Eskom	Specification	Peaking

Title: **Technical Specification (ECC3) for Gariep Power Station Wall Cladding, and Roofing system replacement**

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1. Introduction

Gariep, was constructed between 1966 and 1971, and because of its geographical location it has experienced a tremendous amount of deterioration on the exposed surfaces due to the extreme exposure to sunlight, rain, wind, cold etc. The elements of the wall cladding and roofing system with all its gutters are the most impacted. Over time, these systems have deteriorated, leading to failure of the sheets and fasteners becoming loose and being blown off. Water from rain and ingress of moisture has compromised the structural integrity of the Machine Hall surface building facility. These environmental elements have aggravated this deterioration. UV radiation from sunlight accelerates material breakdown, while rainwater promote corrosion and the penetration of extreme moisture.

Upon an assessment of the entire building cladding and roof was noted:

- The outer sheet is separated, and the fastening mechanism is loose, with areas where there are missing sheets that have blown away or are laying loose. These have been observed to be likely to detach completely and be blown towards vehicles or persons causing harm and injury, which must be avoided.
- A potential safety hazard.
- Flooding incidents and damaged to underlying furniture on the inside of the building.
- The entire sheeting and roof surface layer must be replaced as the remaining sheeting is close to its end of life and a full cladding and roof refurbishment (replacement) – roof sheeting, side cladding sheeting, ridge vents and flashings is required.
- Damage to the insulation and associated waterproofing of the roof surface.
- Upon removal of the top sheet, if there are any signs of the under structure, below the purlins is observed to have excessive corrosion and structural failure present, from the excessive water and moisture ingress in the area, then the under sheeting in that area must be replaced or treated prior to placing the new sheeting.

The content of this document therefore includes the requirements for the replacement of the Machine Hall surface building wall cladding and the roof surface sheeting, assessment and replacement installation of the damaged secondary sheeting fixed to the underside of the existing purlins as described for the full length of the building including all additional ancillary requirements.

The necessity for this project is grounded in the need to protect the building and its critical infrastructure, ensuring its continued reliability and performance.

Because the opportunity for access to this area is presented by the current scope, to this we will also include the installation of a catladder that is required by site maintenance personnel to conduct activities at this level.

2. Supporting Clauses

2.1 Scope

1. Dismantling, removal in sections of the cladding sheets and roof sheets, insulation, waterproofing, ridge vents, capping and flashings and gutters sequentially to conduct a thorough assessment of the underlying structural elements. This stripping/dismantling exercise will still allow normal operations to continue within the Power Station.
2. Verify the existing side sheeting and roof sheeting structure (i.e. purlin/side girts sizes, placing connection types, condition, ceiling/insulation type and its sub-structure, gutter and access hatches, Coping/barge closures, flashings, RWDP sizes and locations, and all other associated elements that constitute the full roof and side sheeting system) for the purpose of creating an As-built drawing of the elements.
3. With the use of the As-built drawing create workshop drawings for the replacement of the following:

a. Cladding: The exterior wall cladding shall be replaced with Inverted Box Ribbed (IBR) profile Zinc Aluminium cladding with a pre-painted finish. The specification shall be IBR 686 sheeting with AZ200 coating system with a profile thickness of 0.54mm rolled from G550 Steel in continuous lengths, pierce fixed (or similarly approved based on existing girts spacing).

b. Roof Sheeting: Replace roof sheeting with new Roof sheeting that is commercially available. For the new roof sheeting use, Kliplok 700 with AZ200 coating system with a profile thickness of 0.58mm rolled from G550 Steel in continuous lengths concealed fixed (or similarly approved based on existing purlin spacing). The *contractor* must fix the new roof sheeting to the existing structural steel components, trusses, purlins, side girts, etc. and also assess these for any corrosion and moisture damage on their surfaces.

c. The *contractor* must allow for the treatment or replacement of the structural elements upon detection and verification by camera of corrosion or extreme moisture ingress exposure induced wear. Therefore, the new roof sheeting, side sheeting, ridge vent, flashing and all associated components will be fixed to the existing structure.

4. The replacement of the complete Cladding system, Roof sheeting with its associated hatch frame and steel gutters and the necessary insulation and waterproofing requirements, to the new approved solution.

5. Design and install a catladder

d. Install a catladder that is securely mounted and fixed to enable personnel to perform maintenance activities.
   i. The catladder requires a design for ease of access and safe use.
   ii. Prior to any approval for installation, the contractor must submit the checks and shop drawing from the relevant manufacturer of all the members, including the base plates and associated fasteners.

6. The new work requirements shall ensure compliance to current engineering standards and safety requirements.

2.2 Purpose

The purpose of this Technical Specification is to state the *Employer's* technical requirements and provide the *Contractor* with the necessary information to submit a comprehensive tender.

2.3 Applicability

This document shall apply to Peaking and is to be used as an input to the associated Works Information.

2.4 Normative/Informative References

Parties using this document shall apply the most recent edition of the documents listed in the following paragraphs.

2.5 Normative

[1] ISO 9001 Quality Management Systems.

[2] 240-53114002 Engineering Change Management Procedure

[3] Occupational Health and Safety Act, 1993

[4] 167A/16261 Strategy to strengthen the current cladding and roofing for beyond design base wind conditions

2.6 Informative

[5] NEC3 - ECC Document & Guidance Notes (Link to MS Teams Folder)

[6] SANS Standards (Digital Library (sharepoint.com))

[7] 240-53113685 Design Review Procedure

2.7 Disclosure Classification

Controlled disclosure: controlled disclosure to external parties (either enforced by law, or discretionary).

3. Description of the *works*

3.1 Executive overview

The *works* make provision for the dismantling, detailed assessment, generate as-builts, manufacture shop drawings, replace external cladding sheeting with an inverted box rib (IBR) profile zinc aluminium cladding with a pre painted finish. Replace the roof sheeting and associated elements as well as the required drainage, insulation and waterproofing and furniture. Install a catladder for access during maintenance operations.

Gariep Power Station is a key asset in the Orange River Project, providing essential hydroelectric power and water supply to the region. It's first two machines went into commercial service in 1971 and the last two in March 1976, the station has been operating for 49 years.

An inspection of the exterior wall cladding was undertaken and shows that the West End and South End is in the worst condition as it faces the direction where the wind force is the most severe. Sections of the cladding have blown off over time and re-securing was done to hold the panels in place. Gariep Power Station Machine Hall building is 137.708m long and 25.449m in width. The height of the Machine Hall is 20.449m.

The side wall cladding consists of profiled arc-line aluminium anodized sheets secured to steel girts by means of hook bolts. The side cladding sheets is in turn fixed by means of self-tapping screws and sealed with an aluminium capping piece. It is estimated that there is 3000 m^2 of cladding to be replaced. The side cladding is working loose due to the component fixing system that is ageing. The perpetual exposure to inclement weather conditions as well as the vibrations caused during the operation of the station can also have an effect on the sheets becoming loose which ultimately contributes to the technical performance of the cladding system. The failure of the cladding system and the rate of deterioration may result in the sheets being blown off completely and may cause damage to plant and endanger personnel or even vehicles. The work entails replacing the existing side cladding with a conventional type and a modern fixing system at Gariep Power Station.

Figure 1: Present condition of the side cladding

The roof surface consists of steel sheets, access hatches and a wide steel gutter to drain water. It is estimated that there is 3 600 m^2 of roof sheeting to be replaced. The station roof has two hatches, located on the North-eastern and South-western section of the roof. Over a 180m span of the roof, a 1200mm x 0.58mm metal plating exists on top of the IBR roof sheeting and fixed in place. Waterproofing is required to the roof and notably to the steel hatches and surrounding steel plate. This surrounding plate is designed to convey surface water away from the hatches. The waterproofing has degraded and requires new waterproofing and corrosion protection.

Figure 2: Plan view of station roof, with hatch locations

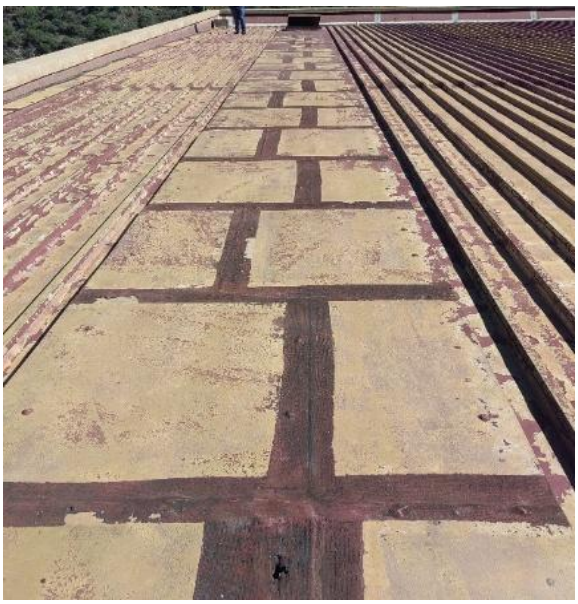


Figure 3: South-western Hatch

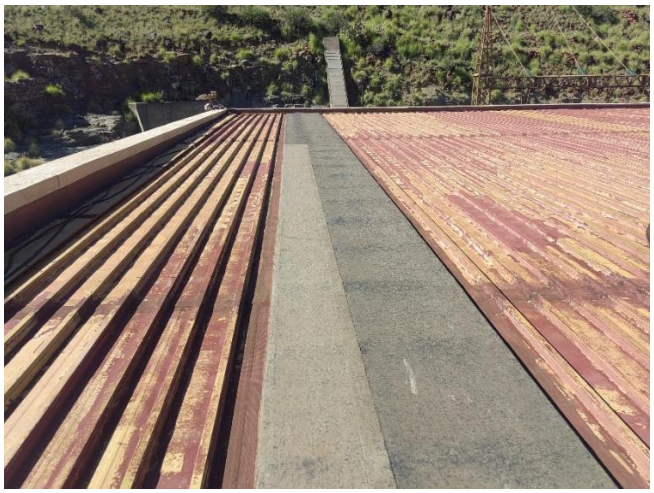


Figure 4: Northeastern Hatch

Figure 5: Hatch opening

Figure 6 Hatch opening

Figure 7: Hatch opening

Design and install a cat ladder or similar for safe means of access to allow for the maintenance of services located on the roof.

