These electric panel heaters shall be retained but shall be rewired with new cabling from the new sub-distribution electrical boards. Refer to the drawings for locations and quantities. Therefore, the Contractor shall allow for the supply and installation of a new switched fused spur to the existing electric panel heaters as indicated on the drawings.

There shall be a specific circuit in the new sub-distribution electrical board for electric water heaters. This circuit shall be controlled by a hand-off-auto switch and timeclock arrangement.

Wiring:

The existing electric undersink water heaters shall be wired using 3core 4.0mm^2 in LSZH (in conduit) c/w double pole switched fused spur with a rating of 13 amps and be exactly to suppliers instructions. Refer to section 62.11 for details on the cabling and wiring required.

A switched fused spur outlet shall be installed for all existing electric undersink water heaters. Refer to section 62.14 for further information on the switched fused spur outlets. The switched fused spur outlet shall be located at low level at approximately 500mm above finished floor level.

Allow for cabling from the new fused spur to the existing electric panel heater.

62.28 Attendances to the existing two-port valves

General:

There are some existing motorised two-port valves for the heating installed in some rooms in the building. All these existing motorised two-port valves shall be retained but shall be rewired with new cabling from the new sub-distribution electrical boards in the building. Refer to the drawings for locations and quantities.

Therefore, the Contractor shall allow for the supply and installation of a switched fused spur to any existing motorised two-port valve as indicated on the drawings.

Wiring:

The existing motorised two-port valves shall be wired using 3core 2.5mm^2 in LSZH (in conduit) c/w double pole switched fused spur with a rating of 13 amps and be exactly to suppliers instructions. Refer to section 62.11 for details on the cabling and wiring required.

Allow for a fused spur at high level for the isolation of each motorised two-port valve. The switched fused spur outlet shall be located at high level at approximately 2500mm above finished floor level. Refer to section 62.14 for further information on the switched fused spur outlets.

62.29 Public Address System

Existing Public Address System:

The existing Public (PA) system throughout the building shall be retained.

62.30 Spurs for smart TV

In the majority of the classrooms, there is a smart TV mounted on the teachers wall. These existing TV's are currently supplies by a switched 13amp spur outlet.

As indicated on the drawings, new spur outlets shall be installed on the dado trunking arrangement for the smart TV's in all classrooms (including future provision).

The Contractor shall allow for the supply and installation of all these new spur outlets on the dado trunking arrangement as indicated on the drawings. Refer to the drawings for quantities, locations and types of spurs required on the dado trunking.

All new spurs shall have a grey graphite finish to match the finish of the new sockets on the dado trunking. Refer to 62.14 for details on switched and unswitched spurs.

The Contractor shall allow for disconnecting the existing cabling from the TV's to the spurs and reconnecting the existing cabling for the TV's back to the new spurs once the new spurs are installed. Allow for all necessary labour for this.

62.31 Blank plates on some existing sockets

Some of the existing sockets in the building that will be decommissioned are recessed into the existing structure. Therefore, the existing sockets cannot be removed so the Contractor will need to allow for the supply and installation of blanking plates on these existing sockets.

Blank plates shall be from the MK Albany Plus (Brushed Stainless Steel) range as MK Albany Plus K3330 BSS (1 gang) or MK Albany Plus K3329 BSS (2 gang), or equivalent.

For tendering purposes, allow for the following quantities:

- 50no MK Albany Plus K3330 BSS (1 gang) blank plates, or equivalent.
- 50noMK Albany Plus K3329 BSS (2 gang) blank plates, or equivalent.

62.32 Earthing and bonding

The new existing electrical installation in the building shall be effectively earthed and non-current carrying metalwork shall be bonded, all in accordance with ETCI rules and as described below. This shall include all conduit, metal clad equipment; fuse board, trunking, etc. or any metal work whatsoever adjacent to the electrical equipment.

All items shall be bonded together and earthed to a main earthing terminal on each of the new distribution boards.

The Contractor shall therefore allow for effectively earthing and bonding the new electrical boards.

The objective of the system is to provide an effective system to minimise danger to life and equipment arising from:

- Faults between line conductors and non-current carrying metal work
- Atmospheric discharges
- Accumulation of static charges
- The design parameters are defined within the ETCI National Rules for Electrical Installations.
- The system requirements are as defined on the system drawing

62.33 Testing and commissioning

The Contractor shall test all items of equipment individually and shall commission the full installation as a unified system. All testing and commissioning shall be carried out in the presence of and to the satisfaction of the Employer's Representative. The Contractor shall give to the Employer's Representative seven days notice in writing before testing or commissioning is carried out.

All tests shall be carried out in accordance with IEE Recommendations, relevant British and Irish Standards or IEC Publication.

62.34 PC Sum for ESB Capital Contribution

A PC sum of €10,000 for both the Junior School and Senior School shall be included in the tender costs for the cost of the ESB capital contribution. This cost is indicated on the tender return document under section 62.06.

This cost will be confirmed with ESB Networks during the construction phase.

Refer to section 62.08 New ESB meters for the Junior School and Senior School and electrical attendances required for ESB Networks.

62.35 ASD Unit existing power and general services to be rewired

The ASD unit existing power and general services installation shall be re-wired back to the New Sub distribution Board (NSDB.06) in the ASD Store Room on the Ground Floor as indicated on the drawings. The existing installation is recessed and the contractor shall re-use the existing conduits.

63.0 LIGHTING SERVICES

63.01 Decommissioning of the existing lighting services installation in the main building

As highlighted on the drawing, the electrical installation throughout the main school building shall be decommissioned, removed and replaced with a new electrical installation. As a result, the existing lighting and emergency lighting services installation throughout the main building shall be decommissioned and replaced with a new lighting and emergency lighting installation.

The Contractor shall allow for all works in decommissioning and replacing the existing lighting and emergency lighting services installation throughout the main building as indicated on the drawings:

- Decommissioning and replacing of the existing emergency lighting services installation throughout the main school building and installation of a new emergency lighting services installation throughout the main school building. This includes decommissioning and removing all existing emergency light fittings, existing cabling, etc.
- Decommissioning and replacing of the existing lighting services installation throughout the main school building and installation of a new lighting services installation throughout the main school building. This includes decommissioning and removing all existing light fittings, existing cabling, etc.

63.02 New internal and external task lighting

General:

The Contractor shall, install, connect, test and commission the whole of the new lighting installation in the main school building and remote tower as shown on the drawings and as described in the specification.

See the drawings for the locations in the building and externally where new lighting is to be installed. This includes all light fittings, cabling, cable containment, controls, etc.

The type of luminaire required for each location is specified in the appropriate schedules. The lighting system shall be fed from the new electrical boards in the building as indicated on the drawings. The exact location of each luminaire shall be determined on site in consultation with the Employer's Representative.

The Contractor shall allow for the supply and installation of all new light fittings as indicated on the drawings. See the lighting schedule below for further information on all light fittings to be supplied and installed.

The circuit shall be arranged for a loop-in system of wiring. Circuit arrangement shall be based on a maximum of 1kW per circuit. Circuit protection shall be by means of 10A MCB only.

Switching arrangements shall be as indicated on the drawing.

Average working plane illumination levels shall generally be as follows:

- *Offices:* 500lux at 700mm AFFL
- *Classrooms:* 300lux at 700mm AFFL
- *Circulation:* 150lux at 700mm AFFL
- *Toilets:* 150lux at 700mm AFFL
- *Disabled toilet:* 200lux at 700mm AFFL

The Contractor shall allow for the supply and installation of all new internal and external light fittings as indicated on the drawings. All the new internal and external light fittings for the project shall be supplied and installed by the Contractor.

The Contractor shall allow for the supply, installation, cabling and commissioning of all the light fittings listed below. The type of luminaire required for each location is specified in the schedule below.

The Contractor shall install these luminaires in the locations as shown on the drawings. The exact location of each luminaire shall be determined on site in consultation with the Employer's Representative.

The proposed schedule of light fittings for the project is as highlighted below.

Samples:

The Contractor shall ensure that all the luminaires required for the project are placed on order in due time to ensure delivery to suit the project construction programme. However, approval of the Employer's Representative shall be obtained for final selection of the luminaires before the orders are placed.

A sample of each luminaire shall be erected on site in a suitable location for inspection by the Employer's Representative for this purpose.

The Contractor shall allow for providing a sample of each proposed light fitting on site so that the Design Team can approve all light fittings prior to ordering.

The Contractor shall allow for factoring the cost of providing samples of the light fittings into his tender costs.

Wiring:

Refer to section 62.11 for details on the cabling and wiring required.

All final sub-circuit cables for lighting installations shall be single core low smoke and zero halogen (LSZH) insulated type cable.

All final circuit wiring for lighting shall be completely enclosed in surface-mounted conduit or in dedicated mains only trunking system.

Cable sizes shall be as follows:

- *Lighting final circuits (1kW max load):* $2.5mm^2/2.5mm^2$ CPC
- *Emergency light fittings:* $2.5mm^2/2.5mm^2$ CPC

Cable Carrier:

Refer to section 62.10 for further information on cable containment. All new cabling for the new lighting installation shall be installed in a steel conduit/trunking system.

Schedule of light fittings to be provided by the Contractor:

See drawings for quantities and locations of all light fittings. All light fittings shall be supplied by Thorn Lighting, or equivalent.

Internal and wall mounted external light fittings	
Type	**Description**
A  **Surface mounted LED light fitting**	A high performance, surface mounted, LED luminaire. Light source: LED Output: 23watt Body: White painted steel End caps: White polycarbonate Diffuser: Clear prismatic polycarbonate Colour: White Dimensions : 1542mm x 195mm x 82mm Luminous flux: 3320lm Lifetime: 10,000hrs L80 at 25°C Dimming: Yes High frequency: Yes Lamp Efficacy: 144 lm/W Colour temp: 4000k IP rating: IP44 Weight: 4.72 kg CE Marked: Yes Warranty: 5 years on all components Light fitting shall be as **Thorn College LED 3000-840 HF HFIX L1500** (or equivalent)

Type	Description
B  **Surface mounted LED light fitting**	A high performance, surface mounted, LED luminaire. Light source: LED Output: 31watt Body: White painted steel End caps: White polycarbonate Diffuser: Clear prismatic polycarbonate Colour: White Dimensions : 1542mm x 195mm x 82mm Luminous flux: 4360lm Lifetime: 100,000hrs L80 at 25°C Dimming: Yes High frequency: Yes Lamp Efficacy: 143 lm/W Colour temp: 4000k IP rating: IP44 Weight: 4.72 kg CE Marked: Yes Warranty: 5 years on all components Light fitting shall be as **Thorn College LED 4600-840 HF L1500** (or equivalent)

Type	Description
C  **Surface mounted LED light fitting**	A high performance, surface mounted, LED luminaire. Light source: LED Output: 47watt Body: White painted steel End caps: White polycarbonate Diffuser: Clear prismatic polycarbonate Colour: White Dimensions: 1520mm x 195mm x 82mm Luminous flux: 6320lm Lifetime: 100,000hrs L80 at 25°C Dimming: Yes High frequency: Yes Lamp Efficacy: 133 lm/W Colour temp: 4000k IP rating: IP44 Weight: 4.81 kg CE Marked: Yes Warranty: 5 years on all components Light fitting shall be as **Thorn College LED 6500-840 HF L1500** (or equivalent).

Type	Description
D  **Surface mounted LED light fitting** **(Ceiling Mounted)**	Slim round ceiling mounted high performance LED luminaire. Light source: LED Output: 12watt Body: White polycarbonate Diffuser: Opal polycarbonate Colour: White Dimensions: 307mm diameter by 58mm deep Luminous flux: 1400lm Lifetime: 50,000hrs L80 at 25°C Dimming: No High frequency: No Lamp Efficacy: 125 lm/W Colour temp: 4000k IP rating: IP65 Weight: 1 kg CE Marked: Yes Warranty: 5 years on all components Light fitting shall be as **Thorn Katona KAT RD 1400-840 HF** (or equivalent).
D1  **Surface mounted LED light fitting with integrated PIR sensor** **(Wall mounted and Ceiling Mounted)**	Shall be the same light fitting as specified above for the 'Type F' fitting but this fitting shall have an integrated PIR sensor for lighting control. Ensure that the light fitting is supplied with an integrated PIR sensor. Light fitting shall be as **Thorn Katona KAT RD 1400-840 MWS** (or equivalent).

