

DEPARTMENT ROADS AND PUBLIC WORKS NORTHERN CAPE

MAYIBUYE MULTIPURPOSE CENTRE, GALESHEWE

TENDER SPECIFICATION

ELECTRICAL INSTALLATION: BUILDING SERVICES

Tenderer : _____

Contact Person : _____ Cell No. _____

Address : _____

Telephone : _____

MVD Kalahari



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SPECIFICATION FOR ELECTRICAL WORK

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LIST OF DRAWINGS

All drawings as listed in the Drawing List: 6258/K/G/D/001 will form part of this contract.

Note: Only the drawings listed below are attached to this tender document for the purpose of tendering.

DRAWING NUMBER	DESCRIPTION
6258/K/G/D/001	DRAWING LIST
6258/K/G/D/002	LIGHTING SCHEDULE
6258/K/G/LV/001	LV RETICULATION & AREA LIGHTING LAYOUT
6258/K/G/SLD/001	LV SINGLE LINE DIAGRAM
6258/K/G/LL/001	ARTS BUILDING - GROUND AND FIRST FLOOR LIGHTING LAYOUT
6258/K/G/LL/002	SPORTS BUILDING - GROUND AND FIRST FLOOR LIGHTING LAYOUT
6258/K/G/SP/001	ARTS BUILDING - GROUND AND FIRST FLOOR SMALL POWER LAYOUT
6258/K/G/SP/002	SPORTS BUILDING - GROUND AND FIRST FLOOR SMALL POWER LAYOUT
6258/K/G/G/001	STANDBY GENERATOR POSITION

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SECTION 1.: NOTICE TO TENDERERS

- As per the Occupational Health and Safety Act (No. 85 of 1993)., Electrical Installation Regulations, all electrical work shall be done by a Registered Electrical Contractor.
- A person registered as Installation Electrician shall exercise daily control over all electrical installation work being carried out under this contract. This accredited person/s must be on site on a full-time basis.
- The Electrical Contractor shall be appointed by the Main Contractor as a subcontractor as per the Main Contractor's conditions of contract for subcontractors.
- The tenderer shall submit additional information regarding the installer of the electrical installation together with the returnable schedules enclosed with the tender enquiry document.
- Tenderers shall submit the information indicated on the forms in the Returnable Schedules with their tenders.
- Tenderers shall note that the specified work are for various buildings of which certain buildings are double story and Tenderers shall allow in their tender rates for all related material and equipment to complete the works.

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SECTION 2.: CONDITIONS OF CONTRACT

2.1. GENERAL CONDITIONS OF CONTRACT

The General Conditions of Contract shall be CONTRACT DATA: JBCC 2000 DOMESTIC SUBCONTRACT AGREEMENT (Edition 4.1 of March 2005).

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SECTION 3.: SPECIAL CONDITIONS OF CONTRACT

3.1. GENERAL

These special provisions shall form an integral part of and supplement to the General Conditions of Contract and General Specifications which governs the work embodied in this contract. In case of conflict with any part of the said General Conditions of Contract and General Specifications, the Special Provisions in this part shall take preference and shall govern.

3.2. METHOD OF TENDER AWARD AND APPOINTMENT OF CONTRACTORS

Successful tenderer(s) shall be appointed by the Main Contractor according to the Main Contract Conditions of Contract.

3.3. DESCRIPTION OF WORK

The works is described in The Technical Specification and on the Drawings forming part of this document.

3.4. MANUFACTURING DRAWINGS

The manufacturing drawings will mean detail drawings from manufacturers or suppliers for items such as light luminaries, distribution boards, installation detail and other equipment/material as may be requested by the engineer.

3.5. CONTRACTOR'S PERSONNEL AND QUALITY CONTROL

The Contractor shall be responsible for all the requirements of his own personnel. The Contractor shall allow in his tender price for the **full-time** supervision by a three-phase installation electrician.

The full-time supervision of the works must include the implementation of quality control schedules (check sheets), appropriate for the various installations of the works, to be approved by the Engineer before being implemented.

3.6. CONTRACTOR'S SITE FACILITIES

A suitable area will be made available where limited storage facilities can be erected. The Contractor shall supply at his own expense the necessary facilities including temporary ablutions as required for his operations on site. The Contractor shall arrange and pay for all sanitary removals, water supplies, electric and telephone connections required for his operations on site.

Except for security personnel, the contractor and his personnel cannot be accommodated on site overnight.

3.7. AVAILABILITY OF WATER AND ELECTRIC POWER

Although temporary water and electric power may be available on site it may not be accepted as a responsibility from the employer to provide such services. Contractors shall at all times be prepared to provide water and electric power for themselves for the intended construction activities. The Contractor may approach the Local Authority for the provision of water end electric power connections at his own cost.

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3.8. OFFICES

The Contractor shall provide temporary office accommodation on the site, as mentioned in Clause 6 above, for his own use. The employer will provide for facilities for site meetings.

3.9. STORAGE AND ACCOMMODATION

The Contractor shall at his own cost provide and maintain adequate and suitable storage of all perishable or corrodible materials and fittings on site. Such storage accommodation shall be ventilated, weather and waterproof, with floors raised off the ground so as to keep the material perfectly dry and freely aerated and shall be subjected to approval of the Engineer, who shall have free access at all times to the storage facilities.

3.10. TEMPORARY SANITARY FACILITIES

The Contractor shall provide sanitary and ablution facilities for the use of his employees and shall be entirely responsible for maintaining such facilities in a clean, orderly and sanitary condition to the satisfaction of the employer and Local Authority.

3.11. TRANSPORT OF MATERIALS

All materials for the Works shall be delivered on site and such deliveries shall be for the expense of the Contractor.

3.12. OFF-LOADING OF MATERIAL

The Contractor shall supply all the necessary labour, tools and equipment for off-loading the materials and equipment delivered by road and shall include therefore in his rates.

3.13. HANDING OVER OF SITE

The Sites will be deemed to be handed over to the Contractor on the date that the Site Handing Over Form has been signed by the client and the Main Contractor.

The Contractor shall consider all other construction activities on the site in the planning and execution of the works.

3.14. PROTECTION OF EXISTING WORKS OR SERVICES

The Contractor shall take all necessary steps to ascertain the location of existing services before commencing any section of the work and shall exercise the greatest care when working in the vicinity of such services.

The Contractor must obtain the latest available drawings showing the location of services already installed and the latest proposals for any services and connections to buildings which may still be required and installed by others.

The Contractor shall take all necessary steps to ascertain which service have actually been installed and to protect any existing works whatsoever against damage which may arise as a result of his operations on Site.

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The Contractor shall be responsible for the repair of damage to any service the possible existence of which could reasonably have been ascertained by him in good time.

The Contractor shall assume full responsibility for the further protection and care of existing works and shall report in writing to the Engineer any defects and/or obstruction which may be found:

- a) within five working days of the Site being handed over to this Contractor in the case of service structure and/or pipelines which are open to view or capable of being inspected after the lifting away of removable covers only;
- b) within one working day of works being opened up under this contract after having previously been covered over with gravel in terms of another contract, or
- c) within one working day or work under this contract being commenced on any particular section of existing earthworks carried out as part of a previous contract.

In the event of any existing works being found defective and/or obstructed and duly reported in accordance with the provisions of the foregoing paragraph, the Engineer shall inform the Contractor of the remedial measures which will be taken, in all probability by another Contractor in terms of the maintenance provisions of a previous contract. Once the necessary remedial measures have been taken to the satisfaction of the Engineer and of the Contractor, further protection and care of the service (s) concerned shall become the responsibility of the Contractor.

Failure on the part of the Contractor to report existing defects within the appropriate period allowed, shall result in the Contractor being held fully responsible for rectifying such defects.

Machine excavations near existing services and buildings will only be permitted to the extent agreed to by the Engineer and will be dependent on the skill of the operator(s) involved. Notwithstanding authorisation by the Engineer of any machine excavation, the Contractor will be responsible for the repair of any damage which may occur in the process. No additional payment will be made for any hand excavation which may be required.

Any service, structure or foundation which may be exposed during the cause of excavation shall be adequately shored, struttred, slung or otherwise suitably protected. No backfilling shall be commenced before the item concerned had been inspected and passed by the engineer as being undamaged. The Contractor shall conduct his operation in such a manner as not to increase the danger of flooding on Sites occupied by other Contractors. Temporary access roads which may be required to reach various parts of his site, will be the Contractor's responsibility.

The Contractor shall ascertain the telephone numbers and persons to be contacted at each of the service authorities in the case of damage to services. These numbers shall be prominently displayed in the Contractor's site office, preferably near the telephone or radio, before the first payment certificate will be issued. When damage to existing services occurs, the Contractor shall immediately contact the relevant service authority, after which he shall notify the Engineer or his representative, who will investigate the matter and determine liability for the damage.

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3.15. PERIOD OF COMPLETION AND PROGRAMMING OF WORK

The programming of the works will be determined by and based on the Main Contractor's works programme.

The contractor shall ensure that the activities for the electrical installations are properly documented and included in the Main Contractor's programming for the project.

The Engineer services the right to change the sequence of activities within the accepted construction period, without any cost implications to the Employer.

3.16. PENALTY FOR DELAY

Penalties for Delays shall be determined in accordance with the Main Contractor conditions of contract and agreement between the Main Contractor and Subcontractor.

3.17. PENALTY FOR FAILURE TO PROVIDE STATED CONSTRUCTION CAPACITY

It is a specific tender requirement that tenderers must guarantee their construction capacity which will be made available for this contract. If, when an actual award of work is made to a Contractor, he fails to establish on Site or to provide the guaranteed capacity within the time indicated in the contract programme, the following will apply:

- A penalty amount will be payable by the Contractor to the Employer within 30 days of the Actual Award Date or of it becoming apparent that he will fail to provide the guaranteed capacity.
- The Employer may request the Main Contractor to appoint other parties for the execution of the Works. Any additional cost thus incurred, over and above the original tender amount, will be recovered from the Contractor.
- The Contracting company may automatically be disqualified from any future tenders issued by the Employer.

3.18. PRELIMINARY AND GENERAL COST ALLOWANCE

The total amount included in the tender price for P & G items such as Site establishment, travelling expenses, head office overheads, etc, shall be presented as a detail tabulation in the Bill of Quantities. The preliminary and general allowance shall be paid in accordance the following formula:

$$\text{P\&G payable} = \text{total P\&G as per bill*} \frac{\text{Value of work certified to date}}{\text{Total contract value}}$$

3.19. EXTENSION OF CONTRACT PERIOD

Extension of Contract Period shall be determined in accordance with the Main Contractor conditions of contract and agreement between the Main Contractor and Subcontractor.

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3.20. SPOIL MATERIAL

No indiscriminate spoiling or undue waste of material will be allowed. All surplus or unsuitable material shall be stored in designated areas as directed by the Engineer. It is the responsibility of the Contractor to verify the exact quantities of materials required prior to ordering and the Employer will not be liable for or take over any excess or wasted material.

3.21. FINISHING AND TIDYING

Finishing and tidying shall be undertaken during and after completion of the construction activity.

3.22. PRACTICAL COMPLETION

Practical Completion for the completed installation will be certified after meeting the following conditions:

- All stages of the construction work have been completed, tested, commissioned and all certification for the works have been completed.
- Finishing and Tidying has been completed to the satisfaction of the Engineer.
- Accurately marked-up, record drawings (in paper format) of the completed installation have been provided to the Engineer.

At the discretion of the engineer, a limited number of defects may still be corrected within ten (10) days after the practical completion date. This will be indicated as such on the practical completion certificate.

3.23. VARIATIONS OF WORK

Notwithstanding anything to the contrary, contained in the Conditions of Contract the Employer reserves the right to increase or decrease the amount of work to be done allocated under this contract without any adjustments to the tendered rates.

3.24. GUARANTEE PERIOD

The guarantee period shall be for one year commencing on the practical completion date. During the guarantee period, the Contractor shall repair all defects in the Installation which may arise as result of inferior quality materials or faulty workmanship.

The fact that the installation will be handed over to the Employer during the guarantee period shall in no way exempt the Contractor from his responsibility under this clause.

Should a non-urgent fault occur during the guarantee period, the Contractor will be advised, and he shall repair the fault within 7 (seven) days of receiving notice.

Should a fault occur that is of an urgent nature to repair, the Employer will affect any emergency repairs required. These faults include the arising of dangerous situations on site, or faults causing power interruptions to consumers. The cost of such repair work shall be borne by the Contractor in accordance with the escalated tendered rates. In such a case the faulty equipment shall be kept for scrutiny by the Contractor, and he will have the right to inspect the repair work.

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Should the Contractor not proceed within 7 days to rectify a fault of normal nature, the Employer shall obtain the services of any available party to repair the fault. The cost of such repair work shall be borne by the Contractor in accordance with the escalated tendered rates. In such a case the faulty equipment shall be kept for scrutiny by the Contractor.

Should the Contractor be responsible for faults and defects in the Installation during the guarantee period the Contractor shall upon receipt of a Written instruction from the Engineer without delay satisfactorily correct and repair all faults and defects.

Should the frequency of faults and breakdown in the opinion of the Engineer become so regular as to constitute an unacceptable state of affairs or should the Installation or portions thereof prove to be unacceptable, the Contractor shall, upon receipt of a Written Instruction from the Engineer replace portions or components of the Installation at his own cost as prescribed by the Engineer.

3.25. PROGRESS PAYMENTS

The Contractor's request for payments shall include invoices for the purchases of materials and equipment delivered to the Site and shall include explanatory data on the cost of labour, the latter item differentiating between the various types of labour, e.g. artisans, apprentices and labourers. Included with these requests shall be a cession of all unfixed materials to the Employer. Ownership of unfixed materials shall be passed on to the Employer upon receipt of payment, retention excluded.

The equipment or material shall be delivered to Site, unless prior arrangements have been made with the Employer and the Employer agreed to authorise payment for material or equipment stored elsewhere, under conditions prescribed by the Employer.

