

**ST. KEVIN'S COLLEGE,
BALLYGALL ROAD EAST,
FINGLAS,
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K67 Y319**

ROLL NUMBER: 60581M

ELECTRICAL SERVICES SPECIFICATION

VOLUME E1

**PARTICULAR SPECIFICATION
FOR THE ELECTRICAL INSTALLATION**

TENDER ISSUE (T1)

Document Control: J26-043/T1/E1

Rev:	Date:	Prepared By:	Quality Check By:
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GENERAL ITEMS

Introduction

The intention of this specification and the drawings 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.

The works entails the replacement of the existing light fittings and the disconnection/reconnection of some existing services throughout the building. Refer to the drawings for further information, layout of the building and services/works required. 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 the Main Contractor 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.

The Contractor shall also review all Architects and Structural Engineers drawings to familiarise themselves with the proposed development and scope of works involved. It is the Contractor's responsibility to raise any concerns over the proposed works with the Engineer prior to commencement of works. Failure to inform the Engineer 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 design drawings and data to be used by the Contractor in order to submit a tender bid for the electrical services installation and the works associated with the installation. 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 drawings and 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, 1989.
- 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) I.S. 3218:2013+A1:2019 – Fire Alarm Systems
- xiii) I.S. 3217:2013+A1:2017 - Emergency Lighting
- xiv) EN12464 - The Lighting of Workplaces
- xv) I.S. 10101:2020 National Rules for Electrical Installations.

Please note that 'The Contractor' in this specification refers to the Electrical Contractor.

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

For any queries relating to this specification or related drawings, the Contractor shall contact the following:

*Mr. Johnny O'Sullivan,
Galileo Energy Services,
Unit A6,
M4 Business Park,
Celbridge,
Co. Kildare.
Tel: 01-6274103
E-mail: johnny@galileoenergy.ie
www.galileoenergy.ie*

Site visit prior to tender submission

The Contractor shall be deemed to have carried out a site visit of the site prior to the completion of his tender to ascertain for themselves the full extent and nature of the works.

The Contractor shall ensure that all factors, site conditions, and items are taken account and what items are necessary in order 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. The Contractor shall contact the Main Contractor to arrange an appropriate appointment to visit the site during the tender period.

Tendering contractors 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.

Standard and code of practice

Unless specifically stated otherwise, or approved by the Engineer, installation, materials and equipment shall be in accordance with the relevant Irish, European International and British Standards and Codes of Practice and CIBSE Guidelines, whether indicated in this Specification or not.

Where stated in this document the British Standard Reference numbers shall be compatible with the I.E.C. reference numbers or vice versa.

Acts and regulations

The installation(s) shall comply with all Acts, relevant Statutory Instruments and Regulations including any special Regulations issued by the electricity, gas and/or water authorities. The tender shall be based on the Acts and Regulations current on the date for return of tenders. If these Acts and/or Regulations are amended or new Acts and/or Regulations are enacted after that date the Electrical Contractor shall inform the Engineer immediately.

Specified equipment

The Contractor shall refer to the rear of this document for a schedule of the specified equipment on which The Company's price is based. The Tenderer may offer an alternative manufacturer, providing the equipment offered is equal in all aspects, i.e. aesthetic appearance, classification and performance.

Alternative equipment proposed to that specified shall only be accepted/installed with the expressed approval of the Engineers in writing prior to the completion of the tender documents.

Plant warranties

Where a manufacturer's warranty applies, the warranties on plant and equipment shall commence from the date of commissioning and acceptance of plant by the Engineers.

Form of tender

The Contractor will pay particular attention to the proper completion of the Form of Tender. Completion of the Form of Tender must be as per the item numbers listed and should note that any section heading may apply to one or more of the items listed in the Summary of Prices.

The Contractor shall include in his tender under additional headings if necessary, and irrespective of the items indicated for all work specified or implied by the drawings or specification.

The tenderer shall be deemed to have full knowledge of the Specification and Drawings supplied to him and to have made himself fully acquainted with all requirements and to have obtained clarification on any matter or detail, which may be obscure to him.

Should any matter arise which in the opinion of the tenderer is obscure, he shall submit the details for clarification in writing to the Employer's Representative Engineer within 7 days of expiration of the tender period. The Employer's Representative shall circulate a reply to all Tenderers before the tender period expires.

The tender price is to be based on the works being carried out at rates of pay during working hours and under conditions of labour not less favourable than those established for the trade or industry in the district where the works are to be carried out. Any non-productive time associated with the recruitment of additional staff by the Contractor during the execution of the contract shall be deemed to be included in the tender price.

Installation and setting out of works

The Contractor shall set out the whole of the works and be responsible for the correctness of the positions, levels and dimensions of the several works. All openings, plinths, bases and holes to be cut in the structure shall be positioned and marked by the Contractor.

The tender drawings are diagrammatic only and the Contractor shall allow for a practical installation allowing for the setting around obstructions and other minor modifications which may or may not be apparent from the Architectural, Engineering, Structural, or services drawings.

The exact courses and positions of all pipes, ducts, flues, cabling, conduit, trunking etc. and other items of equipment shall be duly laid out and marked on the job by the Contractor and approved before execution as the best possible course and position, having regard to all considerations including temperature and the proximity to other services plant.

The Contractor shall make good any incorrectly set out works and shall be liable for costs of making good any work incorrectly carried out. The Contractor shall furnish all materials, labour and instruments necessary to enable the setting out to be checked.

Conflict between drawings and specifications

In the event of there being a conflict between drawings and specification, the tenderer shall obtain clarification before submitting his tender. Failure to do so will be deemed to imply that the most onerous requirements have been included for.

In the event that an apparent contradiction exists between any of the specification or between any of the specification and the drawings, this shall be addressed in writing to the Engineer during the tender period for clarification. If an apparent contradiction is not identified during the tender process, then it shall be at the discretion of the engineer to identify which document or clause takes precedence. Claims raised post-tender in relation to apparent contradictions shall not be entertained and the onus shall remain with the contractor to highlight any such issues during the tendering period. This in no way over rides the order of precedence of information as defined within the contract.

Contract drawings and specifications

Refer to the 'Document Issue' sheet issued with this pack as this document highlights all the contract drawings and specifications.

Details of the complete installation are indicated on the contract drawings and described within this specification. The exact locations of all equipment shall be agreed on site with the Consulting Engineers prior to installation where any doubt or potential conflict with other installations is perceived.

Plant and equipment which is installed and which conflicts with existing work or installations will be removed and reinstalled without expense to the client by the Contractor.

Materials and workmanship

All materials used in the works shall be fit for the use for which they are intended and for the conditions in which they are to be used in and includes materials which:

- a) Bear a CE mark in accordance with the provisions of the Construction Products Directive (89/106/EEC)
- b) Comply with an appropriate harmonized standard, European technical approval or national technical specification as defined in article 4(2) of the Construction Products Directive (89/106/EEC)
- c) Comply with an appropriate Irish Standard or Irish Agreement Board Certificate or with an alternative national technical specification of any member state of the European community, which provides in use an equivalent level of safety and suitability.

The installation shall be carried out and maintained in the best and most substantial and workmanlike manner. Workmanship shall comply with British or Irish Standards and the relevant codes of practice.

Only fully qualified and competent tradesman and helpers shall be employed on the works. Work shall not be sub-let or done by any other Contractors without the Employer's Representative permission.

No work shall be covered up prior to inspection by the Employer's Representative.

Wherever a proprietary name is used to specify a material or process it shall be deemed to have the term '**or equivalent**' appended to it.

Where a material or process is described by reference to its propriety name the name is used to indicate the standard of construction, appearance, ease of maintenance and durability acceptable to the Employer's Representative. The Employer's Representative will approve the use of alternatives where such alternatives are shown to equal or surpass the qualities of the product or process specified. Accordingly proprietary names wherever mentioned in the Specification, schedule of Rates or on the drawings shall be deemed to mean the provision of the named product or process or an approved alternative.

