

**Dunhill EcoPark, Waterford.
Co. Waterford**

***Works Requirement document – Volume A.2.4.
Specification of Performance, Standards and Materials***

For

Electrical Services Installation Works

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REV	ISSUE	DATE	DOCUMENT	AUTHOR	APPROVED
1	Tender Issue	22/05/2026	0595 – Electrical Specification	KM	JG

SECTION 1: PRELIMINARIES AND GENERAL CLAUSES:

01. Description Of Site:

The site is the existing Dunhill EcoPark, Waterford, which is easily accessible from the road. The site boundaries are defined on the attached drawings, and this Contractor shall confine his operations to the area indicated.

This Contractor shall be deemed to have made a thorough examination of the site and all features thereof, the existing premises, together with all internal and external services, adjoining premises and property or other things affecting the proposed works, to ascertain precisely the nature and extent of same and the condition under which the works will have to be executed, as no claim will be allowed on the grounds of want of knowledge in this respect.

This specification entails the supply, erection, installation, connection, testing and setting to work of Electrical Services associated with the finishing in every respect of the following works:

- Provision and Installation of sub electrical distribution board and sub-mains cabling
- Provision and Installation of cable containment
- Provision and Installation of wiring for power, lighting, protective services and ELV circuits.
- Provision and Installation of equipment, as indicated.
- Provision and Installation of lighting fittings
- Provision and Installation of emergency lighting
- Provision and Installation of Lighting, power and protective services for the site services.
- Provision and Installation of power and control wiring to ventilation plant throughout the area of works including MVHR unit and fans

This Specification should be read in conjunction with the Architectural, Structural, Civil and Fire drawings and specifications.

It shall be noted that not all elements of the specification have been transferred to the drawings. It is therefore important that the specification is read in conjunction with the drawings. Where a discrepancy is found between the drawings and specifications the most onerous should be taken. Any apparent contradictions between tender documentation should be queried with the Employer's representative during the tender process. In the case where a contradiction is not highlighted it will be at the discretion of the Employer's Representative to decide which document takes precedence. In the case of all standards outlined in this and other contract documentation, it is to be taken that the latest version or superseding standard is the relevant standard. (The precedence of information as defined within the Contract will still stand on all other matters)

02. Description Of Works:

The works covered by this specification comprises of the Electrical Services Installation works complete, in the refurbished areas in the existing building as shown.

Electrical systems to include general and emergency lighting, fire alarm, IT systems, small power, security systems, outside of areas of works, must be maintained at all times.

These works are to be carried out by a suitably qualified and registered Electrical Contractor as a domestic contractor to the Main Contractor.

The contractor shall include all labour, materials, import charges and transport which may be required for and in the construction of works detailed in the Specification and as shown on drawings, and shall provide at this own expense for all necessary power, plant, tackle, machinery, tools, apparatus, instruments, scaffolding, ladders, hoists, fencing and other equipment for the workmen and for the erection, testing, demonstration and commissioning of the complete plant in the manner described, together with the carriage thereof to the spot where they are required to be used and their subsequent removal.

This project is governed by the Building Control (Amendment) Regulations 2014, the electrical contractor shall allow for the provision of data sheets for all items associated with the electrical installation including cabling, containment, light fittings, electrical accessories, fire alarm devices, security devices etc.

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:

- The Safety, Health and Welfare Act, 1989.
- Requirements of the Health and Safety Authority / SI 138.
- Requirements of the Fire Officer.
- All Irish Building Regulations including Building Control (Amendment) Regulations (BC(A)R), S.I. 9 of 2014.
- Factories Act / Statutory Instruments.
- Client Safety Protocol.
- Client Specifications.
- Chartered Institute of Building Services Engineers.
- The Tender Drawings.
- The Contract Preliminaries.
- All relevant Irish, British and European Standards and Codes of Practice.
- I.S. 3218:2024 – Fire Alarm Systems
- I.S. 3217:2023 - Emergency Lighting
- EN12464 - The Lighting of Workplaces
- National Rules for Electrical Installations, IS 10101:2020
- IS 820-2019 Nondomestic Gas installation.

The Contractor shall at his own expense, keep his area of the site, always, free from debris, obstructions or surplus materials arising because of the works described in this specification and on completion of the works shall leave the site in a clean and tidy condition to the satisfaction of the Employer's Representative at the end of each working day.

All goods, products and materials shall be in accordance with the latest revision of Irish and EU Standards. All installations shall be in accordance with latest NSAI and Department of the Environment Building Regulations and Technical Guidance Documents.

The Contract for services and scope of work for the Contractor includes for the supply, delivery, positioning, erection, connection, testing, commissioning, and setting to work, of all plant and materials necessary to complete all remedial works to the satisfaction of the Employer's Representative and in accordance with the various drawings, schedules conditions and contractual documents and the requirements of this specification.

Materials and Products

Materials shall be selected, and all building elements designed to ensure that the building and all components are durable and low maintenance and do not present a hazard to the health and safety of the users. In accordance with Part D of the Building Regulations all works shall be carried out with proper materials and in a workmanlike manner. "Proper materials" means materials which are fit for the use for which they are intended and for the conditions in which they are to be used, and includes materials which:

- Bear a CE Marking in accordance with the provisions of the Construction Products Regulation.
- Comply with an appropriate harmonised standard or European Technical Assessment in accordance with the provisions of the Construction Products Regulation.

Or

- Comply with an appropriate Irish Standard or Irish Agreement Certificate or with an alternative national technical specification of any State which is a contracting party to the Agreement on the European Economic Area, which provides in use an equivalent level of safety and suitability.

The Engineer 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. The Engineer will periodically inspect the progress of the installation as it proceeds. If the Contractor requires any special inspection, he shall be obliged to advise the Engineer with two weeks' notice prior to the inspection required.

The electrical contractor will provide submittals sheets for all elements of the electrical installation. The initial submittal package will include all items in a single submittal for ease of assessment. Submittals shall have the relevant technical information presented in a proper datasheet with the specific product highlighted. Evidence of CE Marking, warranties and triple E register compliance will be provided where applicable. Following approval of submittals by the M&E consultant all visible elements of the installation will be provided on a samples board on site for the M&E consultant and Architect to review. Following this review of samples final design team approval is issued.

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

03. Site Conditions:

The submission of a tender will be deemed to imply that a site visit has been made to ascertain the nature and extent of the works involved, accessibility, local conditions, the supply of, and conditions affecting labour and the execution of the Contract generally.

On submission of a tender the Contractor shall be deemed to have acquainted themselves fully with all the necessary details of the building construction and occupancy.

Claims for extra payment on the grounds that the nature and extent of the work was not understood will not be granted.

This Contractor is strongly advised to visit the site and ascertain the facilities of access thereto, the supply of labour and materials the district will afford and general convenience of working. He shall be taken to have made himself acquainted with the nature of the works; the site and all existing buildings and all other things insofar as they may have any connection with or effect the works.

Contractors must refer to the Construction Industry Federation standardised approach to commencing construction projects in Ireland which incorporates the COVID-19 public health requirements, and ENSURE that all measures required in order to comply with these guidelines are included for. This document is available at www.cif.ie and a copy of same is included with the tender documentation issued for the works.

All the above matters must be taken into account when tendering and no charge for any extra labour or materials will be allowed in consequence of this Contractors failure to do this. The Contractor must notify the project Architect/Engineer immediately should site conditions alter significantly from those as stated in the tender documents.

04. Covid 19

The contractor shall allow in his tender for working on site in line with the CIFs Standard Operating Procedure (SOP) and, for any additional time and cost incurred to accommodate the implications of C19 restrictions. Ensure all directly and indirectly employed staff have undergone the CIF's COVID-19 safety induction programme and have a digital card and follow the instructions of the main contractors C-19 compliance officer.

05. Tender Drawings/Surveys

The submission of a tender will be deemed to imply that a site visit has been made to ascertain the nature and extent of the works involved, accessibility, local conditions, the supply of, and conditions affecting labour and the execution of the Contract generally.

On submission of a tender the Contractor shall be deemed to have acquainted themselves fully with all the necessary details of the building construction and occupancy.

Claims for extra payment on the grounds that the nature and extent of the work was not understood will not be granted.

The design drawings issued within the tender package must be read in conjunction with all relevant project specifications. If the contractor has any queries regarding design drawings issued prior to tendering they shall notify this office immediately. It shall be otherwise deemed that the contractor has understood and priced for all works as designed.