Each progress invoice shall be divided in and shall include the following items:

- a) Total value of contract work done and contract material on Site up to the invoice date.
- b) Total value of previously valued and approved variations orders completed up to date of the invoice.
- c) The total value of escalation of the Contract Sum in terms of the specified escalation clauses where applicable.

The Contractor shall not cede or transfer his claim to any payment which may be due or become due in terms of the Contract. The Employer will also not recognise any such cession or transfer.

3.26. MARKING OF MATERIALS

The Contractor shall ensure that all materials and equipment delivered by road are consigned in his name and that they are properly marked to facilitate identification on the Site as so to avoid confusion with materials consigned to the Employer itself to other Contractors.

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3.27. ALLOWANCE FOR THE COMPLETION OF THE CONTRACT IN ITS ENTIRETY

Tenderers shall allow in their tender priced for all materials, equipment, machinery, labour, supervision, transport and all other items which are or may be necessary to complete the Contract in its entirety or implied therein.

3.28. DEVIATIONS OR OMISSIONS

Tenderers shall specify any deviations to or omissions from this Specification and the drawings. Tenderers shall also give full details of materials not specified but which are considered necessary by the Tenderer for the completion of the Contract.

3.29. SITE CONDITIONS

Before submitting tenders, Tenderers shall carry out a site inspection in order to acquaint themselves with the site conditions, access, etc.

Tenders must allow for all conditions on site in their tenders since extra claims arising from difficult site conditions in respect of transport, handling, loading, off-loading, labour, housing etc will not be entertained.

3.30. LAWS AND REGULATIONS

The Contractor shall be responsible to ensure that the Contract Works comply in full with the requirements, as amended, laid down by:

- The Electricity Supply Regulations as published in the official Gazette.
- The requirements of the Electricity Act, Act 41 of 1987.
- The requirements of the Code for Overhead lines NRS 041 of 1995.
- The Occupational Health and safety Act (Act 85/1993), including the Construction Regulations, Regulation R1010 of 18 July 2003
- Code of Practice for the Wiring of Premises SANS 10142 (AS AMENDED).
- The regulation of the local Supply Authority.
- The local Fire Regulations.
- The Regulations of Telkom
- The Standard Regulations of any Government Department or public service company, where applicable.
- The applicable specifications and codes of the SABS / SANS and NRS, for materials and workmanship or in the absence of such specifications and codes the applicable IEC or BS specifications and codes.

In addition, the Contractor shall issue all notices and pay all the required fees in respect to the Installation to the local authorities, and shall exempt the Employer from all losses, costs or expenditures which may arise as a result of the Contractors negligence to comply with the requirements of the regulations enumerated.

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It shall be assumed that the Contractor is conversant with the aforementioned requirements. Should any requirement, bye-laws or regulation, which contradicts the requirements of this specification, apply or become applicable during erection of the Installation, such requirement, bye-law or regulation shall overrule the requirements of this specification and the Contractor shall immediately inform the Engineer of such a contradiction. Under no circumstances shall the Contractor carry out any variations to the installation in terms of such contradictions without obtaining the written permission to do so from the Engineer.

3.31. INTERCHANGEABILITY OF EQUIPMENT

All items of similar equipment supplied under this contract shall be identical and completely interchangeable.

3.32. INFORMATION TO BE SUBMITTED WITH TENDERS

Tenderers shall indicate whether their offer complies in every respect with this Specification or, if not, precisely how they deviate from the Specification.

Tenders shall submit details of construction facilities, manpower and equipment available in their companies and allocated towards this project.

All Returnable Schedules shall be submitted with tenders.

3.33. INSPECTION AND TESTS

3.33.1. Factory Inspection and Tests

The Engineer reserves the right to inspect any of the work at any stage or to be present at any of the tests specified.

The Contractor shall perform all tests as described in the relevant SABS/NRS, BS Specifications of IEC Publications and as specified in this Specification.

The Contractor shall inform the Engineer of any work and tests which have been arranged, in which case the Engineer will arrange for an inspection if it is deemed necessary.

Three copies of all equipment maintenance and test reports, whether these tests have been carried out in the presence of the Engineer or not, shall immediately after they become available be submitted to the Engineer for scrutiny, unless otherwise stated in this Specification.

All electrical equipment will be subjected to tests and commissioning on site. The Contractor will allow in his rates to use an experienced Technician to perform this task. Well documented test reports will be submitted and all equipment should be suitable for the application.

Upon completion of the erection at the site, the Contractor shall perform all tests as specified or as required by the Engineer to ensure that all equipment, cabling etc have been connected correctly and that the installation is ready for handing over and commissioning into regular service.

The Contractor shall provide his own test equipment which shall be of an accepted standard. All test equipment older than 1 year should be accompanying by a calibration certificate.

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The Contractor shall allow the Engineer at least 14 days' notice before any tests and commissioning are scheduled to be performed, unless otherwise stated in this Specification.

3.33.2. Inspection and Handing Over Procedure

The Contractor shall conduct an inspection to satisfy himself that all lugs have been properly crimped, that all labels are engraved and properly fixed, that bolts and screws are not missing, that all phasing is correct, that all spoil which is the responsibility of the Contractor is removed, and in general that the Installation has been completed to the requirements of the Specification and that the workmanship complies with the expected standard.

After the Contractor has conducted the above-mentioned inspection, he shall notify the Employer in writing, for a final inspection.

The Installation shall then be inspected in the presence of Representatives of the Engineer and the Contractor.

Should the completed project not pass the inspection, the Contractor shall rectify the Fault(s) and apply for a re-inspection within 10 working days.

One (1) re-inspection of the Contract as a whole, shall be conducted free of charge. The Contractor shall incur a penalty of R5000,00 (five thousand rand) for all subsequent re-inspections required on the Contract and this amount will be deducted from the following payment due to the Contractor.

When the Installation passes a handing over inspection, the Contractor shall submit a completion and handing over certificate for signing by the Employer. The retention period for the particular section of the Installation shall commence on the date this section of the Installation passes the final handing over inspection.

3.34. RETENTION AND SURETIES

Retention and Sureties shall be determined in accordance with the Main Contractor conditions of contract and agreement between the Main Contractor and Subcontractor.

3.35. ESCALATION AND PRICE VAR

Escalation Price Variations will be applicable on this project.

3.36. INSURANCE OF THE WORKS

The Contractor must take note that all insurance costs for the total project (material and labour) is for the successful tenderer's account in accordance with the Main Contractor conditions of contract and agreement between the Main Contractor and Subcontractor.

3.37. COMPLYING WITH CONSTRUCTION REGULATIONS

The tenderer must make provision to comply with the Occupational Health and Safety Act (Act No.85 of 1993), Construction Regulations (R1010) of 18 July 2003 as amended. The financial implication must be accommodated in the P&G's of the Bill of Quantities. Failure to comply will lead to the termination of the contract and the contractor will carry the full responsibility of his actions.

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SECTION 4.: GENERAL SPECIFICATIONS

4.1. TESTS

After completion of the Works and before first delivery is taken, a full test will be carried out on the installation for a period of sufficient duration to determine the satisfactory working thereof. During this period the whole of the Works will be inspected, and the Contractor shall make good, to the satisfaction of the Engineer, any deficiencies that may arise.

The contractor shall provide all instruments and equipment required for testing.

Any water, power and fuel required for the commissioning and testing of installations on their completion will be provided by and at the expense of the Electrical Contractor.

4.2. MAINTENANCE OF INSTALLATIONS

With effect from the date of the First Delivery / Practical Completion Certificate the Contractor shall at his own expense undertake the regular servicing of the installation during the 12-month maintenance period and shall make all adjustments necessary for the correct operation thereof.

If during the said period the installation is not in working order for any reason for which the Contractor can be held responsible, or if the installation develops defects, he shall immediately upon being notified thereof take steps to remedy the defects or to make any necessary adjustments.

Should such stoppages however be so frequent as to become troublesome, or should the installation otherwise prove unsatisfactory during the said period the Contractor shall, if called upon by the Client or Representative, at his own expense replace the whole installation or such parts thereof as may deem necessary with apparatus specified by the Client or Representative.

4.3. REGULATIONS

The installation shall be erected and tested in accordance with the following Acts and regulations as amended:

- The latest issue of SANS 10142: "Code of Practice for the Wiring of Premises".
- The Occupational Health and Safety Act, 1993 (Act 85 of 1993) as amended.
- The Local Government Act 1998 (Act 10 of 1998 (Gauteng)), municipal by-laws and any special requirements of the Local Supply Authority.
- The Fire Brigade services Act, 2000 (Act 14 of 2000),
- The National Building Regulations and Building Standards Act 1996 (Act 29 of 1996),
- The Post Office Act 1998 (Act 124 of 1998),
- The Electricity Act, 1996 (Act 88 of 1996),
- The Regulations of the Local Gas Board where applicable,
- The National Water Act 1998 (Act no. 36 of 1998),
- The Water Service Act 1997 (Act 108 of 1997),
- The General Authorizations (Water Act),
- The Environmental Management Act 1998 (Act no. 73 of 1989),
- The National Environmental Management Act 1998 (Act no. 107 of 1998),
- The relevant SANS publications

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4.4. NOTICES AND FEES

The Contractor shall give all notices required by and pay all necessary fees, including any inspection fees which may be due to the Local Supply Authority.

On production of the official account, the net amount of fees charged by the Supply Authorities will be refunded to the contractor.

Connection fees for the electrical connection will be paid direct by the client. The tenderer shall allow in his tender to consult with the supply authority on behalf of the client for all related issues.

4.5. SCHEDULE AND SPECIFICATIONS

In all instances where schedules of light, socket outlet and power points are attached or included on the drawings, these schedules are to be regarded as forming part of the specification.

4.6. QUALITY OF MATERIALS

Only materials of first-class quality shall be used and all materials shall be subject to the approval of the Client. Standard specifications for various materials to be used on this contract are available from the Engineer and form part of this specification.

Wherever applicable material shall comply with the relevant South African Bureau of Standards specifications, or to British Standard Specifications, where no SANS Specifications exist.

Materials wherever possible, must be of South African manufacture.

4.7. CONDUIT AND ACCESSORIES

The type of conduit and accessories required for the service, i.e. whether the conduit and accessories shall be of the screwed type, plain-end type or of the non-metallic type and whether metallic conduit shall be black enamelled or galvanised, is specified in the Bill of Quantities and on the Drawings.

Unless other methods of installation are specified for certain circuits, the installation shall be in conduit wiring ducts throughout. No open wiring in roof spaces or elsewhere will be permitted.

The conduit and conduit accessories shall comply fully with the applicable SANS specification as set out below and the conduit shall bear the mark of approval of the South African Bureau of Standards.

- a) Screwed metallic conduit and accessories: SANS 60423
- b) Plain-end metallic conduit and accessories (Locfit): SANS 60423
- c) Non-metallic conduit and accessories: SANS 950.

All conduit fittings except couplings, shall be of the inspection type.

Bushes used for metallic conduit shall be brass and shall be provided in addition to locknuts at all points where the conduit terminates at switchboards, switchboxes, draw-boxes, etc.

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Draw-boxes are to be provided in accordance with SANS 10142 and wherever necessary to facilitate easy wiring.

For general light and socket outlet circuits, the conduit used shall have an external diameter of 20mm. In all other instances the sizes of conduit shall be in accordance with the SANS 10142 for the specified number and size of conductors, unless otherwise specified or indicated on the drawings.

Only one manufacture of conduit and conduit accessories will be permitted throughout the installation.

Running joints in screwed conduit are to be avoided as far as possible and all conduit systems shall be set or bent to the required angles. The use of normal bends must be kept to a minimum with exception of larger diameter conduits where the use of such bends is essential.

All metallic conduits shall be manufactured of mild steel with a minimum thickness of 1,2mm for plain-end conduit and 1,6mm in respect of screwed conduit.

NOTE:

Under no circumstances will conduit having a wall thickness of less than 1,6mm be allowed in screeding laid on top of concrete slabs.

Bending and setting of conduits must be done with special bending apparatus manufactured for the purpose and which are obtainable from the manufacturers of the conduit systems. Damage to conduit resulting from the use of incorrect bending apparatus or methods applied must on indication be completely removed and rectified and any wiring already drawn into such damaged conduits must be completely renewed at the contractor's expense.

Conduit and conduit accessories used for flame-proof or explosion proof installations and for the suspension of Light Fittings as well as all load bearing conduit shall in all instances be of the metallic screwed type.

All conduit and accessories used in areas within 50km of the coast shall be galvanised to SABS 763.

Tenderers must ensure that general approval of the proposed conduit system to be used is obtained from the local electricity supply authority prior to the submission of their tender. Under no circumstances will consideration be given by the Client to any claim submitted by the Contractor which may result from a lack of knowledge in regard to the supply authority's requirements.

4.8. CONDUIT IN ROOF SPACES

Conduit in roof spaces shall be installed parallel or at right angles to the roof members and shall be secured at intervals not exceeding 1,5m by means of saddles screwed to the roof timbers.

Where non-metallic conduit has been specified for a particular service, the conduit shall be supported and fixed with saddles with a maximum spacing of 450mm throughout the installation. The contractor shall supply and install all additional supporting timbers in the roof space as required.

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Under flat roofs, in false ceilings or where there is less than 0,9m of clearance, or should the ceilings be insulated with glass wool or other insulating material, the conduit shall be installed in such a manner as to allow for all wiring to be executed from below the ceilings.

Conduit runs from distribution boards shall, where possible terminate in fabricated sheet steel draw-boxes installed directly above or in close proximity to the boards.

4.9. SURFACE MOUNTED CONDUIT

Wherever possible, the conduit installation shall be concealed in the building work; however, where unavoidable or otherwise specified, conduit installed on the surface shall be plumbed or levelled and only straight lengths shall be used.

The use of inspection bends shall be avoided and instead the conduit shall be set uniformly, and inspection couplings used where necessary.

Conduit shall run on approved spacer bar saddles rigidly secured to the walls.