3.2 *Employer*'s objectives and purpose of the *works*

The *Employer's* objective is for the effective replacement of the loose outer cladding sheeting and the roofing system of the Machine Hall Surface building at Gariep Power Station with new specified IBR steel sheets as per the given specifications and all the associated fittings and waterproofing as is required. Eliminate all the existing water ingress points into the building through the surface of the roof and seal it completely. Ensure that the roof drainage and stormwater elements are all operating efficiently.

3.3 Interpretation and terminology

The following abbreviations are used:

Abbreviation	Meaning given to the abbreviation
AB	As Built
AFC	Approved for construction
GRS	Global Roofing Solution
IBR	Inverted Box Rib
ISO	ISO International Standards Organisation
m	Meter (measurement of length)
m^2	Square meter (measurement for area)
OBL	Outside battery limits
OHSA	Occupational Health and Safety Act
QA	Quality Assurance
QC	Quality Control
QCP	Quality Control Plan
Rev.	Revision
RWDP	Rainwater Down Pipe
SANS	South African National Standards
SHE	Safety Health and Environmental
SHEQ	Safety Health Environmental and Quality

3.4 Interpretation of incorporated documentation

Wherever the following words or phrases are used in the listed or referred documentation, they are interpreted in this contract as tabled below.

Word or Phrase	Interpretation
'Eskom Holdings' (Eskom or Electricity Supply Commission) in the context of: • Owner • Insurer of the Works • Paymaster • A party to the contract	The *Employer*.
'Eskom Holdings' in the context of: • A duty or procedure to be performed by the administration of the contract.	The *Project Manager* or *Supervisor* as determined by the conditions of contract.
Accepted or approved by (or to the satisfaction of) the *Project Manager*, *Engineer, Employer,* or the Architect.	Accepted by the *Project Manager* or the *Supervisor*.

A duty, procedure, decision or action of the Engineer, *Employer,* or the Architect and or the Superintendent, Eskom's Representative, Site *Supervisor* or Clerk of Works	An action of the *Project Manager* or the *Supervisor* depending on the context. Clause 14 of the Core Clauses determines what the actions of each are. Either may delegate in terms of Clause 14.2

3.5 Documents referenced in Works Information

Numerous documents such as standards and specifications are referenced within this Works Information. All these referenced documents including the normative references within must be adhered to during the implementation of the *works*. Where a SANS standard referenced has been replaced by a newer standard, the *Contractor* is required to adhere to the latest revision of the newer standard. Where a SANS standard referenced is composed of several parts, all applicable parts are to be adhered to.

All national and international standards referenced are not bound in this document but are obtained by the *Contractor* at his own expense. Documents developed by the *Employer* as referenced in this Works Information are provided to the *Contractor*.

4. Management and start up

The *Contractor* submits a company profile which includes a list of traceable references that adequately proves that the *Contractor* and/or their *Sub-Contractor* has the relevant (i.e., similar insulated sheet metal structure) experience as required by the *works*. In addition, the *Contractor* provides guarantees on his workmanship, materials, and watertightness.

4.1 Engineering quality assurance requirements

The Quality Plan manages the overall quality of the project's main activities and milestones. It lists detailed activities in order of execution where each activity is described and references the associated work packages or specifications with witness, hold and verification points.

The *Contractor* is therefore required to ensure QCP's meet the following requirements as a minimum:

- The QCP's are to have provisions for signatures indicating Completion by the *Contractor* and acceptance by the *Employer* at the end of each activity.
- The *Contractor* is to comply with all quality requirements as set out in the Eskom – 240-105658000 Supplier Quality Management Specification.
- The *Contractor* complies with the latest version of the ISO 9001 Quality Management System.
- The Contractor defines the level of QA/QC or inspection imposed on his Subcontractors and suppliers.
- The programming of inspections, hold and witness points are agreed between the *Employer* and the *Contractor* prior to undertaking any work or inspections.
- All technical design and implementation documentation and QCP's are submitted to the *Employer* for acceptance 2 weeks prior to the commencement of any *works* or inspections.
- The *Contractor* has the necessary equipment and qualified staff to carry out the quality control required to ensure compliance with the specification.
- The *Contractor* retains the following records:

  – Material batch records
  – Signed Product Data Sheets.
  – Technical records
  – Specific drawings and details for the installation of the roof sheeting

- Mechanical vent data and performance sheets

- The *Contractor* ensures that a complete Quality Control Plan (QCP), Method Statement, and program for executing the work, are submitted to the *Project Manager* and *Supervisor* for review and acceptance before the *works* can commence.
- During reviews of the QCP, the *Employer* provides the necessary intervention points, if required.
- All Quality Management System requirements shall comply with - Supplier Quality Management: Specification 240-105658000 Category 3.
- The *Contractor* is responsible for the preparation, maintenance during the execution of the *works* and submission of all quality requirements as stipulated in Supplier Quality Management: Specification 240-105658000 (Category 3) to the Quality Advisor/ *Supervisor* for acceptance at least thirty (30) days prior to the execution of the project.
- On completion of the project, the *Contractor* shall hand in all data books (Packs) before the Completion Certificate is issued.
- Where the *Contractor* maintains an official Quality Management System, details of the level of the *Contractor's* self-certification procedures shall be adopted in respect of supplied materials shall be agreed with the *Supervisor* prior to commencement of work.
- Where no official Quality Management System exists, the *Contractor* shall plan all quality management procedures, carry out all quality control testing as required and shall make available records of such testing for the *Supervisor's* acceptance.
- The *Contractor* shall submit full details of the proposed quality management system and procedures for acceptance by the *Supervisor*, who shall have full access to all records, site trials and tests.

The *Contractor* shall ensure that monitoring and measuring equipment are calibrated and verified to confirm serviceability prior to usage, and records of such shall be kept on Site.

4.2 Quality Control Plan

Quality Control Plans will include, but is not limited to the following aspects of the *works*:

- Civil Engineering inspections such as –

- Inspections of the wall sheeting purlins, side girts, connection types, condition.
- ceiling/insulation type and its sub-structure, gutter and access hatches, Coping/barge closures, flashings, RWDP sizes and locations, and all other associated elements that constitute the full roof and side sheeting system and replacement thereof, if required
- Method of dismantling and removal of sheeting, flashings, old worn hooks and fasteners, ridge capping, roof ventilators, gutters etc.
- Method of installation of roof sheeting, claddings, flashings, ridge capping's, roof ventilators etc.
- Cleaning and Remedial *works* to gutters and drainage system.

- Waterproofing requirements
- Confirmation of Corrosion protection system of steel sheeting.
- The on-site (mobile rig) fabrication of the steel roof sheets by approved steel roof sheeting manufacturer.
- QC requirements of the on-site (mobile rig) steel roof sheet fabricator by approved steel roof sheeting manufacturer.

4.3 Training workshops and technology transfer

The *Contractor* is required to train the staff at the sites dependent on the tasks. Training will include, but is not limited to the following:

- Inspection and Maintenance of the new sheeting systems.
- Maintenance may include as a minimum refixing of any loose Klip-Lok sheeting in the future, should sheets become dislodged, cleaning the roof of debris annually (if required by the maintenance philosophy) etc.
- Mid-term applications to the waterproofing systems as per manufactures requirements, to achieve the maximum performance.

The *Contractor* is further required to provide the *Employer* with the maintenance philosophy to continue with maintenance of the new steel roof sheeting systems.

5. Engineering and the *Contractor*'s design

5.1 *Employer*'s Design

The *Employer* provides the steel roof and side sheeting specification, and the *Contractor* is responsible for the full installation of the roofing system and ensures the *works* is executed as per the relevant standards and manufacturer's specifications. The *Contractor* is required to carry out the initial assessment of the *works* and for the secondary protection system installation of all sheets fixed to the underside of the existing steel purlins and trusses take the actual measurements to generate as-built drawings for approval by the *Employer*. After the as- built information is approved, he can commence with generating the shop drawings required for the works. Installation of all the new sheeting is only to commence once the shop drawings have been approved by the Employer as implementation drawings, issued for construction.