Notwithstanding the above no items shall be used for the works except those as specified in the contract documents except with the permission of the Employer's Representative. Any points, which differ in the contract documents to the Contractors normal practice, may receive consideration at tender stage if referred to the Employer's Representative. If no reference is made at tender stage it will be assumed that the Contractor will proceed exactly according to this specification.

Improper materials

The Employer's Representative shall have the power to order during the progress of the works the removal from site of any material, which in his opinion is not in accordance with this contract, the substitution of proper materials, and the removal and proper re-execution of any work, which in respect of materials and workmanship is not in accordance with the contract. This condition is not withstanding any previous tests or interim payments.

Liability for defects

Works showing defects or damage, whether caused by or as a consequence of negligence on behalf of the Contractor or not and regardless of whether the defects are discovered during the progress of the works or upon completion of the works, and regardless of whether the works have been approved or fully certified, the Contractor shall make good, at his own expense, such damage or defects discovered. On refusal to do so the Employer shall be entitled to carry out the work necessary and recover the expenses associated with such work.

Allow for maintaining the works in perfect condition for 12 months after the issue of the Employer's Representative's Certificate of Substantial Completion in accordance with the Conditions of Contract.

Conditions of building and site

The Contractor shall be responsible for making good any damage caused to the fabric or decor of the building or site by, or as a result of, his negligence or the negligence of his employees or contractors or others unnamed or otherwise. All rubble and waste shall be removed as it arises. Upon completion of the works, the site and building shall be thoroughly cleaned to the satisfaction of the Employer.

The Contractor shall pad ladders or similar equipment so that the building structure or finishes are not damaged in anyway. He shall also ensure that oil, grease or similar goods do not cause damage to the structure during the execution of the works.

Local authorities

The Contractor shall observe and comply with the requirements of all Statutes and Byelaws and serve notice on the Authorities or Owners of water, gas, electricity or any other items, which may be affected in any way by the execution of the works.

Plant

The Contractor shall supply all necessary slings, tackles, scaffolding, haulage, instruments, materials, apparatus, tools and labour for delivery and erection of the works, and for the completion and testing of the works to the entire satisfaction of the Employer's Representative.

Loss, theft, damage and injury

The Employer or Employer's Representative shall not bear any responsibility for the loss, theft or damage of equipment or materials associated with the works either during delivery or at any time during the execution of the works. All plant, equipment, tools, workmanship and materials shall comply with the relevant safety standards. The Contractor shall bear responsibility for the safety of his employees and agents throughout the execution of the works.

Copyright

Copyright is reserved on the Consulting Engineers' documents, which include all drawings, specifications, sketches and the like. These documents may only be used in relation to the works as outlined in this contract. Photocopying of documents is not permitted without prior permission of the Consultant Engineer. Any copies of documents made during the execution of the works shall be returned to the Consulting Engineer prior to final payment

Contractors drawings

The Contractor shall prepare if requested by the Employer's Representative any working drawings necessary for proper completion of the Contract. Two copies of each drawing shall initially be submitted to the Employer's Representative and upon approval the Contractor shall provide 6 no. copies of said drawings for distribution.

Working drawings shall show the final arrangement of all items of plant and their associated connections, all control assemblies and panels, as well as the routing of all pipework and ductwork.

The Contractor shall consult with all relevant parties and in the preparation of his working drawings so as to ensure there is no conflict between the Mechanical, Electrical and other services, Architectural or structural elements.

Variations, extras and omissions

No variation shall vitiate this Contract or save as hereinafter provided or give rise to any claim for compensation.

Where an extra, variation, omission is required the Contractor shall submit a price for such variation, omission or extra to the Employer's Representative in writing within seven days of the request for such a price.

He shall not proceed with such alteration, variation or extra until such a time as he has received a Variation Order in writing from the Employer's Representative.

No payment shall be made whatsoever to the Contractor for any variation, alteration, addition or extra unless a Variation Order is produced. Variations shall be priced at the rates submitted by the Contractor with his tender where such are applicable.

Pricing

Un-priced items

Any item left un-priced shall be deemed to be included for in the tender and the cost of the item shall be deemed to be spread across and included in the rates generally.

Currency

All prices and rates shall be deemed to be denominated in Euros (€).

Electricity supply, electric wiring and equipment

All electrical equipment is to be suitable for the standard ESB supply of 400/230V @ 50hz AC.

Where starters or controls are provided with any equipment included under the mechanical services contract, they shall be handed over to the Electrical Contractor together with their wiring diagrams, for erection and commissioning by him.

Electrical sub-systems certification

All electrical subsystems shall be certified as having been carried out in compliance with the requirements of I.S. 10101:2020.

Copies of I.S. 10101:2020 sub-systems certificates, accompanied by the relevant test results, shall be included with the I.S. 10101:2020 Completion Certificate in the Health and Safety File for the project.

In the event of the Contractor failing to secure subsystem certificates for all items of equipment then the Contractor shall be liable for the cost of having the system tested, remedied as necessary and certified.

The tender figure shall be deemed to include for all costs incurred by the Contractor in providing the appropriate documentation.

Proprietary names

Wherever a proprietary name is used to specify a material or process it shall be deemed to have the term '**or equivalent**' appended to it. If applicable, if the Contractor proposes an alternative material or equipment, this material or equipment shall be approved by the Employer's Representative prior the end of the tendering period.

Where a material or process is described by reference to its proprietary name, the name is used to indicate the standard of construction, appearance, ease of maintenance and durability acceptable to the Client / Employer's Representative. The Client / Employer's Representative will approve the use of alternatives where such alternatives are shown to equal or surpass the qualities of the product or process specified. Accordingly proprietary names wherever mentioned in the Specification, Schedule of Rates or on the drawings shall be deemed to mean the provision of the named product or process or an approved alternative

'Safepass' accreditation

The Contractor shall comply with the requirements of the construction industry's safety accreditation scheme, known as the 'Safepass' scheme.

Decision of the Employers Representative

The decision of the Employer's Representative on all questions relating to the execution of the works, the meaning of the Drawings and Specification, the manner of the execution of the works or the quality of the materials, the nature, quality of the works executed or what amount was included in the Contract shall be final, conclusive and binding.

Works outside the contract

The contractor should note that claims for additional works will not be entertained unless specifically requested in writing by the Employer's Representative.

Waste management

The site shall at all times be kept as clean and tidy as possible and the contractor shall be responsible for removing debris and rubbish on a regular basis. Removal of waste from site shall comply with the statutory waste management requirements.

Damage

External:

The Contractor shall note that any damage to the existing yards, main entrance, grassed areas, access roads or paved areas that may arise during construction stage of the project and caused by the construction works or by the Contractor's vehicles or staff, is to be made good by him at no extra cost to the Client.

The Contractor should provide all necessary protection to existing paved, grassed and landscaped areas around the site and shall make good any damage caused by lack of such protection at no extra cost to the Client.

The work is not to interfere in any way with the public roads. In particular, the Contractor is to ensure that these areas 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. Any damage caused to the surrounding public roadways shall be made good to the satisfaction of the Local Authority at the Contractor's expense. Any damage caused to the surrounding barracks roadways shall be made good to the satisfaction of the Client at the Contractor's expense.

Internal:

The Contractor shall note that any damage to the existing walls, windows, floor coverings, ceilings, doors, etc. that may arise during construction stage of the project and caused by the construction works or by the Contractor's plant or staff, is to be made good by him at no extra cost to the Client.

Any damage caused to the internal building as listed above shall be made good to the satisfaction of the Client at the Contractor's expense.

Interpretation of this specification and drawings

This specification has been written using simple, direct language wherever possible. Imperative terms such as 'provide' and 'submit' mean that the Electrical Contractor shall 'provide' or 'submit' the relevant samples, documentation or information.

If any discrepancies exist or there is any doubt about the interpretation of the Documents, obtain clarification from the Project Manager.