Alternatively, fittings, tees, boxes, couplings etc., shall be cut into the surface to allow the conduit to fit flush against the surface. Conduit shall be bedded into any wall irregularities to avoid gaps between the surface and the conduit.

Crossing of conduits shall be avoided, however, should it be necessary purpose-made metal boxes shall be provided at the junction. The finish of the boxes and positioning shall be keeping with the general layout.

Where several conduits are installed side by side, they shall be evenly spaced and grouped under one purpose-made saddle.

Distribution boards, draw-boxes, industrial switches and socket outlets etc., shall be neatly recessed into the surface to avoid double sets.

In situations where there are no ceilings the conduits shall run along the wall plates and tie beams.

In buildings where building operations are to be carried out, all surface conduit will be painted by the building contractor.

In all other instances the electrical contractor shall allow for painting of surface conduit with two coats of good quality enamel paint and appropriate primer, and the colour shall match the surrounding building finish.

Only approved plugging materials such as aluminium inserts, fibre plugs, plastic plugs, nail-in anchors etc., and round-head screws shall be used for fixing saddles, switches, socket outlets, etc., to walls, wood plugs and the plugging in joints in brick walls are not acceptable.

4.10. CONDUIT IN CONCRETE SLABS

In order not to delay building operations the contractor must ensure that all conduits and other electrical equipment which are to be cast in the concrete columns and slabs are installed in good time.

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The contractor shall have a representative in attendance at all times when the casting of concrete takes place.

Draw-boxes, expansion joint boxes and round conduit boxes are to be provided where necessary. Sharp bends of any nature will not be allowed in concrete slabs.

Draw and/or inspection boxes shall be grouped under one common cover plate and must preferably be installed in passages or common areas.

All boxes, etc., are to be securely fixed to the shuttering to prevent displacement when concrete is cast. The conduit shall be supported and secured at regular intervals and installed as close as possible to the neutral axis of concrete slabs and/or beams.

Before any concrete slabs are cast, all conduit droppers to switchboards and outlets shall be neatly spaced and rigidly fixed.

4.11. FLEXIBLE CONNECTIONS FOR CONNECTING OF APPLIANCES.

Flexible tubing connections shall be of galvanised steel construction, and in damp situations of the plastic sheathed galvanised steel type. Other types may only be used subject to the prior approval of the Engineer.

Connectors for coupling onto the flexible tubing shall be of the gland or screw-in types, manufactured of either brass or cadmium or zinc plated mild steel, and the connectors after having been fixed onto the tubing, shall be durable and mechanically sound.

NOTE:

Aluminium and zinc alloy connectors will not be acceptable.

4.12. WIRING

Except where otherwise specified, wiring shall be carried out in conduit throughout. One circuit per conduit will be preferred but if more than one circuit is to be drawn into one wireway the maximum number of wires shall be in accordance with SANS 10142.

No wiring shall be drawn into conduit until the conduit installation has been completed and all steel conduit ends provided with bushes. All conduits shall be clear of moisture and debris before wiring is commenced.

Unless otherwise specified or indicated on the drawings, the wiring of the installation shall be carried out in accordance with SANS 10142. Further to the requirements concerning the installation of earth conductors to certain light points as set out in SANS 10142, it is a specified requirement of this document that where plain-end metallic conduit or non-metallic conduit has been used, earth conductors must be provided and drawn into the conduit with the main conductors to all points, including all Light Fittings and switches throughout the installation.

Sizes of conductors to be drawn into conduits for as feeders to distribution boards, power points etc., shall be as specified or indicated on the drawings. Sizes of conductors not specified must be determined in accordance with SANS 10142.

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The loop-in system shall be followed throughout, and no joints of any description will be permitted.

The wiring shall be done with SABS approved PVC insulated 600/1000 V grade general purpose electrical wiring.

Where wire ends connect onto switches, Light Fittings etc., the end strands must be neatly and tightly twisted together and firmly secured. Cutting away of wire strands of any cable will not be allowed.

4.13. SWITCHES AND SOCKET OUTLETS

All switches and switched socket outlet combination units shall be manufactured and approved according to SANS 164-0.

No other than 16A 3 pin sockets are to be used, unless other special purpose types are distinctly specified or shown on the drawings.

All light switches shall be installed at 1,4m above finished floor level and all socket outlets as directed in the Schedule of Fittings which forms part of this specification or on the drawings.

4.14. SWITCHGEAR

Switchgear, which includes circuit breakers, iron-clad switches, interlocked switch-socket outlet units, contactors, time switches, etc., is to be SABS Approved and shall be equal and similar in quality to such brands as may be specified.

For uniform appearance of switchboards, only one approved make of each of the different classes of switchgear specified shall be used throughout the installations.

4.15. SWITCHBOARDS

All boards shall be in accordance with the types as specified, be constructed according to the detail or type drawings and must be approved by the Engineer before installation.

In all instances where provision is to be made on boards for the supply authority's main switch and/or metering equipment the contractor must ensure that all requirements of the authorities concerned in this respect are met.

Any construction or standard type board proposed as an alternative to that specified, must have the prior approval of the Engineer.

All busbars, wiring, terminals, etc., are to be adequately insulated and all wiring is to enter the switchgear from the back of the board. The switchgear shall be mounted within the boards to give a flush front panel. Cable and boxes and other ancillary equipment must be provided where required.

Clearly engraved labels are to be mounted on or below every switch. The wording of the labels in English, shall be according to the lay-out drawings or as directed by the Engineer and must be confirmed on site. Flush mounted boards to be installed with the top of the board 2,0m above the finished floor level.

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4.16. WORKMANSHIP AND STAFF

An accredited person shall exercise general control over all electrical installation work being carried out.

The workmanship shall be of the highest grade and to the satisfaction of the Engineer.

All inferior work shall, on indication, immediately be removed and rectified by and at the expense of the electrical contractor.

4.17. CERTIFICATE OF COMPLIANCE

On completion of the service, a certificate of compliance must be issued in terms of the Occupational Health and Safety Act, 1993 (Act 85 of 1993).

4.18. EARTHING OF INSTALLATION

The type of main earthing must be as required by the supply authority if other than specified, and in any event as directed by the Engineer, who may require additional earthing to meet test standards.

Where required an earth mat shall be provided, the minimum size, unless otherwise specified, being 1,0m x 1,0m and consisting of 16mm diameter hard-drawn bare copper wires at 250mm centres, exothermically welded at all intersections.

Alternatively, or additionally, earth rods or trench earths may be required as specified or directed by the Engineer.

Connection from the main earth bar on the main board must be made to the cold water main, the incoming service earth conductor, if any and the earth mat or other local electrode by means of 12mm x 1,60mm solid copper strapping or 16mm² stranded (not solid) bare copper wire or such conductor as the Engineer may direct. Main earth copper strapping where installed below 3m from ground level, must be run in 20mm diameter conduit securely fixed to the walls.

4.18.1. Water Pipes

Hot and cold-water systems shall be bonded together and also be bonded to the earth continuity conductor system with 2.5mm stranded copper wire or 12mm x 0,8mm perforated or solid copper strapping.

The strapping shall be fixed to the pipework with brass nuts and bolts and against walls with brass screws at 150mm centres.

In all cases where metal water pipes, down pipes, flues, etc., are positioned within 1,6m of switchboards an earth connection shall be installed between the pipework and the board. In vertical building ducts accommodating both metal water pipes and electrical cables, all the pipes shall be earthed at each distribution board.

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4.18.2. **Roofs**

Where service connections consist of overhead conductors, all metal parts of roofs, gutters and down pipes shall be earthed. One bare 10mm² copper conductor shall be installed over the full length of the ceiling void, fixed to the top purlin and connected to the main earth conductor and each switchboard. The roof and gutters shall be connected at 15m intervals to this conductor by means of 12mm x 0,8mm copper strapping (not conductors) and galvanised bolts and nuts. Self-tapping screws are not acceptable. Where service connections consist of underground supplies, the above requirements are not applicable.

4.18.3. **Sub-distribution boards**

A separate earth connection shall be supplied between the earth busbar in each sub-distribution board and the earth busbar in the Main Switchboard. These connections shall consist of bare or insulated stranded copper conductors installed along the same routes as the supply cables or in the same conduit as the supply conductors. Alternatively, armoured cables with earth continuity conductors included in the armouring may be utilized where specified or approved.

4.18.4. **Sub-circuits**

The earth conductors of all sub-circuits shall be connected to the earth busbar in the supply board in accordance with SANS 10142.

4.18.5. **Ring Mains**

Common earth conductors may be used where various circuits are installed in the same wireway in accordance with SANS 10142. In such instances the sizes of earth conductors shall be equivalent to that of the largest current carrying conductor installed in the wireway, alternatively the size of the conductor shall be as directed by the Engineer. Earth conductors for individual circuits branching from the ring main shall be connected to the common earth conductor with T-ferrules or soldered. The common earth shall not be broken.

4.18.6. **Non-metallic Conduit**

Where non-metallic conduit is specified or allowed standard copper earth conductors shall be installed in the conduits and fixed securely to all metal appliances and equipment, including metal switch boxes, socket-outlet boxes, draw-boxes, switchboards, luminaries, etc. The securing of earth conductors by means of self-threading screws will not be permitted.

4.18.7. **Flexible Conduit**

An earth conductor shall be installed in all non-metal flexible conduit. This earth conductor shall not be installed externally to the flexible conduit but within the conduit with the other conductors. The earth conductor shall be connected to the earth terminals at both ends of the circuit.

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4.18.8. Connection

Under no circumstances shall any connection points, bolts, screws, etc., used for earthing be utilised for any other purpose. It will be the responsibility of the Contractor to supply and fit earth terminals or clamps on equipment and materials that must be earthed where these are not provided. Unless earth conductors are connected to proper terminals, the end shall be tinned and lugged.

4.19. **MOUNTING AND POSITIONING OF LIGHT FITTINGS**

The electrical contractor is to note that in the case of board and acoustic tile ceilings, i.e. as opposed to concrete slabs, close co-operation with the building contractor is necessary to ensure that as far as possible the Light Fittings are symmetrically positioned with regard to the ceiling pattern.

The lay-out of the Light Fittings as indicated on the drawings must be adhere to as far as possible and must be confirmed with the Engineer.

Light Fittings installed against concrete ceilings shall be screwed to the outlet boxes and in addition 2 x 4mm nail-in anchors or other approved type fixing bolts are to be provided. The bolts are to be $\frac{3}{4}$ of the length or diameter of the Light Fitting apart.

Light Fittings to be mounted on board ceilings shall be secured to branderings or joists by means of two 40mm x No. 10 round head screws and washers $\frac{3}{4}$ of the length or diameter of the fitting apart. The Light Fittings shall also be bonded to the circuit conduit by means of locknuts and brass bushes where applicable.

If permitted by the ceiling structure Spring Toggle Anchors fixing screws may be placed $\frac{3}{4}$ of the length of the fitting apart. This type of fixing may only be done with approval from the ceiling installer.

Small Light Fittings (less than 100mm long or diameter) may be screwed directly to outlet boxes in concrete slabs. Against board ceilings small Light Fittings shall be secured to the brandering or joists by means of two 40mm x No.8 round head screws.

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SECTION 5.: DETAIL SPECIFICATION: STANDARD CLAUSES FOR COMPREHENSIVE SERVICES

5.1. EXTENT OF WORK

The work covered by this contract comprises the complete electrical installation, in working order, as shown on the drawings and as per this specification, including the supply and installation of all specified materials and the installation of such equipment supplied by the Client.

The work entails the complete electrical installation associated with the refurbishment and upgrading of a portion of the site works, the Arts Building and the Sports Building of the Mayibuye Multipurpose Centre in Galeshewe, Kimberley. Including, but not to be limited to the following installation components:

- 400/231V Distribution Systems.
- 600/1000V Electrical cable installations.
- Installation of new outdoor standby diesel generator.
- Upgrading and refurbishment of Distribution Boards.
- Cable sleeves, Trays, Power skirting and Ducts.
- Conduit and wiring installations.
- Installation of new light fittings and switches.
- Replacement of lamps.
- Electrical supplies and connections to other installations. (Heat Pump, Air Conditioners, extraction fans etc.)
- Test and commission of complete installation.

5.2. SLEEVE PIPES

Where cables cross under roadways, building platforms, other services and where cables enter buildings, the cables shall be installed in double wall corrugated high density polyethylene sleeve pipes.

The ends of all sleeves shall be sealed with a non-hardening watertight compound after the installation of cables. All sleeves intended for future use shall likewise be sealed.

5.3. NOTICES

The Contractor shall issue all notices and make the necessary arrangements with Supply Authorities, the Postmaster-General, S.A. Transport Services, Provincial or National Road authorities and other authorities as may be required with respect to the installation.

5.4. ELECTRICAL EQUIPMENT

All equipment and fittings supplied must be in accordance with the attached quality specification this document, suitable for the relevant supply voltage, and frequency and must be approved by the Engineer.

5.5. DRAWINGS

Where applicable drawings generally show the scope and extent of the proposed work and shall not be held as showing every minute detail of the work to be executed.

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The position of power points, switches and light points that may be influenced by construction methods or other services must be established on site, prior to these items being built in.

5.6. BALANCING OF LOAD

The Electrical Contractor is required to balance the load as equally as possible over the multiphase supply.

5.7. SERVICE CONDITIONS

All plant shall be designed for the climatic conditions appertaining to the service and location.

5.8. SWITCHES AND SOCKET OUTLETS

The installation of switches and socket outlets must conform to the General Specifications of this specification.

5.9. LIGHT FITTINGS AND LAMPS

The installation and mounting of luminaries must conform to the General Specifications of this specification.

All fittings to be supplied by the electrical contractor shall have the approval of the Engineer. All lamps shall bear the approved SANS / SABS mark and shall be of the specified make.

The light fittings must be of the type specified in the Schedule of Light Fittings.

5.10. EARTHING AND BONDING

The Contractor will be responsible for all earthing and bonding of the building and installation. The earthing and bonding is to be carried out strictly as described in SANS 10142, this specification and to the satisfaction of the Engineer.