5.1.1 Contractor's responsibility as defined and required by Employer's design

The *Contractor* is responsible for the full installation of the new required sheeting to both the wall cladding and roofing system and ensures the *works* is executed as per the relevant standards and manufacturer's specifications. All roof sheeting, side sheeting, capping's, flashings, and roof ventilators etc. are to be replaced with new elements that match that of the existing. The *Contractor* is to ensure that the roof is leak free, watertight, and guaranteed to seal against inclement weather conditions such as strong and severe gail force winds of minimum 50m/s, temperature variations, rain, wind driven rain, a corrosive atmosphere, etc. The *Contractor* may propose an alternate design or system such as roof sheeting with a double locking mechanism or thicker roof sheeting, for the review and acceptance of the *Supervisor*.

The *Contractor* is responsible for developing full detailed workshop drawings for the installation of the roof sheets to the underside of the existing steel trusses. Workshop drawings must include all the alterations required for the installation of the roof sheet, cat ladders, access hatches for the cat ladders and the removable panels over any crawl crane beams.

The *Contractor* therefore ensures the following deliverables are included and this is not limited to the following:

- Cherry picker and/or Fixed Scaffolding and/or Mobile Scaffolding required during inspection and execution of the *works*.
- The *Contractor* is to allow for minor fabrication on-site (if required). The *Contractor* will be required to engage with the *Employer* with regards to the designated area for this activity to be performed.
- The *Employer* and *Contractor* are to agree to all minor fabrication.

- The *Contractor* is to develop a plan for the protection of critical equipment. This is different to the general protection of equipment. The *Contractor* plans the *works* in such a manner that the ongoing operation of the power station continues uninterrupted i.e., during dismantling and re-installation of the roof sheeting and cladding, the *Contractor* ensures that the equipment in the Machine Hall is always protected and there is no water ingress and/ or debris that falls onto the units and equipment below.

The *Contractor* submits a detailed Method Statement and plan of how he is going to protect the existing plant and equipment from falling objects for acceptance by the *Supervisor*, prior to commencement of the *works*.

- If temporary hoarding is required based on site clarification, then this must be included in Project Plan and Method statement.
- The *Contractor* updates and issues As-built drawing to the *Project Manager* for acceptance. Drawings are to include as a minimum the new steel roof sheeting description and details specific to the installation.
- The *Contractor* is to communicate to *Employer* prior to site establishment specific requirements to ensure *works* are executed as per *Employer's* specification or methods to consider which may lead to saving time and cost. The *Employer* reserves the right to engage in such deliberations. The *Employer* cannot be held liable if not able to assist with any or all of *Contractor's* specific request other than what is specified in the NEC contract.

5.1.2 General Demolition as required by Employer's Design

- The *Contractor* is to remove all roof sheets and roof sheet connection plates used to fix to purlins. Caution and care are to be executed by the *Contractor* to ensure no further damage to purlins and trusses.
- The *Contractor* removes all damaged roof sheeting insulation with caution and care to ensure no further damage to adjacent unaffected/undamaged insulation.
- The *Contractor* removes ridge capping's, flashings and ventilators and replaces with new.
- The *Contractor* must liaise with the *Employer* with regards to the storing or removal of the existing sheeting, flashing, roof ventilators, etc. A designated spoil area will be highlighted to the *Contractor* where the old and damaged roof sheeting is to be stored during the implementation of the *works*.
- All damaged material removed by the *Contractor* is to be replaced with the specified new steel roof sheeting and must be fixed to the existing structure and seamlessly tie into existing structures such as gutters (where possible).
- All replacement of material (roof sheeting, insulation, purlins etc.) is to be submitted for acceptance by the *Supervisor* prior to installation.
- The *Contractor* is to ensure 100% effective watertightness of all *works*.
- The *Contractor* provides Method Statements and Quality Control Plans for all repair work for acceptance by the *Employer*.
- The *Contractor* ensures that during the upgrades of the Machine Hall roof, the equipment and units in the Machine Hall are protected. The *Contractor* plans and executes the *works* and ensures there is no water ingress and debris that impacts the units and equipment below.

5.1.3 Roof Sheeting and Side Sheeting as required by Employer's Design

The *Contractor* procures and installs new roof sheeting as specified, fixed onto existing purlins with associated connections brackets etc. Fixing of roof sheets to be in accordance to roof sheeting manufacturer specification for high wind exposure. If exact sheeting cannot be procured, the *Contractor* is to advise of a suitable alternative for the *Employer's* acceptance. The roof sheeting to be used for replacement is Klip-Lok 406, 0.58mm thick and rolled from G550 steel in continuous length with a ZincAL AZ200, COLORPLUS AZ200 coating or similar approved. The colour of the new sheeting is to be olive green and is to match the existing.

Sheeting is to be fixed to steel purlins/girts using KL65 clips (aluminium KL65 clips to be used in conjunction with aluminium sheeting) and class 3 fasteners with 150mm x 0.8mm thick galvanised steel bearing strip (or similarly approved by manufacturer), in strict accordance with the manufacturer's specifications by a Global Roofing Solution Approved *Contractor*. Fixing clips to be placed in a continuous manner (forming a beam like fixing). A written and approved five-year guarantee of watertightness is to be issued after approval of roofs by the manufacturer Global Roofing Solutions.

The side sheeting to be used for replacement is to be interlocking concealed-fix Brownbuilt 406mm, 0.58mm thick profile roll-formed in continuous lengths and cut to length by a pneumatic cut-off process from certified steel manufacture or similar approved. Side sheeting is to be fixed to steel purlins/girts using D1 Starting clips, D2 Duplex clips and S3 Finishing clips and class 3 fasteners (or similarly approved by manufacturer), in strict accordance with the manufacturer's specifications by a Global Roofing Solution Approved *Contractor.* A written and approved five-year guarantee of watertightness shall be issued after approval of roofs by the manufacturer Global Roofing Solutions

The roof and side sheeting are to be fixed to resist high winds:

- Installation region: inland.
- Atmospheric corrosion category: C5.
- Sheet coating: AZ200 - (or similarly approved)

The *Contractor* removes all damaged roof sheeting insulation with caution and care to ensure no further damage to adjacent unaffected/undamaged insulation and procures and installs new insulation to match existing. The installation of the new insulation is to match the existing and the *Contractor* subsequently plans and prices for this *works* accordingly.

All *works* are to be executed in accordance with all regulatory and statutory codes i.e., SANS etc as well as per Eskom Standards including the standard for Structural Steel.

Notwithstanding the above, the *Contractor* submits detailed method statements and specifications of each portion of the *works* for the acceptance of the *Project Manager* and proceeds with the implementation thereof after its acceptance.

During the implementation of the *works*, the *Contractor* brings any other urgent repairs noted to the *Employer's* attention.

5.1.4 Ridge Capping's, Flashings and Roof Ventilators as required by *Employer's* Design

The capping's and flashings are to be installed as per the manufacturer's specifications for the type of sheeting utilized. The recommended sheeting is as per Section 5.1.3 and the *Contractor* is responsible for ensuring that the appropriate capping's and flashings are fitted.

New capping's with a maximum girth of 900mm and fixed by way of S10 brackets or Sliding brackets at apex where roof sheets are 30m or longer are to be installed in accordance with manufacturer's specification using the appropriate tools available from Global Roofing Solutions.

New flashings to be installed are to be ZincAL AZ200, 0.58mm coated steel with a COLORPLUS finish to one side and standard backing coat, colour to match existing sheeting. The new flashings are to be fixed by way of S1 brackets or, sliding brackets at apex where roof sheets are 30m or longer, all in strict accordance with manufacturer's specification using the appropriate tools available from Global Roofing Solutions.

Positive fixing, self-taping screws is the preferred fixing for side and ridge flashing.

All roof ventilators, including the damaged components must be replaced with new. The existing ventilators are to be replaced with the same type of unit as the existing or similar approved. Where the *Contractor* cannot source the existing ventilator type, the *Contractor* is required to propose a new type for acceptance by the *Supervisor*. The roof ventilators are to comply with the relevant SANS and Eskom standards and regulations and must be installed by an approved installer.

The *Contractor* seals all openings on the roof i.e., Apex, side flashing, barge flashing etc.

5.1.5 Purlins and Trusses as required by *Employer's* Design

The *Contractor* inspects the trusses and purlins on dismantling of the existing roof sheeting. All defective or damaged purlins are indicated to the *Supervisor* and the accepted damaged purlins (full length between trusses) are to be removed and replaced with similar size and thickness purlins (pre-galvanised and painted to match existing).

Localised damages of truss members are indicated to the *Supervisor* and the accepted damaged trusses are repaired. The *Contractor* submits the repair methodology for *acceptance* by the *Supervisor* to ensure the long-term structural integrity of the truss members.

The *Contractor* brings any other urgent repairs noted to the *Employer's* attention.

5.1.6 Gutters as required by *Employer's* Design

All gutters and downpipes are cleaned from all dirt and debris (internally and externally). Gutters and downpipes are further cleaned from rust and repainted according to the *Employer's* corrosion specifications or similarly approved.