06. Tender Returns:

The Electrical Contractor shall be deemed, before tendering, to have made a thorough examination of the Drawings, Specifications, Conditions of Contract, the Site and other things affecting the proposed works to ascertain precisely the nature and extent of same and the conditions under which the proposed works will have to be executed. The Tenderer must complete the tender return / pricing pages accompanying this specification document, in full, where each elemental item is to be priced for separately.

07. 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 (€). All P.C. and Provisional Sums herein are in Euros.

08. Payment:

The Contractor must submit Progress Statements for each Claim and Interim Certificate Amounts may be at the Engineer's Discretion.

09. Ascertainment of Prices for Variations:

Any oral instructions, directions or explanations given by the Architect or Engineer upon the Works to Electrical Contractor shall if involving a variation be confirmed in writing by the Electrical Contractor to the Architect or Engineer within five working days.

The rates in the Priced Bill of Quantities referred to in the clause above applied to the Works shall determine the value of work carried out as a variation when such work is of a character similar to that to which the aforesaid rates apply and is carried out under similar conditions. The aforesaid rates shall also determine the value of any work omitted.

10. Bill Of Quantities:

The contractor shall, within seven days of being requested to, submit to the Engineers a detailed schedule, of rates covering every item fixed, as specified, upon which the sub-contractors estimate has been based. The number of items and quantities shall be given up to the totals as indicated in the Tender Summary. The Bill of Quantities shall remain with the Engineers until the works are completed and shall form the basis for agreement of variations by measurement. However, the Contract is a lump sum contract and is not subject to re-measurement.

11. Works Programme:

The Electrical Contractor shall include within his Programme, details of his intended timing and order for the construction of the Electrical Services Works and the dates by which any significant items of information will be required from the Main Contractor.

12. 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.

13. Guarantees and Warranties

All manufacturers guarantees and warranties on plant, equipment, etc., shall be valid up to the end of the Defects Liability Period.

14. Defects Liability Period:

All manufacturers guarantees and warranties on plant, equipment, etc., shall be valid up to the end of the Defects Liability Period. Refer to the Conditions of Tendering in the Main Contract Document.

15. Triple E Register

The Triple E Products Register is a benchmark register of best-in-class energy efficient products. The European Union (Energy Efficient Public Procurement) Regulations 2011, SI 151 of 2011, state “a public body shall only procure equipment or vehicles which are (a) listed on the Register or (b) satisfy the published SEAI energy efficiency criteria for the equipment or vehicle concerned, and the public body shall specify this requirement in any documentation describing its procurement requirements”. The contractor shall ensure that all products or electrical equipment installed in schools are listed on the Sustainable Energy Authority Ireland’s (SEAI) Triple E lists of energy efficient equipment or are compatible with the criteria of the Triple E evaluation scheme.

16. Builders Work:

The Electrical Contractor shall be responsible for the correct marking out and providing all builder’s works information/drawings to enable the Main Contractor to fulfil his obligations with regard to Builder’s Attendances. Where services pass through partitions (floors, walls, ceilings) the Electrical Contractor shall maintain the fire rating if applicable within the services e.g. Fire dampers in ductwork etc. The Electrical Contractor shall refer to the Architect to identify all Fire Walls within the building. The Main Contractor shall be responsible for making good of all builder’s work opes around services and ensuring that the making good does not damage the services installed.

17. Coordination Works:

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 shall be the responsibility of the Mechanical Contractor but the Electrical Contractor shall allow for co-ordinating the electrical installation with the Mechanical Contractor.

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 Main Contractor in sufficient time to allow the Main Contractor complete his works to programme.

18. Supervision:

The Contractor shall make available throughout the duration of the works a Project Supervisor or Site Foreman with appropriate qualifications and or experience to attend site meetings and receive instructions as are necessary for the execution of the contract, and to carry out superintendence of the works on site. The Project Supervisor /Site Foreman shall keep accurate records and details of all aspects of the works as necessary.

19. Labour:

The Electrical Contractor shall ensure that all employees are registered for PAYE / PRSI and that all employees have successfully completed a SafePass course. Only fully qualified and competent tradesmen, together with their necessary labourers, or helpers, shall be employed by the Contractor on the works, which shall be carried out and completed in the best substantial manner.

20. Site Establishment:

It is the responsibility of the Main Contractor to provide adequate temporary water, power and lighting supply for the duration of the Construction period.

21. Protection of Existing Services:

When stripping out the redundant services the Contractor shall ensure that no unnecessary damage is caused to either the equipment and/or the building fabric which is to be retained. The Electrical Contractor shall make good, at his own expense any damage caused whatsoever to existing services to the complete satisfaction of and in accordance with the instructions of the Engineer/Statutory Authority concerned, and shall keep the Client indemnified at all times from claims in connection with the damage.

22. Electricity Supply:

The electricity supply to this project will be 380/220 Volts, 50 cycles, and all electrical plant and equipment must be suitable for this supply.

23. Wiring Details:

The General rules for wiring of supplies of Electrical Energy, as laid down by the Electro Technical Council of Ireland, National Rules for Electrical Installations, 5th Edition IS 10101:2020, together with the regulation laid down by the E.S.B., shall be strictly adhered to, as shall the requirements of the 18th Edition of the I.E.E. Rules and Regulations.

24. Trade Names

Any reference to Trade names shall be for the purpose of describing the Specification standard of the article or material to be used and it does not imply that the specified trade name solely must be used.

25. Inspection Prior to Concealment

Where work requiring inspection or testing is subsequently to be concealed, due notice shall be given to the Main Contractor/Engineer to accommodate necessary inspection and witnessing of testing where required before concealment. Failure to give due notice, of at least 48 hours, shall necessitate the Contractor uncovering the work and reinstating at their own expense.

The Engineer reserves the right to forego its inspection; however this will in no way relieve the Contractor's responsibility to comply with the specification and drawings. All work that is not installed to the required standard or does not demonstrate adequate co-ordination with the building and other services must be removed and re-installed in full compliance with the tender documentation and relevant standards at the Contractor's cost and without any associated increase in the project program

26. Tests/Commissioning On Completion:

The contractor shall test all installations on completion in accordance with standard test procedures, that is, relevant I.S. / B.S. / E.S. and Codes of Practice. The Contractor shall notify the Main Contractor in writing when the electrical services installation or parts thereof are ready for testing and commissioning, allowing sufficient time period for programming the testing, commissioning and handover of the systems.

The contractor shall issue a seven day notice period to the Engineer prior to tests being carried out to allow for the Project Engineer to witness, if he so wishes.

The Contractor shall prove that all test results are in accordance with the performance based specification issued, and furnish the project Engineer with the report / certificate issued by the specialist commissioning company. All test / commissioning certificates are to be included in the project O&M manual.

27. BC(A)R 2014 Building Control (Amendment) Regulations:

The electrical specialist shall allow in full, for compliance with all statutory obligations under the Building Control (Amendment) Regulations BC(A)R, S.1.9 of 2014, including all revisions thereafter.

Ancillary Electrical Design Certificates to be provided to the M&E Consultant by the Contractor:

Electrical Design Certificate for all necessary design work for the installed systems not explicitly designed (as presented in the tender documentation) by the consultant, consultant design altered in any way or initial design impacted by final equipment selection, this includes but is not limited to:

- Cable Sizing
- Utilities Related Design
- Lighting System Design
- Emergency Lighting System Design
- Fire Detection & Alarm System Design
- Security Systems Designs
- All Temporary Designs

Note: is the contractor's responsibility to ensure all design work and certification is carried out by competent persons.

28. Making Good Damage:

The Contractor shall inspect all equipment and materials on arrival on site for defects or any failure to meet the specification and shall replace any defective equipment or materials as necessary. The Contractor shall take all necessary precautions to ensure that there is no damage or defacements caused by their employees or representatives to the furniture, fittings or other

equipment within the buildings or to the premises themselves or to adjoining premises, and shall make good at their own expense any damage caused to the premises or its contents during the works, to the entire satisfaction of the Employer's Representative.

29. Instruction:

This Contractor shall liaise with the Main Contractor in providing for instructing the Employer in the operation of the electrical services installations on completion of the installation works. He shall provide two sets of record drawings, for the installed systems and full operating and maintenance manuals.

30. Drawings:

Copies of drawings of the building are issued with each Specification. Dimensions and other information shown on the drawings forming part of the Contract are believed to be correct, but no responsibility for same is accepted. This Contractor should note that, prior to finally positioning and outlets or fittings, these must be agreed with the Engineer. The Contractor shall be responsible for the setting out of the work and he shall rectify any errors he may make, either in setting out the work or during its progress. The Sub Contractor shall not deviate in the execution of the work from the Specification or Drawings herein referred to, except upon written order signed by the Employers Representative authorising such deviation.