5.11. MAINTENANCE OF ELECTRICAL SUPPLY

All interruptions of the electrical supply that may be necessary for the execution of the work will be subject to prior arrangement between the Contractor, the user, and the Client's representative.

5.12. SUPPLY AND CONNECTION

Each new building will be supplied with a new 400/231V electricity connection.

The contractor shall arrange with all other parties that may be influenced before the electricity supply to a building or any section of the installation is to be interrupted.

5.13. CONDUIT AND WIRING

Conduit and accessories in ceiling voids, cast in concrete and chased into brickwork or fixed to structures, concealed out of reach shall be PVC.

Surface mounted unconcealed conduit shall be galvanised steel

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All wall boxes shall be galvanised steel.

All conduits and wiring, regardless of the system employed, shall be installed strictly as described in the applicable paragraphs of the General Specifications of the specification.

Unless otherwise specified by the engineer conduit sizes shall be as follows:

- Conduit for general electrical circuits with wiring up to 4mm² shall be 20mm Ø.
- Conduit for general electrical circuits with wiring 6mm² and higher shall be 25mm Ø
- Conduits for electronic services shall be 25mm Ø.

Note:

Regardless of the type of conduit used, all switches and light fittings must be supplied with a permanent earth terminal for the connection of the earth wire.

Lugs held by switch fixing screws or self-tapping screws will not be acceptable.

5.14. POWER POINTS

The tenderer shall allow for the installation of power points and equipment as listed in the schedules and indicated on the drawings.

5.15. CABLES

The contractor shall supply and completely install all distribution cables as indicated on the drawings and listed in the Schedule of Cables.

Tenderers must base their tender on the amounts of cable, including earth conductors, as indicated in the Bill of Quantities. During the course of the work the actual lengths will be measured on site and adjustments will be made according to the price per meter length as inserted by the tenderer for the particular cable size concerned.

Tenderers must base their cost for trenching in earth, soft rock and hard rock on the total quantities as indicated in the Bill of Quantities. The actual quantities, based on the dimensions as specified below for trenches for the applicable number of cables to be laid, will be measured on site during the course of the service and adjustments made according to the price per cubic meter as inserted by the tenderer. Payment for cable trenching having a greater volume than that specified for the purpose will not be considered except where extra excavations are necessary to by-pass obstacles such as water pipes, drains, large boulders etc. In all such instances the amount of the extra excavations must be agreed upon on site between the Engineer and the contractor.

TENDERERS ARE TO NOTE THAT:

a) Hard rock:

shall mean granite, quartz sandstone, slate and rock of a similar or greater hardness, solid shale and boulders over 0,03m; in volume.

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b) Soft rock:

shall mean rock that can be loosened by hand-pick and includes hard shale, compact oukclip and boulders from 75mm in diameter up to 0,03m; in volume.

c) Earth

shall mean grounds that can be removed by pick and hand shovel and includes loose gravel, clay, made-up ground, lose or soft shale, loose oukclip and boulders less than 75mm in diameter.

The storage, transportation, handling and laying of the cables shall be according to first class practice, and the contractor shall have adequate and suitable equipment and labour to ensure that no damage is done to cables during such operations.

The cable-trenches shall be excavated to a depth of 0,7m deep below ground level and shall be 400mm wide for one to three cables. The width shall be increased where more than three cables are laid together so that the cables may be placed at least two cable diameters apart throughout the run. The bottom of the trench shall be level and clear and the bottom and sides free from rocks or stones liable to cause damage to the cable.

The contractor must take all necessary precautions to prevent the trenching work being in any way a hazard to the personnel and public and to safeguard all structures, roads, sewage works or other property on the site from any risk of subsidence and damage.

In the trenches made in soft and hard rock the cables shall be laid on a 75mm thick bed of earth and be covered with a 150mm layer of earth before the trench is filled in.

All joints in underground cables and terminations shall be made either by means of compound filled boxes according to the best-established practice by competent cable jointers using first class materials or by means of approved epoxy-resin pressure type jointing kits. Epoxy-resin joints must be made entirely in accordance with the manufacturer's instructions and with materials stipulated in such instructions. Low tension P V C A cables are to be made off with sealing glands and materials designed for this purpose which must be of an approved make. Where cables are cut and not immediately made off, the ends are to be sealed without delay. The lying of cables shall not be commenced until the trenches have been inspected and approved. The cable shall be removed from the drum in such a way that no twisting, tension or mechanical damage is caused and must be adequately supported at intervals during the whole operation. Particular care must be exercised where it is necessary to draw cables through pipes and ducts to avoid abrasion, elongation or distortion of any kind. The ends of such pipes and ducts shall be sealed to approval after drawing in of the cables.

Backfilling (after bedding) of the trenches is to be carried out with a proper grading of the material to ensure settling without voids, and the material is to be tamped down after the addition of every 150mm. The surface is to be made good as required.

On each completed section of the laid and jointed cable, the insulation resistance shall be tested to approval with an approved "Megger" type instrument of not less than 500 V for low tension cables.

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Earth continuity conductors are to be run with all underground cables constituting part of a low-tension distribution system. Such continuity conductors are to be stranded bare copper of a cross-sectional area equal to at least half that of one live conductor of the cable but shall not be less than 4mm² or more than 70mm². A single earth wire may be used as earth continuity conductor for two or more cables run together, branch earth wires being brazed on where required.

5.15.1. Laying, Jointing and Making Off of Electrical Cables

NB: The requirements specified hereafter, are aimed essentially at high tension cable but are also valid for low tension cable, where applicable.

The use of the term "Inspector" includes the engineer or inspector of the Client or an empowered person of the concerned supervising consulting engineer's firm.

No cable is to be laid before the cable trench is approved and the contractor and inspector agree upon the soil qualification of the excavation.

After the cable has been laid and before the cable trench is backfilled the inspector must ensure that the cable is properly bedded and that there is no undesirable material included in the bedding layer.

Qualified experienced cable jointers must only carry out all cable jointing and the making off of the cables. Helpers of the jointers may not saw, strip, cut, solder, etc. The cable and other work undertaken by them must be carried out under the strict and constant supervision of the jointer.

Before the contractor allows the jointer to commence with the jointing work or making off of the cable (making off is recognised as half a joint) he must take care and ensure:

- That he has adequate and suitable material available to complete the joint properly and efficiently. Special attention must be given to ensure the cable ferrules and cable lugs are of tinned copper and of sufficient size. The length of the jointing lugs must be at least six times the diameter of the conductor,
- That the joint pit is dry and that all loose stones and material are removed,
- That the walls and banks of the joint pit are reasonably firm and free from loose material which can fall on the joint,
- That the necessary cofferdams or retaining walls are made to stop the flow of water into the joint pit,
- That the joint pit is provided with suitable groundsheets so that the jointing work is carried out in clean conditions,
- That the necessary tents or sails are installed over the joint pit to effectively avert unexpected rainfall and that sufficient light or lighting is provided,
- That the necessary means are available to efficiently seal the jointing or cable end when an unexpected storm or cloudburst occurs, regardless of how far the work has progressed,
- That the cables and other materials are dry, undamaged and in all respects are suitable for the joint work or making off.

5.15.2. Labelling of Electrical Cables

All cables shall be labelled at both ends of the cable, by means of a "Brother Tape label printer, covered with transparent heat shrink covering". This label shall indicate the size of the cable and earth conductor and DB to which it feeds, or feeds from, e.g. **"50mm² x 4 Core Cable +25 mm² Earth Conductor – Feeding Sub-DB 2 In Hostel 2"**

TENDERER:

Initial: Authorized Signatory/ies:

1 _____
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DRPW

Initial: DRPW _____

Witness: _____

5.16. DISTRIBUTION BOARDS

Special Note:

- Only "**CBI or Schneider**" type circuit breakers shall be used on this contract.
- Only "**Schneider**" type contactors shall be used on this contract.

In addition to General Specifications the following shall also be applicable to switchboards required for this service.

The electrical contractor shall supply and install the distribution boards as indicated on the in the Distribution Board Schedules or line diagrams. All distribution board designs shall comply with approved by the Engineer prior to manufacturing.

5.16.1. General information regarding the distribution boards.

a) Construction

All distribution boards shall be manufactured according to the detail specifications and drawings and shall be inspected and approved by the Engineer before installation.

The Engineer shall first approve any other type of distribution board, which may be submitted as an alternative.

All buzbars and lugs shall be insulated, and wiring shall enter the switch gear from the back of the distribution board.

b) Quality specification and Manufacturers

All switchgear and equipment shall comply with the quality specification in the document.

c) Wiring

The manufacturers shall internally wire all distribution boards.

Wiring between switchgear and busbars shall be done by means of PVC insulated stranded copper conductors, fixed to the busbars with copper lugs, and brass bolts.

Only colour coded wiring shall be accepted, e.g.: Red, yellow and blue for phases, and black for neutral.

Wiring coloured by means of PVC insulated tape shall not be accepted.

Wiring shall be neatly strapped in a vertical and horizontal manner.

All instrument and control wiring shall be 2,5mm² PVC insulated copper conductors, and shall be numbered for ease of tracing circuits.

d) Colour

The colour of all distribution boards shall be as indicated on the single line diagrams for each board.

TENDERER:

Initial: Authorized Signatory/ies:

1 _____
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Initial: DRPW

Witness: _____

e) Doors

Where specified, doors shall be of the removable type.

f) Separate Compartments

Where distribution boards have separate compartments, they shall be separated by means of a metal dividing section and be equipped with individual removable circuit breaker covers.

g) Labelling

All distribution boards shall be labelled in the following manner:

Name of distribution board.

Supply information and size of cable e.g.: Supply from Mini-sub with 1 x 50mm² x 4 core cable.

All circuit breakers shall be marked with an engraved type of label (black letters on white background) and secured to the metal panel by means of self-tapping screws, or pop rivets. (Letters shall not be smaller than 5mm.)

Legend cards can be used for circuits of which the description is too long to fit below the circuit breaker.

All distribution boards shall comply with the requirements as stipulated in the Standard Specifications of this document.

The electrical contractor shall supply and install the distribution boards as indicated on the drawings and listed in the Distribution Board Schedule. All distribution boards shall comply with the quality specification in Section 3 of this specification and be approved by the Engineer.

An engraved Trefolyte, PVC or aluminium label indicating the name, size and origin of the cable feeder, e.g. "DB A1 fed from DB A by means of 50mm² x 4 core cable" shall be secured to the front side of the DB door, by means of 2 x pop-rivets. Minimum size of label: 2 x 50 x 100mm. Similar labels identifying the main switch and all outgoing (L1, P1, ELU, PP1) circuits shall be secured inside ALL the distribution boards against the internal panels.

5.16.2. General information regarding the distribution boards.

a) Construction:

All distribution boards shall be manufactured according to the detail specifications and drawings and shall be inspected and **approved** by the Engineer before installation.

The Engineer shall first approve any other type of distribution board, which may be submitted as an alternative.

All busbars and lugs shall be insulated, and wiring shall enter the switch gear from the back of the distribution board.

TENDERER:

Initial: Authorized Signatory/ies:

1 _____
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DRPW

Initial: DRPW

Witness: _____

b) Quality Specification and Manufacturers:

All switchgear and equipment shall comply with the specification in the document.

c) Wiring:

The manufacturers shall internally wire all distribution boards.

Wiring between switchgear and busbars shall be done by means of PVC insulated stranded copper conductors, fixed to the busbars with copper lugs, and brass bolts.

Only colour coded wiring shall be accepted, e.g.: Red, yellow and blue for phases, and black for neutral.

Wiring coloured by means of PVC insulated tape shall not be accepted.

Wiring shall be neatly strapped in a vertical and horizontal manner.

All instrument and control wiring shall be 2,5mm² PVC insulated copper conductors, and shall be numbered for ease of tracing circuits.

d) Doors:

Where specified, doors shall be of the removable type.

e) Separate Compartments:

Where distribution boards have separate compartments, they shall be separated by means of a metal dividing section and be equipped with individual removable circuit breaker covers.

f) Legend Cards:

Legend cards covered by removable glass or 1.6mm transparent acrylic plastic shall be fitted to the inside of the door of the distribution board and circuits shall be noted on this legend card. Legend cards shall be as follow, for example:

Main	-	Main Isolator Switch OR Local Isolator Switch (As case may be).
L1	-	Lights; Bedroom 1, Bedroom 2 & Kitchen.
P1	-	Plugs; Bedroom 1, Bedroom 2 & Kitchen.
ELU1	-	Earth leakage unit for plug circuits 1, 2 & 3.

5.17. LIGHT FITTINGS

Light fittings and accessories shall be according to the Schedule of Light Fittings and shall be approved by the Engineer.

Important Note:

- **All light fitting prices shall include lamps and shall be priced as per the exact specifications indicated on the schedule and drawings.**
- **Any deviation from the specification, shall first be approved by the client, engineer and architect, after the tender has been awarded.**

TENDERER:

DRPW

Initial: Authorized Signatory/ies:

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Initial:

DRPW

Witness:

5.18. LIGHT SWITCHES

All light switches shall be flush mounted 16A type with **metal cover and earth terminal** as specified and be mounted in a 100 x 50 x 50mm galvanised flush wall box. Light Switches shall be similar to Crabtree Classic Range and shall include the metal cover plate.

5.19. PHOTOCCELL

Security lighting on the outside of buildings shall be controlled by a 16A photo cell "**National**" type mounted in a weatherproof "York Box" enclosure.

5.20. SOCKET OUTLETS

All socket outlets rated 16A and shall be wired with 2 x 2.5mm² or 4mm² PVC insulated conductors as specified and 1 x 2,5mm² earth conductor, in a 20mm conduit.

All switched socket outlets shall be flush mounted 16A type with **metal cover and earth terminal** as specified and be mounted in a 100 x 100 x 50mm galvanised flush wall box. Socket Outlets shall be similar to Crabtree Classic Range and shall include the metal cover plate.

5.21. CIRCUITS AND WIRING

Electrical circuits shall be arranged according to the indications on the drawings. Only one circuit shall be installed per conduit.