5.1.7 Procedure for submission and acceptance of *Contractor's* alternative proposals or report based on *Employer's* Design

Acceptance of reports, drawings by the *Project Manager* will imply that:

- General arrangement and layout drawings, and (where appropriate) calculations and key diagrams have been examined and appear to be in accordance with the relevant SANS (national and international regulatory codes) and Eskom codes and standards and meet the requirements of the Works Information.
- Calculations appear to substantiate the alternative design, rating, and performance of design in accordance with the specified requirements. Investigation and photographic report on current condition and extent of affected areas.
- Acceptance of drawings, calculations or samples does not relieve the *Contractor* from his total liability to complete the *works* in accordance with the Works Information, Schedules, and the conditions of contract or exonerate him from any of his guarantees.
- All correspondence and submittals are to be prominently identified as relating to the *works* and is submitted under the cover of appropriate letters or transmittal notes in accordance with the correspondence procedures which will be advised by the *Project Manager* after the signing of the Contract. All documentation supplied by the *Contractor* to the *Project Manager* in hard copy is supplied in electronic format.
- Paint Manufacturers and *Contractor's* workmanship guarantee to be issued to *Employer* on completion.

5.1.7.1 Time Required for Acceptance of Reports, Drawings & Calculations by the Project Manager

Not later than thirty (30) days after receipt, the *Project Manager* will return one copy of the drawing marked "Accepted"; "Accepted as Noted" or "Not Accepted", as may be appropriate. The notations "Accepted" and "Accepted as Noted" authorize the *Contractor* to proceed with the manufacture of the Plant covered by such drawings subject to the corrections, if any, indicated thereon.

Where prints or drawings have been "Not Accepted" the *Contractor* shall make the necessary revisions on the drawings and submit further copies for acceptance in the same procedure as for the original submission of drawings. Every revision shall be shown by number, date, and subject in the revision block on the drawing.

All technical design and implementation documentation and QCP's are submitted to the *Employer* for acceptance two (2) weeks prior to the commencement of any *works* or inspections. Not later than two (2) weeks after receipt,

the Project Manager will return the submission marked “Accepted”; “Accepted as Noted” or “Not Accepted”, as may be appropriate.

5.2 Parts of the works which the *Contractor* is to design

Contractor is not required to design. *Contractor* is only required to implement *Employer's* Design. The *Contractor* may provide alternate solutions for the roof sheeting and/or fixing, if required, to ensure that that the upgrade to the roof is leak free, watertight, and guaranteed to seal against inclement weather conditions such as temperature variations, rain, wind driven rain, corrosive atmosphere etc.

5.3 Procedure for submission and acceptance of *Contractor*'s design

N/A

5.4 Other requirements of the *Contractor*'s design

N/A

5.5 Use of *Contractor*'s design

N/A

5.6 Design of Equipment

The *Contractor* is to ensure scaffolding, hoarding and any specialist equipment is designed in such a way to ensure the *works* can be executed efficiently, without delay and that critical plant is always protected. The *Contractor* provides assurances regarding this to *Project Manager*.

The *Contractor* submits particulars of the design of any item of Equipment to the *Project Manager* for acceptance if the *Project Manager* instructs him to, as per clause 23.1.

5.7 Equipment required to be included in the *works*

The *Contractor* provides all resources, equipment, and services in compliance with the OHS Act. This includes all working at heights requirements, certification, equipment, and compliance needed to carry out the *works*.

The *Contractor* provides all mobile access, scaffolding, ladders, rope access and lifting/rigging to perform the *works*. The *Contractor* provides and erects such scaffolds, hoarding and rigging as and when it may be required. All scaffolding and/or rigging must comply with the requirements of the OHS Act and Eskom SHE Standards.

5.8 As-built drawings, operating manuals and maintenance schedules

At least 1 month before notification of Completion of the *works*, the *Contractor* shall revise drawings where necessary to show the Plant as installed and send two copies for acceptance. Drawings shall also be submitted in an electronic format compatible with Micro Station Ver.8 supplied by Bentley Systems Inc., DWG, one PDF and two hard copies, in paper size A2. After acceptance, prints shall be provided as required of the type and in such quantities as shall be determined by the *Project Manager*. Drawings shall include those drawings necessary for the efficient maintenance of the Plant. The specific KKS code of each plant, equipment and component shall appear on all drawings.

Before a Certificate of Completion will be issued, all as-built drawings and data must be provided to the *Project Manager* on completion of the Permanent *works*. Any information in the possession of the *Contractor* which is necessary for the *Supervisor* to check the “as built” drawings shall be supplied to the *Supervisor* on a regular basis and all information must be delivered before a Certificate of Completion will be.

Any information in the possession of the *Contractor* which is required under this contract shall be supplied timeously to the *Supervisor* on a regular basis.

The *Contractor's* drawings are produced and developed as per the Eskom Drawing Standard.

a.1. Pre-implementation documentation

The Contractor provides the following for acceptance by the Employer prior to implementation:

- The *Contractor* generates as-built drawings using the present-day metric system with all the specification and sketches for the *Works* prior to commencement All drawings generated shall be size A0 and must be approved prior to commencing with the *work*. All accepted drawings generated are supplied by the Contractor in Electronic format (DWG) for the Employer's records and ownership.
- The *Contractor* submits comprehensive construction method statements for the *Employer's* approval prior to commencement of works. As a minimum the *Contractor* to provide a method statement of handling, lifting, installation, placing and storage of sheets. In order to develop a suitable Method Statement, the Contractor shall have prior discussions and planning with the power station management about the appropriateness of the activity taking into account safety, outage times, weather conditions etc. This includes method of dismantling and installation of sheets at the transformer area.
- The *Contractor* shall provide risk assessments and fall protection plans for approval along with all the required safety data.
- Included will be the mechanisms of what action will be employed to prevent objects from falling.
- Quality Control Plans and Check Sheets.
- A bar chart program (preferably in PDF format) detailing all scope of work activities including construction and installation i.e. detailed project schedule.
- Material Data Sheets, sketches and drawings.
- Warrantee and Guarantee certificates.
- A copy of the manufacturers updated ISO certificate confirming that the product is manufactured to the necessary standard.

a.2. Post-implementation Documentation

- The *Contractor* supplies the *Employer* with the following:
  i. Signed-off Quality Control Plan and Check sheets.
  ii. Maintenance manuals detailing installation care and maintenance procedures where required.
  iii. Maintenance plan.
  iv. Supplier's certification, warrantees and guarantee certificates.
  v. Drawings/sketches and specifications.
- Documentation and Handover:
  vi. Provision of as-built drawings, operating manuals, and maintenance schedules to support ongoing upkeep and management of the new roofing and waterproofing systems.
  vii. Handover documentation to ensure all stakeholders are informed and satisfied with the completed works.

5.8.1. Information to be included as As-built drawings and/or operating manuals and/or maintenance schedules

The Contractor shall supply where necessary and after approval by the Supervisor, two bound sets of operating instructions, maintenance manuals, data books and/or updated as-built drawings including the following details and information:

- *Contractor's* and Supplier's details (name, address, email address, telephone numbers)
- *Contractor's* emergency (after-hours) contact details
- Subcontractors/Suppliers Documents
- Test Certificates
- Certificates of Compliance
- Guarantees and Warranties

The *Contractor* shall mark up one full set of the Supervisor's drawings with relevant as-built changes and information and submit to the *Supervisor* for his approval 30 days before completion.

All documentation supplied is in the English language. The contract shall not be accepted as complete until these have been supplied, complete and to the satisfaction of the *Supervisor*.

Not later than thirty (30) days after receipt, the Project Manager will return one copy of the drawing marked "Accepted"; "Accepted as Noted" or "Not Accepted", as may be appropriate. The notations "Accepted" and "Accepted as Noted" authorize the Contractor to proceed with the manufacture of the Plant covered by such drawings subject to the corrections, if any, indicated thereon. Where prints or drawings have been "Not Accepted" the Contractor shall make the necessary revisions on the drawings and submit further copies for acceptance in the same procedure as for the original submission of drawings. Every revision shall be shown by number, date, and subject in the revision block on the drawing.

6. Procurement

6.1 Plant and Materials

The *Contractor* provides all labour, tools, vehicles, temporary works / scaffolding, hoarding, consumables, equipment, and cleaning materials required to Provide the *works*. The *Contractor* supplies/ procures all Plant and Material, fabrication, manufacturing, handling, storage, testing, delivery, off-loading and erection/construction, disposal of debris and finishing in every detail of *works*. The *Contractor* constructs any *works* that can be reasonably inferred from this *Employer's* specifications.

6.2 Quality

During the erection period, the *Contractor* as a builder and/or user of machinery performs 'building work' in terms of OHS Act. The *Contractor*, before taking occupation on a Site, obtains a permit to work from the *Project Manager*. No unauthorised person(s) enters any prohibited/restricted area. Daily dairies/logs/data books are kept and signed by the *Contractor* and are also signed off daily by the *Supervisor*.

The following is to be recorded (as a minimum) in the daily diaries:

- Manpower and Equipment used,
- Weather conditions,
- Description of any unique occurrences, incidents, or accidents,
- Delays and reasons for the delays,
- Industrial relations irregularities,
- Description of activities to be performed,
- Recording of on-site tests, for example film thickness testing of the different of coats of the corrosion protection coating system.

In addition to the above-mentioned, the *Contractor* adheres to the following:

- The *Contractor* is restricted to the Site.

- The *Contractor* is not to enter any other areas and ensures that his employees abide by the regulations.
- The *Contractor's* Equipment does not impair the operation or access to the plant.
- The *Contractor* provides any temporary or expendable materials required for the storage of material.
- The *Contractor* safeguards and secures all items whilst in the *Contractor's* custody and control, until completion of the works.
- The adjacent plant and equipment are not modified without written permission from the *Project Manager*. Modification in this sense includes, but is not limited to the following:
  - Welding onto existing plant,
  - Drilling into structural steel or concrete,
  - Cutting or removing
  - Loading adjacent structures

1.1.2 Quality

Proof of compliance with materials specifications and samples of materials are required.