Type	Description
F  **Surface mounted LED light fitting** **(Wall mounted and Ceiling Mounted)**	Slim round wall mounted or ceiling mounted high performance LED luminaire. Light source: LED Output: 16watt Body: White polycarbonate Diffuser: Opal polycarbonate Colour: White Dimensions: 307mm diameter by 58mm deep Luminous flux: 1950lm Lifetime: 50,000hrs L80 at 25°C Dimming: No High frequency: No Lamp Efficacy: 125 lm/W Colour temp: 4000k IP rating: IP65 Weight: 1 kg CE Marked: Yes Warranty: 5 years on all components Light fitting shall be as **Thorn Katona KAT RD 2000-840 HF** (or equivalent).
F1  **Surface mounted LED light fitting with integrated PIR sensor** **(Wall mounted and Ceiling Mounted)**	Shall be the same light fitting as specified above for the 'Type F' fitting but this fitting shall have an integrated PIR sensor for lighting control. Ensure that the light fitting is supplied with an integrated PIR sensor. Light fitting shall be as **Thorn Katona KAT RD 2000-840 MWS** (or equivalent).

Type	Description
G  **IP65 rated Surface mounted LED light fitting**	IP66 rated surface mounted LED luminaire. Light source: LED Output: 30watt Body: Light grey polycarbonate Diffuser: Opal polycarbonate Colour: Light grey Dimensions: 1100mm x 92mm x 90mm Luminous flux: 4290lm Lifetime: 100,000hrs L80 at 25°C Dimming: No High frequency: No Lamp Efficacy: 146 lm/W Colour temp: 4000k IP rating: IP66 Weight: 1.7 kg CE Marked: Yes Warranty: 5 years on all components Light fitting shall be as **Thorn Aquaforce Pro LED 4300-840 PC WB HF** (or equivalent).

Type	Description
H  **Surface mounted LED light fitting. These light fittings shall be protected by cages as**	A high performance, surface mounted, LED luminaire. Light source: LED Output: 47watt Body: White painted steel End caps: White polycarbonate Diffuser: Clear prismatic polycarbonate Colour: White Dimensions: 1542mm x 195mm x 82mm Luminous flux: 6320lm Lifetime: 50,000hrs L90 at 25°C Dimming: Yes High frequency: Yes Lamp Efficacy: 127 lm/W Colour temp: 4000k IP rating: IP44 Weight: 4.44 kg CE Marked: Yes Warranty: 5 years on all components Light fitting shall be as **Thorn College LED 6500-840 HF L1500** (or equivalent). There shall be a galvanised steel cage installed over the new LED light fittings that are to be installed in the GP Hall to protect them from ball impact.
Cages **Cages to be installed on the 'Type H' LED light fittings that are to be installed in the GP Hall**	There shall be a galvanised steel cage installed over the new LED light fittings that are to be installed in the GP Hall to protect them from ball impact. In total there are 15no new 'Type H' LED light fittings to be installed in the GP Hall. The size of each light fitting is 1520mm long x 217mm wide x 90mm deep. The Contractor shall allow for the supply and installation of 12no galvinised steel cages to be installed over these light fittings to protect them from ball impact.

Type	Description
X1  **IP65 rated external wall mounted LED light fitting**	IP65 rated wall mounted external LED luminaire. Light source: LED Output: 20watt Back plate: Aluminium painted anthracite Body: Anthracite polycarbonate Diffuser: Opal polycarbonate Colour: Anthracite grey (RAL7016) Dimensions: 381mm x 196mm x 305mm Luminous flux: 2640lm Lifetime: 60,000hrs L70 at 25°C Dimming: No High frequency: No Lamp Efficacy: 130 lm/W Colour temp: 4000k IP rating: IP66 Weight: 2.8 kg CE Marked: Yes Warranty: 5 years on all components Light fitting shall be as **Thorn Piazza 3 LED 9-16-27 827-830-840 HF ANT** (or equivalent).

Type	Description
X2  **IP65 rated external wall mounted LED light fitting**	IP65 rated wall mounted external LED flood light. Light source: LED Output: 45watt Back plate: Aluminium painted anthracite Body: Die-cast aluminium Diffuser: Opal polycarbonate Colour: Powder coated silver grey (RAL 9006) Dimensions: 181mm x 236mm x 49mm Luminous flux: 4300lm Lifetime: 50,000hrs L90 at 25°C Dimming: No High frequency: No Lamp Efficacy: 96 lm/W Colour temp: 3000k IP rating: IP66 Weight: 2.85 kg CE Marked: Yes Warranty: 5 years on all components Light fitting shall be as **Thorn LEDFIT S 45W A/S CL1 L830** (or equivalent).

63.03 New lighting switches

General:

The Contractor shall allow for the supply and installation of a number of light switches in the building as indicated on the drawings.

The majority of the new light switches to be installed in the building shall be 'Push-to-Make' retractive light switches but there shall also be some standard on/on rocker light switches installed in the building. Refer to drawings for types, locations and quantities.

Standalone momentary (Push-To-Make) retractive light switches:

The lighting in the majority of rooms shall be operated via daylight dimming and absence detection. As a result, the lighting in these rooms will require momentary (push-to-make) retractive light switches to operate the lighting in these rooms.

The majority of the new light switches to be installed in the building shall be 'Push-to-Make' retractive light switches and shall be standalone. Refer to the drawings for quantities and locations of all momentary (push-to-make) retractive light switches required in the building.

All standalone momentary (push-to-make) retractive light switches shall be surface mounted.

Standalone momentary (push-to-make) retractive light switches as required shall be from MK Albany Plus range, or equivalent, and shall have a brushed stainless steel finish. Include for suitable cover plate, grid and surface mounted back box. Mounting boxes to be supplied without knock outs.

The Contractor shall allow for the following from the MK Albany Plus range, or equivalent for each standalone momentary (push-to-make) retractive light switch:

- Brushed stainless steel cover plate as K3431BSS for one gang or K3432BSS for two gang, or equivalent.
- Surface mounted back box in metalclad grey as K829ALM, or equivalent. Back box to suit light switch.
- Single pole two-way push switch with 'Press' printed on the switch. The switch shall be finished in white as K4885PWHI, or equivalent.

Lighting switches shall be provided and ganged as indicated on the drawings and shall be either 1-way, 2-way or intermediate as indicated. Switches for internal use shall be of the 15/20 Amp inductive rating grid switch type.





Standalone standard on/off rocker light switches:

Standalone standard on/off rocker type light switches shall be installed in some rooms in the building as indicated on the drawings. Refer to the drawings for quantities and locations of all standard on/off rocker light switches required in the building.

All standalone standard on/off light switches shall be surface mounted on the wall. Refer to the drawings for quantities and locations of all standard on/off rocker light switches required in the building.

Standalone standard on/off rocker type light switches as required shall be from MK Albany Plus range, or equivalent, and shall have a brushed stainless steel finish. Include for suitable cover plate, grid and surface mounted back box. Mounting boxes to be supplied without knock outs.

The Contractor shall allow for the following from the MK Albany Plus range, or equivalent for each standalone standard on/off light switch:

- Brushed stainless steel cover plate as K3431BSS for one gang or K3432BSS for two gang, or equivalent.
- Surface mounted back box in metalclad grey as K829ALM, or equivalent. Back box to suit light switch.
- Standard rocker module switch finished in white included with switch.




Lighting switches shall be provided and ganged as indicated on the drawings and shall be either 1-way, 2-way or intermediate as indicated. Switches for internal use shall be of the 15/20 Amp inductive rating grid switch type. Switches shall comply with BS EN 60669-1:2000.

Mounting heights and cable containment for all light switches in the building:

All new lighting switches installed in the building, unless stated otherwise, shall be surface mounted. All lighting switches, unless stated otherwise, shall be located 1200mm (to the top of the light switch) generally above finished floor level.

All new cabling to the light switches shall be installed in surface mounted steel conduit. All conduit supplies to the back box for all the surface mounted light switches shall be surface mounted on the wall so ensure for a neat installation.

Refer to section 62.10 below for further information on the conduit and cable containment required.

Wiring:

Refer to section 62.11 for further information on cabling required for the lighting installation.

63.04 Lighting controls for teaching spaces and offices

General:

Automatic lighting controls shall be installed for all teaching spaces and classrooms in the building as indicated on the drawings. The controls shall incorporate 3no control elements:

- Manual On/Off control
- Automatic daylight dimming
- Absence Control

The lighting controls in all these rooms shall be based on manual on/off switching, daylight sensing to dim lights as required to "Off" in response to the changes in daylight levels and absence detection to turn off lights.

Absence detection shall be set up so that the sensor in each room will require the lighting 'push-to-make' light switch to turn the lights on and will time out when the area is left unoccupied and will need re-activation again by the light switch.

In rooms (where possible), lighting control shall be set up such that all light fittings are linked to just one detector in each room such that all lights respond in the same manner to the automatic control signals. A remote daylight dimming/PIR sensor shall be supplied for all the light fittings in each of these rooms and this sensor shall be linked to the light fittings in the room for lighting control. Allow for the necessary control wiring between the light fittings and the relevant sensor in each area/room.

Light switches:

A momentary action (bell push) rocker type switch shall be installed in all these rooms for the lighting circuits in these areas (see drawings for quantities).

Operation of lighting system in areas:

- The user will enter the room/area and to press the 'push-to-make' rocker switch to bring the lights on. The lights shall then turn on to the required light level only if the detectors sense that the room/area is occupied AND the photocell senses that there is an inadequate lighting level in the room/area.

- The lights will remain on while the room/area is occupied. There is no time limit to this.
- Once the room/area is vacated, the system will time out and switch the lights off. This timeout period shall be set to 15 minutes.
- If the room/area is entered before the lights have timed out, the system will reset and stay on until once again the room/area is vacated.
- If the room/area is entered after the lights have timed out, the user will have to press the 'push-to-make' rocker switch to bring the lights back on.

The daylight level sensors shall be programmed as follows:

- The average working plane illumination levels in these rooms shall be 300 lux for General Classrooms and 500lux for offices. These lux levels shall be constantly maintained.
- The sensor shall adjust the illumination levels of the lights / row of lights connected as required.
- Where day light levels are above the required illumination levels, the light fittings shall not operate. The lighting levels are as follows:
    - If the light level is above the required lux level then the lights/rows of lights will turn off.
    - If the light levels above are achieved, then the light/row of lights will turn off.
    - If the light level is below 100 lux below the required levels, then the light/row of lights will turn on.
    - The light level hysteresis should be set to five minutes to prevent short cycling.

Remote daylight dimming/absence detector for these areas:

The Contractor shall allow for the supply and installation of a remote motion sensor to control the light fittings in these areas as indicated on the drawings.



All detectors shall be as follows or equivalent:

- *Type:* Thorn SENSA MRE DDP, or equivalent
- *Colour:* White
- *Mounting:* Recessed into the ceiling or surface mounted

- *Detection range:* 360°
- *Cover:* 7 meters at 2.8m
- *Voltage:* 230V AC
- *Detection:* Infrared detection

See drawings for quantities and locations.

Wiring & Control Wiring:

See detail on drawings for control wiring and mains wiring for lighting controls.

The Contractor shall include for the following wiring and control cabling in each room:

- All new mains wiring from the new electrical boards in the building to all the new light fittings in the building and as indicated on the drawings. Refer to 62.11 for information on cabling. The Contractor shall include for all mains power supply cabling to the new light fittings in these rooms in 3-core 2.5mm^2 LSZH cable as indicated.
- The Contractor shall also for 3-core 2.5mm^2 LSZH low voltage cabling from the sensor to all the light fittings in that room.
- Allow for the supply and installation of all retractive 'Push-To-Make' light switches for each room as indicated on the drawings. Refer to 'Section 63.03' above for details on the light switches. Retractive 'Push-To-Make' light switches shall be installed for all rooms and areas that require daylight dimming and absence detection. Refer to drawing for locations, type, quantities, gangs, etc.
- All associated cabling. Refer to section 62.11 for specific details on the cabling required for the lighting system.
- All associated cable containment. Refer to section 62.10 for specific details on the cabling required for the lighting system.

The Contractor shall ensure that the lighting control system selected is compatible with the luminaires selected. This shall include liaising with the lighting control specialist prior to first fix, to ensure the light sensor is located in the optimum location within each room.

Commissioning:

The Contractor shall allow for the testing and commissioning of the lighting systems for the building to ensure all lighting control parameters are achieved. The Contractor shall allow for a full day of commissioning on site to set all light levels and times for the lighting controls in the building.

The lighting system in the building shall be commissioned, tested, and demonstrated to the Engineer and the client.