Declaration of Performance/CE markings

General:

The Contractor shall be aware of the Construction Products Regulation (CPR), which entered into force on 1 July 2013 and requires mandatory CE MARKING of construction products covered by Harmonised European Standards (HENS), when products are placed on the EU market. The purpose of the CPR and CE Marking of construction products is to facilitate the free circulation of construction products across the EU market. In doing so, the CPR has established a common technical language for declaring, specifying and setting requirements for construction products.

All CE MARKED construction products must have a Declaration of Performance (DoP), drawn up by the manufacturer. The DoP provides information on the performance of the construction product in relation to technical essential characteristics e.g. compressive strength, durability etc.

It is important that the electrical contractor uses only CE MARKED construction products within this installation and obtains a DoP for each product to ensure the product is fit for the use for which it is intended and for the conditions in which it is to be used.

Furthermore, it is the Contractor's responsibility to ensure all works should be carried out using "proper materials...which are fit for the use for which they are intended and for the conditions in which they are to be used" in order to demonstrate compliance with the requirements under Building Regulations.

All materials, equipment and plant used in the works shall be fit for the use for which they are intended and for the conditions in which they are to be used in.

All materials, equipment and plant shall adhere to the following:

- Shall bear a CE mark in accordance with the provisions of the Construction Products Directive (89/106/EEC)
- Shall comply with an appropriate harmonized standard, European technical approval or national technical specification as defined in article 4(2) of the Construction Products Directive (89/106/EEC)
- Shall comply with an appropriate Irish Standard or Irish Agreement Board Certificate or with an alternative national technical specification of any member state of the European community, which provides in use an equivalent level of safety and suitability.

The Contractor shall provide a Declaration of Performances (DOP's) cert for all materials, equipment and plant used in the works.

Evidence:

The Contractor shall provide evidence of Declaration of Performances (DOP's) and CE markings for all equipment, plant and material used in this project upon request by the Employers Representative. This is also mandatory for B(C)ar compliance sign off.

BREXIT implications for CE Marking and deployment of products for contracts with the EU member states including the Republic of Ireland:

As the UK has recently left the EU on the 31st January 2020. Contractors shall be aware of the implications and non-compliance risks for them or any of their sub specialists to install products which are CE marked under UK notified bodies. Post Brexit, UK notified bodies used for certification of conformity for 'CE' marking proposes will lose their status as EU Notified bodies and will be removed from the EU Nando website. In such instances the manufacturer of the product will need to obtain alternatives for certification of conformity for 'CE' marking.

Trade union rates and agreements

The Contractor must be in compliance with all Trade Agreements and the Contractor shall pay all employee's connected with the project to current trade union rates. If the Contractor appoints Sub-Contractor's to complete work then they too shall be compliant with current trade union agreements.

This will be monitored on site to ensure that all the Contractors employees and subsequent Sub-Contractors are in compliance with all Trade Agreements and that all are paid current union rates.

All employee's and Sub-Contractors employed by the Contractor for the duration of the works shall have their union cards on them at all times.

NZEB/BER Compliance

This building needs to be NZEB compliant.

An NZEB compliance report and calculation has been carried out for this project and the building is NZEB compliant based on all the plant, equipment, materials, etc. as specified below in the specification document.

The Contractor shall ensure that all items specified within this specification is installed as a preliminary NZEB/BER calculation has been carried out based on this specification.

If the Contractor is to deviate from the specified items within this specification and propose alternatives, the Contractor must ensure that these items match the specified criteria within this specification.

If in any case the Contractor takes the onus to install any item that isn't an equivalent to the specified items or isn't formally approved by the Engineer, then the Contractor shall be asked to carry out an individual NZEB/BER assessment to ensure it meets the desired NZEB/BER criteria. This shall be carried out at the Contractors expense and any cost implications for this shall be at the expense of the Contractor.

Timescale, working hours, payment, etc.

Refer to the Main Contractor for specific details on these requirements.

BUILDING CONTROL REGULATIONS

General:

All works shall be carried out to the new Building Control (Amendment) Regulations (BC(A)R), S.I. 9 of 2014.

Therefore, the Contractor shall allow for the following over the following stages of the contract:

Commencement Stage:

- Familiarise themselves with the drawings, specifications and documents lodged with the Commencement Notice.
- Ensure a competent person is assigned to oversee the Construction works.

During Construction:

- Install the services and construct the building in accordance with the plans and specifications.
- Ensure that the workmanship complies with the requirements of the Building Regulations.
- Ensure that materials which they select and for which they are responsible comply with the requirements of the Building Regulations.
- Co-operate with the design team, the Assigned Certifier and other certifiers.
- Co-operate with the Assigned Certifier for the implementation of the site inspection plan.

Upon Completion:

- Sign the Certificate of Compliance (completion).
- Provide to the Assigned Certifier, such documents for which they are responsible, as may assist the Assigned Certifier to collate particulars for the purposes of handover and certification, and/or for further submissions to the Building Control Authority.
- We will require Certificate of Compliance with the Building Regulations and relevant standards and manufacturers requirements at this stage.
- Ensure the coordination and provision of all test certificates and confirmations to the satisfaction of the Assigned Certifier or other designated inspectors or certifiers providing Ancillary Certificates;
- Maintain records.

Inspections during the Construction Process:

The Contractor shall allow the following for inspections during the Construction Phase:

- Contractor to give the Engineer at least 5 days notice to carry out a necessary inspection.
- All services that are to be hidden or concealed shall be left exposed until inspected.
- Prior to closing up services in walls, ground, attics, etc., all tests shall be completed and sign off sheets shall be signed and witness signed. Test sheet to contain the name of the tested, name of the witness, type of test, duration of test and results recorded.
- No cost variations will be accepted for time delays or opening up for inspections if these procedures are not followed.

BUILDERS WORK

General:

All Builders work associated with the execution of this Contract shall be carried out under the main contract by the Main Contractor. The Contractor shall liaise with the Main Contractor on all builders work requirements relating to their installations and shall prepare detailed builders work drawings for the Main Contractor.

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 of 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:

- 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.

Opes through Fire Barrier Membrane:

All services through fire barriers, fire walls or floor slabs shall be sleeved either side of the fire barrier/wall/slab. All opes shall be filled in and fire proofed by the Main Contractor after services is installed and commissioned. Allow for all necessary works. Liaise with Main Contractor in ensure that all opes for services are fire-proofed.

M&E CO-ORDINATION AND M&E CO-ORDINATOR

M&E Co-ordinator:

The co-ordination of the mechanical installations and electrical installations shall be the responsibility of the Main Contractor as they shall appoint a dedicated M&E Co-Ordinator for the mechanical installations and electrical installations on site.

In addition, the co-ordination of the electrical installations shall be the responsibility of the Electrical Contractor and the co-ordination of the mechanical installations shall be the responsibility of the Mechanical Contractor but both Contractors shall allow for co-ordinating their installation with each other and the M&E Co-ordinator.

All mechanical and electrical installations shall be co-ordinated by the M&E Co-ordinator which shall be the responsibility of the Main Contractor. The Main Contractor shall appoint a suitably qualified person to complete this role. The M&E Co-ordinator shall have relevant experience on site and experience in M&E installations:

The M&E Co-ordinator shall allow for the following (non-exhaustive list):

- Oversee the installation of the M&E installations for the duration of the projects.
- Detailed co-ordination of the M&E installations.
- Completing co-ordination drawings for the M&E Contractors on site.
- Ensuring that the M&E installations are completed and installed in compliance with design documents and current regulations.
- Programming of the M&E installations with the M&E Contractors and the Main Contractor.
- Shall be responsible for reporting on progress and creating procurement schedule.
- Shall be responsible for the overall progress & quality of work.
- Responsible for ensuring the clients requirements are being met.

Electrical Contractors Co-ordination:

The Electrical Contractor shall allow for liaising with all other trades in relation to coordination. Before any works are started on site, the Electrical Contractor shall hold a meeting with the Mechanical Contractor to co-ordinate the M&E installations in the building.

The co-ordination of the mechanical installations and electrical installations shall be the responsibility of the Main Contractor as they shall appoint a dedicated M&E Co-Ordinator for the mechanical installations and electrical installations on site.