The Electrical Contractor shall keep on site a full set of the Construction Drawings, on which he shall record and note the actual layout of all the Electrical services installations as installed, including routes.

The Electrical Contractor shall include for the preparation of final marked-up drawings, at practical completion stage.

31. Maintenance:

The works shall be maintained by the Contractor in perfect condition for 12 months after the issue of the Engineers certificate of practical completion and any work or material exhibiting defects during that period shall be made good by the Contractor at his own expense.

32. Tax Clearance Certificate & C.I.F. Pension/Sick Pay Scheme:

It will be a condition for the award of the Contract that the firm being considered must be able to produce, within seven days of being requested to do so, a Tax Clearance Certificate from the Collector General of Taxes, Sarsfield House, Limerick and provide evidence of Membership of the Construction Industry Federation (C.I.F.) Pension/Sick Pay Scheme.

33. Insurances:

The Contractor shall comply with the requirements of Clause 10 of the "Short Public Works Contract" relating to Insurance and Compensation. He shall effect adequate insurance in his own name and also in the name of the Employer to cover all the risks or claims specified in the aforesaid "Short Public Works Contract" and shall hold the Employer indemnified against all such claims and risk in anyway arising out of the works included in the Contract.

The minimum sum for public liability insurance shall be €6,500,000.00 (six million, five hundred thousand euro) for any single claim, including employer's liability of €13,000,000.00 (thirteen million euro) and including all risks as stated in the attached "Tender and Schedule".

CONTRACT SAFETY AND HEALTH PROCEDURES:

Introduction

The Contractor shall note the Preliminary Safety and Health Plan prepared by the Project Supervisor for Design Stage, information included within this report and include all costs relating to compliance with that set out within the various Sections of the Preliminary Safety and Health Plan.

The Contractor shall include for complying with the Safety, Health and Welfare at Work Acts and Regulations current at the date of tender.

The Contractor shall include for providing all necessary information as requested by the Project Supervisor for the Construction Stage to enable the preparation and completion of the Safety File.

The Contractor shall include for "As Built" drawings for inclusion in the Safety File.

The Contractor shall hand over all documentation in connection with the Safety File and full information must be handed over for sign off, to the PSDP prior to Practical Completion Certificate been issued

Procure and maintain insurance cover and provide indemnity in respect of any claim incurred by reason of the performance of functions and duties of the project supervisor for the Construction Stage of the Project. Assist in preparing and completing the Safety File.

Regulations

The Contractor shall comply and adhere to the general principles of prevention as stated in the following:

- Safety, Health and Welfare Act 2005 - Present;
- Safety, Health and Welfare at Work (General Application) Regulations 2007;
- Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. No. 291 of 2013);
- Memorandum on Council Directive 92/57/EEC; and
- Construction Industry Research and Information Association: "Control of Risk: A Guide to the Systematic Management of Risk from Construction", Report FR/CP/32, 1995.
- Safety, Health and Welfare Act (Chemical Agents) Regulations (2015)

B1. BASIC LEGAL REQUIREMENTS:

Contractors must comply with the Safety, Health and Welfare at Work (Construction) Regulations 2013 to 2021 and any other statutory provisions and common law duties. Steps must be taken to ensure the provision of adequate and suitable plant and equipment.

Only those Contractors and Employees having appropriate training and experience should be allowed work, on the premises. The Contractor shall appoint a Project Supervisor as required by the Site Health and Safety Regulations.

B2. SAFETY COMMUNICATION:

The Contractor is required to ensure that all the Employees, Sub-Contractors and all their Employees, whilst on the Company premises are informed of the Health and Safety Rules and Procedures.

B3. PERIOD OF WORK:

The Contractor must notify the Project Co-ordinator in an appropriate way before commencing and on completion of their task. Prior application must be made for any work to be undertaken outside of normal office hours.

If work is to be phased, the method of phasing the work is to be prepared, agreed and distributed to all parties.

B4. VEHICLES:

Vehicles used by Contractors or their Employees are allowed on the Companies premises for delivery, parking or collection subject to local instructions. All drivers are requested to exercise maximum care when on Company premises and particularly when Employees or Members of the Public are entering or leaving.

Drivers of large vehicles operating in confined circumstances must ensure there is a person in attendance to assist with reversing etc.

B5. DELIVERY AND DEPOSIT OF MATERIALS AND GOODS:

No materials, goods or equipment shall be stored in Plant Rooms or placed so as to obstruct general work areas, gangways or fire exit routes.

All rubbish especially dangerous or flammable materials must be removed from the premises daily.

B6. CONTRACTORS WORK AREA:

The Contractor must keep locked, the doors to flat roofs with unprotected edges, plant rooms and electrical apparatus, unless in attendance. Where possible, the Contractor's work should be clearly defined and physically separated from all parts of the premises. The area may be marked by a temporary partition or tape backed up with warning signs.

The segregated area will become the responsibility of the Contractor. Visitors to Contractor's work must be accompanied by Contractors representative. Under no circumstances should portable or temporary methods of heating be introduced to the Contractors Area, without prior written authorisation.

B7. RAISED SURFACES, HOLES AND PROJECTIONS:

Raised surfaces, holes, trailing leads or surface and projecting equipment must not be left at any time without taking the necessary safety precautions. All opening must be securely fenced or covered over and marked with warning notices. Loose materials of whatever kind must not be left about or allowed to obstruct the roadway, gangways or working area.

B8. FIRE EQUIPMENT:

The removal or obstruction of Fire Extinguishing Equipment from its original location is prohibited. A Contractor is responsible for providing and maintaining any specialised fire extinguishers and equipment for the work in progress.

B9. EVACUATION OF BUILDING:

The contractor must read Fire Instructions displayed on the premises and comply in the event of an emergency evacuation. He/she is not to eliminate or diminish exists during alterations.

B10. EXISTING SERVICES:

It is the Contractors responsibility to ascertain the existence and whereabouts of electrical cables, drains, air, gas, and water mains. The Contractor must familiarise himself/herself and how to operate the main and/or local isolation points for services before starting work and in anticipation of an emergency.

B11. PLANT, TOOLS, AND EQUIPMENT:

All plant, tools and equipment brought onto the Company's premises should be of safe design and in a safe condition. Particular attention must be given to checking the electrical and mechanical integrity of any hired equipment. Earth leakage circuit breakers should be fitted on all 220-volt cables. Equipment operating at 110 volts is preferable.

B12. SAFEGUARDING OF MACHINERY:

All machines such as circular saw tables and pipe threaders must be guarded in accordance with statutory requirements.

B13. SAFETY STATEMENT:

Contractors are required to have safety statements available for inspection by the Clients H.S. and W. offices. They are also required to prepare method statements when undertaking tasks requiring special skills or technology.

B14. PORTABLE ACCESS EQUIPMENT:

Where ladders, step-ladders and trestles are necessary, they must be used in a safe manner for work to be done. Ladders should be securely tied at the top or held by a person at the bottom unless they incorporate suitable safety devices. The equipment should be of suitable construction and free from defect. Equipment and materials must be carefully moved and not thrown or dropped from a height.

B15. WARNING OF DANGER:

Care must be taken, at all times to protect the Client's employees and members of the public from danger and to protect property and work in progress from damage.

Any circumstances which give rise to such danger or damage must be reported immediately.

B16. PERSONAL PROTECTIVE EQUIPMENT AND CLOTHING:

All Contractors employees must be issued with, and make full use of, all such protective equipment or clothing, as required by statute or any regulations made thereunder. They must also meet any locally agreed requirements for protecting the employee, e.g., for the use of safety helmets and protective footwear.

B17. ACCIDENTS:

In addition to the statutory obligations for Contractors to report dangerous occurrences and accidents to the appropriate authority, all accidents must be reported to the safety co-ordinator of the Clients.

B18. HOT WORK:

In the event of the Contractor carrying out any of the following works he must carry the appropriate insurance and also comply with all the procedures and safety precautions set out in this insurances:

- ☐ All activities involving flame.
- ☐ Hot air or arch welding and cutting equipment.
- ☐ Braising and soldering equipment and blow lamps.
- ☐ Bitumen boilers and other equipment producing heat or having naked flam

B19. SAFETY, HEALTH, WELFARE & ENVIRONMENTAL ISSUES

This Contractor shall comply fully with all statutory safety, health and welfare regulations regarding work people, including those employed by Sub-Contractors employed on the site and particularly the Safety, Health and Welfare at Work (Construction) Regulations 2013 to 2021 and provide all relevant details to the Main Contractor to carry out the function of Safety Planning Supervisor for the construction phase of the works.