A testing and commissioning cert for the lighting controls, stating that each and every area has been commissioned to the above parameters shall be provided to the Consultant Engineer prior to handing over the building.

63.05 Lighting controls for corridors

General:

Lighting in corridors shall be controlled by presence detection but shall also have light switches installed to turn off the light fittings if required.

The light switches shall turn the power off to the lights so that in the event the school want to manually turn of the lighting in the corridors, they can do so via the light switches.

The lighting controls in all these rooms shall be based on manual on/off switching to turn the lights on or off when they are switched on by the School.

The lighting controls in these areas are to be based on motion detection to turn on the lights when motion is sensed and to turn off lights when no presence is detected after 15 minutes.

Settings shall be set up as identified below.

Light switches:

A standard light switch shall be installed for the lighting in the corridors to switch the lighting on so that it can operate in presence detection mode (see drawings for quantities). Refer to 63.03 for further information on light switches.

Operation of lighting system in these areas:

- If the light switch is switched on, the user will enter the corridor and the lights shall then turn on.
- The lights will remain on while the corridor is occupied. There is no time limit to this.
- Once the corridor is vacated, the system will time out and switch the lights off. This timeout period shall be set to 15 minutes.
- If the corridor is entered after the lights have timed out, the lighting will automatically turn on again via the presence detector and operate as highlighted above.

- If the light switch is in the off position, the lighting in the corridors will not come on.

Remote motion/presence detector for these areas:

The Contractor shall allow for the supply and installation of a remote sensor to control the light fittings in these areas as indicated on the drawings.

Refer to drawings for quantities and locations. Allow for the necessary control wiring between the light fittings and the relevant sensor in each area/room.

Refer to the drawings for further information.

All detectors shall be as follows or equivalent:

- *Type:* Thorn SENSA MRE DDP, or equivalent
- *Colour:* White
- *Mounting:* Recessed into the ceiling or surface mounted
- *Detection range:* 360°
- *Cover:* 7 meters at 2.8m
- *Voltage:* 230V AC
- *Detection:* Infrared detection

See drawings for quantities and locations.



Wiring & Control Wiring:

See detail on drawings for control wiring and mains wiring for lighting controls.

The Contractor shall include for the following wiring and control cabling in each room:

- All new mains wiring from the new electrical boards in the building to all the new light fittings in the building and as indicated on the drawings.

Refer to 62.11 for information on cabling. The Contractor shall include for all mains power supply cabling to the new light fittings in these rooms in 3-core 2.5mm^2 LSZH cable as indicated.

- The Contractor shall also for 3-core 2.5mm^2 LSZH low voltage cabling from the sensor to all the light fittings in that room.
- Allow for the supply and installation of all standard on/off light switches for each room as indicated on the drawings. Refer to 'Section 63.03' above for details on the light switches. Refer to drawing for locations, type, quantities, gangs, etc.
- All associated cabling. Refer to section 62.11 for specific details on the cabling required for the lighting system.
- All associated cable containment. Refer to section 62.10 for specific details on the cabling required for the lighting system.

The Contractor shall ensure that the lighting control system selected is compatible with the luminaires selected. This shall include liaising with the lighting control specialist prior to first fix, to ensure the light sensor is located in the optimum location within each room.

Commissioning:

The Contractor shall allow for the testing and commissioning of the lighting systems for the building to ensure all lighting control parameters are achieved. The Contractor shall allow for a full day of commissioning on site to set all light levels and times for the lighting controls in the building.

The lighting system in the building shall be commissioned, tested, and demonstrated to the Engineer and the client.

A testing and commissioning cert for the lighting controls, stating that each and every area has been commissioned to the above parameters shall be provided to the Consultant Engineer prior to handing over the building.

63.06 Lighting controls for toilets and stores

General:

Automatic lighting controls shall be installed for all the light fittings in these areas as indicated on the drawings. The light fittings in these areas shall be controlled via motion detection.

There is no requirement to install light switches for these areas as the lights in these areas/rooms shall be switched on by the presence detector and will also be switched off by the presence detector.

The lighting controls in these areas are to be based on motion detection to turn on the lights when motion is sensed and to turn off lights when no presence is detected after 15 minutes.

Settings shall be set up as identified below.

A remote sensor or sensor incorporated into the light fitting shall be supplied for the light fittings in these rooms and this sensor shall be linked to the light fittings in the room for lighting control.

Allow for the necessary control wiring between the light fittings and the relevant sensor in each area/room. Refer to the drawings for further information.

Operation of lighting system in these areas:

- The user will enter the room and the lights shall then turn on.
- The lights will remain on while the room is occupied. There is no time limit to this.
- Once the room is vacated, the system will time out and switch the lights off. This timeout period shall be set to 15 minutes.

Remote motion/presence detector for these areas:

The Contractor shall allow for the supply and installation of a remote sensor to control the light fittings in these areas as indicated on the drawings.

Please note that the majority of light fittings for these areas shall have the sensor incorporated into the light fitting and shall be supplied with the light fitting.

However, some light fittings in these areas will require a remote sensor as indicated on the drawings. Refer to drawings for quantities and locations. Allow for the necessary control wiring between the light fittings and the relevant sensor in each area/room.

Refer to the drawings for further information.

All detectors shall be as follows or equivalent:

- *Type:* Thorn SENSA MRE DDP, or equivalent
- *Colour:* White
- *Mounting:* Recessed into the ceiling or surface mounted
- *Detection range:* 360°
- *Cover:* 7 meters at 2.8m
- *Voltage:* 230V AC
- *Detection:* Infrared detection

See drawings for quantities and locations.



Wiring & Control Wiring:

See detail on drawings for control wiring and mains wiring for lighting controls.

The Contractor shall include for the following wiring and control cabling in each room:

- All new mains wiring from the new electrical boards in the building to all the new light fittings in the building and as indicated on the drawings. Refer to 62.11 for information on cabling. The Contractor shall include for all mains power supply cabling to the new light fittings in these rooms in 3-core 2.5mm^2 LSZH cable as indicated.
- The Contractor shall also for 3-core 2.5mm^2 LSZH low voltage cabling from the sensor to all the light fittings in that room.
- All associated cabling. Refer to section 62.11 for specific details on the cabling required for the lighting system.
- All associated cable containment. Refer to section 62.10 for specific details on the cabling required for the lighting system.

The Contractor shall ensure that the lighting control system selected is compatible with the luminaires selected. This shall include liaising with the lighting control specialist prior to first fix, to ensure the light sensor is located in the optimum location within each room.

Commissioning:

The Contractor shall allow for the testing and commissioning of the lighting systems for the building to ensure all lighting control parameters are achieved. The Contractor shall allow for a full day of commissioning on site to set all light levels and times for the lighting controls in the building.

The lighting system in the building shall be commissioned, tested, and demonstrated to the Engineer and the client.

A testing and commissioning cert for the lighting controls, stating that each and every area has been commissioned to the above parameters shall be provided to the Consultant Engineer prior to handing over the building.

63.07 Mains and control cabling to the light fittings

New cabling/wiring shall be installed from the new sub-distribution electrical boards in the building to all the new internal and external light fittings throughout the building.

New control cabling from new lighting sensors shall also be supplied and connected to the new light fittings throughout the building. Refer to the drawings for further information.

63.08 Cable carrier system for lighting installation

New cable containment i.e. trunking, tray, conduits, etc. shall be installed to distribution the necessary cabling from the new sub-distribution electrical boards to all the necessary lighting to be installed the building. Refer to the drawing for further information.

Where possible, the Contractor shall utilise the existing conduit drops to the existing light fittings and light switches, providing that the existing containment is installed in steel conduit and the conduit is in good condition.

Refer to 62.10 for further information on the cable containment and conduits required for the lighting system installation.

63.09 New external bulkhead lighting attached to the building

The existing external wall mounted light fittings on the main shall be decommissioned and replaced with new external wall mounted light fittings.

The external lighting attached to the building shall be installed as per the drawings. The Contractor shall allow for the cabling and power to these new light fittings from the new sub-distribution electrical boards in the building.

The Contractor shall allow for supplying and installing the new external lighting as per the drawings and specifications. Lighting circuits shall be as indicated on the drawings.

All external lighting mounted on the building shall be carried out in 2.5mm^2 LSF cable run in conduit or trunking.

All external wall mounted light fittings shall be controlled by a photocell & analogue timeclock arrangement c/w hand-off-auto switch located inside the new sub-electrical boards in the building as indicated on the drawings.

Include for cabling and wiring all new external wall mounted light fittings back to the new sub-electrical boards in the building. Location as indicated on the drawings. Cabling requirements as highlighted above.

Demonstration to be given to the Employer's Representative for setting of time clocks at future date. All times to be agreed with Client. Demonstration to be given to Client for setting of time clocks at future date.

See section 63.02 for information on the external wall mounted light fittings.

63.10 Existing CCTV Cameras mounted on the ESB External Store Room

There are 4no existing CCTV cameras mounted on the ESB External Store Room where the new main distribution electrical board is to be installed. There is an existing consumer board that shall be retained but shall be re-wired and shall be cabled back to the new main distribution electrical board for the Junior School.

63.11 Emergency Lighting

Existing emergency lighting system installation in the building:

The existing emergency lighting system including all emergency light fittings, containment, controls, etc. in the building shall be decommissioned and removed. A new emergency lighting system as specified below shall be installed throughout the building.

New emergency lighting system installation in the building:

The Contractor shall supply, install, connect, test and commission a fully comprehensive operational emergency/escape lighting systems installation throughout the main building as indicated on the drawings.

The emergency lighting installation shall be installed in conjunction with the fire alarm system. All emergency light fittings shall be supplied, tested and commissioned by the Contractor.

The objective of the system is to provide an efficient and effective emergency lighting system meeting the requirements of IS 3217:2023. The emergency lighting shall consist of standalone luminaires and exit signs, as indicated on the system drawings. In the event of circuit power failure the emergency fitting or exit sign shall illuminate for a period of 3 hours.

The Contractor shall supply and install the emergency lighting system and emergency light fittings in compliance with IS 3217:2023, BS EN 50172 and IEC 62034.

All emergency light fittings for this building shall be EMC compliant, CE Marked and manufactured to IS EN60598-2-22.

The emergency lighting system shall operate for a period not less than 3 hours following failure of the normal supply.

The system shall include all emergency lights and exit signs, and the Electrical Contractor shall take responsibility to ensure that all emergency luminaires are compatible with the chosen system.

Each emergency luminaire shall have a switching unit which shall automatically switch the luminaire to the emergency circuit in the event of local or mains power failure. The installation shall consist of self-contained maintained emergency exit signs with appropriate running man symbol.

Types of luminaires required for the various locations are shown on the drawings and described in the below. The Contractor shall ensure that the luminaires are placed on order to suit the installation programme. However, approval of the Engineer shall be obtained before placing orders.

Containment

A new cable carrier shall be installed for the new cabling for the emergency lighting installation in the building. A system of galvanised steel cable trunking shall be installed to distribute the new lighting cabling throughout the building.

See section 62.10 above and drawing for further information on containment required for new cabling for the emergency lighting system.

New Electrical Boards:

All the new emergency light fittings shall be wired on the same circuits as the new general lighting which are being installed will be installed in conjunction with the emergency lighting.

This ensures that the emergency lights will protect not just against a general power cut, but also against the failure of a lighting circuit. If it desired to switch the normal lighting by a contactor; then this is done by the use of suitable multi pole contactors controlled as desired.

The emergency lighting should be connected before the contactors, such that opening of the contactor won't discharge the batteries.

Emergency Lighting Test Units:

All new electrical boards to be installed throughout building shall be provided with an emergency lighting test unit. An emergency lighting test unit shall be provided in the new electrical boards to be supplied and installed throughout the building as indicated on the drawings.

All test units shall be complete with interface units on the lighting MCB board as necessary. Power to each central test unit shall be in 3 x 2.5 mm^2 cables in conduit from a separate circuit on the lighting MCB board.

The emergency lighting test unit shall have the following functions:

- Shall have a timer.
- Shall have pre-set test durations for selection.
- Shall have indicators for 'Test', 'Complete' and 'Elapsed Time'.
- Shall have automatic restoration of mains power.

Facility shall be provided for periodic testing of the emergency lighting luminaires without having to switch off the relevant circuit.

Emergency luminaires shall generally be suitable for 3-hour duration. The recharge period for the batteries after full discharge shall not exceed 24 hours.

A full discharge/recharge test must be performed for every luminaire during commissioning procedures. Each emergency luminaire shall have a switching unit which shall automatically switch the luminaire to the emergency circuit in the event of local or mains power failure. The emergency lighting system shall operate for a period not less than 3 hours following failure of the normal supply.