This also applies to the subcontractors. All materials and plant which are procured for the *works* are subject to the provision of a proof of payment by the *Contractor* or his Subcontractors at least 30 days after delivery to site; ownership will then transfer to the *Employer* once valuated, accepted, and paid for by the *Employer*.

The *Contractor* ensures that corrosion protection meets the quality requirements of Eskom Standard 240-106365693 for the External Corrosion Protection of Plant, Equipment and Associated Piping with Coatings.

1.1.3 Guarantee Inspection

The *Contractor* provides his terms and conditions of guarantee on the *works* and further includes labour and material in his guarantees.

Latent Defects Period are as per the NEC Contract.

6.3 Product Support

The *Contractor* provides his terms and conditions of guarantee on the *works* and further includes labour and material in his guarantees.

Latent Defects Period are as per the NEC Contract.

6.4 Defects correction

Corrosion protection coating system to be applied in accordance with manufacturer's specification and guidance. *Contractor* to liaise with supplier/manufacturer to ensure product is applied in accordance with manufacturers specification and *Employer's* specification.

Paint Manufacturers and *Contractor's* workmanship guarantee to be issued to *Employer* on completion.

6.5 Plant & Materials provided "free issue" by the *Employer*

All new equipment, materials and systems shall be furnished with a written guarantee with a defects liability period as per the NEC Contract from date of completion of work. These guarantees shall be furnished in favour of the *Employer*. On Completion of the required and specified work the systems, installations and equipment shall be commissioned and handed over to the *Supervisor* for acceptance.

6.6 Spares and consumables

The *Contractor* registers all the plant and materials with Eskom and for materials it must be in the form of a delivery note. This ensures that when the *Contractor* needs to take something out of site, there is proof that the *Contractor* owns that item. All vehicles utilised for this contract must be roadworthy and certified in terms of National Road Regulations of South Africa. The *Contractor* is responsible to ensure that all his/her belongings are always stored safely and are not obstructing other operations in the power station.

The *Contractor* is to ensure that he stores materials in a dry area, protected from freezing, staining and damage.

6.7 Tests and inspections before delivery

The *Contractor* shall provide a testing/ commissioning program and procedure to be accepted by the *Project Manager*. All tests will be witnessed by the Eskom Engineer and/or *Supervisor* and therefore the *Contractor* ensures that the *Project Manager* is timeously informed of when and where the tests and inspections will occur.

All tests and commissioning are to be as per National and Eskom Standards.

The *Contractor* is required to perform the following tests aligned with the QCP's for e.g., Flood Penetration Test, Workshop Drawings, if required, for review and acceptance by the *Supervisor*.

As a minimum, before delivery of the *works*, the *Contractor* provides:

- The respective testing procedures to the Employer for his review and acceptance prior to conducting testing at the *Contractors* facilities.
- Site acceptance testing and commissioning of the integrated system with all associated equipment. The *Contractor* is to submit the respective testing procedures to the *Employer* for his review and acceptance prior to conducting testing.

6.8 Marking Plant and Materials outside the Working Areas

All equipment and materials MUST be marked as follows: Gariep Power Station, *Contractor's* Name.

1.2 *Contractor*'s Equipment (including temporary works).

The *Contractor* supplies, installs, maintains, and removes all temporary construction facilities and utilities necessary to provide the *works*.

The *Contractor* provides all equipment and plant necessary to execute the *works* i.e., all the necessary tools, equipment, working at heights equipment, anchor points, mobile access etc. required to execute the *works*. During construction, the *Contractor* provides photographs of the *works* specifically the areas that are above ground level.

Transportation of equipment and materials is the responsibility of the *Contractor*. Additionally, the *Contractor's* Equipment is to not impair the operation or access to the plant. The *Contractor* supplies, installs, maintains, and removes all temporary construction facilities and utilities necessary to provide the *works*.

6.9 Cataloguing requirements by the *Contractor*

N/A

6.10 Damage To Components Not Forming Part Of the *works*

The *Contractor* takes the utmost care to prevent damage to existing infrastructure and equipment. The *Contractor* therefore plans the works taking into account any existing infrastructure and equipment.

Any damages resulting from the works is repaired/made good by the *Contractor* at his own expense, to the satisfaction of the Employer. The *Contractor* supplies a method statement for the repair *works* to the *Employer* for review and acceptance prior to conducting the repair works.

If the *Contractor* requires removing of equipment to facilitate the works. In such case, the *Contractor* submits a list of existing equipment that requires removal in a method statement for the *Project Manager's* review and acceptance. The cost of removal of undamaged components, preservation and replacement to its original working state is the responsibility of the *Contractor*. In the case where existing drawings are not available, the *Contractor* is responsible for compiling drawings signed by a Professional Engineer that are adequate for reassembling of equipment that require to be reinstated. The *Contractor* is accountable for any modifications and impacts on the existing structures due to removal and reassembly.

6.11 Title to Materials from Demolition and Excavation

The *Contractor* is responsible for disposal of all the waste generated from the *works* in an environmentally friendly manner, ensuring that hazardous (contaminated rubble) and general waste are disposed of at a nearest registered landfill site in accordance with 32-245, Eskom Waste Management Standard. The *Project Manager* is notified of the disposal site before any disposal can be done.

For all scrap metal, cables, and material the *Contractor* submits with the tender the price per tonne for disposal of such material. In case of salvaged equipment, identified by the *Project Manager*, the *Contractor* is expected to safely remove such equipment and store it at the designated site as identified by the *Project Manager*. The list of all salvaged equipment is to be issued to the *Contractor* before the start of the *works*.

The *Contractor* has no title to plant/or materials resulting from him carrying out the Works. The *Contractor* will have no title to the usable material from the existing surface buildings.

6.12 Requirements from the Tenderer

The tenderer must submit the following information and documentation with his/her tender:

a) Detailed qualifications of any deviation from the contents of this specification.

b) Evidence of the tenderer's capability of undertaking that he has successfully completed similar contracts of like size and scope. Additionally provide certification proving competency.

c) A Quality Control Plan (QCP).

d) Method statements

e) A quality assurance document in accordance with the requirements of 240-105658000 - Supplier Quality Management Specification Category 3.

f) Cleaning and protection during the progress of the *works*, the *Contractor* shall clean the work area as well as protect his/her work area in strict accordance with the particular standards for such works.

g) A project/construction programme.

h) The *Contractor* should be well established and reputed *Contractor* and should have a minimum of 3 years' experience in construction of similar *Works* as well as key personnel with adequate experience and competency to perform work specific to the scope of this project.

7. Construction

For all intents and purpose, temporary works for this contract shall be any work or infrastructure and or establishment which the *Contractor* requires to provide the *works*, which includes inter alia his facilities, laboratories for control and acceptance testing, connection to existing water, sewer, electricity, etc. All such temporary works shall be adequately decommissioned, restoration to natural environment and the area made good on completion of the *works*; all to the acceptance of the *Project Manager*.

Method statements shall be prepared prior to commencement of any work for the acceptance of the *Supervisor*. All costs relative to this aspect shall be on account of the *Contractor*.

7.1 Temporary works, Site services & construction constraints

7.1.1 Contractor's equipment

The *Contractor* will keep comprehensive records of all the *Contractor's* equipment, owned, or hired, brought on and removed from site. This record must be shared with site security and updated accordingly during the duration of the project.

The *Contractor* is to comply with the Safety and Site access procedures.

7.1.2 Equipment provided by the Employer

N/A

7.1.3 Site services and facilities

All services and facilities that are not specifically stated to be provided by the *Employer* and which are necessary for the *Contractor* to Provide the *works*, shall be provided by the *Contractor*. The *Contractor* shall provide everything else necessary for Providing the *works*.

7.1.3.1 Electricity Supply

All points of supply are provided in terms of availability and location. The *Employer* indicates which supply points may be used. The *Contractor* is to note that generally a 220V Electrical Supply is available in the power station complex and electrical power points to be pre-arrange with *Employer*.

3-phase power supply is available on request and the *Contractor* provide all other equipment i.e., extension power leads etc.

7.1.3.2 Potable Water Supply

All points of supply are provided in terms of availability and location. The *Employer* indicates which supply points may be used, and the *Contractor* ensures that the pressure at the tap-off point is regulated to the correct operating pressure to ensure that the pressure and flow supplied to the end-user is within the specified range as per SANS 10252 for specific applications.

7.1.4 Spoil Area

A spoil area will be indicated to the Contractor. No sheeting material removed from the roof must be removed from site, without the Employer's consent.

7.1.5 Facilities provided by the Contractor

The *Contractor* supplies all facilities to enable work and general site requirements. This will be removed by the Contractor on completion of the project, unless otherwise agreed and accepted by the Project Manager.

The *Contractor* is to ensure that his employees are transported in a vehicle that is approved to carry passengers. All vehicles must have safety belts for all passengers, airbags, and an ABS system.

7.1.5.1 Storage Facilities

The *Contractor* is to make his own arrangements regarding storage facilities and laydown areas that are required to complete the *works*. All laydown areas on Site are as per agreement with the *Project Manager*. All storage facilities (Plant, Material and Equipment) will be within the boundaries of the Site in order not to affect the operations of Others.