Wiring shall be done with general purpose PVC insulated copper wire. The following wiring sizes shall be used:

Item	Circuit Type	Circuit Breaker	L+N Wire	Earth Wire
1	Power Points	30A	6.0mm ²	4.0mm ²
2	Power Points	20A	4.0mm ²	2.5mm ²
3	General Socket Outlets	20A	2.5mm ²	2.5mm ²
4	General Lighting	10A	1.5mm ²	2.5mm ²

5.22. POWER SKIRTING, CABLE RACKS AND WIRE DUCT

5.22.1. Power Skirting:

- Power skirting shall be powder coated steel channels complete with covers, corner covers and end caps.
- Either 1 or 2 tier systems shall be installed as indicated on the drawings.
- Power skirting shall be installed according to manufacturer's instructions.

5.22.2. Cable Racks: (For electronic installations in passages with ceilings only)

Cable racks shall be of the "Cabstrut" medium duty type welded wire mesh, mounted to the concrete ceiling, roof structure or against walls at 600mm intervals by means of purpose made 8mm dia threaded rods and P2000 cross bracing.

TENDERER:

Initial: Authorized Signatory/ies:

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Initial: DRPW

Witness: _____

5.22.3. Wire Duct: (For electrical installations in passages with ceilings only)

P8000 or P 9000 wire ducting shall be installed from the main DB's on each floor against the concrete ceiling, roof structure (*duct opening and cover facing down*) or against walls and conduits shall feed into this duct.

5.23. LIGHTNING PROTECTION

Special Note:

- **It is a specific requirement of this contract that specialists who are conversant with this type of work shall do the design, supply, installation and certification of this part of the installation.**
- **Where applicable lightning protection installation and test joints shall be built into the brickwork.**

5.23.1. Definitions

The terminology in this section has the same meanings as in SANS 61024 (as amended).

5.23.2. Tests

After completion of this section of the installation the Contractor shall conduct tests as prescribed by the Engineer.

A certificate of compliance shall be issued by the specialist Lightning Protection Contractor to certify that the installation complies with the relevant SANS standards.

5.23.3. Design

The Lightning Protection System shall be designed by a specialist lightning protection installer. Designs shall be submitted to the Engineer for acceptance prior to installation.

5.24. STANDBY DIESEL GENERATOR

The Contractor will be responsible for the supply and installation of the complete standby diesel generator plant consisting of the following:

- One new 200kVA standby diesel generator set.
- The new 200kVA generator must be manufactured and supplied by Unilec Power Systems or of equal quality and approval.
- The new standby diesel generator shall as a minimum comply to the following specifications:
 - Three phase, 50HZ, 1500rpm, 200kVA standby diesel generator set.
 - Automatic change-over with 7320 deep sea controller.
 - 30% dummy load complete with 3-phase electrical supply and distribution board.

TENDERER:

Initial: Authorized Signatory/ies:

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Initial: DRPW

Witness: _____

- Lockable fuel filling cap and fuel pipes with fuel filling pump.
- 8-hour/1000Litre double wall day tank.
- Water jacket heater set and element.
- Weatherproof and sound attenuated canopy with doors. The canopy shall be designed to attenuate the generator noise to 70 dBA, measured 7m from the generator set, 1 m above ground. The soundproof material shall be self-extinguished. The canopy shall be manufactured from 1,6 mm thick mild steel sheet metal with a powder coat finish. The colour of the canopy shall be confirmed prior to manufacturing. Adequate ventilation louvres shall be provided with due allowance for the required sound attenuation. The steel canopy shall include a centre lifting eye on top for hoisting purposes. The control panel, engine and alternator shall have convenient access for repair and maintenance. The access doors shall be pad lockable with a three-point barker and nelson locking mechanism. Convenient access to cable work and cable terminations shall be provided. Enclosed type damp proof LED luminaires, type Beka 46W LED Vapourline or of equal quality and approval with stainless steel clips shall be provided at the top, inside the canopy for repair and maintenance purposes. A detail sketch of the proposed sound attenuated canopy shall be enclosed with the tender.
- Residential silencer with stainless steel tail pipe and flexible bellow fitted between engine and silencer.
- The six-cylinder, turbo charged, TAD733GE VOLVO diesel engine must be capable of producing 213kVA under standby conditions and 913kVA under prime conditions @ 1500m above sea level.
- The alternator must be 213kVA @ 0,8power factor, three phase, Marelli motori/Leroy Somer single bearing, brushless alternator coupled via flange and flexible coupling.
- The switchboard must be complete with 300A ABB Motorized Mains Isolator & Genset Circuit Breaker, Ammeters, Voltmeters, Frequency Display on Controller, control circuit breakers, slave relays & engine wiring terminals including an 7320 DSE Deep Sea Controller with the Vdo Fuel gauge for fuel level display on controller.
- Two 120A/Hour Bosch Maintenance Free Batteries complete with 24V independent battery charger unit for each genset.
- All required notices and labels, complete as specified including a set of earmuffs for hearing protection.
- The Carbon Dioxide fire extinguisher, 5kg must be mounted outside the outdoor weatherproof canopy.
- The generator set shall be capable of accepting 75% of the specified site electrical output 10 seconds after the starter motor is energised and the remaining 25%, 5 seconds thereafter, ie 100% load acceptance shall not exceed 15 seconds.
- The engine and alternator of the set shall be built together on a common frame, which must be mounted on a skid base on anti-vibration mountings. The set must be placed direct on the outdoor concrete plinth. A drip tray must be fitted under the engine. The tray must be large enough to catch a drip from any part of the engine. The frame must be of the 'DUPLEX' type.

TENDERER:

Initial: Authorized Signatory/ies:

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DRPW

Initial: DRPW _____

Witness: _____

- d. All the Deep-Sea communication GSM modules shall be provided to ensure alarm and status communication via SMS notification.
- e. The contractor must allow for the commissioning factory acceptance and site acceptance diesel fill.
- f. The contractor must allow for the complete 50ppm diesel first fill of the generator day tank.
- g. Detail workshop drawings of the new generator set including the schematic diagrams must be submitted for approval by the Engineer prior to manufacturing.

TENDERER:

Initial: Authorized Signatory/ies: 1 _____
2 _____

DRPW

Initial: DRPW _____
Witness: _____

5.25. TECHNICAL SCHEDULES

5.25.1. Schedule Of DB's

Refer to Single Line Diagram Drawings

5.25.2. Schedule Of Light Fittings

Refer to Schedule of Lighting Luminaires

Special Note:

- Details or samples of all light fittings must be submitted to the engineer for approval prior to installation.
- Unless otherwise recommended by manufacturer, only **Osram or Philips** lamps shall be acceptable. Details of lamps offered shall be submitted at tender stage.
- Unless otherwise recommended by manufacturer, only **Osram or Tridonic LED** Control gear shall be acceptable.

TENDERER:

Initial: Authorized Signatory/ies: 1 _____
2 _____

DRPW

Initial: DRPW _____
Witness: _____

SECTION 6.: RETURNABLE SCHEDULES

6.1. ELECTRICAL CONTRACTOR DETAILS

Name and address of Electrical Contractor: (Company Name)

Tel. No. _____

Name and registration number of Certified Accredited Person:

Reg No: _____

Certified Accredited Person Registration Type: **Please mark**
(Minimum requirement for person to exercise general control over the work for this project is registration as an Installation Electrician)

- ☐ Master Installation Electrician
- ☐ Installation Electrician – 3 Phase
- ☐ Electrical Tester for Single Phase

Electrical Contractor's Registration Number:

_____ Valid Till: _____
(Copy of current registration document must be attached)

Authorised Signature

Name

Date

TENDERER:

Initial: Authorized Signatory/ies:

1 _____
2 _____

DRPW

Initial: DRPW

Witness:

6.2. SCHEDULE OF EQUIPMENT OFFERED

a) LV distribution and lighting

ITEM	MATERIAL	MAKE OR TRADE NAME	COUNTRY OF ORIGIN
1.	Low Voltage Cable		
2.	Distribution Boards		
3.	Wiring Duct		
4.	Light Fittings (Provide Manufacturer And Description)		
5.	Building Lighting		
5.1	Type A		
5.2	Type B		
5.3	Type C		
5.4	Type D		
5.5	Type E		
5.6	Type F		
5.7	Type H1		
5.8	Type H2		
5.9	Type H3		
5.10	Type H4		
5.11	Type H5		
5.12	Type H6		
5.13	Type N		
5.14	Type O1		
5.15	Type P		
5.16	Type Q2		
5.17	Type V		
6.	Light Switches (Lever Type)		
7.	Light Switches (Occupancy Type)		
8.	Switched Socket Outlets		
9.	Isolators (Lever Type)		
10.	Isolators (Rotary Type)		
11.	Lightning Protection		

TENDERER:

Initial: Authorized Signatory/ies:

1 _____
2 _____

DRPW

Initial: DRPW

Witness: _____

b) Generator

i. Generator Engine

NO	ITEM	REMARKS 200KVA GENSET
1.	Manufacturer's Name	
2.	Country of Origin	
3.	Manufacturer's model No. and year of manufacture	
4.	Continuous sea level rating after allowing for ancillary equipment : a) In bhp b) In kW	
5.	Percentage de-rating for site conditions, in accordance with BS 551.4 a) For altitude b) For temperature c) For humidity d) Total de-rating	
6.	Net output on site in kW	
7.	Nominal speed in rpm	
8.	Number of cylinders	
9.	Strokes per working cycle	
10.	Stroke in mm	
11.	Cylinder bore in mm	
12.	Swept volume in cm ³	
13.	Mean piston speed in m/min	
14.	Compression ratio	
15.	Cyclic irregularity	
16.	Fuel consumption of the complete generating set on site in l/h of alternator output at : a) Full load b) $\frac{3}{4}$ load c) $\frac{1}{2}$ load NOTE : A tolerance of 5% shall be allowed above the stated value of fuel consumption.	
17.	Make of fuel injection system.	
18.	Capacity of fuel tank in litres	
19.	Is gauge glass fitted to tank?	
20.	Is electric pump for filling the fuel tank included?	
21.	Method of starting	
22.	Voltage of starting system	
23.	Method of cooling	
24.	Type of radiator if water-cooled	
25.	Type of heater for warming cylinder heads	

TENDERER:

Initial: Authorized Signatory/ies: 1 _____
2 _____

DRPW

Initial: DRPW _____
Witness: _____

NO	ITEM	REMARKS 200KVA GENSET
26.	Capacity of heater in kW	
27.	Method of protection against high temperature	
28.	Method of protection against low oil pressure	
29.	Type of governor	
30.	Speed variation in % a) Temporary b) Permanent	
31.	Minimum time required for as assumption of full load in seconds	
32.	Recommended interval in running hours for : a) Lubricating oil change b) Oil filter element change c) Decarbonising	
33.	Type of base	
34.	Can plant be placed on solid concrete floor?	
35.	Are all accessories and ducts included?	
36.	Is engine naturally aspirated?	
37.	Are performance curves attached?	
38.	Diameter of exhaust pipe	
39.	Noise level in plant room in dBA	
40.	Noise level at tail of exhaust pipe in dBA	
41.	BMEP (4 stroke) at continuous rating (kPa)	
42.	% Load acceptance to BS 5514, Part 4, with 10% transient speed drop	

ii. Generator Alternator

NO	ITEM	REMARKS 200KVA GENSET
1.	Maker's name and model no.	
2.	Country of Origin and year of manufacture	
3.	Type of enclosure	
4.	Nominal speed in rpm	
5.	Number of bearings	
6.	Terminal voltage	
7.	Sea level rating kVA at 0.8 power factor	
8.	De-rating for site conditions	
9.	Input required in kW	
10.	Method of excitation	
11.	Efficiency at 0,8 power factor and : a) Full load b) ¾ load c) ½ load	
12.	Maximum permanent voltage variation in %	

TENDERER:

Initial: Authorized Signatory/ies: 1 _____
 2 _____

DRPW

Initial: DRPW _____
 Witness: _____

NO	ITEM	REMARKS 200KVA GENSET
13.	Transient voltage dip on full load	
14.	Voltage recovery on full load application in milliseconds	
15.	Is alternator brushless?	
16.	Class of insulation of windings	
17.	Is alternator tropicalised?	
18.	Symmetrical short circuit current at terminals n Ampere	
19.	Type of Coupling	

iii. Generator Switchboard

NO	ITEM	REMARKS 200KVA GENSET
1.	Maker's Name	
2.	Country of Origin	
3.	Is board floor mounted?	
4.	Finish of board	
5.	Make of volt, amp, and frequency meters	
6.	Dial size of meters in mm	
7.	Scale range of voltmeter	
8.	Scale range of ammeters	
9.	Ratio of current transformers	
10.	Make of hour meter	
11.	Range of cyclometer counter	
12.	Smallest unit shown on counter (Item 11)	
13.	Make of circuit breaker	
14.	Type of circuit breaker	
15.	Rating of circuit breaker in Amp and fault level in kA	
16.	Setting range of overload trips	
17.	Setting range of instantaneous trips	
18.	Make of change-over equipment	N/A
19.	Make of voltage relay	
20.	Is control and protection equipment mounted on a small removable panel?	
21.	Type of control equipment	
22.	Make of mains isolator	
23.	Type of indicators for protective devices	
24.	Make of rectifier	
25.	Type of rectifier	
26.	Is battery charging	
27.	Are volt- and ammeters provided for charging circuit?	

TENDERER:

DRPW

Initial: Authorized Signatory/ies:

1 _____
 2 _____

Initial:

DRPW

Witness:

NO	ITEM	REMARKS 200KVA GENSET
28.	Is the alarm hooter of the continuous duty type?	
29.	Rating in Amps of : a) Change-over equipment b) Mains on load isolator c) By-pass switch d) Circuit breaker to outgoing feed	N/A
30.	Is manufacture of switchboard/control panel to be sub-let?	
31.	If yes, state name and address of specialist manufacturer	

iv. Generator Battery

NO	ITEM	REMARKS 200KVA GENSET
1.	Maker's Name	
2.	Country of Origin	
3.	Type of battery	
4.	Voltage of battery	
5.	Number of cells	
6.	Capacity in cold crank amp	

v. Generator Dimensions

NO	ITEM	REMARKS 200KVA GENSET
1.	Overall dimensions of set in mm	
2.	Overall mass	
3.	Is the generator room adequate for the installation of the set	

vi. Generator Guarantee

This item must be completed for tender purposes.