Supplies to emergency sections of signs shall be taken from the interface unit on the lighting MCB board fed from the MCB controlling the adjacent lighting circuit. Also, where sustained, a switched supply, taken from the same circuit, shall be run to the sustained section of the fitting together with a permanent supply. The switch for the sustained fittings shall be mounted with the nearby light switch.

Emergency Luminaires

The Contractor shall supply, test and commission all the emergency light fittings throughout the building. Refer to schedule below for further information on all emergency light fittings to be supplied and installed.

The Contractor shall ensure that all emergency luminaires (maintained and non-maintained as appropriate) shall be compatible with the emergency lighting test system.

All emergency light fittings shall be designed and manufactured to meet the requirements of EN60598-2-22 and all applicable EU standards. All emergency light fittings shall also be EMC compliant and CE Marked.

Emergency lighting luminaires shall be mounted at least 2000mm from the finished floor level. Emergency lighting safety signs shall be positioned between 2000mm and 3000mm above finished floor level (measured to the base of the sign).

See 'Schedule of Emergency Light Fittings' below for information on all type, models and makes of emergency light fittings required for the installation.

LED emergency exit signs & control modules

LED Emergency Exit Signs shall be used in conjunction with remote Control Modules. The LED sign shall utilise a strip of LEDs

Cabling

The Contractor shall allow for new cabling for the new emergency lighting system throughout the building. New cabling shall be supplied and installed from the new electrical boards that are to be supplied throughout the building.

All new cabling for the emergency lighting shall be wired from the new MCB's in the new electrical boards that are to be installed in the building.

All cable carrying mains voltage for emergency lighting services shall be LSZH. Wiring to all emergency light fitting shall be cabled in 3 x 2.5mm^2 LSZH which is installed in conduit. Wiring to exit signs shall also be installed in 3 x 2.5mm^2 LSZH in conduit to a surface outlet box over which the fitting shall be mounted.

All cabling shall low smoke and zero halogen (LSZH) insulated type, flame retardant to BS 4066, with stranded copper conductors, thermosetting insulation type E1.5 to BS 7655 all complying with BS 7211. All cabling shall be LSZH sheathed cable.

Refer to section 62.10 for further information on cable containment and refer to section 62.11 for further information on cabling.

All the new emergency light fittings shall be wired on the same circuits as the new general lighting in the areas as indicated on the drawings. This ensures that the emergency lights will protect not just against a general power cut, but also against the failure of a lighting circuit.

If it desired to switch the normal lighting by a contactor; then this is done by the use of suitable multi pole contactors controlled as desired. The emergency lighting should be connected before the contactors, such that opening of the contactor won't discharge the batteries.

All new cables shall be supplied from the new electrical distribution boards in the building. Quantity and locations as indicated on the drawings.

Containment

A new cable carrier shall be installed for the new cabling for the emergency lighting installation throughout the building.

All of the new conduits installed buildings shall be surface mounted.

Commissioning

The Contractor shall make allowance for the specialist manufacturer to commission the emergency lighting system throughout the building in accordance with the manufacturer's recommendations.

The Contractor shall allow for fully testing and commissioning the emergency lighting system throughout buildings in full compliance with IS 3217:2023.

The Contractor shall allow for the following during the commissioning for the emergency lighting system for the building:

- Carry out a full test on the emergency lighting system in the building. A full discharge/recharge test must be performed for every luminaire during commissioning procedures.
- The test shall be carried out at night time when it is fully dark to see the effectiveness of the emergency lighting system in the building. Results shall be recorded and any discrepancies highlighted.
- The Electrical Contractor shall allow for the witnessing of the emergency lighting system by the Engineer in the building.
- Check all emergency light fittings in the building to ensure all lamps and LED indicators are operational.

- Verify sub-circuit monitoring in the building.
- Simulate power failure to each area in the building.
- Verify maximum 24-hour recharge. The recharge period for the batteries after full discharge shall not exceed 24 hours.
- Carry out a second full duration test in the building after the 24-hour recharge has elapsed.

Lux level check:

The Contractor shall allow for carrying out a test on the emergency lighting system in the building at night time to ensure that all lux levels are being achieved. The test shall be carried out at night time when it is fully dark to see the effectiveness of the emergency lighting system in the building. Results shall be recorded and any discrepancies highlighted.

After the test is completed, the Contractor shall confirm that all areas in the building are compliant with I.S. 3217:2023 and if not, what areas are not compliant. The Electrical Contractor shall allow for the cost of labour for carrying this test outside of normal working hours.

The Contractor shall mark on a drawing the lux levels that is being achieved by the emergency lighting throughout the building.

Labelling:

The Contractor shall allow for labelling, numbering and identifying all the new emergency light fittings throughout the building. All fittings shall be adequately labelled with a dedicated ID number via a small adhesive sticker to identify fitting number and where it is wired from.

For example, if an emergency light fitting is wired from the new sub-distribution electrical board NSDB-01, it should be labelled; NSDB.01-EL-01 and NSDB.01-EL-02 for the second fitting and so on. The unique label shall be highlighted on the record drawing as highlighted below.

The Contractor shall mark on a drawing the lux levels that is being achieved by the emergency lighting throughout the building.

Record Drawing:

The Contractor shall allow for preparing a record drawing of the installed emergency lighting system throughout the building which shall include all locations of emergency light fittings throughout the building.

The Contractor shall also highlight on this drawing the location, type and ID of light fitting for the building. This record drawing shall be included in the O&M manual. It is the responsibility of the Electrical Contractor who installs the system to produce a relevant record drawing to the satisfaction of the Engineer.

The Contractor shall mark on a drawing the lux levels that is being achieved by the emergency lighting throughout the building.

Certificates:

When the system is commissioned and handed over to the Client, in compliance with I.S. 3217:2023, the Contractor shall provide the following certificates for the emergency lighting system throughout the building:

- Certificate of Installation as highlighted in I.S. 3217:2023.
- Certificate of Commissioning as highlighted in I.S. 3217:2023.
- Certificate of Handover as highlighted in I.S. 3217:2023.

Warranties on emergency light fittings:

All emergency light fitting shall have a 6-year warranty as a minimum. This warranty shall include battery replacement within the 6-year warranty period.

Schedule of emergency light fittings:

The Contractor shall allow for supplying and installing the emergency light fittings listed below for the emergency lighting installation throughout the building.

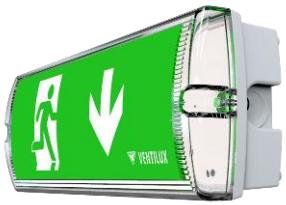
All emergency light fittings shall be EMC compliant, CE Marked and manufactured to IS EN60598-2-22. See drawings for locations and quantities.

Emergency light fittings shall be as follows:

Type	***Description***
E1  **Single-sided wall mounting emergency exit sign**	New emergency exit light fitting with 3hr maintained emergency operation c/w status indicator. Refer to drawing for directional arrows required. Light fitting shall adhere to the following: • Wall mounted. • Single sided screen-printed legend panel in appropriate European signs directive format pictogram. • Body - flame retardant ABS. • Panel - flame retardant acrylic • Legend - flame retardant PVC • Batteries(self-contained)–3.2V 3.2A/h LiFePO4 • Lamp Colour – 5700K • IP40. • Finish shall be white (RAL 9016) • 1 watt LED in total. • Built-in downlighter (70 lumens) • Three-hour maintained. • Weight is 1.06Kg • 6-year warranty including battery • The light fitting shall conform to the current BS ISO 3864-1 & ISO 7010 S standards. • CE marked The proposed lighting fitting is **Ventilux Atlantic EB** (or equivalent).

Type	***Description***
E2  **Ceiling mounted emergency exit sign (double-sided)**	New emergency exit light fitting with 3hr maintained emergency operation c/w status indicator. Refer to drawing for directional arrows required. Light fitting shall adhere to the following: • Ceiling mounted hanging light emergency exit fitting (blade type). • Double sided screen-printed legend panel in appropriate European signs directive format pictogram. • Body - Aluminium. • Panel - flame retardant acrylic • Legend - flame retardant PVC • Batteries (self-contained) - 3.6V 800mAh Ni-Cd • IP20. • Lamp colour – 5000K • Lamp power – 0.4W. • 25m Viewing Distance • Finish shall be white (RAL 9016) • Three-hour maintained. • Weight is 1.6kg • 6-year warranty including battery • The light fitting shall conform to the current BS ISO 3864-1 & ISO 7010 S standards. • CE marked The proposed lighting fitting is **Ventilux Fusion LED (Hanging Recessed)** (or equivalent).

Type	***Description***
E3  **Ceiling mounted emergency exit sign (single-sided)**	New emergency exit light fitting with 3hr maintained emergency operation c/w status indicator. Refer to drawing for directional arrows required. Light fitting shall adhere to the following: • Ceiling mounted hanging light emergency exit fitting (blade type). • Single sided screen-printed legend panel in appropriate European signs directive format pictogram. • Body - Aluminium. • Panel - flame retardant acrylic • Legend - flame retardant PVC • Batteries (self-contained) - 3.6V 800mAh Ni-Cd • IP20. • Lamp colour – 5000K • Lamp power – 0.4W. • 25m Viewing Distance • Finish shall be white (RAL 9016) • Three-hour maintained. • Weight is 1.6kg • 6-year warranty including battery • The light fitting shall conform to the current BS ISO 3864-1 & ISO 7010 S standards. • CE marked The proposed lighting fitting is **Ventilux Fusion LED (Hanging Recessed)** (or equivalent).

Type	***Description***
E4  **Wall mounted IP65 rated emergency exit sign**	New IP65 rated emergency exit light fitting with 3hr maintained emergency operation c/w status indicator. Refer to drawing for directional arrows required. Light fitting shall adhere to the following: • Wall mounted. • Housing - flame retardant ABS plastic. • Panel - flame retardant clear ABS plastic. • Gear tray - powder coated sheet steel. • Batteries (self-contained) – 3.6V 1.8A/h Ni-Mh. • IP65. • Finish shall be white (RAL 9016) • 10 high output white LED's. • Lamp power – 0.6 watt. • Class I. • 120lumens in emergency • Lamp colour - 5000K • Three-hour maintained. • 6-year warranty • The light fitting shall conform to the current BS ISO 3864-1, IS 1838:2013 & ISO 7010S standards. • CE marked The proposed lighting fitting is **Ventilux Visor LED Exit** (or equivalent).

Type	***Description***
E5  **Surface mounted fitting with 'Open Plan' lens**	New self-contained standalone surface mounted LED emergency light downlighter (Open Area Version). Fitting shall be a high performance LED light fitting. Light fitting shall be a non-maintained emergency operation c/w status indicator. Light fitting shall adhere to the following: • Surface mounted for open area version. Supplied with the open plan lens (symmetrical light pattern). • Self-contained. • Dimensions of fitting is 150mm long by 150mm wide by 39mm high. • Lamp power - 4.0 Watt (2no x 2watt) • Lamp colour - 5000K. • Weight is 1Kg. • 510 lumens in emergency • Material of fitting is ABS. • Batteries (self-contained) – 6.4V, 3.2Ah LiFePO4 • Non-Maintained 3 hour duration • Class II. • IP40 • Colour shall be white RAL 9016 • Status indicator to indicate operational condition. • 6-year warranty. • CE marked. • Fully compliant to EN 60598.2.22 The proposed lighting fitting is **Ventilux Delta SM (OP)** (or equivalent).

Type	***Description***
E6  **IP65 rated LED bulkhead fitting**	New self-contained standalone wall/ceiling mounted LED emergency bulkhead with 3hr non-maintained emergency operation c/w status indicator. Ceiling or wall mounted version dependent on location. Light fitting shall adhere to the following: • Surface mounted bulkhead. • IP65 rated for external use. • Self-contained. • 8 high output white LED's • Lamp colour - 5000K. • Lamp power is 1W. • 120 lumens in emergency • Body - flame retardant ABS plastic. • Diffuser - flame retardant clear ABS plastic. • Gear Tray - powder coated sheet steel. • Batteries (self-contained) - 4.8V 1.3A/h Ni-Mh • Colours shall be White RAL 9016. • Class I. • 6-year warranty. • CE marked. • Fully compliant to EN60598-2-22 The proposed lighting fitting is **Ventilux Visor 120** (or equivalent).
Type	***Description***
Cages **Cages to be installed on the 'Type E6' emergency light fittings that are to be installed in the GP Hall**	There shall be a galvanised steel cage installed over the new emergency light fittings that are to be installed in the GP Hall to protect them from ball impact. In total there are 3no new emergency light fittings to be installed in the GP Hall that need to be protected. The size of each light fitting is 300mm long x 100mm wide x 100mm deep. The Contractor shall allow for the supply and installation of 3no galvinised steel cages to be installed over these light fittings to protect them from ball impact.