The Electrical Contractor shall provide all information necessary and on time to the M&E Co-ordinator for the proper discharge of this responsibility. The Electrical Contractor shall agree all methods, sequences timing and all relevant details of the works within his contract with the M&E Co-ordinator in advance and shall not deviate from this agreement unless otherwise agreed in writing with the Contractor. No adjustments will be made to the electrical 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 Electrical Contractor shall liaise with all other trades when co-ordinating their works.

The Electrical Contractor shall mark out opes and holes on all floor and wall surfaces as required to the satisfaction of Services Engineer, Structural Engineer and M&E Co-ordinator in sufficient time to allow the Main Contractor complete his works to programme.

METHOD STATEMENTS AND RISK ASSESSMENTS

Before any works commence to the existing services in the existing buildings or in the existing buildings, the Electrical Contractor shall submit risk assessments for the works and method statements for the works to the Main Contractor for works in the existing buildings.

The Electrical Contractor shall allow for carrying out a risk assessment on all works and services to be installed in the new building and the existing buildings and shall highlight any risks to the Main Contractor.

Safety and Method statements must relate fully to this project only, e.g. the identification of hazards therein, and to enshrine the health & safety principles of prevention in the protection of employees and for others who may enter onto this site, or be effected by this work outside the line of site fencing etc.

The safety statement shall include the names of authorized deputies and job titles. Commitment signed by the Managing Director of the company to uphold the health and safety principles of this project, in compliance with Regulation 12 of the 89 Act.

Method statements shall describe the method to be employed by the Contractor to ensure that hazards and risks associated with this work have been identified, and that the hazards or risks will be reduced or eliminated to an acceptable level as far as reasonable practicable.

The method statement shall also specify the plant or equipment to be used and the safety procedures to be adapted when using plant or equipment. The contractor is obliged to ensure that all works will be carried out in accordance with all relevant safety standards.

Method statements are required where a particular task involves a specific risk to people and to all other parties who may be affected by the contractor's actions.

Examples include the following:

- Working at heights.
- Connecting to existing mechanical and electrical services.
- Decommissioning of existing mechanical and electrical services.
- Hot works in the new extension building.
- Hot works in the existing buildings.

(6-) ELECTRICAL WORKS

General

The Contractor shall be responsible for all electrical works and 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. 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.

61.01 Decommissioning and removal of the existing general light fittings

All of the existing general internal and external light fittings throughout the main school building shall be decommissioned and replaced with new LED light fittings as part of the works.

The existing cabling that is in place for these existing light fittings shall be retained and used for the new LED light fittings. The new LED light fitting shall be installed in the same location as the existing light fittings and as a result, the existing cabling shall be used for the new light fittings.

The Contractor shall allow for the following works:

- Disconnecting the existing cabling from the existing internal and external light fittings throughout the main school building.
- Once the existing cabling is disconnected, the Contractor shall allow for decommissioning and removing from site of the existing internal and external light fittings throughout the min school building.
- Supply and installation of new internal and external LED light fittings in place of the existing internal and external light fittings.
- Connecting of the existing cabling that was in place for the existing internal and external light fittings to the new internal and external LED light fittings once in place.
- Any other works deemed necessary by the Contractor.

Refer to drawings for further information and section 61.02 for new LED lighting schedule.

61.02 New internal & external LED light fittings

Existing internal and external light fittings:

As indicated in 61.06, all of the existing general internal and external light fittings throughout the main school building shall be decommissioned and replaced with new LED light fittings. The existing cabling that is in place for these existing light fittings shall be retained and used for the new LED light fittings.

New light fittings to be supplied and installed:

The Contractor shall allow for the supply, installation and wiring of the new LED light fittings throughout the main school building as indicated on the drawings and as described in the specification. See the drawings for the locations in the building and externally where new light fittings are to be installed.

The existing cabling that is in place for existing light fittings shall be retained and used for the new LED light fittings.

See the lighting schedule below for further information on all light fittings to be supplied and installed. All luminaires shall be supplied complete with lamps.

All surface mounted luminaires shall be fixed to surface mounted conduit boxes at their rear, unless stated otherwise or recommended by the manufacturer.

Switching arrangements shall be as currently on-site as the switching will not be replaced.

The Contractor shall allow for the supply, installation 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 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 Engineer 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:

The existing cabling that is in place for existing light fittings shall be retained and used for the new LED light fittings.

All of the new light fittings installed throughout the main school building shall be connected to the existing wiring that was in place for the existing light fittings as the new LED light fittings are to be installed in the same locations as the existing light fittings.

The existing wiring to the existing light fittings is not to be replaced as part of the works.

Before ordering the new LED light fittings:

Before any new light fittings are ordered, the Contractor shall allow for surveying in detail the existing light fittings and the cabling in place to the existing light fittings.

It is the Contractors responsibility to ensure that all light fittings shall fit in the locations as indicated. Final locations of all light fittings to be agreed on site.

Light fittings shall not be ordered until all types, locations, sizes, etc. have been agreed with the Engineer on site.

The Contractor shall allow for one full day on site for reviewing the existing light fittings and the new LED light fittings to be installed. No light fittings shall be ordered by the Contractor until the Contractor is fully satisfied that all new LED light fittings can be installed in their proposed locations.

Schedule of light fittings to be provided by the Contractor:

See drawings for quantities and locations of all light fittings.

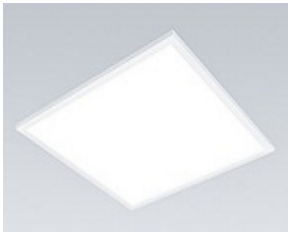
All light fittings shall be supplied by Thorn Lighting, or equivalent.

<u>Internal and wall mounted external light fittings</u>	
Type	Description
<u>A</u>  Surface mounted LED light fitting on the ceiling (23watt)	A high performance, surface mounted, LED luminaire. <u>Light source:</u> LED <u>Output:</u> 23watt <u>Body:</u> White painted steel <u>End caps:</u> White polycarbonate <u>Diffuser:</u> Clear prismatic polycarbonate <u>Colour:</u> White <u>Dimensions :</u> 1542mm x 195mm x 82mm <u>Luminous flux:</u> 3320lm <u>Lifetime:</u> 100,000hrs L80 at 25°C <u>Dimming:</u> Yes <u>High frequency:</u> Yes <u>Lamp Efficacy:</u> 144 lm/W <u>Colour temp:</u> 4000k <u>IP rating:</u> IP44 <u>Weight:</u> 4.72 kg <u>CE Marked:</u> Yes <u>Warranty:</u> 5 years on all components Light fitting shall be as Thorn 'College 2' 3000-840 HF L1500 (or equivalent)
<u>A1</u>  Suspended LED light fitting (23watt)	Shall be the same light fitting as specified above for the 'Type A' fitting but this fitting will need to be <u>suspended</u>. Therefore, the Contractor shall allow for the supply and installation of a wire suspension kit for each light fitting indicated. The wire suspension kit shall be as the 'College 2 Wire suspension kit' which consists of a suspension wire, cable connectors, and connecting plates for the back of the light fitting. There will be 4000mm of suspension wire required per light fitting. Light fitting shall be as Thorn 'College 2' 3000-840 HF L1500 c/w wire suspension kit (or equivalent)