NO	ITEM	REMARKS
1.	Guarantee period in months	
2.	State conditions of guarantee	

TENDERER:

Initial: Authorized Signatory/ies: 1 _____
2 _____

DRPW

Initial: DRPW _____
Witness: _____

NOTE:

Tenderers are to note that under no circumstances may materials be installed other than that offered in the above material schedule, which has been approved and accepted by the Engineer.

Should the successful Tenderer wish to supply materials other than that originally offered, prior written approval must be obtained from the Engineer.

6.3. SCHEDULE OF IMPORTED MATERIALS AND EQUIPMENT

TO BE COMPLETED BY TENDERER

The Contractor shall list imported items, materials and/or equipment which shall be adjusted in terms of currency fluctuations only. Copies of the supplier's quotations for the items, materials or equipment (not higher than the Contract rate as listed below) shall be attached to this page and submitted with the tender documentation, failing which, the tender may be considered not compliant and maybe disqualified. No adjustment of the contractor's profit, local VAT amount, discount, mark-up, handling costs, etcetera shall be allowed.

ITEMS	MATERIAL / EQUIPMENT	RAND (R) EXCLUDING VAT
1		
2		
3		
4		
5		
6		

FORMULA:

The net amount to be added to or deducted from the contract sum:

A = $V (Z/Y - 1)$
A = the amount (R) of adjustment

V = the net amount (R) (Supplier's Quotation) of the imported item
(Material or Equipment)

Y = exchange rate at the closing date of tender submission

Z = exchange rate on the date of payment

TENDERER:

Initial: Authorized Signatory/ies: 1 _____
2 _____

DRPW

Initial: DRPW _____
Witness: _____

KIMBERLEY

MAYIBUYE MULTIPURPOSE CENTRE

DEPARTMENT OF PUBLIC WORKS AND INFRASTRUCTURE

DRAWING NO.	DESCRIPTION	REVISION
6253/K/G/D/001	DRAWING LIST	
6253/K/G/D/002	LIGHTING SCHEDULE	
6253/K/G/LV/001	LV RETICULATION & AREA LIGHTING LAYOUT	
6253/K/G/SLD/001	LV SINGLE LINE DIAGRAM	
6253/K/G/LL/001	ARTS BUILDING- GROUND & FIRST FLOOR LIGHTING LAYOUT	
6253/K/G/LL/002	SPORTS BUILDING-GROUND & FIRST FLOOR LIGHTING LAYOUT	
6253/K/G/SP/001	ARTS BUILDING-GROUND & FIRST FLOOR SMALL POWER LAYOUT	
6253/K/G/SP/002	ARTS BUILDING- GROUND & FIRST FLOOR SMALL POWER LAYOUT	
6253/K/G/G/001	GENSET POSITION FOR MULTI PURPOSE CENTRE	

SCHEDULE OF LIGHTING LUMINAIRES								
Type	Type	Description	LED Lamp (Watt)	Lm (luminaire)	Mounting Height	Colour	IP	Photo
A		Province recessed ceiling mounted, 1200 x 600 module, 70W LED panel light, 4000K, type Theia with 5A plug and 3,5m captyre cord or equal and approved.	70W	7000	Recessed ceiling	White	20	
B		Province recessed ceiling mounted, 600 x 600 module, 36W LED panel light, 4000K, type Theia with 5A plug and 3,5m captyre cord or equal and approved.	36W	3600	Recessed ceiling	White	20	
C		Beka VLN, damp proof, 46W LED light, 4000K. Allow deeper round box in ceiling slab/void to accommodate the damp proof gland for wiring access through top base where new 20mm dia hole is cut. No surface conduit/wiring. Must have stainless steel diffuser clips or equal and approved.	46W	7062	Surface, ceiling mounted	White	65	
D		Beka, series 50, bulkhead, 4000K, prismatic-clear diffuser or equal and approved.	16W	2190	2500mm AFFL	Black, powder coated	65	
E		Beka, series 40, bulkhead, 4000K, prismatic-clear diffuser or equal and approved.	8W	1095	2500mm AFFL	Black, powder coated	65	
F		Beka, series 30, bulkhead, 4000K, opal diffuser or equal and approved.	17W	2620	Surface, ceiling mounted	Black, powder coated	65	
H1		Province lighting, Maria, recessed down lighter, 4000K or equal and approved	40W	3500	Recessed, ceiling mounted	White	20	
H2		Province lighting, Aegeon, recessed down lighter, 4000K or equal and approved	30W	2450	Recessed, ceiling mounted	White	20	
H3		Province lighting, Aegeon, recessed down lighter, 4000K or equal and approved	20W	1650	Recessed, ceiling mounted	White	20	
H4		Province lighting, Aegeon, recessed down lighter, 4000K or equal and approved	15W	1200	Recessed, ceiling mounted	White	20	
H5		Province lighting, Aegeon, recessed down lighter, 4000K or equal and approved	10W	800	Recessed, ceiling mounted	White	20	
H6		Province lighting, Aegeon, recessed down lighter, 4000K or equal and approved	5W	400	Recessed, ceiling mounted	White	20	
N		Province, SIGMA, emergency exit light, with 1 hour, 100% output, Nickel-cadmium, 5 x 2Ahr battery pack, 4000K	3W		Wall, 250mm above door	Standard	20	
O1		Beka, Zela, post top, including a 4m mounting height galvanized pole as manufactured by Sectional Poles, including baseplate, circuit breaker (2,5kA), etc.	55W	6490	4m, Pole Mounted	Black (Pole & Fitting), powder coated	66	
O2		Beka, LEDlume Midi, street light, including a 8,5m mounting height fibreglass pole as manufactured by BEKA, including baseplate, circuit breaker (2,5kA), and 1,5mm x 3c Cu surfix wiring, etc.	55W	6441	8,5m, Pole Mounted	Black (Pole & Fitting), powder coated	66	
P		Beka Omnistar 1-E Midi, 80 LED, 226W flood light with mounting bracket, 29434K, with 5A plug and 3,5m captyre cord or equal and approved.	226W	29434	Surface against the roof steel trusses at 5m, at 45deg tilt to horizontal level.	White	66	
Q2		Province ceiling mounted LF55 x 80 Powder Coated Extruded Aluminium Continuous linear or curved body with separate driver compartment, Led Strip 2 x 1600lm 4000K, complete with 2 x LED drivers and power supply or equal and approved.	34W	3200	Surface against c-channel purlin	CHARCOAL	20	
V		Province Lighting, 2 x 7W 4000K ,GU10,250000hr, 60 degree beam, Die Cast Aluminium Led,Up / Down, Downlighter, complete with LED driver or equal and approved.	2x 7W	2x 580	Wall mounted at 2,5m AFFL	Graphite	65	

GENERAL NOTES	
Open area Lux Control sensor	
All recessed down lighters in concrete ceilings/soffits must be housed in a recessed galvanised concrete slab box sized according to the luminaire supplier's specification to accommodate the heat disipation.	
	Light symbols that are yellow colour coded refers to the requirement for a DALI dimmable driver for the relevant light fitting
Alternative	Alternative offer must have the same or better efficacy lm/w performance as the product specified and must be submitted for approval to the engineer.
LED Drivers	All LED luminaires shall bear the Safety Requirements Mark, SANS 60598 and Performance Requirements Mark, SANS 475 and be fitted with high-frequency, "flicker free" drivers (LG, Osram, Tridonic, TCI/DC JOLLY) with a frequency greater than 100Hz.
LED aluminium strip lighting	All linear and or curved Aluminium LED strip lighting must be installed by the supplier's preferred specialist to ensure the perfect product installation with reference to the extruded aluminium metal cutting, fitting, levelling, etc.

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DRAWING DESCRIPTION
LV RETICULATION AND AREA
LIGHTING LAYOUT

DESIGN ONTWERP	H. Jonck	SCALE	NTS
DRAWN GETEKEN	G. Bosman	DATE DATUM	July 2024

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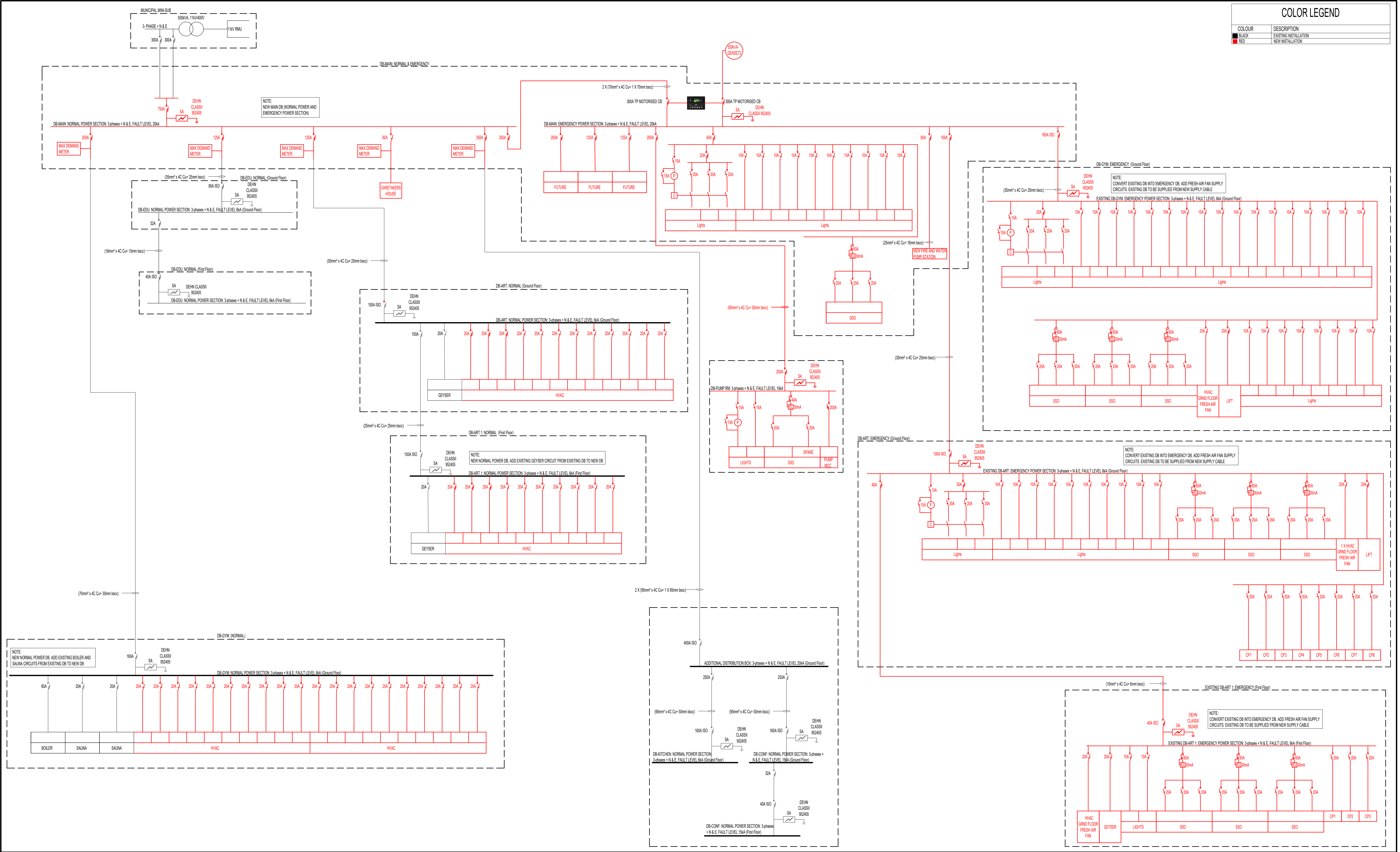
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DITSELA LE DITIRO

DRAWING DESCRIPTION			
LV SINGLE LINE DIAGRAM			
DESIGN ONTWERP	H. Jonck	SCALE	NTS
DRAWN GETEKEN	G. Bosman	DATE DATUM	July 2024