Type	***Description***
E7  **IP65 rated LED bulkhead fitting**	New self-contained standalone wall/ceiling mounted LED emergency bulkhead with 3hr non-maintained emergency operation c/w status indicator. Ceiling or wall mounted version dependent on location. Light fitting shall adhere to the following: • Surface mounted bulkhead. • IP65 rated for external use. • Self-contained. • 6 x 1.5 high output white LED's • Lamp colour - 6000K. • Lamp power is 9W. • 1200 lumens in emergency • Body - flame retardant ABS plastic. • Diffuser – Clear polycarbonate • Gear Tray - powder coated sheet steel. • Batteries (self-contained) – 9.6V 4.5A/h NiCd • Colours shall be White RAL 9016. • Class I. • 6-year warranty. • CE marked. • Fully compliant to EN60598-2-22 The proposed lighting fitting is **Ventilux Skylux** (or equivalent). There shall be a galvanised steel cage installed over the new emergency light fittings that are to be installed in the GP Hall to protect them from ball impact. In total, there shall be 2no new emergency light fittings installed in the GP Hall where steel cages will be required. Refer to the specification for dimensions of the light fitting.

Type	***Description***
E8  **Ceiling suspended emergency exit sign (single-sided)**	New emergency exit light fitting with 3hr maintained emergency operation c/w status indicator. Refer to drawing for directional arrows required. Light fitting shall adhere to the following: • Ceiling suspended hanging light emergency exit fitting (blade type). • Single sided screen-printed legend panel in appropriate European signs directive format pictogram. • Body - Aluminium. • Panel - flame retardant acrylic • Legend - flame retardant PVC • Batteries (self-contained) - 3.6V 800mAh Ni-Cd • IP20. • Lamp colour – 5000K • Lamp power – 0.4W. • 25m Viewing Distance • Finish shall be white (RAL 9016) • Three-hour maintained. • Weight is 1.6kg • 6-year warranty including battery • The light fitting shall conform to the current BS ISO 3864-1 & ISO 7010 S standards. • CE marked The proposed lighting fitting is **Ventilux Atlantic SP LED (Suspended)** (or equivalent).

Type	***Description***
E9  **Ceiling suspended emergency exit sign (double-sided)**	New emergency exit light fitting with 3hr maintained emergency operation c/w status indicator. Refer to drawing for directional arrows required. Light fitting shall adhere to the following: • Ceiling suspended hanging light emergency exit fitting (blade type). • Single sided screen-printed legend panel in appropriate European signs directive format pictogram. • Body - Aluminium. • Panel - flame retardant acrylic • Legend - flame retardant PVC • Batteries (self-contained) - 3.6V 800mAh Ni-Cd • IP20. • Lamp colour – 5000K • Lamp power – 0.4W. • 25m Viewing Distance • Finish shall be white (RAL 9016) • Three-hour maintained. • Weight is 1.6kg • 6-year warranty including battery • The light fitting shall conform to the current BS ISO 3864-1 & ISO 7010 S standards. • CE marked The proposed lighting fitting is **Ventilux Atlantic SP Fusion LED (Suspended)** (or equivalent).

63.12 Maintenance of the emergency lighting system

The Contractor shall be responsible for the first years servicing and maintenance of the emergency lighting system in the building once all new works are completed.

The Contractor shall include the cost of this in his submitted tender costs.

63.13 Cabling, wiring and cable sizes

Refer to section 62.11 for information on cabling.

63.14 Blanking plates on some of the existing sockets

Refer to section 63.31 for details on blanking plates on some of the existing sockets.

63.15 ASD Unit existing lighting and emergency lighting services to be rewired

The ASD unit existing lighting and emergency lighting services installation shall be re-wired back to the New Sub distribution Board (NSDB.06) in the ASD Store Room on the Ground Floor as indicated on the drawings. The existing installation is recessed and the contractor shall re-use the existing conduits.

63.16 Testing & Commissioning

The Contractor shall test all items of equipment individually and shall commission the full installation as a unified system. All testing and commissioning shall be carried out in the presence of and to the satisfaction of the Employer's Representative. The Electrical Contractor shall give to the Employer's Representative seven days notice in writing before testing or commissioning is carried out.

All tests shall be carried out in accordance with IEE Recommendations, relevant British and Irish Standards or IEC Publication.

64.0 COMMUNICATION SERVICES

64.01 New IT faceplates on the existing data points

The existing IT wiring shall be retained but the Contractor shall allow for installing new IT faceplates on the new dado trunking and connecting the existing cabling that was in place for the existing IT points to the new IT points on the new dado trunking.

Refer to drawings for quantities and locations.

65.0 RESERVED

Non applicable

66.0 TRANSPORT SERVICES

66.01 Existing lift to be rewired

The existing lift shall be retained but rewired as shown on the drawings.

67.0 RESERVED

Non applicable.

68.0 SECURITY AND PROTECTION SERVICES

68.01 Decommissioning and removal of the existing fire alarm system

The existing fire alarm system throughout in the building shall be thoroughly decommissioned and removed from site.

All associated cabling, devices, panels, etc. in these buildings shall be decommissioned and removed. This existing fire alarm system shall be replaced with a new fire alarm system as described in section 68.02 below.

68.02 New fire alarm system

General:

As indicated above in 68.01, the existing fire alarm system throughout the building shall be decommissioned and replaced with a new fire alarm system.

The Contractor shall allow for the supply, installation and commissioning of a new fire alarm installation throughout the areas of the building as indicated on the drawings. The new fire alarm system shall be installed and commissioned in compliance with I.S. 3218:2024.

All new devices as indicated for the main building be wired back and connected to the new main fire alarm panel which shall be located at the main entrance of the building. See drawings for the locations throughout the building where new fire alarm system devices shall be installed and the main fire alarm panel.

The fire alarm system to be installed in the buildings shall be a fully addressable L1 type fire alarm system that is fully in accordance with I.S. 3218:2024 and as identified in the drawings.

The system shall comprise ionisation and optical smoke detectors, heat detectors, combined heat detectors, combined smoke detectors, alarm beacons/sounders, visual alarm devices, manual call points, magnetic door contacts, fire alarm interfaces, short circuit isolators, aspiration fire alarm systems and similar alarm input devices, located as shown on the drawings.

The devices shall be connected in loops to the compact wall mounted addressable control and indicator panels located as indicated on the drawings.

The new fire alarm system for the building shall be an 'Open Protocol' system with unrestricted access to replacement components and software so that there is no impediment to its future maintenance by companies selected by the Client.

Fire alarm installation in the Main building:

The existing fire alarm installation in the main building shall be decommissioned and removed. A new fire alarm installation shall be supplied and installed in the main building as indicated on the drawings.

A new main fire alarm panel shall be installed in the main building for the main building.

Main fire alarm panel at the main entrance in the building:

A new main fire alarm panel shall be installed at the main entrance to the main building as indicated on the drawings. This panel shall be a compact wall mounted addressable control and indicator panel. All devices within the building shall be connected in loops, to this main fire alarm panel.

As indicated on the drawings, two fire alarm repeater panels shall be installed as indicated on the drawings and these repeater panels shall be wired back and connected to the new main fire alarm panel at the main entrance of the main school building.

See drawings for the locations throughout the building where new fire alarm system devices shall be installed. Should any device within the building go into alarm or fault, the precise zone and state of that device shall be displayed in alphanumeric form on the liquid crystal display (with a minimum capability of 32 characters) of the main fire alarm panel.

The recommended maximum mounting heights for the fire alarm panel is 1800mm to the upper edge of the cabinet and 1400mm to the bottom of the cabinet.

The new fire alarm system for the building shall be an 'Open Protocol' system with unrestricted access to replacement components and software so that there is no impediment to its future maintenance by companies selected by the Client.

The main fire alarm panel shall adhere to the following specification:

- *Type:* Addressable and fully networkable.
- *Quantity:* 1no
- *Proposed panel:* Advanced MxPro 5401, or equivalent.
- *Base Technology:* Dual flash-based processors with real-time clock, trace diagnostics, programmable languages and character sets.
- *Display:* White backlit 240 x 64 graphical LCD.
- *LED Indicators:* 22 red (1 x Fire, 1 x More Alarms, 20 x Zonal Programmable), 1 green (Power), 13 amber and 12 bi-colour (Fault & System).
- *Controls:* Alpha numeric keypad permitting Navigation, Reset,

Mute, Silence, Resound, Evacuate, and 4 x Programmable Push Buttons.

- *Protocols:* Apollo (Xp95 / Discovery), Argus Vega, Hochiki ESP.
- *Number of Loops:* 4-loop control panel.
- *Loop cards:* 2no.
- *Devices per loop:* Protocol dependent.
- *Loop Current:* 500mA per loop.
- *On-Board Sounder Circuits:* 4 x 1 Amp programmable.
- *On-Board Relays:* 2 x 1 Amp 30v AC/DC programmable.
- *Auxiliary Supply:* 1 x 24v 500mA.
- *Programmable Input:* 1 x monitored programmable input on-board.
- *Programmable Key Switch Inputs:* 8 volt free inputs.
- *Total Available* 5A maximum available for loop current + sounder.
- *Output Current:* outputs + auxiliary supply.
- *Mains Supply:* 200 - 240v 47-63 Hz AC (+10%, -15% tolerance) 1.4A max.
- *Battery Capacity:* 24V 4Ah internal (min), 24V, 18Ah internal (max), deep enc. (D) - 24v, 45Ah internal (max).
- *Charger Current:* 2A temperature compensated.
- *Serial ports:* 1 x on-board RS232 connection for PC, modem, IP or portable printer.
- *USB Interface:* 1 x USB B type connection for PC communication.
- *Programming:* On-board keypad or PC running Windows tools.

- *Event Log:* 5000 Event & Diagnostic + 500 Fire Networking.
- *Plug-in Network Card:* Yes.
- *GSM Card:* Yes. For remote monitoring.
- *Enclosure rating:* IP30.
- *Colour Steel:* RAL7035.
- *Temp range:* -5°C to + 40°C.
- *Humidity range:* 10% to 90% RH (non condensing).
- *Mounting:* Surface mounted.
- *Size H x W x D mm:* 470mm x 450mm x 190mm.
- *Warranty:* 3 years.
- *Approvals:* I.S. 3218:2024, EN 54-2:1998, EN 54-4:1998 and EN 54-13:2005.



The main fire alarm panel shall have provision to drive and monitor up to four repeater panels providing a repeat of the indications on the Control and Indicating Equipment display.

The fire alarm panel shall be capable of the following basic system functions:

- Monitor the status of all devices on the addressable loops for fire, short-circuit fault, open-circuit fault, fault tolerance, incorrect addressing, unauthorised device removal or exchange, pre-alarm condition and contaminated detector condition.
- Monitor the status of all internal connection and interfaces, including charger, battery and remote signalling functions.
- Monitor all critical system components and interconnections (internal and external). In the event of a failure occurring which prevents correct operation of the alarm.
- Provide text messages to indicate the precise location of where a fault has occurred in the system.
- The extract shall remain operational during a fire event.

Fire alarm repeater panels in the building:

As indicated on the drawings, two fire alarm repeater panels shall be installed in other buildings and these repeater panels shall be wired and linked back to the main fire alarm panel in the main building. Refer to drawings for locations and quantities.

Fire alarm repeater panels shall be installed at the external doors as indicated on the drawings.

Each fire alarm repeater panel shall be wall mounted and shall be a compact wall mounted addressable control and indicator panel.

The two fire alarm repeater panels shall be linked back and connected to the main fire alarm panel in the main building. Each fire alarm repeater panel shall be linked back to the main fire alarm panel via 2no x 2.5mm^2 PH120 cables. See below for further information on the fire alarm cabling required.

The recommended maximum mounting heights for the fire alarm repeater panels is 1800mm to the upper edge of the cabinet and 1400mm to the bottom of the cabinet.

Fire alarm repeater panels shall adhere to the following specification:

- *Type:* Analogue addressable
- *Quantity:* 2no
- *Proposed panel:* Advanced MxPro 5202, or equivalent.