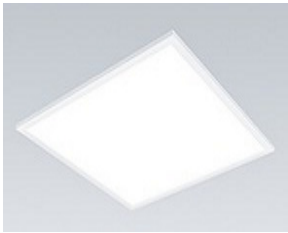
Type	Description
<u>B</u>  Surface mounted LED light fitting on the ceiling (31watt)	A high performance, surface mounted, LED luminaire. <u>Light source:</u> LED <u>Output:</u> 32watt <u>Body:</u> White painted steel <u>End caps:</u> White polycarbonate <u>Diffuser:</u> Clear prismatic polycarbonate <u>Colour:</u> White <u>Dimensions :</u> 1542mm x 195mm x 82mm <u>Luminous flux:</u> 4360lm <u>Lifetime:</u> 100,000hrs L80 at 25°C <u>Dimming:</u> Yes <u>High frequency:</u> Yes <u>Lamp Efficacy:</u> 143 lm/W <u>Colour temp:</u> 4000k <u>IP rating:</u> IP44 <u>Weight:</u> 4.72 kg <u>CE Marked:</u> Yes <u>Warranty:</u> 5 years on all components Light fitting shall be as Thorn 'College 2' 4600-840 HF L1500 (or equivalent)
<u>B1</u>  Suspended LED light fitting (32watt)	Shall be the same light fitting as specified above for the 'Type B' fitting but this fitting will need to be <u>suspended</u>. Therefore, the Contractor shall allow for the supply and installation of a wire suspension kit for each light fitting indicated. The wire suspension kit shall be as the 'College 2 Wire suspension kit' which consists of a suspension wire, cable connectors, and connecting plates for the back of the light fitting. There will be 4000mm of suspension wire required per light fitting. Light fitting shall be as Thorn 'College 2' 4600-840 HF L1500 c/w wire suspension kit (or equivalent)

Type	Description
<u>C</u>  Surface mounted LED light fitting on the ceiling (47watt)	A high performance, surface mounted, LED luminaire. <u>Light source:</u> LED <u>Output:</u> 47watt <u>Body:</u> White painted steel <u>End caps:</u> White polycarbonate <u>Diffuser:</u> Clear prismatic polycarbonate <u>Colour:</u> White <u>Dimensions :</u> 1542mm x 195mm x 82mm <u>Luminous flux:</u> 6320lm <u>Lifetime:</u> 100,000hrs L80 at 25°C <u>Dimming:</u> Yes <u>High frequency:</u> Yes <u>Lamp Efficacy:</u> 133 lm/W <u>Colour temp:</u> 4000k <u>IP rating:</u> IP44 <u>Weight:</u> 4.72 kg <u>CE Marked:</u> Yes <u>Warranty:</u> 5 years on all components Light fitting shall be as Thorn 'College 2' 6500-840 HF L1500 (or equivalent)
<u>C1</u>  Suspended LED light fitting (47watt)	Shall be the same light fitting as specified above for the 'Type C' fitting but this fitting will need to be <u>suspended</u>. Therefore, the Contractor shall allow for the supply and installation of a wire suspension kit for each light fitting indicated. The wire suspension kit shall be as the 'College 2 Wire suspension kit' which consists of a suspension wire, cable connectors, and connecting plates for the back of the light fitting. There will be 4000mm of suspension wire required per light fitting. Light fitting shall be as Thorn 'College 2' 6500-840 HF L1500 c/w wire suspension kit (or equivalent)

Type	Description
<u>D</u>  Surface mounted LED light fitting (Ceiling Mounted)	Slim round ceiling mounted high performance LED luminaire. <u>Light source:</u> LED <u>Output:</u> 12watt <u>Body:</u> White polycarbonate <u>Diffuser:</u> Opal polycarbonate <u>Colour:</u> White <u>Dimensions:</u> 307mm diameter by 58mm deep <u>Luminous flux:</u> 1400lm <u>Lifetime:</u> 50,000hrs L80 at 25°C <u>Dimming:</u> No <u>High frequency:</u> No <u>Lamp Efficacy:</u> 125 lm/W <u>Colour temp:</u> 4000k <u>IP rating:</u> IP65 <u>Weight:</u> 1 kg <u>CE Marked:</u> Yes <u>Warranty:</u> 5 years on all components Light fitting shall be as Thorn Katona KAT RD 1400-840 HF (or equivalent).
<u>D1</u>  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 <u>integrated PIR sensor for lighting control</u>. 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  600mm x 600mm recessed LED light fitting	A high performance 600mm x 600mm square light fitting that shall be recessed and inset into the new suspended ceiling: <u>Light source:</u> LED <u>Output:</u> 36watt <u>Body:</u> White sheet steel <u>Diffuser:</u> UV Stabilised polymethylmethacrylate <u>Colour:</u> White <u>Dimensions:</u> 597mm x 597mm x 55mm <u>Luminous flux:</u> 4250lm <u>Lifetime:</u> 50,000hrs L90 at 25°C <u>Dimming:</u> Yes <u>High frequency:</u> Yes <u>Lamp Efficacy:</u> 118 lm/W <u>Colour temp:</u> 4000k <u>IP rating:</u> IP20 <u>Weight:</u> 5.05kg <u>CE Marked:</u> Yes <u>Warranty:</u> 5 years on all components Light fitting shall be as Thorn Omega Pro 2' 4440-840 OP HF Q600 (or equivalent).

Type	Description
G  IP65 rated Surface mounted LED light fitting	IP66 rated surface mounted LED luminaire. <u>Light source:</u> LED <u>Output:</u> 20watt <u>Body:</u> Light grey polycarbonate <u>Diffuser:</u> Opal polycarbonate <u>Colour:</u> Light grey <u>Dimensions:</u> 1100mm x 92mm x 90mm <u>Luminous flux:</u> 2880lm <u>Lifetime:</u> 100,000hrs L80 at 25°C <u>Dimming:</u> No <u>High frequency:</u> No <u>Lamp Efficacy:</u> 146 lm/W <u>Colour temp:</u> 4000k <u>IP rating:</u> IP66 <u>Weight:</u> 1.7 kg <u>CE Marked:</u> Yes <u>Warranty:</u> 5 years on all components Light fitting shall be as Thorn Aquaforce Pro LED 2900-840 PC WB HF (or equivalent).

Type	Description
G  600mm x 600mm recessed LED light fitting	A high performance 600mm x 600mm square light fitting that shall be recessed and inset into the new suspended ceiling: <u>Light source:</u> LED <u>Output:</u> 30watt <u>Body:</u> White sheet steel <u>Diffuser:</u> UV Stabilised polymethylmethacrylate <u>Colour:</u> White <u>Dimensions:</u> 597mm x 597mm x 55mm <u>Luminous flux:</u> 3600lm <u>Lifetime:</u> 50,000hrs L90 at 25°C <u>Dimming:</u> Yes <u>High frequency:</u> Yes <u>Lamp Efficacy:</u> 120 lm/W <u>Colour temp:</u> 4000k <u>IP rating:</u> IP20 <u>Weight:</u> 5.05kg <u>CE Marked:</u> Yes <u>Warranty:</u> 5 years on all components Light fitting shall be as Thorn Omega Pro 2' 3800-840 OP HF Q600 (or equivalent).

Type	Description
X1  IP65 rated external wall mounted LED light fitting	IP65 rated wall mounted external LED luminaire. <u>Light source:</u> LED <u>Output:</u> 15watt <u>Back plate:</u> Aluminium painted anthracite <u>Body:</u> Anthracite polycarbonate <u>Diffuser:</u> Opal polycarbonate <u>Colour:</u> Anthracite grey (RAL7016) <u>Dimensions:</u> 381mm x 196mm x 305mm <u>Luminous flux:</u> 1844lm <u>Lifetime:</u> 60,000hrs L70 at 25°C <u>Dimming:</u> No <u>High frequency:</u> No <u>Lamp Efficacy:</u> 125 lm/W <u>Colour temp:</u> 4000k <u>IP rating:</u> IP66 <u>Weight:</u> 2.8 kg <u>CE Marked:</u> Yes <u>Warranty:</u> 5 years on all components Light fitting shall be as Thorn Piazza II LED 1690-840 HF P ANT (or equivalent).

61.03 Cabling, wiring and cable sizes

General installation:

All final sub-circuit cables for new emergency lighting 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 61.04 for further information.
2. All final sub-circuit cables for lighting 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 2.5mm² 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.

LSZH Cabling:

All final sub-circuit cables for lighting 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 2.5mm². 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): 2.5mm²/2.5mm² CPC
- Emergency light fittings: 2.5mm²/2.5mm² CPC

61.04 Cable carrier and cable containment

General:

The Contractor shall allow for supplying and installing a new cable carrier containment system for the new emergency lighting and other electrical items in the building as indicated on the drawings.