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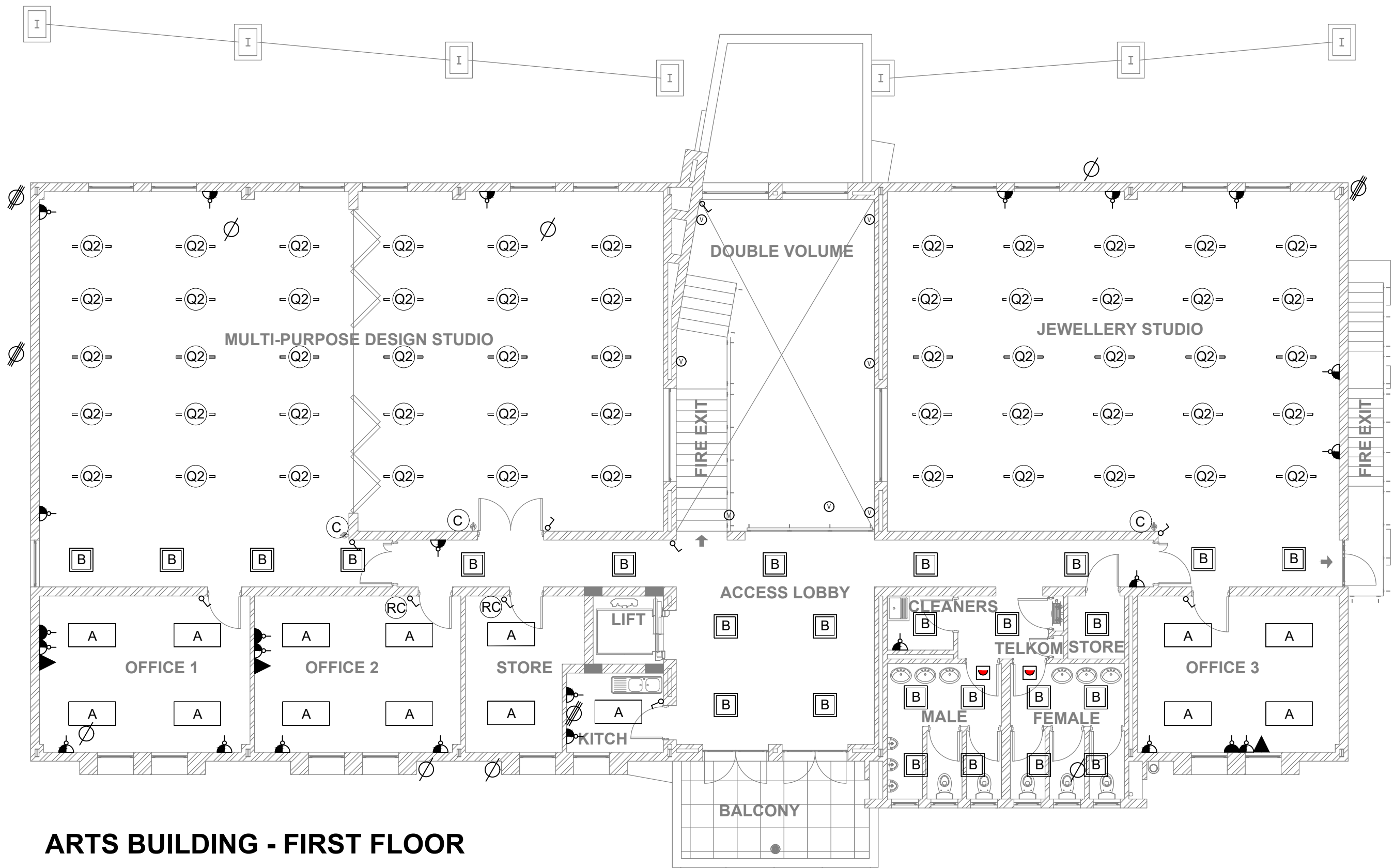
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ARTS BUILDING - GROUND FLOOR



ARTS BUILDING - FIRST FLOOR

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PROFENSI YA KAPA BOKONE
LEFAPHA LA DIPALANGWA
DITSELA LE DITIRO

DRAWING DESCRIPTION
ARTS BUILDING -GROUND & FIRST
FLOOR LIGHTING LAYOUT

DESIGN ONTWERP	H. Jonck	SCALE	1:100
DRAWN GETEKEN	G. Bosman	DATE DATUM	July 2024

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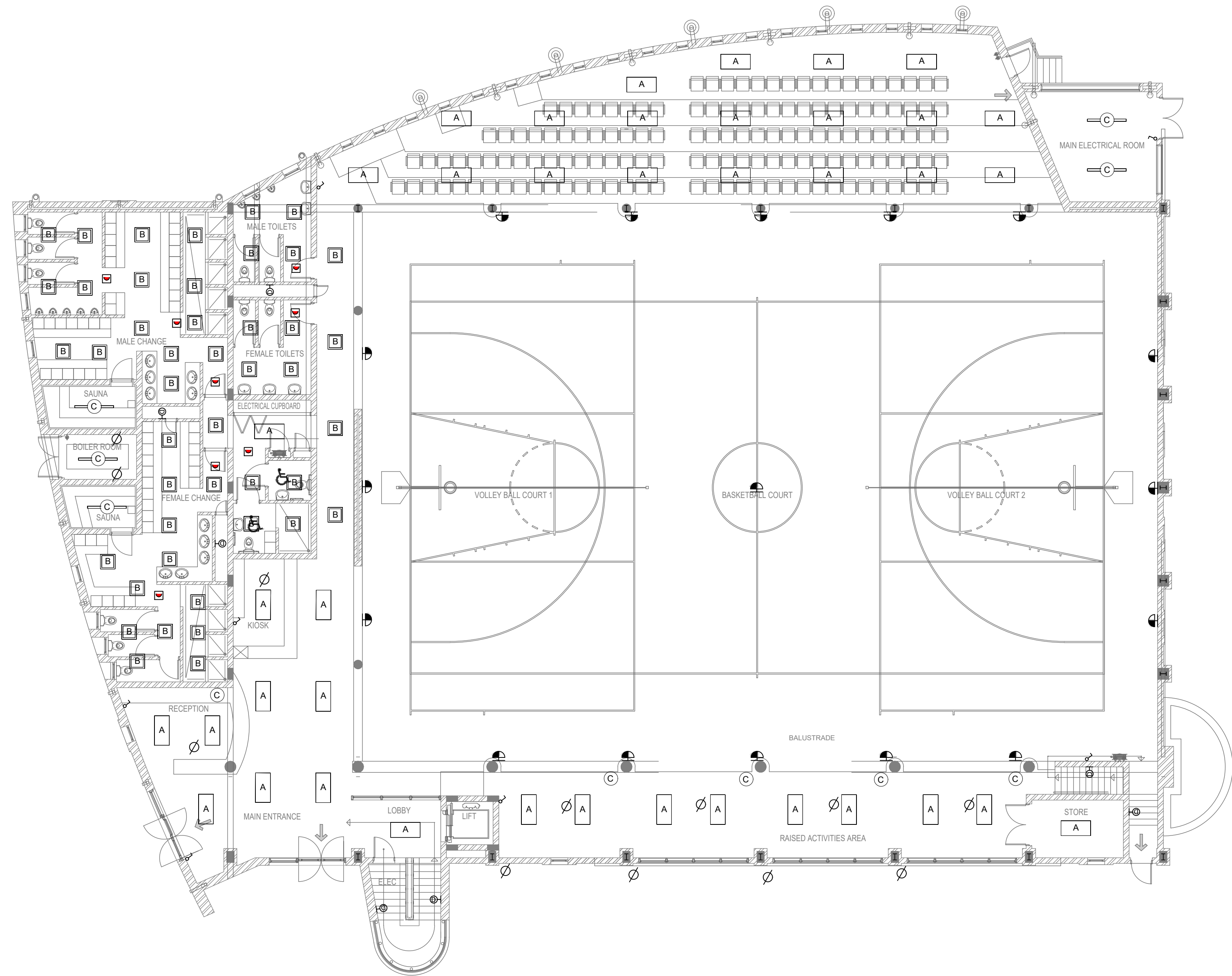
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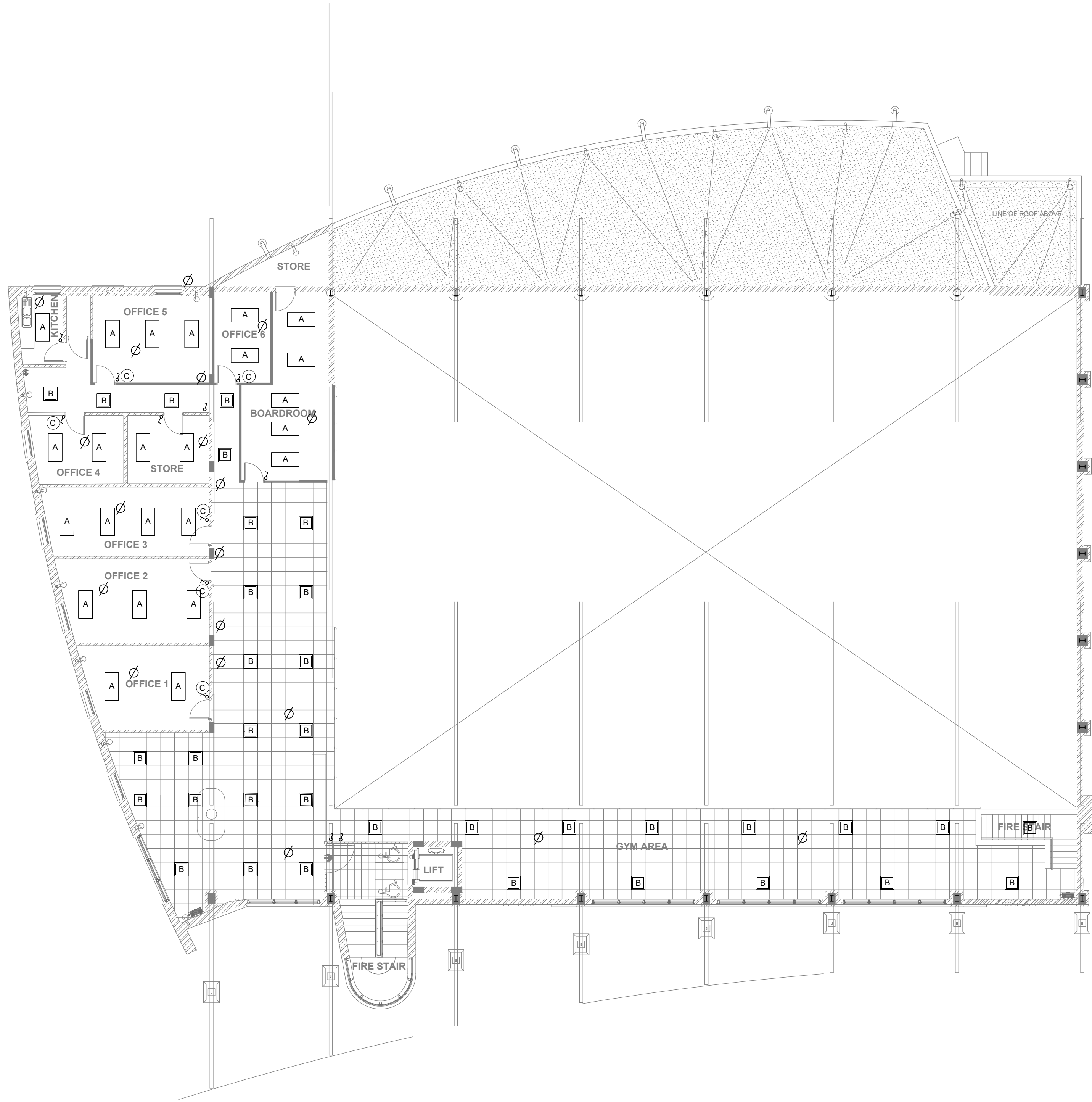
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SPORTS BUILDING - GROUND FLOOR



SPORTS BUILDING - FIRST FLOOR

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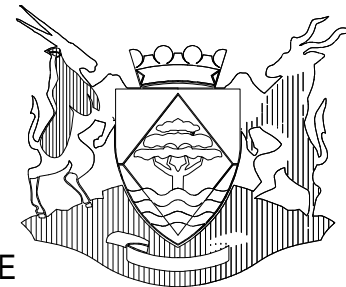
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NE LEZEMISEBENZI
PROFENSI YA KAPA BOKONE
LEFAPHA LA DIPALANGWA
DITSELA LE DITIRO