7.1.5.2 Telephone / Internet Facilities

The *Contractor* is responsible for arranging his own telephone/internet facilities.

7.1.5.3 Existing premises, inspection of adjoining properties and checking work of Others

Within the locality of the works, there are existing services (water pipes and electrical cables, motors, panels etc.) which the *Contractor* shall take extreme care to prevent any damages during the execution of the *works*.

The *Contractor* shall liaise with the *Supervisor* before work commences.

The *Contractor* shall indicate to the *Supervisor* daily on the intended areas of work and joint inspections required to be done with *Supervisor*. Deviation from programmed area of work is to be liaised with the *Supervisor* for inspection of proposed area. All this to be done timeously to avoid delays in the daily execution plan.

The *Contractor* shall be responsible to protect all existing services while the *Supervisor* or *Employer's* Representative is present and providing input on method of protecting.

7.1.6 Survey control and setting out of the works

Quality inspection plan (QIP) of the Employer must be adhered to, to ensure the job is performed to the *Employer's* satisfaction.

The *Contractor* shall carry out surveys of the new cladding and roof to ensure correct dimension of sheeting, existing structure to fix new sheeting onto, mechanical vent for comparative replacement unit etc.

7.1.7 Excavations and associated water control

NA

7.1.8 Underground services, other existing services, cable and pipe trenches and covers

N/A

7.1.9 Sequences of construction or installation

The *Contractor's* programme shall clearly show and sequence the activities of all the project work to be done by the *Contractor* and the other work covered by the contract that is being done by the sub-contractors. The following activities are to be included, as a minimum, in the programme:

- Preconstruction Documentation Submission:
  - Final SHE File Submission to the Employer for review and acceptance
  - Site Establishment Method Statement Submission to the Employer for review and acceptance
  - Quality Control Plan submission to the Employer for Review and Acceptance
  - All activity Method Statements Submission to the Employer for review and acceptance
- Construction Activities:
  - Site Establishment

- Maintenance & Roof Assessment:
  - Assessment and marking of the Roofs defects
  - Refurbishment of metal protective plate
  - Roof Waterproofing upgrades/ repairs/ replacement
- Testing and Commissioning:
  - Commissioning/ Testing Works (Flood/ rain penetration test)
- Post-Construction Documentation Submission:
  - De-establishment
  - SHE File Submission to the Employer for review and closure
  - Data Books Submission to the Employer for review and acceptance

The *Contractor* is to further note that all quality documents and Method Statements require a 14-day review period.

7.1.10 Hook ups to existing works

Hooking at heights is one of Eskom's Cardinal Rules and must always be adhered to. Failure to follow this rule and other Eskom rules are prohibited and will lead to *Contractor* being penalized and removed from the Power Station. The *Contractor* ensures that all lifelines are made available for always hooking-up purposes where required.

7.2 Completion, testing, commissioning and correction of Defects

7.2.1 Work to be done by the Completion Date

On or before the Completion Date the *Contractor* shall have done everything required to Provide the *Works*. The Project Manager cannot certify Completion until all the work has been done and is also free of Defects which would have, in his opinion, prevented the *Employer* from using the works and Others from doing their *work*.

	Item of work	**To be completed by**
	As built drawings of *works*.	Within 30 days after Completion
	Performance testing of the *works* in use as specified in paragraph 7.2.8 of this Works Information.	Date of Completion.

7.3 Use of the *works* before Completion has been certified

The *Contractor* will be performing the *works* above the operational power station and ensures that the ongoing operation of the station is not impeded in any way. In addition, the *Contractor* plans the work accordingly to ensure that water ingress, dirt, and debris to do not contaminate the areas below the roof and that the units and equipment are always protected during the execution of the *works*.

All roads are currently being used by Eskom and other *contractors*. The *Contractor* shall always ensure unrestricted access of all road users. Failure to do so will result in all third-party claims being passed onto the *Contractor.*

7.4 Materials, facilities and samples for tests and inspections

The *Contractor* shall arrange facilities where appropriate, to allow for the provision of samples, to the acceptance of the *Supervisor*.

The *Supervisor* will carry out routine site inspections of finished work as well as of work in progress. The *Contractor* shall allow access to the *works* for such routine inspections.

7.5 Commissioning

Commissioning of the *works* as per the relevant codes and standards will be the responsibility of the *Contractor* and executed as per the Commissioning Schedule developed by the *Contractor*, for acceptance by the *Supervisor*.

7.6 Start-up procedures required to put the works into operation

N/A

7.7 Take over procedures

Acceptance of the system by the *Employer* will be based on the system being able to perform its function as per the quality requirements and hand over certificate is issued to the *Project Manager*.

7.8 Access given by the *Employer* for correction of Defects

Access is granted to the *Contractor* for defects correction as per Core Clause 43.4 in ECC3.

7.9 Performance tests after Completion

Tests to be completed include but is not limited to the following:

- Flood/rain penetration test as per SANS 10400-K: 2011.

7.10 Training and technology transfer

The Contractor is required to train the staff in the use and maintenance of the works or any associated transfer of technology from him to the Employer, where required.

7.11 Operational maintenance after Completion

Refer to Section **Error! Reference source not found.**.

The *Contractor* is required to provide Operation and Maintenance Manuals for all of the works, for acceptance by the *Supervisor*, where required.

8. Plant and Materials standards and workmanship

8.1 Investigation, survey and Site clearance

The *Contractor* conducts a thorough site investigation of existing facilities and the area around which he is to do his work before he commences with any part of the *works* as detailed in this contract.
If the *Contractor* require access to specific areas, this must be arranged with the *Project Manager* and notify site management in advance.
The existing cladding and roof sheets shall be stockpiled on a designated place as instructed by the *Employer*. The *Employers* intention is to sell the cladding components as scrap. However, the *Contractor* must allow in pricing for the removal of material off site. The *Project Manager* will inform the *Contractor* regarding the final decision. The *Contractor* arranges for the disposal of waste generated from the *works*. The waste shall be disposed at an approved waste disposal facility. Records and proof of disposal certificates must be provided to the *Employer* for record.

8.2 Building works and applicable *works* specification

During the construction of the *works* there are numerous standards and specifications to which the *Contractor* must adhere to. The documents listed below, including normative references within, are not bound in this document but are obtained by the *Contractor* at his own expense and must be adhered to during the implementation of the *works*. Where a SANS standard referenced has been replaced by a newer standard, the *Contractor* is required to adhere to the latest revision of the newer standard. Where a SANS standard referenced is composed of several parts, all applicable parts are to be adhered to.

This list is not all-inclusive and shall not relieve the *Contractor* from complying with all applicable codes.

8.3 Applicable Standard Specifications

The Standard General and Technical Specifications for the Upgrades (Replacement) of the Structural Steel Cladding and Roof Sheets for the Machine Hall shall be the applicable SANS and Eskom standards. The *Contractor* is responsible for ensuring that he is thoroughly familiar with all the amendments and corrections before submitting his tender.

In addition to the national and statutory applicable standards, the relevant *Employer's* standards are applicable in this contract. Where in the Scope of Work or other documents a reference is made to the Engineer it shall be taken to read *Project Manager*.

Where the reference is to the *Engineer's Representative* or *Resident Engineer* it shall be taken to read *Supervisor*.

Reference number	Title	Tick if publicly available
SANS 1200	1200 series specification for civil work	√
SANS00 H: 1990 3	Standardized specification for civil engineering construction Section H: Structural steelwork	√
SANS 1200 HB	Standardized Specification for Civil Engineering construction Section HB: Cladding and sheeting	√
SANS 1200 HC	Corrosion protection of structural steelwork	√
(SANS 10400-K: 2011)	(SANS 10400-K: 2011) and Cladding Manuals.	√
GSR, IBR 2014	Global Solutions Steel and Roofing design Manuals	√
SANS 1273:2011	Fasteners for roof and wall coverings in the form of Sheeting	√
SANS 1237:1991	Fasteners for roof and wall coverings in the form of sheeting	√
SANS 10120-HB	Code of Practice: Cladding and sheeting	√
SANS 0160:1989	The general procedure and loadings to be adopted for design of buildings	√

SANS 10160-3, 2019	Basis of structural design and actions for buildings and industrial structures Part 3: Wind Actions	√
BS EN ISO 1461: 2022 (en)	Standard for Finishes: Hot dip galvanized coatings on fabricated iron and steel articles — Specifications and test methods	√
BS 10025-2: 2004 – S275	Hot Rolled products of Structural Steel	√
BS 4211	Mild Steel	√
GGR 0992	Eskom Plant Safety Regulations	√
GGS 0315	Standard drawing practice	*
GGS 0441	Drawing record system	*
GGG 0462	Quality requirements for engineering and construction works	*
32/421 240-62196227	Eskom Life Saving Rules	*
240-133087117	Environmental Incident Management Procedure	*
240-106628253	Standard for Welding Requirement on Eskom Plants	*
32-37	Eskom Substance Abuse Procedure.	*
32-95	Occupational Health and Safety Incident Management Procedure	*
32-726	Contract and Contractor OHS Management	*
32-727	SHEQ Policy	*
OHS Act	The Occupational Health and Safety Act No. 85 of 1993 and Regulations 13A - (6)	*
	OHS Act General Machinery Regulation 2(1) – Supervision of Machinery	*
32- 418	Working at Heights Procedure	*
32-520	Risk Assessment Procedure	*
Act No.130 of 1993	The Compensation for Occupational Injuries and Diseases, amended by government notices to 30 April 2004 or Equivalent	*

* Available on request

Code	Description
Materials	

SANS 683	Roof paints
SANS 10021	The waterproofing of buildings
SANS 10155	Accuracy in buildings

8.4 Applicable Statutory Requirements

The *Contractor* shall comply with all the relevant South African statutory requirements in terms of the employment of people on site. Site specific requirement shall not take precedence over any statutory requirement.