Trunking:

The primary trunking routes for the building are as indicated on the drawings but these primary electrical routes are to be finalised and decided by the Electrical Contractor in conjunction with the Engineer.

All new wiring for the emergency lighting system in the building shall be installed in metal conduit, trunking, etc. as described below. Cable containment shall be Uni-trunk or equivalent.

All tray and trunking to be installed in the building shall be manufactured from mild steel pre-galvanised.

Trunking shall meet the requirements of BS EN 50085-1:2005 and BS EN 50085-2-1:2006.

Tray systems shall meet the requirements of BS EN 61537:2007.

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 services and items at high level exposed along the ceiling.

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/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 trunking shall be installed to distribute emergency lighting wiring throughout the building in accordance with the ETCI National Rules for Electrical Installations. Cable capacities of conduit and trunking systems shall not exceed the requirements of the ETCI Specifications. It is the responsibility of the Contractor to verify that the trunking system as designed satisfies these regulations. If cables 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.



For tendering purposes, the Electrical Contractor shall allow for the following for pricing:

- 50 meters of 100mm x 100mm trunking.
- 50 meters of 100mm tray.

Conduits:

The majority of the electrical installation below the ceiling in the building to new emergency light fittings and other electrical items 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 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:

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



For tendering purposes, the Electrical Contractor shall allow for the following for pricing:

- 200 meters of 25mm conduit.

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.

The approval of the Employer's Representative must be sought prior to any notching.

61.05 Earthing and bonding

The new electrical installation and any new cable containment installed in the buildings 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, tray, 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 the existing electrical boards in the building.

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.

Bonding cables shall be run in conduit throughout the installation, terminating at the bonding point in surface or flush conduit box. Final connection shall be from a bushed outlet or outlet plate to the bonding point.

Main bonding clamps shall be fitted with approved labels. The use of perforated strip is not permitted, use only proprietary bonding clamps.

61.06 Attendances to the electrical blinds for roof lights

General:

There shall be 30no. electrical blinds for the rooflights installed throughout the building.

The Contractor shall allow for the wiring of all electrical blinds for the room lights in the building.

The Contractor shall allow for the power supplies to all electrical blinds in the building.

Please note that there are 30no rooms where electrical blinds shall be installed. Refer to drawings for quantities and locations.

The Contractor shall allow for taking power supplies from the nearest electrical board to the new electrical blinds in each room.

The Contractor shall include for the following electrical attendances to each electrical blind in the building as indicated:

- A 230V power supply via a new 13amp switched spur to be installed adjacent to the new electrical blind in each location in the building. The new spur shall be installed at approximately 3200mm high (in the ceiling void). Final location of spur to be confirmed with the installer. Refer to below for information on spur required.
- The 230volt power supply to the new 13amp switched spur shall be taken from the nearest electrical board where the new spur is to be installed. Allow for a 3-core 2.5mm² LSZH cable from the new 13amp switched spur to the nearest electrical board on each floor.
- A 3-core 2.5mm² LSZH cable from the new 13amp switched spur to the new electrical blind at high level. For tendering purposes, allow for a cable length of 15metres in each room for cabling from the new 13amp spur to the new electrical blind. Refer to the drawings for the location of the electrical blind in each room.
- Any other items deemed necessary for the supply and installation of the electrical blinds throughout the building.

Wiring shall be by the Contractor and shall be exactly to supplier's instructions. The Contractor shall liaise with the supplier regarding installation of equipment.

Cable containment for control items in the building:

For all the new power and control wiring required to the new electrical blind and spurs in the relevant rooms, the Contractor shall allow for installing all power and control cabling in galvanised steel metal conduit throughout. For tendering purposes, allow for 15 meters of steel conduit between the spur and the electrical blind.

Power supplies to the new electrical blind:

In each of the rooms that require a electrical blind installation, the Contractor shall supply and install a new 230V power supply via a new 13amp switched spur adjacent to the electrical blind at high level in the room.

The spur shall be installed at approximately 3200mm high (in the ceiling void). Final location of spur to be confirmed with the installer. Refer to below for information on spur required.

The 230volt power supply to the 13amp switched spur shall be taken from the nearest electrical board to the new spur in the building Allow for a 3-core 2.5mm² LSZH cable from the 13amp switched spur to the nearest electrical board. Refer to 61.04 for information on the cabling required.

Switched fused spur outlets:

As highlighted above, in each of the rooms that require a new electrical blind installation, the Contractor shall supply and install a new 230V power supply via a new 13amp switched spur adjacent to the electrical blind at high level in the room.

The Contractor shall allow for installing all power cabling for the spur in galvanised steel metal conduit throughout. All new conduits in the building shall be surface mounted. Refer to 61.04 for information on the metal conduits.

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

As per ETCI National Rules for Electrical Installations, the 230v thermostat must have a means of isolation which shall be a switched fused spur at high level above the thermostat.

Conduits:

Refer to 61.04 above.

Cabling:

Refer to section 61.03 for details on cabling required to the fused spur.

61.07 Attendances to the electrical blinds for clearstorey

General:

There shall be 30no. electrical blinds for the rooflights installed throughout the building.

The Contractor shall allow for the wiring of all electrical blinds for the clearstorey in the building.

The Contractor shall allow for the power supplies to all electrical blinds in the building.

Please note that there are 30no rooms where electrical blinds shall be installed. Refer to drawings for quantities and locations.

The Contractor shall allow for taking power supplies from the nearest electrical board to the new electrical blinds in each room.

The Contractor shall include for the following electrical attendances to each electrical blind in the building as indicated:

- A 230V power supply via a new 13amp switched spur to be installed adjacent to the new electrical blind in each location in the building. The new spur shall be installed at approximately 3200mm high (in the ceiling void). Final location of spur to be confirmed with the installer. Refer to below for information on spur required.
- The 230volt power supply to the new 13amp switched spur shall be taken from the nearest electrical board where the new spur is to be installed. Allow for a 3-core 2.5mm² LSZH cable from the new 13amp switched spur to the nearest electrical board on each floor.
- A 3-core 2.5mm² LSZH cable from the new 13amp switched spur to the new electrical blind at high level. For tendering purposes, allow for a cable length of 15metres in each room for cabling from the new 13amp spur to the new electrical blind. Refer to the drawings for the location of the electrical blind in each room.

- Any other items deemed necessary for the supply and installation of the electrical blinds throughout the building.

Wiring shall be by the Contractor and shall be exactly to supplier's instructions. The Contractor shall liaise with the supplier regarding installation of equipment.

Cable containment for control items in the building:

For all the new power and control wiring required to the new electrical blind and spurs in the relevant rooms, the Contractor shall allow for installing all power and control cabling in galvanised steel metal conduit throughout. For tendering purposes, allow for 15 meters of steel conduit between the spur and the electrical blind.

Power supplies to the new electrical blind:

In each of the rooms that require a electrical blind installation, the Contractor shall supply and install a new 230V power supply via a new 13amp switched spur adjacent to the electrical blind at high level in the room.

The spur shall be installed at approximately 3200mm high (in the ceiling void). Final location of spur to be confirmed with the installer. Refer to below for information on spur required.

The 230volt power supply to the 13amp switched spur shall be taken from the nearest electrical board to the new spur in the building Allow for a 3-core 2.5mm² LSZH cable from the 13amp switched spur to the nearest electrical board. Refer to 61.04 for information on the cabling required.

Switched fused spur outlets:

As highlighted above, in each of the rooms that require a new electrical blind installation, the Contractor shall supply and install a new 230V power supply via a new 13amp switched spur adjacent to the electrical blind at high level in the room.

The Contractor shall allow for installing all power cabling for the spur in galvanised steel metal conduit throughout. All new conduits in the building shall be surface mounted. Refer to 61.04 for information on the metal conduits.

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

As per ETCI National Rules for Electrical Installations, the 230v thermostat must have a means of isolation which shall be a switched fused spur at high level above the thermostat.

Conduits:

Refer to 61.04 above.

Cabling:

Refer to section 61.03 for details on cabling required to the fused spur.