This Contractor shall comply in all respects with the Factories and Safety in Industry Acts and any other Acts and with any Statutory Instruments or Regulations issued thereunder.

This Contractor is required to provide a safety method statement clearly indicating the proposed sequence of his works and the precautions he will be taking at each stage in the works to protect his employees, and those of the main contractor, other sub-contractors, visitors and the Employers personnel and any plant and equipment, etc. Full details of any chemicals or substances proposed to be used in the project construction process should also be detailed fully and the Employer's prior written approval received for it's use.

This Contractor shall include for complying with the Safety, Health and Welfare at Work Acts and Regulations current at the date of tender.

The Main Contractor shall be appointed by the Client under a collateral agreement to the main contract as Project Supervisor for the Construction Stage in respect of the project pursuant to the Safety, Health and Welfare at Work (Construction) Regulations 2013 to 2021. This Contractor shall include all costs for the provision of the necessary services and details to the Main Contractor to perform his duties as Project Supervisor for the Construction Stage pursuant to Regulations 6 and 7 of the Regulations.

This Contractor shall include for providing all necessary information as requested by the Project Supervisor for the Construction Stage to enable the preparation and completion of the Safety File including record drawings, specifications, maintenance and operating manuals and commissioning certificates. The record drawings and Maintenance Manuals shall be as required under previous clauses of this document.

COMPLIANCE

We can confirm that our design considers all the requirements as out lined in the current health and safety regulations and we have taken every practical step ensuring that the installations we design can be safely installed, used and maintained

PARTICULAR SPECIFICATION

ELEMENT (61) : ELECTRICITY CENTRE MAIN AND SUB- DISTRIBUTION SYSTEM

61.1 Extent Of Work In This Section

This section covers the extension of the existing main board supply, installation, testing and commissioning of the new sub distribution board, as shown and as detailed on the accompanying drawings.

61.2 Distribution System

Distribution sub-main cables between the main switchboard and the local distribution centres shall be PVC/SWA/PVC/L.S.F cu., insulated cables on cable tray throughout. The size of distribution cables shall be as indicated on the drawings.

61.3 Sub-Distribution Board

The contractor shall supply and install, as shown, the metal clad cubicle type distribution board in the locations shown.

The panel shall be manufactured in strict compliance with the Code of Practice For the Design, Selection and Erection of Low Voltage Switchgear Assembly, as published by the ETCI and the attached general specification for low voltage switchgear.

In addition, the requirement of the IEC document, IEC 439, the boards shall be Form 4 Construction, assembled with production rating of IP 54, externally and IP20, internally. MCB's shall be to BS 3871, DE 0641, Class K for motive power, Class L for lighting services. ELCB's shall be to B.S. 4293, 30 MA. Fuses shall be to B.S. 88.

61.4 Distribution Trunking

The Contractor shall include the low and extra low voltage trunking for the distribution cables and control cables to sizes and runs as indicated on the drawings. The steel cable trunking shall be fixed to walls, ceiling or structural steelworks as indicated on the drawings. It shall be provided complete with all bends, tees, crossovers, couplers, offsets and earth links and shall be as manufactured by Uni-Trunk or equal and approved.

Where cable trunking passes through floors and where it enters separate fire compartments it shall be provided with approved fire barriers.

Vertical mounted cable trunking shall be provided with cable pin racks to support cables at 2000 mm centres. All fixing holes and holes for conduit entry shall be drilled prior to commencement of wiring so as to avoid damage to cables.

61.5 Cable Tray

The Contractor shall supply and install cable tray as required and as shown on the drawing for the distribution cables. Cable trays shall be W.I.B.E., or equal and sizes shall be as shown on the drawings.

ELEMENT (62) : POWER DISTRIBUTION SERVICES

62.1 Extent Of Works In This Section

This section shall include for the complete sockets, power and general services installation as shown on the drawings, and as specified below.

62.2 System Of Wiring

General Services sockets shall be wired on the ring main system using 4 mm² P.V.C/L.S.F/CU cable, protected by 20A RCD units, with a maximum of 6 outlets per circuit. The wiring shall generally be carried out in NYM-J cable in galvanised steel containment and boxed in

62.3 Socket Outlets And Plugs

Socket outlets shall be the flush type in metal boxes. They shall be 13 Amp flat pin type and shall comply with BS 3676.1989 and BS EN 60669-1.2000 or BS 3676. Part 1 of 1989, and amendments up to May 1978, shall be the switched type, single or twin, as shown on the drawings, and shall have a matt chrome finish. The contractor shall note the requirement for unswitched socket outlets to the computer stations.

Sockets generally shall be mounted about 0.3 metres above floor and in the case of worktops placed against walls, the sockets shall be located about 200 mm above the worktop. A small number of outlets shall be at 1.5 metres above floor in the locations as indicated on the drawings.

62.4 Connection Units

The Contractor shall include for the supply and installation of fused connection units for the following equipment located as indicated on the drawing.

- (a) Fire Alarm Panel
- (b) Telephone Equipment
- (c) Intruder Alarm Panel
- (d) Data equipment.

Connections to the equipment shall be by means of 13A fused connection units, with neon light and final connection shall be in PVC flexible cable clipped.

62.5 Wiring To Extract Fans:

Extract fans shall be provided in certain locations as shown on the drawings. Fans shall be provided by the mechanical contractor complete with speed regulators. The regulators shall however be handed over to the Electrical Contractor for erection and connection.

Wiring to fans shall be carried out in 2.5 mm sq., NYM-J cable on galvanised steel containment the final connection in three or four core white flexible cable. Control switches shall be provided by the Contractor. Three phase starters shall be provided, where required, with single phase protection magnetically operated (thermal operation is not acceptable).

In the case of internal areas such as inside toilets the fans shall be controlled by the light switch through the starter. In such cases a run-on timer facility shall be provided which shall keep the fan running while the lights are on and then for about twenty minutes after the light has been switched off.

Where the one fan is serving more than one toilet area the light switches shall be double pole type with the second pole of each of the switches wired in parallel so that when any light is switched on the fan will also come on but not the light in the other areas with the common ventilation system.

62.6 Disconnection and Removal of Obsolete Services

This includes for the disconnection and removal of all existing small power services to facilitate the works

The contractor is strongly advised to visit the site to familiarise himself with the full extent of the works to be disconnected and removed. The contractors attention is drawn to the fact that no allowance will be made due to lack of knowledge of the existing on site conditions and the extent of the works to be disconnected and removed as part of this element of the works.

ELEMENT (63) : LIGHTING SERVICES

63.1 Extent Of Works In This Section

This section shall include for the complete general lighting, and emergency lighting as indicated on the drawings and as specified below.

63.2 System Of Wiring

Wiring to the circuits shall be carried out using 2.5 mm² NYM-J carried on galvanised steel containment with steel conduit drops and boxed in throughout. Circuitry shall be as shown on the accompanying drawings.

Generally, the conduit/wiring shall be run concealed and shall terminate at each lighting point in a C.I. multiple loop-in box. All bushes connecting conduit to trunking shall be securely tightened prior to the commencement of wiring.

Flanged couplings shall be used for connecting conduit to trunking.

The wiring to recessed lighting fittings shall terminate in a local 6 amp outlet, with final connection in heat resistant flexible cable (maximum length 1500 mm). The 6 amp outlet shall be of M.K. manufacture and shall be surface mounted in cast iron Besa boxes. Wiring to surface mounted fittings shall be directly into the terminal blocks provided in the fittings. Heat resistant glass fibre sleeves shall be fitted to all wiring inside fittings.

63.3 Lighting Switching

Lighting switches shall be provided and ganged as indicated on the drawings. They shall be 20 amp inductive rating grid switch type, either 1 way, 2 way, key operated, intermediate for internal use, on push type with auto-time release and shall be mounted on surface conduit boxes. They shall have porcelain bases with plastic rockers and flush mounted matt chrome cover plates.

Where wiring of more than one phase enters a switch box, vertical barriers shall be provided between phases and 'red' warning plates engraved "Danger 380 Volts" shall be provided below the cover plate and fixed to the switch.

The Engineers approval shall be obtained to all ganging arrangements before ordering and fixing to ensure that these are in accordance with the Clients and Architects requirements.

Switchgrids shall be fitted with earth terminals and bonded to the switch boxes by suitable earth conductors. Switches shall be mounted at 1100 mm above finished floor level unless otherwise indicated.