- *Base Technology:* Dual flash-based processors with real-time clock, trace diagnostics, programmable languages and character sets
- *Controls:* Alpha numeric keypad permitting Navigation, Reset, Mute, Silence, Resound, Evacuate, and 4 x Programmable Push Buttons
- *Display:* White backlit 240 x 64 graphical LCD
- *Protocols:* Apollo (Xp95 / Discovery), Hochiki ESP, Argus Vega and Nittan Evolution
- *Number of Loops:* 2-loop control panel
- *Loop cards:* 2no
- *Number of zones:* 20no
- *LED Indicators:* 22 red (1 x Fire, 1 x More Alarms, 20 x Zonal Programmable), 1 green (Power), 13 amber and 12 bi-colour (Fault & System)
- *Devices per loop:* Protocol dependent
- *Loop Current:* 500mA per loop
- *On-Board Sounder Circuits:* 2 x 1 Amp programmable
- *On-Board Relays:* 2 x 1 Amp 30v AC/DC programmable
- *Programmable Input:* 1 x monitored programmable input on-board
- *Programmable Key Switch Inputs:* 1 volt free inputs
- *Total Available OC:* 3A maximum available for loop current + sounder + auxiliary supply
- *Mains Supply:* 230v AC 50Hz

- *Battery Capacity:* 24v 4 Ah internal (min), 24v, 7 Ah internal (max), medium enc. (M) - 24v, 12Ah internal (max), large enc. (L) - 24v, 18Ah internal (max), deep enc. (D) - 24v, 45Ah
- *Serial ports:* 1 x on-board RS232 connection for PC, modem, IP or portable printer
- *USB Interface:* 1 x USB B type connection for PC communication
- *Programming:* On-board keypad or PC running Windows tools
- *Plug-in Network Card:* Yes
- *Mounting:* Surface mounted
- *Enclosure:* Steel IP30 in a RAL7035 colour
- *Size H x W x D mm:* 340mm x 430mm x 115mm
- *Warranty:* 3 years
- *Approvals:* I.S. 3218:2024, EN 54-2:1998, EN 54-4:1998, EN 54-13:2005, LPCB approved.



The fire alarm panel shall be capable of the following basic system functions:

- Monitor the status of all devices on the addressable loops for fire, short-circuit fault, open-circuit fault, fault tolerance, incorrect addressing, unauthorised device removal or exchange, pre-alarm condition and contaminated detector condition.
- Monitor the status of all internal connection and interfaces, including charger, battery and remote signalling functions.

- Monitor all critical system components and interconnections (internal and external). In the event of a failure occurring which prevents correct operation of the alarm.

Interfacing of the main fire alarm panel to the repeater fire alarm panels:

Each fire alarm repeater panel shall be linked back and connected to the main fire alarm panel. The fire alarm repeater panels shall be linked to the main fire alarm panel via 2no x 2.5mm^2 PH120 cables. See below for further information on the fire alarm cabling required.

Fire isolation switch at the main fire alarm panel and the fire alarm repeater panels in the building:

The Contractor shall allow for the supply and installation of a fire isolation switch for the isolation of the power supply to the main fire alarm panel and the 2no fire alarm repeater panels (2no switches to be provided in total).

This switch shall provide a secure method of isolating the mains supply to the fire system control panel. Each fire isolation switch shall adhere to the following (2no of these switches to be provided in total):

- Shall comply with BS5839 Part1
- Shall be operated via a key only. Include for a spare key.
- Key removable in both ON and OFF positions
- Durable fire red casing for easy visual identification
- Power indication LED



Zoning:

Addressable input and output devices shall be connected to addressable loops capable of accepting up to 99 devices. The fire alarm system shall have a minimum capacity for operating four fully loaded addressable loops.

Provision shall be made for each addressable loop to be sub-divided into a maximum of five geographical zones. The section of wiring corresponding to each zone circuit shall be protected from faults in other sections by line isolator

modules. It shall be possible to allocate all 99 addressable devices on the loop to a single zone.

Smoke detectors:

The Contractor shall allow for the supply and installation of all smoke detectors throughout the building as indicated on the drawing. All new detector heads shall include a condition indicating LED light and the smoke detectors sensors shall be complete with bases. The Contractor shall supply necessary address flags and address labels for all devices.

All new automatic fire detectors shall generally be of the optical smoke detectors type. These detectors shall have an address code setting and shall be addressable and suitable for an addressable fire alarm system. Separate addressable plugs for each detector shall be provided.

The Contractor shall label each detector and base with address number. The colour of detectors shall be white.

Detectors to be of the optical point type unless otherwise indicated on the drawings and shall be in accordance with B.S. 5446-1, I.S. EN 54-7 and I.S. 3218:2024. Sensitivity of the smoke detectors shall be set by the main panel control software. Wiring used for detectors shall be in compliance with I.S. 3218:2024. Smoke detectors shall adhere to the following specifications:

- *Type:* Addressable optical smoke detector
- *Sensor Method:* Light Scatter
- *Sensor Element:* IR Diode
- *Conditioning light:* Yes
- *Operating Voltage:* 20V d.c. to 35V d.c.
- *System Voltage:* 35V d.c.
- *Quiescent Current:* 200µA
- *Alarm Current:* 5mA
- *Operating Temp:* -10°C to + 55°C
- *Storage Temp:* -20°C to + 60°C
- *Charging Time:* 4 minutes
- *Relative Humidity* <RH95% non-condensing.
- *I.P. Rating:* IP40
- *Addressing Method:* Soft addressing, Non-Volatile EEPROM.
- *Material:* ABS
- *EMC Conformance:* EMC conformance to BSEN50130-4.
- *CE Conformity:* Yes

- *Certification:* EN54-7 / LPCB 041, I.S. 3218:2024, BS 5446-1, IS EN 54-7.



Heat detectors:

The Contractor shall allow for the supply and installation of all new heat detectors throughout the building as indicated on the drawing. All new detector heads shall include a condition indicating LED light and the heat detectors sensors shall be complete with bases. The Contractor shall supply necessary address flags and address labels for all devices. These detectors shall have an address code setting and shall be addressable and suitable for an addressable fire alarm system. Separate addressable plugs for each detector shall be provided.

The Contractor shall label each detector and base with address number. The colour of detectors shall be white. Detectors to be of the optical point type unless otherwise indicated on the drawings and shall be in accordance with B.S. 5446-1, I.S. EN 54-7 and I.S. 3218:2024. Sensitivity of the smoke detectors shall be set by the main panel control software.

Wiring used for detectors shall be in compliance with I.S. 3218:2024.

Heat detectors shall adhere to the following specifications:

- *Type:* Addressable heat detector
- *Sensor Method:* Thermistor
- *Sensor Element:* Thermistor
- *Conditioning light:* Yes
- *Operating Voltage:* 20V d.c. to 35V d.c.
- *System Voltage:* 35V d.c.
- *Quiescent Current:* 200µA
- *Alarm Current:* 5mA
- *Operating Temp:* -10°C to + 80°C
- *Storage Temp:* -20°C to + 60°C
- *Charging Time:* 4 minutes
- *Relative Humidity* <RH95% non-condensing.
- *I.P. Rating:* IP40
- *Addressing Method:* Soft addressing, Non-Volatile EEPROM.
- *Material:* ABS
- *EMC Conformance:* EMC conformance to BSEN50130-4.

- *CE Conformity:* Yes
- *Certification:* EN54-5 / LPCB 041, I.S. 3218:2024, BS 5446-2, IS EN 54-7.



Combined smoke detectors and sounders:

A number of new sounders shall be combined with smoke detectors as indicated on the drawings. The Contractor shall allow for the supply and installation of all new addressable combined smoke detector and sounder heads throughout the building. Each head shall include a condition indicating LED light and a suitable base for the sounder. All new detector heads shall include a condition indicating LED light and the smoke detectors sensors shall be complete with bases.

See 'smoke detectors' section above for specification on smoke detectors.

The Contractor shall supply necessary address flags and address labels for all devices. Wiring used for detectors shall be in compliance with I.S. 3218:2024.

Combined smoke detectors and sounders shall adhere to the following specifications:

- *Type:* Addressable optical smoke detector and sounder
- *Sounder Base:* Yes
- *Sound output:* 96dB(A) at 1metre
- *Sensor Method:* Light Scatter
- *Sensor Element:* IR Diode
- *Conditioning light:* Yes
- *Operating Voltage:* 20V d.c. to 35V d.c.
- *System Voltage:* 35V d.c.
- *Quiescent Current:* 200µA
- *Alarm Current:* 5mA
- *Operating Temp:* -10°C to + 55°C
- *Storage Temp:* -20°C to + 60°C
- *Charging Time:* 4 minutes
- *Relative Humidity* <RH95% non-condensing.
- *I.P. Rating:* IP40
- *Addressing Method:* Soft addressing, Non-Volatile EEPROM.

- *Material:* ABS
- *EMC Conformance:* EMC conformance to BSEN50130-4.
- *CE Conformity:* Yes
- *Certification:* EN54-7 / LPCB 041, I.S. 3218:2024, BS 5446-1, IS EN 54-7, BSEN50130-4, EN54-7, EN54-2 and EN54-17.



Combined heat detectors and sounders:

A number of new sounders shall be combined with heat detectors as indicated on the drawings. The Contractor shall allow for the supply and installation of all new addressable combined heat detector and sounder heads throughout the building. Each head shall include a condition indicating LED light and a suitable base for the sounder.

All new detector heads shall include a condition indicating LED light and the heat detectors sensors shall be complete with bases. See 'heat detectors' section above for specification on heat detectors. The Contractor shall supply necessary address flags and address labels for all devices.

Wiring used for detectors shall be in compliance with I.S. 3218:2024.

Combined heat detectors and sounders shall adhere to the following specifications:

- *Type:* Addressable heat detector and sounder
- *Sounder Base:* Yes
- *Sound output:* 96dB(A) at 1metre
- *Sensor Method:* Thermistor
- *Sensor Element:* Thermistor
- *Conditioning light:* Yes
- *Operating Voltage:* 20V d.c. to 35V d.c.
- *System Voltage:* 35V d.c.
- *Quiescent Current:* 200µA
- *Alarm Current:* 5mA
- *Operating Temp:* -10°C to + 80°C
- *Storage Temp:* -20°C to + 60°C
- *Charging Time:* 4 minutes
- *Relative Humidity* <RH95% non-condensing.
- *I.P. Rating:* IP40

- *Addressing Method:* Soft addressing, Non-Volatile EEPROM.
- *Material:* ABS
- *EMC Conformance:* EMC conformance to BSEN50130-4.
- *CE Conformity:* Yes
- *Certification:* EN54-5 / LPCB 041, I.S. 3218:2024, BS 5446-2, IS EN 54-7, BSEN50130-4, EN54-7, EN54-2 and EN54-17.



Void Detectors:

New smoke void detectors shall be installed in the in the building to protect the ceiling void as indicated on the drawings.

Smoke or heat detectors above the ceiling shall be complete with a remote monitoring indicating LED. The remote monitoring LED indicator lamp shall be installed below the ceiling so that users of the building will know if the void detector above the ceiling is in alarm.

Allow for installing detectors in the ceiling spaces and subsequent LED indicators in the ceiling below the detector.

See 'smoke detectors' section above for specification on smoke detectors. The Electrical Contractor shall supply necessary address flags and address labels for all devices.

Wiring used for detectors shall be in compliance with I.S. 3218:2024.

Manual Call points (break-glass units):

The Contractor shall allow for the supply and installation of all new manual call points in the building as indicated on the drawing.

Manual call points shall be surface mounted as indicated on the drawing. All points to be fully resettable type via key operation. Break glass units will not be accepted as all manual call points shall be PVC. All call points shall be supplied c/w surface mounting back box to suit.

Call points to be installed 1100mm from the finished floor level and 150mm from doorframes.

Wiring used for manual call points shall be in compliance with I.S. 3218:2024.

Manual call points shall adhere to the following specifications:

- *Type:* Addressable manual call point
- *Operating Method:* Non Frangible, Resettable
- *Operating Element:* Microswitch
- *Conditioning light:* Yes
- *Operating Voltage:* 20V d.c. to 35V d.c.
- *System Voltage:* 35V d.c.
- *Quiescent Current:* 200µA
- *Alarm Current:* 2mA
- *Operating Temp:* -25°C to + 70°C
- *Storage Temp:* -25°C to + 70°C
- *Charging Time:* 1 minute
- *Relative Humidity* <RH95% non-condensing.
- *I.P. Rating:* IP24
- *Addressing Method:* 8 Way DIL switch
- *Material:* POM / Polycarbonate
- *EMC Conformance:* EMC conformance to BSEN50130-4.
- *CE Conformity:* EN54-11 & EN54-17
  54-7.