61.08 Removal and reinstatement of fire alarm devices on the ceilings

The Electrical Contractor shall include for works to the existing fire alarm devices installed on the ceiling throughout the building. These works are required in order for the new suspended ceiling to be installed throughout the building. The Electrical Contractor shall include for the following as part of the works:

- Allow for a suitably qualified contractor to remove all of the existing fire alarm devices from the existing suspended ceiling throughout the building. Please note the existing location of all devices.

- Any fire alarm devices removed from the ceiling shall be kept on site in a safe area of the building until such time as the new suspended ceiling has been installed in the building.
- All of the existing fire alarm devices shall be reinstated in the new suspended ceiling in the same locations as the devices were previously installed.
- The Electrical Contractor shall get a suitably qualified contractor to commission all of the existing fire alarm devices to be installed in the new suspended ceiling throughout the building.
- Any other works required.

For tendering purposes, allow for 150 devices to be removed from the existing ceiling, kept safe while works are being carried out and reinstated into the new suspended ceiling on completion of the works. The Electrical Contractor shall include for all works in the tender return documents.

61.09 Removal and reinstatement of intruder alarm devices on the ceilings

The Electrical Contractor shall include for works to the existing intruder alarm devices installed on the ceiling throughout the building. These works are required in order for the new suspended ceiling to be installed throughout the building. The Electrical Contractor shall include for the following as part of the works:

- Allow for a suitably qualified contractor to remove all of the existing intruder alarm devices from the existing suspended ceiling throughout the building. Please note the existing location of all devices.
- Any intruder alarm devices removed from the ceiling shall be kept on site in a safe area of the building until such time as the new suspended ceiling has been installed in the building.
- All of the existing devices shall be reinstated in the new suspended ceiling in the same locations as the devices were previously installed.
- The Electrical Contractor shall get a suitably qualified contractor to commission all of the existing devices to be installed in the new suspended ceiling throughout the building.
- Any other works required.

For tendering purposes, allow for 50 devices to be removed from the existing ceiling, kept safe while works are being carried out and reinstated into the new suspended ceiling on completion of the works. The Electrical Contractor shall include for all works in the tender return documents.

61.10 Removal and reinstatement of emergency lighting devices on the ceilings

The Electrical Contractor shall include for works to the existing emergency lighting devices installed on the ceiling throughout the building. These works are required in order for the new suspended ceiling to be installed throughout the building. The Electrical Contractor shall include for the following as part of the works:

- The Electrical Contractor shall remove all of the existing emergency lighting devices from the existing suspended ceiling throughout the building. Please note the existing location of all devices.
- Any emergency lighting devices removed from the ceiling shall be kept on site in a safe area of the building until such time as the new suspended ceiling has been installed in the building.
- All of the existing emergency lighting devices shall be reinstated in the new suspended ceiling in the same locations as the devices were previously installed.
- Any other works required.

For tendering purposes, allow for 100 emergency lighting devices to be removed from the existing ceiling, kept safe while works are being carried out and reinstated into the new suspended ceiling on completion of the works. The Electrical Contractor shall include for all works in the tender return documents.

61.11 Removal and reinstatement of PIR devices for lighting on the ceilings

The Electrical Contractor shall include for works to the existing PIR devices for the lighting installed on the ceiling throughout the building. These works are required in order for the new suspended ceiling to be installed throughout the building. The Electrical Contractor shall include for the following as part of the works:

- Allow for a suitably qualified contractor to remove all of the existing PIR devices for lighting installed in the existing suspended ceiling throughout the building. Please note the existing location of all devices.
- Any PIR devices for lighting shall be removed from the ceiling shall be kept on site in a safe area of the building until such time as the new suspended ceiling has been installed in the building.
- All of the existing PIR devices for the lighting shall be reinstated in the new suspended ceiling in the same locations as the devices were previously installed. Allow for linking the PIR to the lighting in each of the spaces.

- The Electrical Contractor shall get a suitably qualified contractor to commission all of the existing Pir for the lighting to be installed in the new suspended ceiling throughout the building.
- Any other works required.

For tendering purposes, allow for 50 devices to be removed from the existing ceiling, kept safe while works are being carried out and reinstated into the new suspended ceiling on completion of the works. The Electrical Contractor shall include for all works in the tender return documents.

61.12 Removal and reinstatement of the existing projectors on the ceilings

The Electrical Contractor shall include for works to the existing projectors installed on the ceiling throughout the building. These works are required in order for the new suspended ceiling to be installed throughout the building. The Electrical Contractor shall include for the following as part of the works:

- The Electrical Contractor to remove all of the existing projectors installed in the existing suspended ceiling throughout the building. Please note the existing location of all projectors.
- Any projector shall be removed from the ceiling shall be kept on site in a safe area of the building until such time as the new suspended ceiling has been installed in the building.
- All of the existing projectors shall be reinstated in the new suspended ceiling in the same locations as the devices were previously installed. Allow for linking the projector in each of the spaces.
- Any other works required.

For tendering purposes, allow for 15 projectors to be removed from the existing ceiling, kept safe while works are being carried out and reinstated into the new suspended ceiling on completion of the works. The Electrical Contractor shall include for all works in the tender return documents.

61.13 Relocation of the existing satellite dish and associated system

The Electrical Contractor shall allow for the relocation of the existing satellite dish and associated system on the roof of the existing building in order for the existing roof to be replaced. The electrical Contractor shall liaise with the current installer of the existing system to ensure that the system is functional once the satellite dish has been replaced.

The Electrical Contractor shall ensure that he has included for all works associated with the relocation of the existing satellite dish.

61.14 Removal of the existing passive supply mushroom head

The Electrical Contractor shall allow for a Mechanical Contractor to remove the existing passive mushroom heads on the existing flat roof of the building in order for the existing roof to be replaced. The Contractor shall allow for the following:

- Removing the existing passive supply mushroom heads from the existing ductwork on the roof of the building in order for the existing roof to be removed from the building.
- The existing mushroom heads shall be stored on-site for the duration of the works.
- Ensure that the existing ductwork passing up through the building is sealed during the works to ensure that no dust or dirt passed down through the existing ductwork.
- Once the new roof has been installed, the contractor shall allow for the existing mushroom heads to be reinstated in the same location where the existing mushroom heads were installed. Ensure there is an upstand installed in the same location to ensure there is no leaks in the roof.
- Any other works required.

In total, there are 3no. mushroom heads to be removed, kept safe for the duration of the works and reinstated once the works are completed. See below image of the exiting mushroom head installed on the roof of the building.



61.15 Removal of the existing fume cupboard flue

The Electrical Contractor shall allow for a Mechanical Contractor to remove the existing flue for the fume cupboard on the existing flat roof of the building in order for the existing roof to be replaced. The Contractor shall allow for the following:

- Removing the existing flue for the fume cupboard on the roof of the building in order for the existing roof to be removed from the building.
- The existing flue for the fume cupboard shall be stored on-site for the duration of the works.
- Ensure that the existing ductwork passing up through the building is sealed during the works to ensure that no dust or dirt passed down through the existing ductwork.
- Once the new roof has been installed, the contractor shall allow for the existing flue for the fume cupboard to be reinstated in the same location where the existing flue for the fume cupboard were installed. Ensure there is an upstand installed in the same location to ensure there is no leaks in the roof.
- Any other works required.

In total, there are 1no. flue from the fume cupboard to be removed, kept safe for the duration of the works and reinstated once the works are completed. See below image of the exiting flue for the fume cupboard installed on the roof of the building.



61.16 Replacement of the existing roof mounted fan on the roof of the building

The Electrical Contractor shall allow for the replacement of the existing extract fan installed on the roof of the building. The existing extract fan shall be decommissioned and removed from site. The Contractor shall review the existing fan installed on the roof of the building and the new fan shall match the existing fan on the roof of the building.

See below image of the existing fan on the roof of the building.