These include but are not limited to the following:

Code	**Title**
SANS 1200	SANS Series Standardized Specifications for Civil Engineering
SANS 10400A	General principles and requirements
SANS 10400C	Dimensions
SANS 10400D	Public safety
SANS 10400F	Site operations
OHSA No 85 0f 1993	Occupational Health and Safety Act

8.5 Applicable Eskom Standards

The *Contractor* shall comply with all the relevant South African statutory requirements in terms of the employment of people on site. Site specific requirement shall not take precedence over any statutory requirement.

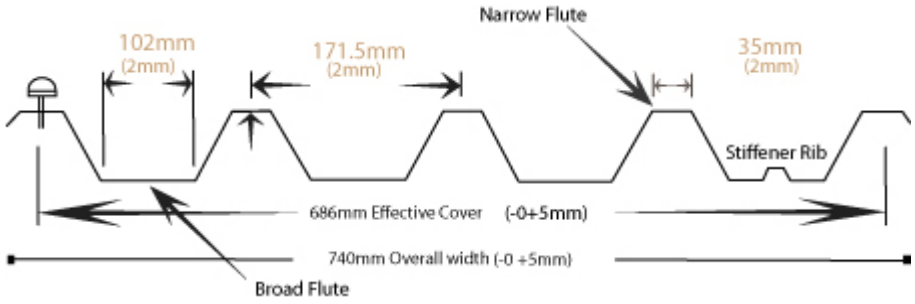
In addition to statutory requirements, the *Contractor* is to comply with the relevant Eskom Standards, and these include but are not limited to the following:

Code	**Title**
QM 58	Supplier Contract Quality Requirements Specification
36-681	Generation Plant Safety Regulations
240-71432150	Plant Labelling and Equipment Description Standard
167A/49	Drawing and documentation standard for *Contractor*s
167A/143	Drawing Office Standard
167A/49	Documentation Process Procedure
32-136	*Contractor* Health and Safety Requirements
240-62196227	Eskom Life-Saving Rules
240-56364535	Architectural Standard for Structures and Other Buildings
240-56364545	Structural Design and Engineering Standard
240-43156827	Introduction to The Welding Rulebook
240-106365693	Standard for the External Corrosion Protection of Plant, Equipment and Associated Piping with Coatings

8.5.1 Particular Specifications

8.6 Wall Cladding Profile

Profiled sheets shall comply with the quality requirements of the relevant South African National Standards (SANS). The Cladding profile shall be IBR (Inverted Box Rib) 686 0.54 mm (AZ 200) Zinc Aluminium coated steel (Al-ZN). The sheeting shall be prepainted/ colour coated. Protected on both sides. The profile has five trapezoidal ribs at 171, 5 mm centres giving a nett cover of 686 mm with one stiffener rib in each pan. The rib height shall be 37 mm. See profile detail below. The IBR sheeting shall be laid in strict accordance with the manufacturer's specification. The manufacturer shall be assessed and certified as complying with ISO 9001:2015 Quality Management System. The type of sheet and profile must allow for the possibility of sheets being overloaded due to hail and construction loads. The cladding and fixing system must therefore be able to withstand the severities of the environmental conditions without deflecting.



- All cladding shall be prepainted of thickness 0.54mm, certified as complying with ISO 9001: 2015 Quality Management System.
- ***Main fasteners*** shall be Bremick B8 self-drilling fasteners for metal or approved equal.
- Number 12 – 24 x 2mm self-drilling Screw with 26mm aluminium bonded washer.
- The *Contractor* shall ensure that the correct fixings are used for the cladding, fasteners must be compatible with the supporting underlying structure. The design life of the cladding must be equal to that of the fixings.
- ***Side lap fasteners***- 25mm Lg Topspeed screws to be used for side lap stitching, 19 mm diameter bonded washers to be used for side lap stitching.
- The *Contractor* shall provide a colour sample of the cladding prior to manufacturing the cladding for the approval by the Employer.
- The cladding system must be complied with SANS Roof and Cladding code of practice SANS 10237.

8.6.1.1 Fasteners and Washers

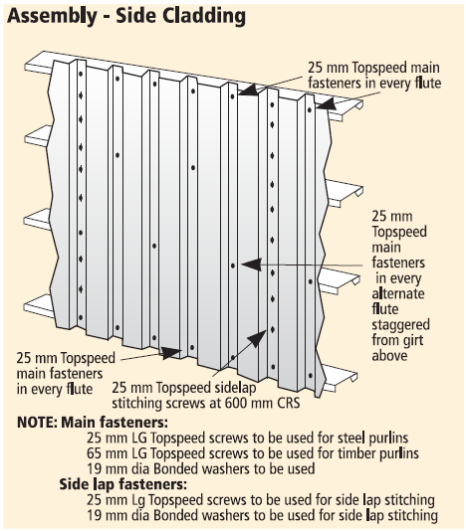
All fasteners shall comply with the requirements of SANS 1273. In the case of fastener types not covered by SANS 1273, the supplier shall guarantee that the general requirements of SANS 1273 are met. The fastener class used shall be to ensure the life expectancy of the fasteners is at least similar to that of the cladding. Washers shall comply with the requirements of SANS 1273. The fasteners, washers and sealants shall be suitable for the specific application and shall be compatible with the sheeting in respect of corrosion, adhesion, long term flexibility, elasticity, temperature break-down and thermal effect, as relevant. The fasteners and washers are subject to deterioration resulting from ultraviolet light, thermal movement and air-borne agents and therefore must be able to withstand these environmental conditions.

8.6.1.2 Fixing Details and Support Spacing

8.7 Assembly of side cladding

The assembly of the side wall cladding shall be fixed as seen in Figure 2. As per drawing 0.38/0.1702 the girt spacing is 1830mm (The *Contractor* must verify the girt spacing and check the span requirements as per the manufacturer's specifications). Inspection of building framework before installation is started, the supporting structure shall be inspected to check whether the girts are correctly placed in true planes and securely fixed.
Structural steelwork and any other materials that would otherwise be incompatible with the sheeting and lead to deterioration, shall be painted or otherwise prevented from making direct contact with the sheeting.
The following points shall be specifically checked:

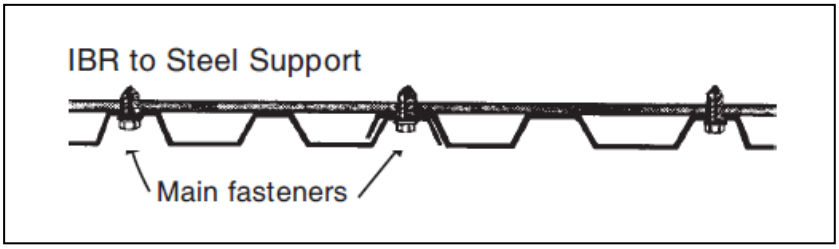
- The purlins and rails are at the spacing as shown on the drawings.
- That the overall dimensions of the roof, walls and gables correspond with those shown on the drawings.
- That no protrusions such as bolt heads, rivet heads and splice plates appear on the face of the frame.
- All holes for fasteners shall be drilled and not punched. Shavings and metal dust shall be removed before fixings and washers are positioned.
- Side cladding shall be fixed by means of Bremick B8 self-drilling fasteners for metal or approved equal. Number 12 – 24 x 2mm self-drilling Screw with 26mm aluminium bonded washer. The bonded washer will aid in distributing the load). The fastener used must offer a 30 Year warranty. Washers and screw caps shall match the colour of the cladding.



Fixing assembly and fasteners to be used.

8.7.1.1.1 Valley Fastening

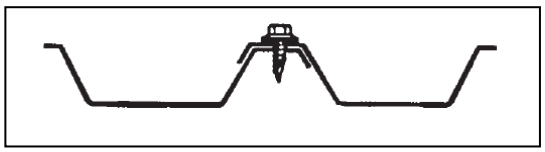
The method of pierced fastening shall be considered for the fixing of sheets. The method of pierced fastening through the valley between corrugations or flutes of IBR is recommended for wall cladding only. Valley fastened IBR will therefore require a side lap fastener in each lap at each support and at midspan for fastener frequency and location as depicted below.



Typical valley fastener details with fastener over support at side lap

8.7.1.1.2 Side lap fastening

The maximum spacing for side lap fasteners along the wall should be on the girt and midspan between girts. The IBR sheeting must be laid and fastened in strict accordance with the manufacturer's specification.



Typical side lap fastener details

8.7.1.2 Waterproofing

Damp proofing and waterproofing comply with the Specifications and requirements given in the table below. Waterproofing materials are applied in accordance with SANS 10021.