Combined smoke detector, sounder and Visual Alarm Devices (VAD's):

Some smoke detectors in the buildings shall be combined with visual aid devices (VAD's) as indicated on the drawing. These are indicated as 'VSS' fire alarm devices on the drawings and are installed in the toilets in the buildings as indicated on the drawings.

The Contractor shall allow for the supply and installation of all addressable combined smoke detectors and VAD's throughout the building in the locations as indicated which is mainly the toilet areas.

All new detector heads shall include a condition indicating LED light.

See 'combined smoke detectors and sounders' section above for specification on the combined smoke detectors and sounders.

The Contractor shall supply necessary address flags and address labels for all devices. Wiring used for combined detectors/sounders and VAD's shall be in compliance with I.S. 3218:2024.

The combined detector, sounder and VAD unit shall be ceiling mounted and shall be EN54-23 Compliant VAD and shall have low current consumption.

The combined detector and VAD unit shall adhere to the following specifications:

- *Mounting Height:* 3m
- *Mounting type:* Ceiling mounted
- *Sounder Base:* Yes
- *Sound output:* 96dB(A) at 1metre
- *Operating Temp:* -20°C to + 50°C
- *Ingress protection:* IP21C
- *Isolator:* Yes
- *Flash rate:* Once per second
- *Operating Voltage:* 17-60V DC Polarity Sensitive
- *Monitoring:* Reverse Polarity
- Body Colour: White
- *Flash Colour:* White
- *EN54-23 Coverage Code*: C-3-8
- *Coverage area:* 8m cylinder diameter coverage
- *Compliant with standards:* EN54 Part 5, 7, 17 and 23
  AS7240 15 (5&7) & 23
  CE marked

Wiring used for devices shall be in compliance with I.S. 3218:2024.



External Alarm Sounder and Beacon:

A suitable weather resistant LED beacon and electronic bell sounder shall be supplied and installed by the Contractor in the areas of the building as indicated

on the drawing. External fire alarm sounders must have a distinct sound to any other sound activating unit such as intruder alarm system.

The sounders shall automatically silence after a period of 15minutes but the visual indicator on the external sounder shall continue to operate until the panel is reset.



Sounders shall adhere to the following specifications:

- *Type:* Weather resistant flasher & electronic bell sounder
- *Sound level:* 109dBa
- *Operating Voltage:* 18V d.c. to 35V d.c.
- *Number of tones:* 32
- *Operating frequency:* 440Hz to 2900Hz
- *Flash rate:* c. 1Hz
- *Operating Temp:* -20°C to + 70°C
- *I.P. Rating:* IP65
- *CE Conformity:* EN54-11 & EN54-17

Internal Magnetic Door Contacts:

The Contractor shall include for the supply and fitting of new magnetic door holders on fire doors in the corridors as indicated on the drawings. All new magnetic door contacts shall be linked/interfaced to the fire alarm system and power supply units as required. All magnetic door holders shall be complete with manual over-ride switches and power supply units. See drawing for quantity and location of magnetic door contacts.

Door holders shall hold fire doors in the open position in normal operation, releasing the door to swing closed on fire alarm activation or loss of mains power. Door holders shall be wall mounted magnetic type, metal robust construction, supplied with 12 or 24 volt transformer and incorporating a release switch accessible from floor level. Each door holder shall be supplied with a receiver to be mounted on the door, with an articulated joint to ensure holding of the door by the wall magnet.

Door holders shall be suitable for releasing fire doors, with rated power size of 4 for an 100mm door leaf with shear force of 80kg in accordance with European Standards BS-EN: 1155. Wiring used for devices shall be in compliance with I.S. 3218:2024.



General fire alarm interface units (I/O units):

The Contractor shall allow for the supply and installation of all standard fire alarm interface units as indicated on the drawings and for the linking of these to the relevant systems as indicated. Interface units (Input/Output models) shall be provided as indicated on the system drawings. Short circuit isolators shall be installed where the loop wiring crossed a fire compartment wall and where the wiring enters another fire zone.

In addition to the items above, the following items shall be connected and interfaced to the fire alarm system and as a result interface I/O units will be required at all equipment:

- MCC controls panel
- Gas detection panels
- Door access controllers
- Lift
- Any other items described on the drawings.



Internal Beacons:

In some areas of the building, internal flashing LED beacons shall be supplied and installed by the Contractor as indicated on the drawings.

All these LED beacons shall be IP67 rated and as a result shall be glanded from the bottom with an appropriate gland to prevent water ingress.

Beacons shall adhere to the following specifications:

- *Type:* Flashing xenon beacon
- *IP rating:* IP67
- *Base diameter:* 85mm
- *Mounting Style:* Ceiling mounted
- *Lamp included:* Yes
- *Bulb type:* LED
- *Housing colour:* Red
- *Lens colour:* Red
- *Light effect:* Flashing
- *Operating Voltage:* 24V d.c.
- *Operating Temp:* -20°C to + 40°C
- *CE Conformity:* Yes



Drawing/Map:

The Contractor shall allow for installing a laminated A3 drawing of the fire alarm system installation and devices in the building at the main fire alarm panel location and the repeater panels locations to indicate where all fire alarm devices are located throughout the building.

This drawing shall indicate and identify the location of the fire alarm devices throughout the building i.e. on the alarm panel if it identifies that the device 45 has gone into alarm, you should be able to see on the drawing where device 45 is located.

Wiring:

General:

All new cabling used for the fire alarm system throughout the building shall meet classification 'PH120 Enhanced'.

A fire-resistant cable with a lesser PH classification than PH120 and if not of enhanced grade status shall not be permitted on this project.

The entire fire alarm system shall be wired in 2 x 2.5mm^2 'Prysmian FP Plus' fire alarm cabling (or equivalent) as specified below. Cabling shall be 2core and earth type.

The fire alarm cable shall be rated at 120mins in compliance with BS 8432-2 (flame, shock and water spray).

The fire-resisting cable shall have 2-hour fire rating according to IEC 331.

All cabling shall be manufactured by a BASEC approved manufacturer. Cables shall be installed strictly in accordance with the manufacturer's requirements.

The enhanced PH120 fire alarm cabling shall satisfy the following requirements for integrated water spray and mechanical shock:

Conductor:

Plain annealed copper. Solid 2 x 2.5mm^2 to meet the requirements of BS EN 60228 class 1 or class 2.

Insulation:

High performance, damage resistant enhanced insulation to meet BS EN 50363-5, Type EI5.

Overall metallic screen and CPC:

Polyester backed laminated aluminium or copper tape bonded to outer sheath to provide overall screen. In contact with full sized, tinned annealed copper circuit protective conductor and laid-up with the cores to provide automatic screen earthing.

Sheath:

Robust thermoplastic low smoke, zero halogen and reduced flame propagation outer sheath. Suitable for outdoor installation with exposure to normal daylight UV. Sheath shall be coloured 'Red' for Fire Alarm System wiring indication.

Standards, Tests & Approvals:

- I.S. 3218:2024
- BS 8432-2 (120 minutes)
- BS EN 50200 (PH 120)
- BS 7629-1 Enhanced 120

- BS 60332-1-2
- BS EN 60754-1
- BS EN 61034-2
- BS EN 50200 PH30, PH60, PH120
- BS 8434-2 Flame, impact & water test for 'enhanced' cable
- BS 5839-1, 6, 8 & 9 'enhanced' fire resisting cable
- BS 5266-1 'enhanced' fire resisting cable
- BS 8519 'Catagory 2' control cable
- BASEC approved
- LPCB approved (specific products & fire tests only)



The Contractor shall allow for all necessary power supplies to the new fire alarm devices and equipment.

The Contractor shall ensure that any other attendances or modifications required to the installation in order to leave the whole of the completed installation in a satisfactory condition are included in his tender. All to the approval of the Employer's Representative.

Remote monitoring of the fire alarm system:

The Contractor shall ensure that the new fire alarm system for the building is monitored and linked to a remote 24-hour manned monitoring station.

The fire alarm panel shall be monitored so that when a fire alarm triggers, a fire alarm alert signal shall be transmitted to the 24-hour central station.

The Contractor shall provide a GSM card in the main fire alarm panel to transmit a signal to a 24-hour monitoring station **or** the Contractor shall allow for bringing a 2-pair copper multipair cable link between the existing main intruder alarm panel in the building to the digi-dialler in the fire alarm panel for the remote monitoring of the fire alarm system.

The first year of monitoring shall be paid by the Contractor. After the 12months defects liability period has expired, the Contractor shall allow for transferring the account over to the building.

Testing & Commissioning:

The Contractor shall allow for the testing and commissioning of the fire alarm system throughout the building. The Contractor shall test all items of equipment individually and shall commission the full installation as a unified system.

All testing and commissioning shall be carried out in the presence of and to the satisfaction of the engineer.

The Contractor shall give to the engineer seven days notice in writing before testing or commissioning is carried out. Commissioning shall comply with I.S. 3218:2024.

The Contractor shall allow for the following during the commissioning:

- Carry out a full test on the new fire alarm system in the building which includes all devices, panels, etc. to ensure that the items are fully operational.
- Test every device in situ including manual call points, sounders, detectors, interfaces, etc. To test each item the Contractor shall use appropriate test method/device.
- Confirm sound levels throughout the building. Audibility level readings shall be taken in each room using an instrument complying with BS 5969, type 2 with slow response and 'A' weighting.
- All trigger devices i.e. manual call points, heat, and smoke detectors shall be tested for correct operation.
- A mains failure test shall be carried out to verify and standby battery system complies with the requirements of this specification.
- The Contractor must confirm that the entire system all components operate satisfactorily. The Contractor shall test for:
    - Operation of each device function
    - Operation of integral indicators (LED's, etc)
    - Fire alarm panel indications and functions
    - Network functions

Certificates:

When completed, in compliance with I.S. 3218:2024 the Contractor shall provide the following certificates for the new fire alarm system for the buildings:

- Certificate of Installation as per Annex C2 on I.S. 3218:2024.
- Final Certificate of Commissioning as per Annex C3 on I.S. 3218:2024.
- Certificate of Handover as per Annex C6 on I.S. 3218:2024.

Cable Carrier for fire alarm cabling:

All new fire alarm cables and distribution shall be installed in a steel conduit/tray system. All fire alarm cables on trays shall be securely clipped to the tray via metal clips.

A new cable carrier shall be installed for the new fire alarm installation throughout the building. A dedicated main run of galvanised steel cable tray shall be installed to distribute the fire alarm cabling throughout the building as indicated on the drawings.

Refer to the drawing for the routes, sizes, locations, etc. No other cabling shall be installed on the dedicated fire alarm tray.

All fire alarm cabling shall be independently separated from all other electrical cabling so that it is not mixed up with other cabling. All fire alarm cabling shall be distinguished and separated from all other electrical cabling.

Fire alarm cabling shall be installed on its own dedicated cable tray. In some instances (short runs in ceiling voids), the cabling can be clipped directly to the structure using metallic 'P' clips (to meet clause 26.2 of BS5839 for fixing of fire cable) to the underside of the floor slabs/structure or fixed to timber joists at 200mm intervals. (No other forms of fixing shall be acceptable).

Fire alarm cabling shall be at least 300mm apart from 230V mains cabling in all circumstances.

The primary cable tray routes for the fire alarm installation throughout the building are as indicated on the drawings but these electrical routes shall be finalised and decided by the Contractor in conjunction with the Engineer on site.

All new fire alarm cabling to be installed in the buildings shall be installed in metal conduit, trunking, tray, etc. as described below.

All new tray to be installed in the building shall be manufactured from pre-galvanised mild steel.

Tray systems shall meet the requirements of BS EN 61537:2007.

The new containment routes on the drawings for the building are indicative only. The Contractor shall allow for all necessary bends, offsets, crossovers, additional labour, etc. in installing the new cable containment in conjunction with the existing services and items in the building.

The Contractor shall allow for visiting the site during the tendering period to review all necessary works that are involved in supplying and installing the necessary cable containment for the new electrical services in the building.

The Contractor shall allow for all necessary brackets, unistrut, threaded rod, etc. in hanging the cable containment in the building. Cable containment shall be properly aligned and securely fixed at regular intervals at 1000mm on straight runs.

Where bends, angles or offsets occur, additional fixings shall be supplied at a distance not exceeding 150mm on each side of the accessory.

Where tray system 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 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.



Conduits for fire alarm cabling:

All of the fire alarm installation in the buildings shall be surface mounted. All surface mounted conduit to be installed in the building shall be steel conduit.