DRAWING DESCRIPTION

SPORTS BUILDING-GROUND & FIRST
FLOOR LIGHTING LAYOUT

DESIGN ONTWERP	H. Jonck	PROJECT PROJEK	6258
DRAWN GETEKEN	G. Bosman	DATE DATUM	July 2024

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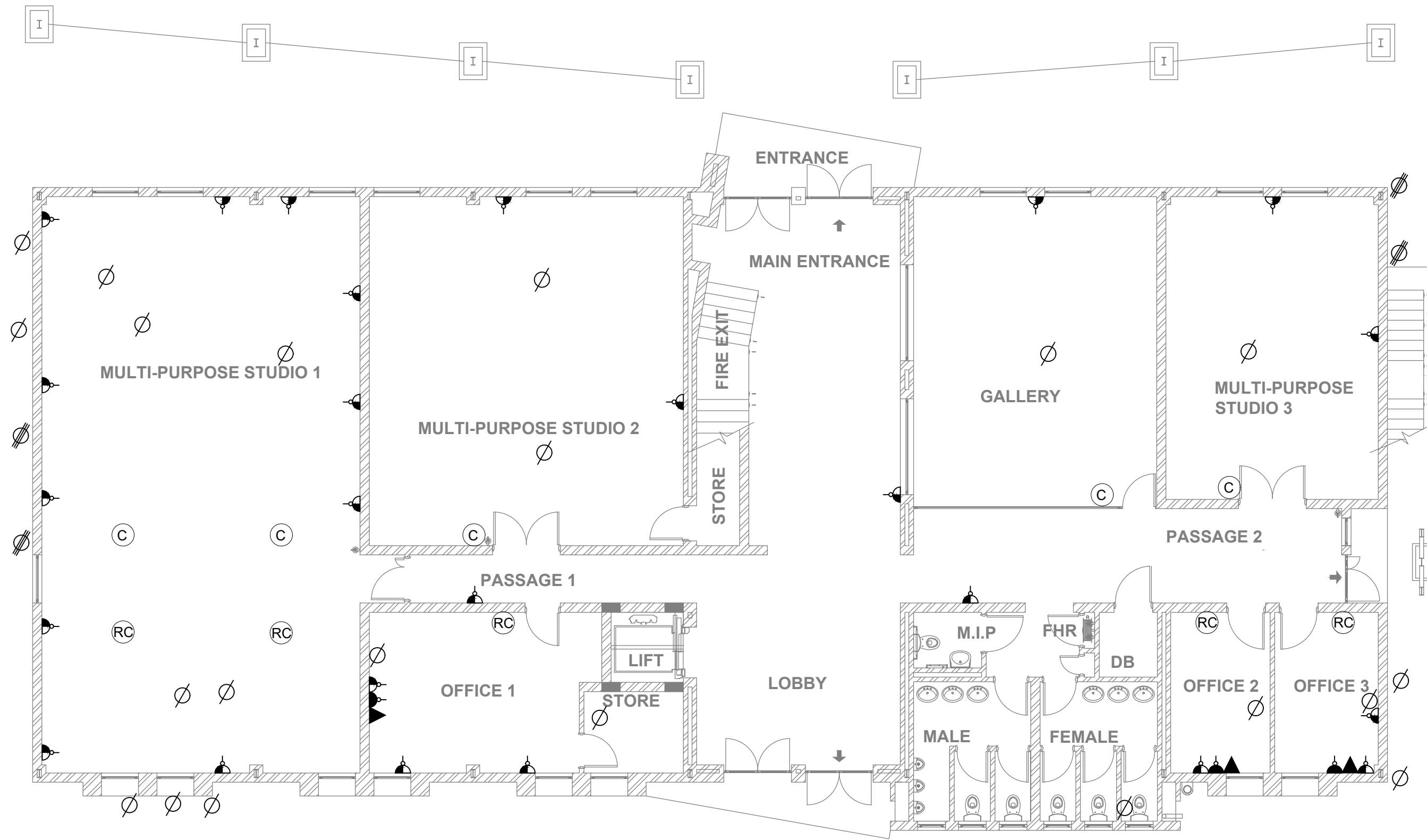
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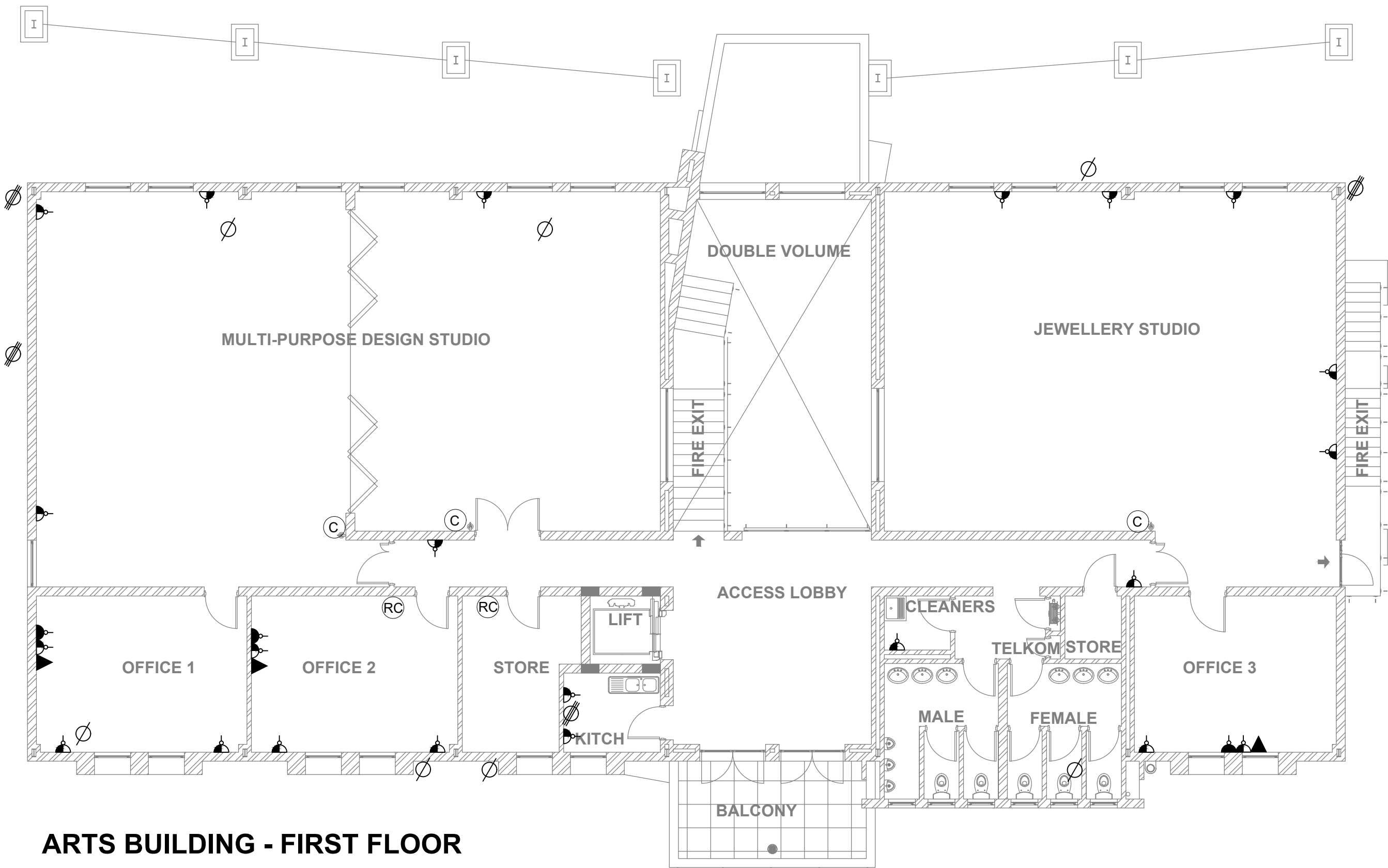
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ARTS BUILDING - GROUND FLOOR



ARTS BUILDING - FIRST FLOOR

SMALL POWER LEGEND	
Symbol	Description
	Double SSO wall mounted @ affl 400
	Double SSO
	Dedicated SSO
	SSO in ceiling void
	DP isolator
	TP isolator
	Double power skirting
	P9000 in ceiling void
	DB Board
	Data/TV point in power skirting

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NE LEZEMISEBENZI
PROFENSI YA KAPA BOKONE
LEFAPHA LA DIPALANGWA
DITSELA LE DITIRO

DRAWING DESCRIPTION
ARTS BUILDING -GROUND & FIRST
FLOOR SMALL POWER LAYOUT

DESIGN ONTWERP	H. Jonck	SCALE	1:100
DRAWN GETEKEN	G. Bosman	DATE DATUM	July 2024

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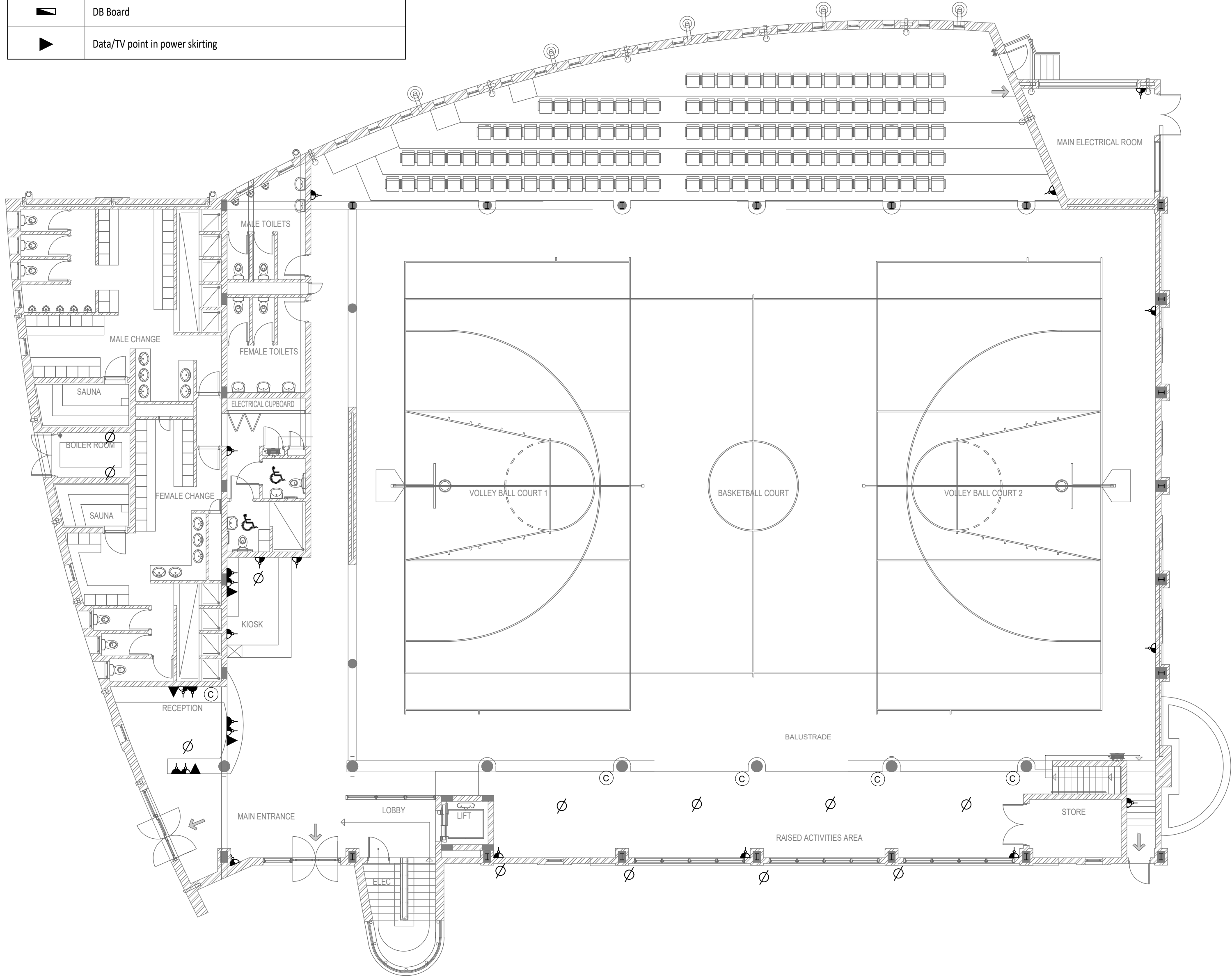


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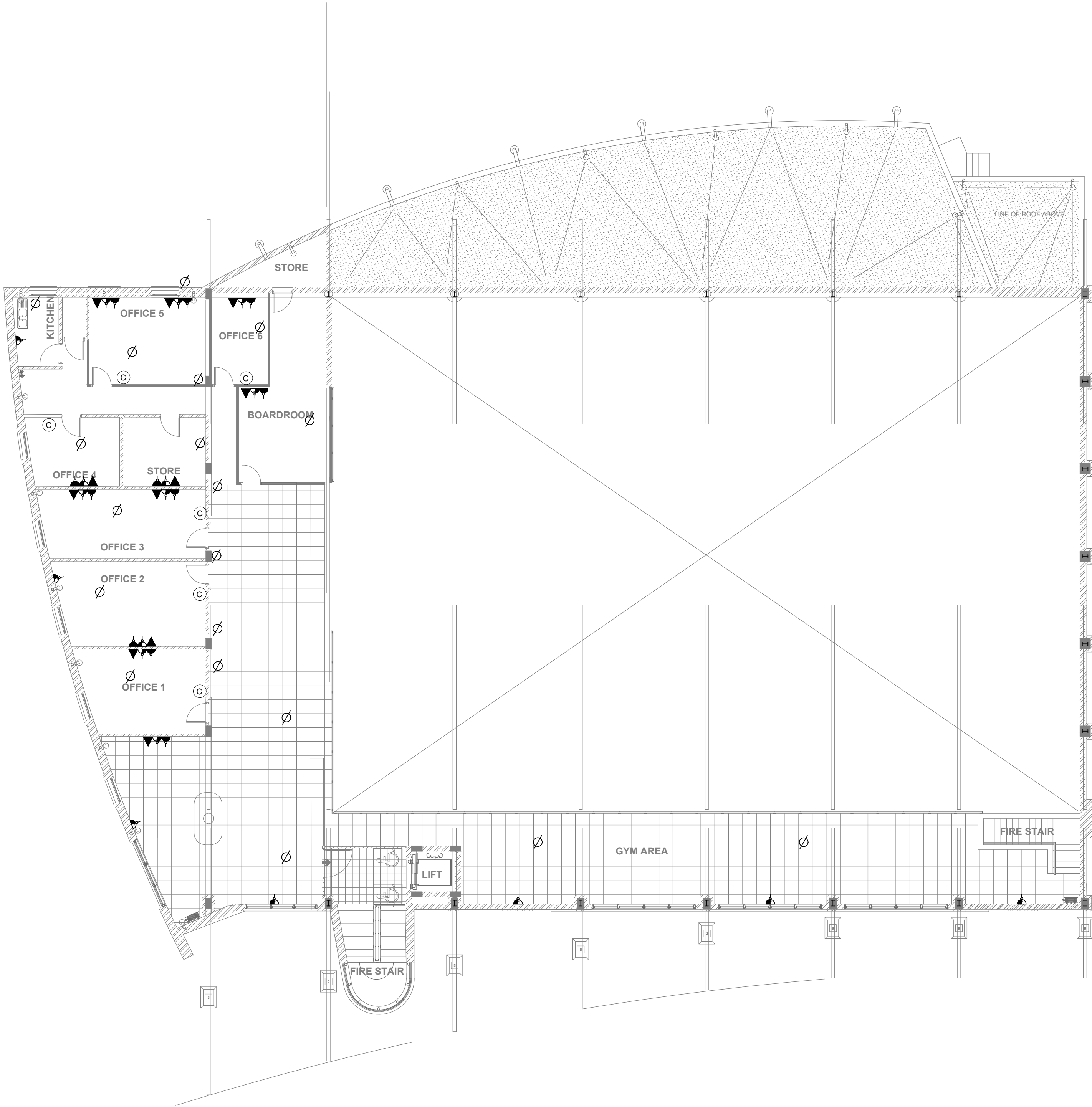
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SMALL POWER LEGEND	
Symbol	Description
	Double SSO wall mounted @ affi 400
	Double SSO
	Dedicated SSO
	SSO in ceiling void
	DP isolator
	TP isolator
	Double power skirting
	P9000 in ceiling void
	DB Board
	Data/TV point in power skirting



SPORTS BUILDING - GROUND FLOOR



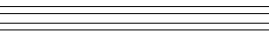
SPORTS BUILDING - FIRST FLOOR

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Architectural floor plan of the Main Electrical Room. The room is 1500 units wide and 1700 units deep. It contains a large rectangular equipment area with a "Panel Option B" label. There are three door openings along the right wall, each 1400 units wide. A dimension of 409 units is shown for the bottom-most opening. The left wall has a hatched area indicating a structural element. The top wall has a door opening.



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