In addition, the *Contractor* ensures the following:

- Roofs must be durable and must not allow the penetration of rainwater or any other surface water to the interior. Additionally, the roofs must not allow the accumulation of water on its surface. All surfaces are to be checked for adequacy of slopes to ensure adequate drainage of the roof.
- It is a requirement of the *Contractor* that an unconditional 5-year guarantee is provided. The guarantee must be provided by the Contractor and the Suppliers. The comprehensive pro forma guarantee must be submitted with the tender. If an additional coating or any maintenance interventions are required to ensure that the system is UV stable, it should be stated. Any maintenance requirements for the above 5-year guarantee shall be clearly indicated in the *Contractor's* guarantee.
- The proposed waterproofing system must provide the following characteristics:
  - Durable
  - Bonding with substrate
  - UV stable
  - Maintainable
  - Provide a guarantee

8.7.1.3 Catladder Key specifications include:

- Installation must adhere to specific safety and dimensional standards, generally referencing local regulations such as OSHA (Occupational Safety and Health Administration) or British Standards (BS 4211/BS 5395).
- Always carry out a risk assessment before each use,
  - check ladder thoroughly for corrosion, signs of vandalism, and damage.

- Always ensure that the area below where you are working is clearly marked to warn people of works above.
- Follow HSE guidelines when working at height.
- At the top of the ladder edge protection must be provided to comply with current work at height regulations and hierarchy of controls
- The maximum load capacity for the ladder is 150kg

- Whether installed on a plant facility, catladdders offer dependable access while meeting strict health and safety requirements.
- Fixed vertical CAT ladders don't stand alone; they form part of a complete rooftop safety system. These safety components include guardrails, self-closing safety gates, and designated walkways to create a fully compliant access route. The result is a safer working environment for everyone who needs access to the roof.
- Users can carry out maintenance tasks confidently, knowing the system is engineered to reduce fall risks and provide a stable, secure, route to the rooftop.

8.7.2 Materials and Workmanship

Only new and undamaged materials are to be used in the *works*. Materials to be permanently installed in the works are not to be used for any temporary purposes on site. Work is required to be for the acceptance of the *Supervisor* and is executed in accordance with the relevant manufacturer's written recommendations and instructions.

8.7.3 Proprietary Products

For the purpose of submission of tenders, rates for items described in the bills of quantities by trade names, catalogue references, etc., are for the particular type and manufacture specified.

Once the Contract has been signed the acceptance of the *Project Manager* is required to be obtained prior to any substitution and where products or materials, etc., other than those specified are used.

Material	**SANS**	**Type and/or Additional Requirements**
Polyethylene sheet for the waterproofing of flat roofs	952	Type A
Bituminous roofing felt	92	Type 60
Chloroprene rubber sheet (for waterproofing)	580	At least 2.5 mm thick and 1200 mm wide

8.8 Civil engineering and structural works

During the construction of the *works* there are numerous standards and specifications to which the *Contractor* must adhere to. The documents listed below, and indicated on the drawings, including normative references within, are not bound in this document but are obtained by the *Contractor* at his own expense and must be adhered to during the implementation of the *works*.

Where a SANS standard referenced has been replaced by a newer standard, the *Contractor* is required to adhere to the latest revision of the newer standard. Where a SANS standard referenced is composed of several parts, all applicable parts are to be adhered to.

8.8.1 Structural Steelwork

The following codes are required to be complied to:

- SANS 2001 CS1: Structural Steelwork
- SANS 1200 H: Structural Steelwork (Only Clause 8 – Measurement and Payment)

- AWS D1.1: Structural welding code – steel
- SANS 1921-3: Construction and management requirements for works contracts, Part 3: Structural steelwork.

- SANS 50025-2: Hot rolled products of structural steels – Part 2- Technical delivery conditions for non-alloy structural steels.
- SANS 1700: Fasteners
- SANS 10162: The structural use of steel

The table below indicates specifications pertaining to SANS 2001-CS1 and must be read in conjunction with the code.

Clause	Particular Specification
4.1	**Materials**
4.1.1	Add the following: All structural steelwork is required to be grade S355JR.
4.1.4.1	Electrodes for electric welding are required to be E7018.
4.1.5.1	Ordinary bolts to be grade 8.8 with class 8 nuts, as a minimum.
4.2	**Drawings**
4.2.4	Fabrication drawings (shop detailing)
4.2.4	The following clause is added: "Fabrication drawings are to be prepared by the *Contractor*. These are issued to the *Project Manager* for acceptance in the form of two paper prints and in "PDF" electronic format. The *Contractor* may not commence with fabrication until written acceptance from the *Project Manager* is received."
4.2.4.2	Attachments to facilitate erections may not remain as part of the permanent structure.
4.2.4.7	Connections to allow movements are as shown on the Drawings.
4.3	**Workmanship (General)**
4.3.6	Holing
4.3.6	The following clause is added: "Flame cutting of holes is not permitted."
4.6	**Workmanship – Erection**
4.6.5	On site welding is not permitted
5.3	**Non-destructive testing of welds**
5.3.3	Fillet welds are required to undergo magnetic particle inspection (20% of welds)
5.3.4	All butt welds and full penetration welds are required to undergo ultrasonic non-destructive testing (100% of welds).

Variations	
Cl 5.2	Add the following: Properly documented evidence of previous qualification of welders is acceptable.
Additional Clauses	
1	All materials are to be new and as specified in this document and on the relevant Drawings.
2	Materials not listed in this specification or on the relevant Drawings are not permitted.
3	In the event of any specified steel not being available, the *Contractor* advises the *Project Manager* in writing. The *Project Manager* is to reply in writing on alternative materials and / or sections.

8.3.2.1 Additional Requirements and Specifications

- The *Contractor* is responsible for the stability of the entire structure and all structural elements during all the erection stages.
- All dimensions are required to be verified on site by the *Contractor* before any fabrication of steelwork commences.
- The *Contractor* is required to supply all bolts, washers, nuts etc. for the fixing of the steel roof sheeting, side sheeting, ridge capping, flashings, and roof ventilators.

8.3.3 Structural Steelwork (Sundry Items)

The following codes are required to be complied to:

- SANS 1200 HA: Structural steelwork (sundry items).

8.3.4 Cladding and Sheeting

The following codes are required to be complied to:

- SANS 1200 HB: Cladding and Sheeting

The table below indicates specifications pertaining to SANS 1200 HB and must be read in conjunction with the code.

Clause	Particular Specification
Variations	
Cl 3.2.1	Add the following: In the event that galvanized steel sheeting is used; it is to be coated with a minimum of 275g zinc per m^2 and is free from white rust.
Cl 5.1.4	Add the following: The *Contractor* is solely responsible for ensuring that the materials and method of installation comply with the details set out on the Drawings. Any further modifications and additional details are to be accepted by the *Project Manager*.
Additional Clauses	
1	Where the use of nails and screws is required: • Galvanised iron nails and screws are to be used for galvanized sheet iron and sheet zinc. • Copper and copper alloy nails and screws are to be used for sheet copper and sheet lead.

	• Aluminium alloy or stainless-steel nails and screws are to be used for sheet aluminium.

8.3.5 Corrosion Protection of Structural Steel

The following codes are required to be complied to:

- SANS 1200 HC: Corrosion Protection of Structural Steel
- SANS 10064: The preparation of steel surfaces for coating
- SANS 121: Hot dip galvanized coatings on fabricated iron and steel articles

8.9 Electrical & mechanical engineering works

Refer to Works Information and Section 5.1.4 for the ridge vents and Section **Error! Reference source not found.** for the lights.

8.10 Process control and IT works

N/A

8.11 Other

N/A

9. List of Drawings

9.1 Drawings issued by the *Employer*

This is the list of drawings issued by the *Employer* at or before the Contract Date and which apply to this contract.

Note: Some drawings may contain both Works Information and Site Information.

Drawing Number	Revision	Title
0.38/2049	2	Detail of Arc-line cladding
0.38/611	1	Details of cladding at Columns
0.38/2489	4	Level 31155 Plan Layout
18.38/3571	0	Floor Plan Elevations and Section
0.38/1702	5	Internal Wall Cladding
0.38/1098		Sidewall detail of sliding fit to sheeting & flashing at north end of slope.
0.38/2328		Hatch cover details at lvl. 25820 and 31155 lvl.

0.38/2346		Hatch cover details at 31155 lvl.

10. Acceptance

Type text here

This document has been seen and accepted by:

Name & Surname	Designation	Signature
Nimroid Sadiki	Snr Supervisor – Gariep Power Station	
Motsabi Foloko	O&M Manager – Gariep Power Station	
Khaya Kebeni	Plant Manager – Gariep Power Station	
Zahier Kapery	Chief Technologist – Civil	

11. Revisions

Date	Rev.	Compiler	Remarks
August 2025	0.1	L Mzalisi	Draft for review
October 2025	1	L Mzalisi	Review comments addressed and circulated for signatures
November 2026	2	L Mzalisi	Document content changed

12. Development team

The following people were involved in the development of this document:

Lungisa Mzalisi

13. Acknowledgements

I would like to give acknowledgement to Zubair Johannes, who is the author for the cladding repair scope specification and Rhodelo Jonkers for the roof repair specification. Rowan Francis and Sandile Ngeleza

Nimroid Sadiki, for his onsite assistance and knowledge provided during the assessment.

APPENDIX A: Schedule A/B