Location of surface mounted conduits to be discussed on site.

All conduits shall be galvanised welded steel to BSS 31 Class E for heavy gauge tubing as manufactured by ASCM or approved equal. 16mm outside diameter is the minimum size to be used. All inlet boxes, conduits shall be plugged or capped whilst waiting for further items to be attached.

The ends of every fitting, tube length or nipple are to be reamed and all threads to be coated with aluminium paint after assembly. All fittings shall be installed so as to facilitate easy re-wiring. Inspection fittings shall be fitted at all bends, tees and elbows.

Back entry elbows or tees shall be used, if necessary, to enable easy of accessibility without disturbing any plasterwork. Inspection fittings shall be flush with the plasterwork and floorboards over conduit fittings shall be screwed in position.

The complete conduit installation shall be finished before any wiring is pulled through.

The minimum spacing of conduit supports shall be as follows:

Nominal Conduit Size	Spacing of Supports
25 mm. and less	1.75 metres
25 mm. to 40 mm.	2.00 metres
Exceeding 40 mm.	2.50 metres





Hanging of cable containment:

The Contractor shall allow for hanging the new cable containment from the existing timber beams and concrete beams in the building.

In order to install the cable containment at high level from the existing steel beams, the Contractor shall allow for the following:

- Dropping 10mm threaded rod from the steel at 1000mm distances over the length of the containment run.

- The threaded rod shall be hung from the steel via 10mm G-Clamps or other suitable clamps.
- The base supports for the cable containment shall be single channel unistrut. Supports shall be placed at 1000mm distances over the length of the containment run.
- Allow for connecting the threaded rods to the single-channel unistrut.

Clipping of fire alarm cabling on the cable carrier:

All new fire alarm cables installed on the tray shall be securely clipped to the tray via non-combustible metal clips. The metal clips/ties shall be installed every 500mm.

The fire alarm cabling shall be clipped to a dedicated metal tray with stainless steel cable ties shall be used.

68.03 Attendances for new AOV Installation

General:

A new automatic opening vents (AOV) shall be supplied and installed by others in the building. The AOV and controls shall be supplied, fitted and commissioned by others. The AOV system installer will be employed directly by the Main Contractor.

However, the Electrical Contractor shall allow for supplying all necessary power supplies and cabling to the AOV system installation as indicated on the drawings. Quantities and locations of all AOV's and control devices are as indicated on the drawings. Also, refer to the AOV wiring schematics on the drawings for information on the cabling and attendances required for the AOV installation.

Electrical attendances:

All AOV's, control panels, fireman breakglasses, etc. shall be supplied by others but shall be handed over to the Electrical Contractor for installation and wiring.

The Electrical Contractor shall allow for providing the following electrical attendances to each AOV control system:

- 13amp 230volt fused spur outlet power supply to each control panel. Height of the panel is highlighted on the drawings. Final location of the spur outlet to be confirmed by the AOV system installer.

- Fire alarm interface (I/O unit) from the fire alarm system to each AOV control panel at low level. Refer to section 68.01 for further information on the fire alarm interfaces. The door release facility for each system shall also be linked to the fire alarm system so that in the event of fire activation the respective doors shall open.
- Installation of the AOV control panel and fire man break glass unit in the locations as indicated for each AOV system. All control panels and break glass units shall be supplied by other and handed over free issue to the Electrical Contractor for wiring and installation.
- All necessary cabling from each AOV control panel to its associated AOV in the roof. See below for specification on cabling required and refer to the schematic on the drawings for details on the cabling required between devices.
- All necessary cable containment for all power supplies to all control panels and fire alarm cabling between devices.

Cabling:

All new cabling used between the control panel and the devices for each AOV control system installed throughout the building shall be wired in 3 x 2.5 sq. mm 'Firetuff Enhanced PH120' with red LSF outer sheath and copper conductors (or equivalent). All cabling shall meet classification PH120 enhanced when tested in accordance with I.S. EN 50200.

The cable shall meet the requirements of IS 3218:2013, BS7629-1; BS 6387 C, W & Z; IS EN 50200; BS 8434-2 and BS5839-1 Clause 26.2 PH 120 'Enhanced'. The cable shall meet the enhanced PH120 class for integrated water spray and mechanical shock as described in Clause 26.2e, and detailed in BS 8434 Part 2:2003:

The enhanced PH120 fire alarm cabling shall satisfy the following requirements for integrated water spray and mechanical shock:

- 120 minutes fire and shock
- 60 minutes fire and mechanical impact, followed by
- 60 minutes fire, mechanical impact and water

The Contractor shall allow for all necessary power supplies to the AOV control panels. The Contractor shall ensure that any other attendances or modifications required to the installation in order to leave the whole of the completed installation in a satisfactory condition are included in his tender.

Cable carrier:

A new cable carrier shall be installed for the new AOV installation throughout the building as indicated on the drawings. All new cables and distribution for the AOV installation shall be installed in a steel conduit/trunking system. See section 62.04 for further information on cable carrier.

68.04 Aspiration System for the lift

The contractor shall provide a complete aspiration system for the lift as indicated on the drawings to include sampling tubing. All cabling to the aspiration system shall be PH120 Enhanced Fire Rated Cabling. The complete system shall be commissioned and connected to the Fire Alarm system via. a fire alarm interface.

Technical	Hi-spec
Manufacturer	Honeywell or equal or approved
No. of Detector Modules	1
Max number of samples	32
Max Pipe Length	300 meters
Monitored area per sampling hole	Corresponds to one point-type detector in accordance with vde 0833-2.
Monitoring of Pipe Systems for breaking and obstructing	Optional adjustment for individual hole monitoring.
Double knock Detection	Yes
Alarms (potential free change-over contacts)	Up to 3 alarms per detector module (info-alarm, pre-alarm and main alarm)
Volt free contacts	3
Fault Alarms	Common Alam
Alarm and Fault Relay Power Rating	1A, 30 V DC, max. 24W
Smoke Level	10-step bar graph display
Fault	Yellow collective fault
Operation	Green Operation Display
Event Log	Built-in. additional external data storage possibility
Connection of External Alarm Notifications	Parallel display optional
VdS-No.	G202064
BPRI-No.	0786-CPD20685
Operating Voltage	24 v DC
Starting current limited to	300mA
Dimensions (WxHxD)	200mmX292mmX113mm
Weight	1460kg
Protection Category	IP52
Humidity	10% to 95% Relative Humidity


Honeywell

68.05 Maintenance of the new fire alarm system

The Contractor shall be responsible for the first years servicing and maintenance of the new fire alarm system building once all works are completed. The Contractor shall include the cost of this in his submitted tender costs.

The fire alarm system shall be maintained in compliance with I.S. 3218:2024 and shall include for four maintenance visits per year.

68.06 Intruder alarm system

The existing intruder alarm system and devices throughout the building shall be retained. All existing power supplies to the existing intruder alarm system panels shall be rewired.

68.07 Door access systems

The existing door access systems and devices throughout the building shall be retained. All existing power supplies to the existing door access system panels shall be rewired.

68.08 CCTV system

The existing CCTV system and devices throughout the building shall be retained. All existing power supplies to the existing CCTV cameras shall be rewired.

68.09 Disable refuge

General:

The Contractor shall allow for the supply and installation of a disabled refuge call system for the Building as indicated on the drawings.

The system shall be fully compliant with BS5588 part 11, BS9999:2008 and BS5839-9:2011. The system shall be battery backed for 24 hours in quiescent mode then 60 minutes in full power and also be fully monitored. The system shall be able to control up to 4 remote units.

The system shall be as per Baldwin Boxall manufacture (or equivalent).

Main Disabled Refuge Control Panel:

A main disabled refuge control panel shall be installed for the building on the Ground Floor of the Office part of the building beside the main fire alarm panel. See drawing for the location.

This panel shall be a compact wall mounted control and indicator panel. All remote call points within the building shall be connected back and wired to this panel. The main control panel shall be located at the main entrance to the building and shall be wall mountable and housed within a unit with a lockable clear glazed door to allow simple access to the control unit and easy viewing of the display.

The control panel shall have the following features:

- Surface mounted.
- Grey finish.
- Battery backed for use in the event of mains power failure (24 hours in standby plus three hours use, as standard.
- 4-way communication.
- Shall be housed within a unit with a lockable clear glazed door to allow simple access to the control unit and easy viewing of the display.
- Shall have a handset, which allows half-duplex speech with the remote refuge units.
- The front panel shall have a separate status display, which indicate Mains Supply Healthy, Battery High & Low, Charger Fault, Fuse Fault, Common Fault, Processor Fault, Processor Restart, Handset Fault and have a lamp test button.
- Output for unanswered call indicator; with adjustable delay.
- Volt free contact - operated when in fault, set during installation
- Lockable glazed door.
- Indicators for: in use/occupied, call, fault, power, charger and speech volume.
- Handset volume control
- 'Listening' facility
- Fire panel interface
- To avoid hoax calls, the disabled refuge remotes shall be programmed to be 'in standby' until the master panel is triggered by the fire panel during an emergency.

The main control panel shall be mounted at 1400mm from finished floor level to the centre of the panel. See drawings for quantities.

Control panel shall be as BVOC4MS from Baldwin Boxall, or equivalent.

Remote lamp buzzer:

The Contractor shall allow for installing a remote lamp buzzer at the main control panel to indicate a call on the system. The unit shall have a stainless steel finish and shall be located 100mm below the ceiling level.

Remote lamp buzzer as BVOCCA from Baldwin Boxall, or equivalent.

Remote Call Unit/Switch:

Remote call units/switches shall be installed throughout the building as indicated to provide two-way communication between the main console on the Ground Floor and person(s) occupying a 'Refuge Area' during an emergency evacuation. Quantities and locations of devices as indicated on the drawings.

Each remote call unit select switch shall have the following features:

- Type B outstation (an outstation using an intercom. Intended for use by disabled people in refuge areas)
- User simply presses the button to initiate call (occupy area). Further communication is hands free at the refuge point or by the user at the control panel.
- Each Remote Call select switch on the control panel shall have "Occupied" and "Call indication", which are clearly visible.
- The system shall give an indication of an incoming call by means of an LED indicator and a tone.
- Stainless steel finish
- Recessed.
- Each unit will have an "occupied" button, which when activated alerts the main control unit. Speech will be half duplex and the occupant will be able to alert the main control panel by simply talking into the unit. Once the unit has been activated the main panel can simply listen in to refuge areas – this link must remain open until the remote unit is reset.
- The front panel of the remote unit will have LED's showing System Healthy and Occupied
- Key operated reset switch.

The remote units shall be mounted at 1000mm from finished floor level to the centre of the unit. Remote control unit shall be as BVOCECPS from Baldwin Boxall, or equivalent. Include for a flush mounting bezel for the remote unit as BVCRMSS from Baldwin Boxall, or equivalent. Also include for a plasterboard back box for each remote unit as BVCRFBS from Baldwin Boxall, or equivalent.

Cabling:

All cabling for the disabled refuge system shall be fire-rated and shall meet classification PH120 enhanced when tested in accordance with I.S. EN 50200. The entire system shall be wired in 3 x 2.5 sq. mm 'Firetuff Enhanced PH120' with red LSF outer sheath and copper conductors (or equivalent).

See section 68.01 for specification on the type of fire alarm cabling to be installed in the building.

68.10 Emergency call systems

There are four accessible toilets to be installed in the building. For each of these toilets, the Contractor shall allow for the supply and installation of an emergency call system consisting of alarm cords, reset button and over door buzzers/light, for the accessible toilets as indicated on the drawings.

The reset button for each toilet shall be within each WC to ensure the assistant check the room prior to resetting the alarm. The pull cords for the alarm shall be installed in the immediate vicinity of the WC in each toilet, to allow the users to call for help. The over door buzzer/light for each alarm shall be installed in a place adjacent to the toilet, where it is highly visible.

A remote zone controller shall be installed to monitor the alarm in each toilet and this shall be located at a nearby office. Wiring shall be carried out in 4-core security cable. See detail on drawing for further information.

The Contractor shall allow for the following for each accessible toilet in the building (2no in total):

- 1no 'One Zone' controller
- 2no Ceiling pull cords
- 1no Overdoor light with sounder
- 1no Reset button (located within the toilet)
- 1no Accessible WC sticker
- 1no Call latch module
- 1no 12volt power supply unit to cater for each system.

Allow for a 230Volt 3amp fused spur switch at the location of each zone controller. See drawings for quantity of emergency call systems required.