Lighting switches for toilets used for the control of extract fans shall be the double pole type as detailed. Switches in small window less stores which are located outside the door shall have an 'on' indicator light.

63.4 Lighting Fittings

Lighting fittings shall be supplied and erected in the positions shown on the drawing and shall be in accordance with the materials specification, the applicable standards and the performance required as scheduled which is bound-in at the end of this specification.

The Contractor shall include for taking delivery, handling, storing, erecting and connecting all lighting fittings, and shall also include for profit and overheads.

The Contractor shall provide in his tender for the erection and trial of a reaable number of fittings specified, not exceeding 5% of the total, for inspection by the Employer and the Architect, and no claim shall afterwards be entertained for the labour involved in the erection of such fittings for trial before selections have been made.

63.5 Lamps

The contractor shall include for the installation of all lamps, the cost of supply and delivery being included in the sum for the fittings.

63.6 Emergency Lighting

The Contractor shall provide for the complete emergency lighting installation as indicated on the drawings

Wiring shall be carried out using 2.5 mm² 2 NYM-J carried on galvanised steel containment and steel conduit to each self contained emergency light or exit sign.

Exit lights of the self contained sustained type shall be complete with LED filaments and a capacity of 3 hours duration and shall have a mains monitoring light.

Some emergency lights shall be of the integrated emergency type with the emergency lighting built into the standard fluorescent fitting. The emergency gear shall include change-over arrangement, battery and charger with inverter for conversion from DC to AC. Twin tube fittings shall have only one emergency lamp. The battery shall have adequate capacity for three hour duration for the particular fitting and shall have a built-in LED monitor to indicate correct charging.

Final connection to the fittings shall be as described for the general lighting installation. Where exit signs are suspended, the Contractor shall allow for providing the necessary conduit suspensions.

The Contractor shall include for supply and delivery of the emergency light fittings including any profit and for handling, storage, erecting and connecting.

63.7 Testing Of Emergency Lighting

Wiring to all emergency lighting units, whether of the self-contained or integrated type, shall be taken separately from the sub-distribution boards. At each board an interface unit shall be inserted into the wiring to the emergency lights. A central test unit shall also be located at the distribution board for testing the systems, as detailed.

The contractor shall include for the testing and commissioning of the system by the system suppliers and for attendance on the suppliers during commissioning. On the satisfactory completion of the testing and commissioning the contractor shall submit the inspection and test certificate in accordance with IS 3217:2023.

63.8 Disconnection and Removal of Obsolete Services

This includes for the disconnection and removal of all existing general and emergency lighting services to facilitate refurbishment works.

The contractor is strongly advised to visit the site to familiarise himself with the full extent of the works to be disconnected and removed. The contractors attention is drawn to the fact that no allowance will be made due to lack of knowledge of the existing on site conditions and the extent of the works to be disconnected and removed as part of this element of the works.

ELEMENT (64) : COMMUNICATIONS SERVICES

64.1 Extent Of Works In This Section

This section shall cover the supply and installation of the infrastructure for the information and communication technology system installations, as detailed.

This system shall be networked with the main frame in the center

64.2 Access / Entry System:

This includes for the works to the door access system as shown and as detailed on the accompanying drawings.

64.3 Infrastructure for system of information and communication technology (ICT):

Extent of Works.

This element of the works includes for the infrastructure of the ICT system as outlined hereafter

All offices shall be networked, as shown and as specified hereafter. The position of network points in all locations shall be prior agreed with the Engineer. An I.D.F. shall be provided as shown.

Structured Cabling Systems;

The primary network shall be installed using Category 6 enhanced / Class D to ISO 11801: 1999. The network will be Fast Ethernet standard IEEE802.3u, with auto-sensing switches. The infrastructure to be provided shall include the structured cabling, RJ45 sockets, RJ45 patch panels and cabinets. These shall all be compatible. ICT cabling system shall be carried on cable tray throughout with 20/25 mm dia galvanised steel conduits drops to outlet positions.

General Requirements;

All cableways (cable trays, trunking, conduit, wall boxes and dado trunking where appropriate) will be completely installed by the Electrical Contractor prior to the beginning of the structured cabling installation.

In general, cable trays shall be specified as wide and flat rather than deep. In no case shall cables be laid more than 6 deep into a cableway. No cableway shall be filled more than 60% after the initial installation.

Maximum loading for a cableway after upgrades and additions is 75%. Gutter bolts shall be secured with the head inside and the nut outside. Carrier systems shall be bonded using flat-earth straps in accordance with current standards.

Where cable trays are used or vertical runs are required cables shall be clipped to trays using loosely attached cable ties. Where cable ties are used to secure structured cables they shall be tied in bundles. Bundles shall be no greater than 10 cables per bundle. Under no circumstances shall cables be tied tightly. The shortest possible routes shall be used; drops

and rises shall be minimised. Power should not be run in the same compartment as structured cabling under any circumstances.

Where crossovers exist, some cross-sectional area of cableway maybe lost. All calculations of required cable tray dimensions refer to the minimum dimensions of the tray, including crossovers.

Where trunking or conduit passes through fire compartment walls, floors and ceilings, holes must be sealed with sealing compound giving appropriate rating of fire stability to BS476, Part F.

General Structured Cabling Specification Requirements;

Standards;

The International Standard For Generic Cabling Systems is ISO11801:1999. ISO standards are used in this document. Where two sets of standards exist with similar characteristics the ISO standard will be applied. Standards noted are current in time of writing; the most up-to-date versions of these standards are to be used at time of design and installation.

All cabling connections and accessories in the structured cabling system shall conform fully with standard ISO/IEC 11801, EN50173, Class D, tested to TSB67.

Cable shall be of a low smoke type and shall conform to building standards for plenum cables. Conformance or otherwise with standards IEC 332, 695-1, 754 and 1034 shall be requested.

EMC Compliance;

The EMC directive applies to requirements on emissions and protection from electro-magnetic interference in the EU. EN 55022 and EN55105 are the standards applicable to Information Technology.

As the structured cabling system is a passive component, the EMC directive does not apply to the system, but to the final application. At time of writing EMC test standards for links have not been finalised.

Record Drawings, Numbering and Labelling Scheme;

The structured cabling installer shall provide record drawings showing the location and number of each data point on a 1:100 scale drawing and schematics. The base for these drawings shall be supplied on disc to the installer by the Services Consultant and have all rooms titled and include 'as-installed' furniture layout as a background layer.

All links, cables shall be clearly labelled with a consistent numbering scheme.

Cabinets;

Five types of cabinets are specified for general usage;

- Type 1 will be minimum 39U, w. 600, d. 600. This is the smallest cabinet for general equipment.
- Type 2 will be minimum 39 U, w. 800, d. 600. This cabinet is for structured cabling where vertical cable management is required in the additional available 200 mm.

- Type 3 will minimum 39U, w 600, d. 910. This extra depth is required for rack-mounted servers.
- Type 4 will be minimum 39 U, w 600, d 910. This cabinet is for all requirements in small Institutions (structured cabling, equipment, servers).
- Type 5 will be min 6U, w. 600, d. 400. This cabinet is a wall-mounted unit to house switches. These items shall be selected to suit cabinet size.

U – Height Unit 44.5 mm.

All cabinets will be 19” rack mounting type of a solid and durable type. Frame shall be of minimum 2 mm steel, doors and panels of minimum 1.5 mm steel. Frame shall be seam-welded.

All floor-mounted cabinets shall be supplied with a plinth. Plinth shall have side on openings in each direction.

Specified cabinets shall be suitable for computer room environments and shall confirm to IP21 EN 60.259/IEC 259. Note that IP21 conformance is required on the installed cabinet after completion of installation. It is the installer’s responsibility to ensure that sufficient care is taken during installation to achieve this.

Cabinets shall be supplied with lockable front doors with safety glazing. They may either be floor or wall mounted. Side and rear panels shall be of a steel constructing and shall be removable. During installation, all adjacent cabinets shall be bolted together by the installer and only two side panels will be required in total.

Cabinets must be installed such that all equipment, including patch panels may be serviced and installed from the front.

Cabinets shall be supplied with brush plates or other such entry mechanism to ensure that cable entries are tidy and sealed to IP21.

Supplies shall declare conformance or otherwise with regard to the EU EMC directive relating to electromagnetic interference on the completed installation EU 89 / 363 with all amendments.

A minimum of eight power points is to be fitted to each type 1 cabinet. These will be mounted to the rear of Type 1 cabinets and shall terminate in a 5 Meter flying lead. The electrical contractor will terminate these in fused-switched spurs. The spur shall connect directly to a dedicated RCD in the local distribution panel. Cabinets shall be installed with full safety earthing.