61.17 New roof mounted fan on the roof of the building

There shall be a new roof mounted fan installed in replacement of the existing fan on the roof of the building. The roof mounted fan shall be installed in the existing upstand in place for the existing fan. The contractor shall ensure that the new fan shall match the open size of the existing fan in place. The new fan shall be as follows:

The Mechanical Contractor shall allow for the supply and installation of the following extract fan on the roof:

Ref No.	Location	Type	Duty	CAT No.	Control	Specific fan power
EF.01	Roof	Roof mounted extract fan	1,030m ³ /hr @ 100Pa	TH-1300/250 ECOWATT	Controlled by remote speed controller REB-5	-

The extract fan shall adhere to the following specification:

- Roof mounted fan in horizontal discharge format.
- Designed for smoke extraction in fire conditions and certified F400-120.
- Suitable for air steam temperature up to 120°C.
- Base manufactured from galvanised sheet steel.
- High efficiency centrifugal backward curved impeller manufactured from galvanised sheet steel.
- Cowl manufactured from spun sheet steel.
- All models incorporate bird-proof guard.
- Available, depending on model, in 4, 6 or 4/8 poles.

Controller for the fan:

The extract fan on the roof shall be controlled by a standard controller.

The Contractor shall allow for the supply and installation of the following speed controller for the fan:

- REB-5 speed controller



Wiring of the fan:

The Electrical Contractor shall allow for wiring the fan to the existing power supply serving the new fan on the roof of the building. Allow for all works in connecting the existing wiring to the new fan on the roof of the building.

61.18 Detailed survey of the existing main electrical board in the building and electrical installation in the building

In the building where the existing lighting services installation is to be decommissioned and removed, there is an existing main distribution electrical board. The Contractor shall carry out a detailed survey of the existing main distribution electrical board and the existing electrical installation throughout the 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 main distribution board in the building.
- Carry out a load test on the existing main distribution board in the building to see what electrical load of the board is pulling.
- For the 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 main distribution electrical board.
- Carry out a survey on the existing electrical installation in the building to ensure all electrical supplies are accounted for in the new electrical board and the new installation.
- Identify the best location for the main distribution electrical board in the location as indicated on the drawing.
- Any other works deemed necessary

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

In the building where the existing lighting services installation is to be decommissioned and removed, there are three existing sub-distribution electrical boards. The Contractor shall carry out a detailed survey of the existing sub-distribution electrical boards and the existing electrical installation throughout the 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 six sub-distribution boards in the building.
- Carry out a load test on the six 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 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 board in the location as indicated on the drawing.
- Any other works deemed necessary

62.20 Phasing of the building while keeping all electrical services live in the building

The Electrical Contractor shall liaise with the Main Contractor with regards to phasing of the works in the building. The works on-site shall be completed in a phased manner due to keeping the school live for the duration of the works.

The Electrical Contractor will be required to detail out to the Main contractor all of the existing lighting circuitry throughout the building to ensure that the building can be kept live for the duration of the building. The Electrical Contractor shall include for the following:

- Carry out a report detailing out the existing circuitry of the existing lighting throughout the building.
- Liaise with the Main Contractor to accommodate the entire works on-site.
- Ensure that the existing lighting in the building can be kept live if works in a area of the building where class are live and works are taking place if a single circuit covers a single area.
- Propose a detail solution to the phasing of the entire building for the existing lighting system.

69.0 COMMISSIONING AND HANDOVER

69.01 Commissioning of systems

Scope

Testing, Commissioning, Certification (TCC) and handover of the works specified.

Standards

- The sections of any standard specified for these works, that dictate testing, commissioning and/or certification formats or procedures
- RECI

Procedures

All systems and equipment must be fully tested and commissioned by the Contractor in accordance with the standards specified, the manufacturer's instructions and the specific requirements of these specifications. Spot testing will not be acceptable for any systems.

The Contractor shall supply, at his own expense, any and all equipment, labour and materials necessary to carry out these works as specified.

Practical Completion shall be withheld until all TCC is complete.

Prepare a schedule of all TCC works required for the project and proposed dates for the execution of same. the Engineer shall be informed of all TCC works a minimum of 3 working days in advance.

Submit written confirmation of all tests executed. Present clearly written or typed commissioning reports and provide original certificates where available.

Testing and Commissioning

Carry out testing and commissioning as follows:

- To all manufacturers specifications.
- For all cable systems (By installer of cable systems).
- Fully test and commission fire alarm panel and all devices individually (By system supplier).

- For addressable systems, verify addresses by confirming same during device test activation (By system supplier).
- Test battery back-up operation (by system supplier).
- Perform audibility test throughout facility. Provide written confirmation of test results (by system supplier).
- Test all external interfaces with the fire alarm system (e.g. HVAC panel, gas detection, etc.) and confirm results in writing. Overall responsibility for this test is with the Electrical Contractor. The Systems Supplier will also be involved.
- Perform sounder sequencing tests and confirm operation of sounders is in full accordance with the specifications.

Certification

- To I.S. 3218:2013+A1:2019, 4 part Model Form.
- RECI Certificate as required.
- Systems/components certification.

Commissioning Records and Reports

All checks, measurements and adjustments must be recorded in writing at the time they are made by the commissioning staff, and copies made available immediately to the Engineer. The form that this report will take shall be agreed with the Engineer prior to commissioning.

When the Contractor is satisfied that the plant and systems have been correctly commissioned, he shall submit a final report to the Engineer, setting out all matters relevant. The final format of this report shall be agreed with the Engineer before completion.

Handover of systems

When the Contractor has satisfied the Engineer that all commissioning has been completed satisfactorily, that the Clients staff have been adequately briefed on all plant and in all maintenance procedures, that all spares have been duly handed over and placed in stores, and that all instruction and maintenance manuals, together with all record drawings, have been delivered to the Client and the Engineer, the Engineer shall issue Completion Certificates to the Contractor. Each

section of the plant shall then be handed over to the Clients representative in the presence of the Engineer.

69.02 O&M Manuals

The Contractor shall provide a Class D Operating & Maintenance manual.

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. THIS PROCEDURE SHALL BE STRICTLY ADHERED TO.

Three prints shall be supplied of each drawing in addition to 3no compact disks containing all drawings in AutoCAD 2008 Format.

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.

Three complete sets of Operating and Maintenance Manuals and record drawings shall be supplied to enable the Employer to operate and maintain the systems correctly. 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

The 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 | Lighting Control Systems |
| ➤ Section 4 | Operating and Maintenance Procedures |
| ➤ Section 5 | Commissioning and Testing |
| ➤ Section 6 | 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
- A detailed description of the automatic lighting control system
- 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 the 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 or misunderstanding including order number for each plant
- Installation instructions as provided by manufacturer
- Colour coding identification schedule for each building services system
- Detailed schematics of the installed electrical boards, including manufactures details, board charts, etc.

Section 3 - Lighting Controls System

This section shall comprise:

- Wiring diagrams of lighting and lighting control systems.

- Parts list for each different type of item.
- Manufacturer's addresses and telephone numbers.
- Complete instructions for ordering replacement parts in a manner that will prevent errors or misunderstanding, including order number for each component item.
- Installation instructions as provided by manufacturers.

Section 4 - 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 the 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 5 - 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. A similar report shall be prepared for tests which have been made. 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

Diagrams shall be prepared on A4 or A3 (297 x 420mm) paper

- Section Dividers

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

- Files for Manual

A4 lever arch files with rigid plastic coated covers shall be used which shall be EMGEE or equal and approved

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.

The Trade Contractor is advised that all Record Drawings and O & M Manuals in the form described herein must be handed over to the Engineer prior to the issue of a Practical Completion Certificate for the Trade Contract Works. Failure to issue these Record Drawings and O & M Manuals will also defer the issue of the Practical Completion Certificate until such time as they are received.

If the Trade Contractor fails to issue such documentation on time, then the Engineer will have the right to engage such other third parties to prepare these Record Drawings and O & M Manuals and any resultant cost incurred by him shall be borne and set against the Contract.

Identification of Services and Plant

All cable trays and trunking shall be labelled clearly with colour coded bands which identifies its content.

Section 6 – 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.



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