All passive metallic components in the cabinet when fully assembled with patch panels, etc., shall be bonded to provide an adequate signal ground.

Patch Panels;

Patch panels are required in all cases and shall be mounted in Type 2 cabinets. Patch panels shall be 1 U per row, with 24 x RJ45 type terminations per row. Every second patch panel shall have a 2 U horizontal cable management bracket mounted underneath. U = height unit 44.5 mm. Full safety earth bonding shall be carried out to each bracket and patch panel. Patch panels shall be fully accessible from the front. Cat 6 cables shall be fixed to patch panels to assist the latter.

Sockets;

Sockets shall be of a single piece rugged construction. Modular socket assemblies will not be accepted. The supplier shall provide samples of sockets for approval. For data sockets termination shall be on IDC style punch down connections to TSB-568-B.

Testing and Commissioning;

All components must be guaranteed to Cat 6 UTP Unscreened.

The performance of each link shall conform to ISO/IEC 11801:1999, lass D or to most recent standards where applicable.

Test set up and test equipment specification as per TSB 67 October 1995 or to most recent standards where applicable. Test results shall be supplied to the consultant and client prior to acceptance of the installed. Results shall be supplied as a word file, in printed and electronic format (1.44 MB floppy disk).

Horizontal cabling links shall be tested to TIA/EIA 568A Basic Link. As a minimum the following results shall be provided in a link performance certificate per horizontal cabling link;

Connection Map.

Length (or propagation delay).

DC loop resistance / pair.

Capacitance per pair.

Attenuation per pair (0-100MHZ).

Near End Cross Talk NEXT per each pair combination (0-100 MHZ)

ACR per pair.

On completion the supplier shall provide full test results in a bound paper form and in a CSV format on diskette.

On completion, the supplier shall provide as constructed drawings in AutoCAD 14 or latest edition format as detailed above.

Warranty;

A link performance certificate for horizontal cabling is required, specifying that all such cables meet or exceed the requirements of ISO11801 Annex A. A proprietary testing device shall be used to test the installation as recommended by the cabling manufacturers and approved by the Consultant.

Horizontal Cables;

All cables meet the standards for general, electrical and additional requirements as per ISO11801:1999, Section 8 or most recent standards where applicable. Only 3 cable impedances are recognised by the standards; 100Ω, 120 Ω and 150 Ω, only 100 Ω cables shall be used.

Many differing cables type exists, UTP, FTP, SFTP etc. Only UTP cable shall be used. All cables shall be LSHF with a fire rating to IEC 332-1 or latest edition.

64.4 Disconnection and Removal of obsolete cabling systems etc

This includes for the disconnection and removal of all existing services to facilitate refurbishment works.

The contractor is strongly advised to visit the site to familiarise himself with the full extent of the works to be disconnected and removed. The contractors attention is drawn to the fact that no allowance will be made due to lack of knowledge of the existing on site conditions and the extent of the works to be disconnected and removed as part of this element of the works.

ELEMENT (65) : PROTECTIVE SERVICES

65.1 Extent Of Works In This Section

This section shall include for the supply and installation of the repeater fire alarm installation, as shown on the drawings and as specified.

This Contractor shall note and make due allowance that the existing system of protection must be maintained in use at all times during the works.

65.2 Fire Alarm Installation:

The fire alarm system (L2/L3 coverage) shall be carried out as indicated on the drawings and as specified hereafter. The fire alarm system shall be carried out in full accordance with IS.3218.2024.

All equipment central to the operation of the analogue addressable Fire Alarm system shall be designed and manufactured by the company installing and commissioning the system.

SINGLE KNOCK OPERATION

The System shall be programmed with 'single knock' operation whereby actuation of an automatic/manual point within the building shall automatic activate the Fire Alarm panel.

The controls repeater panels shall incorporate a facility for separate (Phased) alarms, whereby the sounders shall operate an evacuation signal in the actuated zone and warning signal only in other zones.

The system shall continuously scan all loops and report a fault or fire condition in two seconds maximum.

The system shall be cabled, connected and commissioned with interconnections to the following, as required:

Audio visual systems:

On activation of the Fire Alarm system all audio systems shall cease operation and the Audio Visual System shall remain inoperative for the duration of the alarm. The System shall also conform to ISEN60849, BS7443 relating to the Interfacing of the system with a Public Address System.

Air ventilation units:

With the exception of the Air Extraction system, MVHR unit shall be shut down on activation of the Fire Alarm system. THE AIR EXTRACT SYSTEM IS TO REMAIN ON IN THE EVENT OF FIRE

Door hold Open Installation:

The Fire Alarm shall be inter-linked to the Door Hold-Open Installation. Upon receipt of an alarm signal Door Hold-Open Systems shall fail safe into fire positions.

65.3 Control & Indicating Equipment Configuration:

The control and indicating equipment shall conform to the following requirements:

- Addressable two-state detectors. Analogue addressable detectors.
- Addressable input and output devices shall be connected to addressable loops capable of accepting up to 99 devices.
- Have a minimum capacity for operating 1 fully loaded addressable loop. This shall be extendible up to a maximum capacity of 10 addressable loops.
- Provision shall be made for each addressable loop to be sub-divided into a maximum of 5 geographical zones. The section of wiring corresponding to each zone circuit shall be protected from faults in other sections by line isolator modules.
- It shall be possible to allocate all 99 addressable devices on the loop to a single zone.
- Shall have provision to drive and monitor up to 20 repeater panels providing a repeat of the indications on the Control and Indicating Equipment display and up to a further 3 repeater panels also incorporating the full set of system manual user controls.
- Shall come complete with an 80 character line printer, locally via a parallel port.
- Shall be capable of interfacing directly to an electronic radio paging system.
- It shall be possible to connect a VDU monitor to the Control and Indicating Equipment to display the information that would otherwise appear on the Control Panel Printer.
- Housings shall be capable of being surface or semi-recessed mounted and shall come complete with cable entries, fixings, knock-outs and covers. The housings shall afford a minimum ingress protection to IP43.

65.4 Control & Indicating Equipment Basic System Functions:

The control and indicating equipment shall be capable of the following basic system functions:

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

Provide the following discrete visual indications: Power on green led indicator.

Fire Alarm	dual red led indicator.	Fault	yellow	led	indicator.	Disabled/isolated
	yellow led indicator.					

Fire zones red led indicator per zone.

Incorporate an integral 80 character LCD alphanumeric display. In order that an easy identification of different information is provided, the LCD display shall typically be arranged as follows:

- Row 1: Event type.
- Row 2: Zone message.
- Row 3: Addressable point message.
- Row 4: Circuit identifier/point number/zone number and number of events in the system.

Provide a set of push button controls to enable an authorised operator to perform the following:

- Evacuate (actuates all alarm sounders in the system). Silence (stops all currently actuated alarm sounders).
- Reset (returns the Control and Indicating Equipment to quiescent condition).
- Contain mandatory individual plugable cassettes for: Loop Control.
- Alarm Output Control. Common Monitoring Control.
- Data Processing Control and Optional Control Cassettes for : Service Control Card.
- Programmable Output Control. Computer Inter-Face Control.
- Meet the requirements of BS3116; Part 4.

65.5 Alarm Monitoring Functions:

The control and indicating equipment shall incorporate the following Alarm Monitoring Functions:

- Interrogate each addressable device at least once every 2 seconds.
- The overall response time, for each type of analogue addressable detector, including that for the sensor, the signal transmission system and the fire decision algorithm, meets the requirement of IS 3218.
- The response time of the Control and Indicating Equipment to two-state addressable detectors and conventional detectors shall not exceed 10 seconds. The ability to annunciate a pre-alarm condition designed to give the earliest possible warning of a potential fire condition without raising the full alarm condition.

The ability to automatically adjust the alarm and pre-alarm threshold levels to compensate for changes in detector sensitivity due to contamination over a period of time. The ability to provide automatic warning that a detector has reached a level of contamination which requires that it be replaced or serviced.

65.6 Alarm output functions:

The control and indicating equipment shall have the following Alarm Output Functions:

- Be capable of providing a two-stage alarm sounder facility that can be programmed, either on a zonal basis or common system basis, to meet the requirements of the fire authority. Three possible sound output signals shall be available as follows:
 - Alert pulsed tone (1 second on, 1 second off). Evacuate continuous tone.
 - User definable tone for specialised events, for example bomb alert.

65.7 Supervision and Fault Reporting:

The control and indicating equipment shall have the following Supervision and Fault Monitoring Functions:

- Monitor all critical system components and interconnections (internal and external). In the event of a failure occurring which prevents correct operation of the alarm
- alarm functions, a fault indicator will light and a message shall be given on the alphanumeric display within 100 seconds of occurrence.

- Provide text messages to indicate the precise location of where a fault has occurred in the system.
- The extract shall remain operational during a fire event.

65.8 Automatic Fire Detectors:

All detectors shall be approved and listed by the Loss Prevention Council Board (LPCB).

The automatic fire detectors shall be fixed to the installation by means of plug-in addressable detector bases. The base shall incorporate the optional feature of being able to lock the detectors in place once plugged in. The addressable base must incorporate all the circuitry required for communicating detector status to the Control and Indicating Equipment, including the address setting switch.

The contractor shall produce standard accessories for installing smoke detectors in air ducts. This equipment shall be designed to accommodate the manufacturer's standard smoke detectors and bases, both conventional and addressable.

OPTICAL SMOKE DETECTORS

The Optical Smoke Detectors shall meet the requirements of BS5445: Pt.7: 1984

The optical smoke detectors shall have a sensitivity sufficient to be classified as 'A' in BS5445: Pt.9: 1984 test fires TF2 and TF3.

HEAT DETECTORS

The Heat Detectors shall meet the requirements of either BS5445: Pt.5 (EN54: Pt.5) for detectors suitable for normal environment or BS5445: Pt.8 (EN54: Pt.8) for detectors designed for high ambient temperatures

BEAM SMOKE DETECTORS

The Detectors shall be capable of providing cover in open areas up to 100m in length and up to 14m wide, giving an effective protection area of up to 1400sq m. The Beam Smoke Detectors shall meet the requirements of either BS5445: Pt.5 (EN54: Pt.5) for detectors suitable for normal environment or BS5445: Pt.8 (EN54: Pt.8) for detectors designed for high ambient temperatures.

ADDRESSABLE MANUAL CALL POINTS / BREAK GLASS UNITS

The Addressable Manual Call Points / Break Glass Units shall meet the requirements of BS5839: Pt.2.

The Addressable Manual Call Points / Break Glass Units shall provide an integral red led to indicate activation.

Break-glass Call points shall be individually addressed.

FIRE ALARM SOUNDERS/STROBE UNITS

Fire Alarm Sounders shall be of the detector integrated or surface mounting type, with solid state, two-tone 24V DC c/w integral 75cd strobe light unit.

65.9 Fire Alarm Cabling:

Fire alarm cabling shall be carried out in 1.5sq.mm. PH120 Enhanced Cable with red LSF oversheath. As per Irish Standard – I.S. 3218: 2023. Check to ensure that all ancillary warning devices operate as specified.

Check interconnection with Fire Alarm Control Panel to ensure correct operation.

65.10 Commissioning & Testing of fire alarm:

Introduce Smoke into the Detector Assembly to provide a basic functional test.

Introduce smoke to the furthest Sampling Point in each Sampling Pipe. Transport time is not to exceed the local regulations

Activate the appropriate Fire Alarm zones and advise all concerned that the system is fully operational. Fill out the log book and commissioning report accordingly.

65.11 Disconnection and Removal of All Existing Protective Services

This includes for the disconnection and removal of all existing protective services to facilitate the refurbishment works.

The contractor is strongly advised to visit the site to familiarise himself with the full extent of the works to be disconnected and removed. The contractors attention is drawn to the fact that no allowance will be made due to lack of knowledge of the existing on site conditions and the extent of the works to be disconnected and removed as part of this element of the works.

ELEMENT (69) : EARTHING

69.1 Extent Of Works In This Section

This section shall cover the provision of the earth electrode for the installation, the connection between the electrode and the main earthing terminal in the building and the connection of the following to the main earthing terminal:

- (a) Neutralising conductor from the E.S.B. Neutral.
- (b) Protective earth conductors for the installation.
- (c) Main equipotential bonding conductor.

The earthing system generally shall comply with the following sections of the 'National Rules for Electrical Installations' as issued by ETCI:

Section 413: Protection against electrical shock in case of a fault
(Protection against indirect contact)

Chapter 54: Earth arrangements and protection conductors.

69.2 Earth Electrode

The earth electrode shall consist of an earth rod of copper clad steel or galvanised iron of minimum dimensions 16 mm dia. by 1.2 m long driven vertically into the ground or of bare copper conductor or galvanised iron rod of minimum 16 mm dia. and 4.5 m long buried 500 mm in the ground, complying with ETCI Regulation 542.2.

The point of connection to the earth electrode shall be marked with a 50 mm thick concrete cover stamped 'Earth Electrode' as detailed in Clause 79 of Document 'BE'.

69.3 Main Earthing Terminal

The main earthing terminal shall consist of a bare copper bar of a minimum cross sections area equal to the largest protective earth conductor. The bar shall be incorporated in the main Distribution Board and shall be fitted with adequate terminals which shall ensure that not more than two conductors shall be under the one terminal.

69.4 Earthing Conductor

The earthing conductor shall connect the earth electrode to the main earthing terminal for the installation. The earthing conductor shall be an insulated copper conductor having a cross sectional area in accordance with the following table:

Cross Section Area of phase conductors	Cross Sectional Area of earthing conductor
Smaller or equal to 16 mm ²	10 mm ²
16 mm ² to 35 mm ²	16 mm ²
Larger than 35 mm ²	25 mm ²

69.5 Neutralising Conductor

The neutralising conductor between the main earthing terminal and the E.S.B. neutral shall be an insulated copper conductor. The conductor shall have the same cross-sectional area as that of the earthing conductor between the main earthing terminal and the earth electrode

and may be a conductor of a multicore cable or a separate earth conductor insulated for system voltage.

69.6 Protective Conductors

Protective conductors shall be provided between the main earthing terminal and each sub-distribution board. This shall have a minimum cross sectional area as set out in Table 54F of the ETCI Rules as follows:

Cross Section Area of conductor mm²	Cross Sectional Area of corresponding protective conductors mm²
Smaller or equal to 16 mm ²	Same area as conductor
16 mm ² to 35 mm ²	16 mm ²
Larger than 35 mm ²	Half conductor size

Protective conductors shall be insulated in green-yellow coloured PVC as specified.

It may form one core of a multi-core cable or else be a separate cable run alongside the supply cable.

69.7 Equipotential Bonding

Equipotential bonding shall be carried out in accordance with Clause 547 of the ETCI National Rules for Electrical Installations.

Incoming metallic services and the extension of these services in metal pipes within the building shall be connected to the main earthing terminal at the main switchboard by means of an insulated stranded copper conductor of 10 mm² minimum cross sectional area.

Metallic services and equipment in the toilet areas shall all be bonded together by means of insulated standard copper conductor of 2.5 mm² minimum cross sectional area and such local bonding conductor shall be connected to a protective conductor which in turn shall be connected to the main earthing terminal at the main switchboard.

69.8 Testing

The earthing system shall be tested using an appropriate earth testing kit and the results shall be logged and a copy forwarded to the Engineers for their records.

The engineers shall be advised in advance of the test being carried out so as to give them an opportunity to witness the test.

ELEMENT (70): INTRUDER ALARM

70.1 General:

- The system proposed must be compliant with EN 50131-1 Grade 2 standard.
- It must be capable of complying with the Garda Intruder Alarm Policy – (effective 31 Jan 2008) i.e. the system must be enabled to perform sequential alarm verification.
- The installation company must be a PSA registered and licensed company.
- The system will be linked to the existing system

70.2. Control Panel

- A multi zone control panel will be used with capabilities of future expansion.
- It must have a minimum of 500 event log.
- A minimum of 64 user codes.
- The Keypad will have a digital display and will show alarm, tamper and fault events.
- A 7 amp back up battery will be in place.
- Extra power supply units will be used where necessary.

70.3. Direction Devices:

- Dual Technology Detectors with a minimum range of 12 meters will be used.
- Magnetic Contacts will be used on Doors and will be zoned separately.

70.4 Warning Devices:

- Internal warning devices will be a standard piezo type sounder.
- External warning devices will be a combined sounder/strobe with timer in polycarbonate housing.
- Warning devices will cut out in accordance with EN 50131-1 standard.

70.5 Documentation:

- The System will be fully documented along with a completion certificate and handed over to client.
- Full training will be given.
- A 12 month warranty will be in place from day of handover.

70.6 General;

The internal dome cameras shall be a colour cameras with varia-focal auto iris camera to cover the main entrance. The external cameras shall also be colour white with varia-focal auto iris. Each camera shall be contained within a housing suitable for its environment with a heater and thermostat. Each camera shall be complete with the following;

- High resolution.
- 525 TVL's a minimum for all cameras.
- 1/2" CCD Image Sensor.
- External cameras should be day/night....colour.
- Internal cameras should be colour or day/night....colour
- Video output 1 volt peak to peak composite signal.
- Video termination should be 75 ohms.
- Signal to noise ratio should be greater than 48 db.

- Effective Pixels 752 H x 582 V
- External camera lenses – vari-focal.
- External camera lenses a minimum of F stop 1.0 aspherical and should be IR sensitive.
- Internal camera lenses – vari focal.
- Internal camera lenses a minimum of F stop 1.2 to 1.4.
- Minimum illumination more than 0.005 lux for IR lighting.
- Gain control to be automatic.
- Adjustment required for backlight compensation.
- Automatic white balance is a requirement.
- The system must be compliant with EN 50132-7 standard.

70.7 Training:

Full training will be provided to client.

Appendix A Completion Record Sheet

Institution Name: Address:		
Project;	Signatures & Date;	
Information and Communication Technology Infrastructure, installed, tested and operated satisfactorily.		
Operating & Maintenance Manuals handed over to Institution and explained.		
Training and demonstration meeting held in the presence of the Building Services Consulting Engineer and Institution Care-taker and Principal.		
Wall Chart provided, explaining common operating / maintenance procedures.		
As installed Drawings handed over to the Client in hard copy and on disc.		
Managers Name;	Signed;	Date;
Building Services Engineers Name;	Signed;	Date;

Low Voltage Switchgear - General Specification

- 1.1. This covers the construction of distribution boards, motor controls centres and low voltage switchgear assemblies.
- 1.2. Generally all low voltage switchgear assemblies shall be manufactured in strict compliance with the 'Code of Practice for the Design, Selection and Erection of Low Voltage Switchgear Assemblies', as published by the Electro-Technical Council of Ireland. In addition, the requirements of I.E.C. document, I.E.C. 439, shall be fully complied with. Assemblies may be custom built assemblies or factory built assemblies, as appropriate.
- 1.3. Main distribution board assemblies shall generally be 'Form 4' fully compartmented, unless specifically stated elsewhere. Sub-distribution boards shall be 'Form 3' construction while motor centres shall be of 'Class 1' construction. A protection rating of I.P. 54 shall be provided externally, while an internal rating of I.P. 20 shall be applicable.
- 1.4. Switchboards, motor control centres, and distribution boards shall be of cubicle type construction. The enclosure framework shall be of minimum 2.50 mm sheet steel, while door panels, etc., shall be 1.50 mm thickness.

Insulated assemblies where specified, shall be constructed of high impact-resistant glass fibre reinforced polyester.

All assemblies shall be of symmetrical construction, extendible and incorporating a minimum of 25% free space for future use.

- 1.5. Air Circuit breakers/moulded case circuit breakers shall be manufactured to comply with the requirements of the current edition of VDE 0660, BS 4752, and IEC 157 part 1, and amendments thereto.

Air circuit breakers/moulded case circuit breakers when used as a main incomer, shall be capable of withstanding a prospective short circuit current of 40 KA and shall be tested to Category P2, IEC 157-1.

- 1.6. Miniature circuit breaker: shall comply with the requirements of BS 3871 and VDE 0641. MCBS serving motive power requirements shall be of 'Class K' construction. MCBS serving lighting and general services requirements shall be of 'Class L' construction, while MCBS serving low voltage lighting circuits shall be of 'Class D' construction.
- 1.7. Earth Leakage Circuit Breakers: shall be manufactured to comply with the requirements of BS 4293 and amendments thereto, of 2 KA short circuit current rating, current operated and set to trip at 30 mA, unless stated otherwise elsewhere.
- 1.8. Fuses: shall be manufactured to comply with the requirements of BS 88, VDE 0635, VDE 0636, and all applicable amendments. Fuses shall be DZ type (up to 35A rating) and/or 'NH' type (ratings above 35A) as appropriate.
- 1.9. Isolators: shall be manufactured to comply with the requirements of IEC 408 and amendments thereto, shall be of the rotary air break type and shall be lockable in the off position. The prospective short circuit current rating of each isolator shall be adequate for the respective duty.
- 1.10. Motors starters: shall be manufactured to comply with the requirements of IEC 292-1 and amendments thereto. Starters shall be provided with adjustable thermal and magnetic

protection. It shall be the responsibility of the manufacturer to set the overload facility and to supply to the contractor/client, a record of all such settings.

- 1.11 Contactors: shall be manufactured to comply with the requirements of IEC 158-1, shall be AC3 Category and shall be provided with a minimum of 2 no. spare normally open contacts with 2 no. spare normally closed contacts.

- 1.12 Busbars: shall comply with the requirements of IEC 439 and BS 159 and amendments thereto. Bars shall be manufactured from H.D.H.C. copper of rectangular section and shall be moulded in a separate compartment within the switchboard.

Neutral busbars shall be of the same dimensions as the above busbars, while the earth busbar shall be a minimum of 50% of the neutral/phase busbar cross sectional area.

Busbars shall be sized to carry safely, the installed load and shall be capable of accommodating a 25% increase in the installed load without the necessity of increasing the busbar size. Centre fed busbars shall be capable of accommodating a minimum of 75% of the installed load on each half.

Flexible connections to the busbars shall be of acceptable for connections up to 63A rating. Connections of greater rating than 63A shall be carried out in adequately insulated and supported copper busbar of rectangular cross section.

- 1.13 Pilot lamps push buttons and control switch: shall comply with the requirements of IEC 337 and IEC 144 and shall have a protection rating of IP 65. A maximum voltage of 220V shall be admissible in respect of control/indicating circuits, however, where possible an operating voltage of either 110 V or 24 V should be adopted.

- 1.14 Instruments/instrument transformer: shall comply with the relevant sections of IEC 473, IEC 185 and VDE 0414.

- 1.15 Wiring: all wiring within the switchgear enclosure shall consist of PVC insulated copper conductor run within PVC trunking. The spacing factor within the trunking should be such as not to exceed 30% of the cross section of the trunking. Labels of a patented manufacture shall be provided at each end of each cable.

- 1.16 Labelling: The function of all items inside and outside the switchgear enclosure shall be suitably identifiable throughout the provision of 'screw-on' type engraved labels, manufactured from 'Traffolyet' sheet or similar and prior approved.

All circuits within the enclosures shall be given a reference number. This reference number shall be repeated on a heat sealed chart within each compartment. The chart shall state the function and rating of each service.

- 1.17 Terminals: A separate terminal section shall be provided within each switchgear enclosure. The location of this enclosure, i.e. top/bottom or side, shall be decided by the Engineer prior to fabrication.

Terminals shall be manufactured to comply with the requirements of BS 3042. Each terminal shall be sized to accept the incoming cables. Terminals of a 'push-in' type shall not be acceptable.

- 1.18 Earthing: An earthing bar sized as described previously shall run the full length of the enclosure. All metal work, including panels, doors shall be bonded to this bar. Cables

terminated on moving parts such as doors, shall be of a flexible type and shall be run in PVC spiral wrap or similar and prior approved protection system.

- 1.19 Drawings: Prior to commencement of the manufacture of any switchboard/enclosure, a full set of panel layouts and schematic wiring diagrams shall be made available to the engineer by the manufacturer, for the engineers approval. Only on acceptance of an approved set of drawings, will manufacture of the switchboard/enclosure commence.
- 1.20 Tests: Before despatch to site each switchboard assembly shall be subjected to the following tests. The results of each test shall be recorded and submitted to the engineer, together with an 'as-manufactured' drawing of the board.
- a. Functional and mechanical tests: to test the physical operation of all switches, isolators, control circuits, etc.
 - b. Continuity tests: to prove continuity in the wiring system.
 - c. Insulation resistance test, as follows:
 - 1. Phase to Phase.
 - 2. Phase to Neutral.
 - 3. Phase to Earth.
 - 4. Neutral to Earth.
 - d. Flash test: 2.50 KV applied for one minute for each of items (1) to (4), listed at (c) above.
 - e. Simulation tests: Overload and short circuit protection devices tested for correct operation on randomly selected circuits.
- 1.21. Compliance with the requirements listed at items 1-20 inclusive, shall not exonerate the manufacturer from his responsibility of providing a safe and functional assembly to the user.