Eskom	Scope of Work	Tutuka Power Station

Title: **Refurbishment of Coal Silo 1-6 Scope of Work**

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Compiled by	Functional Responsibility	Authorized by
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Date: 20/03/2026	Date: 20/03/2026	Date: 20.03.2026

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1. Introduction

Tutuka Power Station intends to undertake structural repair works on Coal Silos 1 to 6. Tutuka Power Station is a coal-fired power plant with a total installed capacity of 3,600 MW. It was constructed in the mid-1980s and is located approximately 21 km northeast of the town of Standerton within the Standerton magisterial district in Mpumalanga Province. The power station comprises a wide range of civil engineering infrastructure that must be routinely maintained to preserve operational performance and safety. These structures are exposed to varying environmental conditions, which contribute to material deterioration over time. In terms of the Construction Regulations, 2014 (promulgated under the Occupational Health and Safety Act, Act No. 85 of 1993), all civil infrastructure must be inspected at least annually. It is therefore a legal obligation for the Owner of the structure to ensure that these inspections and any necessary repairs are undertaken.

Following a comprehensive inspection and condition assessment, a range of structural defects and material degradations were identified in the silos. These include extensive internal and external concrete deterioration, failure of previous repair interventions, damage to stainless steel hopper liners, and exposure of corroded reinforcement. These issues pose a risk to the structural reliability and operational safety of the silos. This Scope of Work defines the full extent of civil engineering interventions required to restore the structural integrity of the silos. It covers general and silo-specific repair requirements, including concrete remediation, crack sealing, protective coatings, and hopper liner replacement. The work must be carried out in accordance with applicable Eskom standards, statutory safety regulations, and industry best practices to ensure durability and long-term performance.

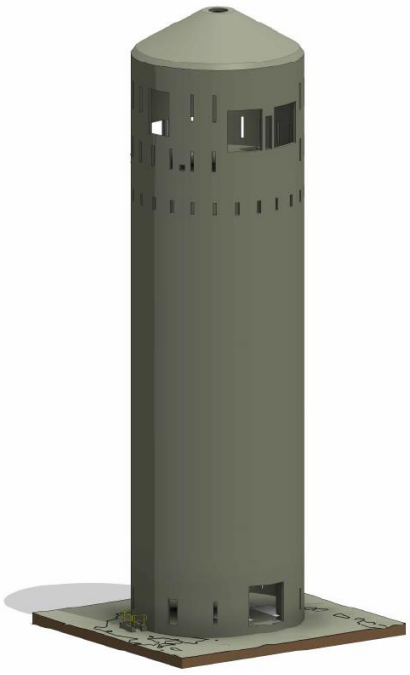


Figure 1: Isometric View of a Silo

2. Supporting Clauses

2.1 Scope

2.1.1 Purpose

To detail the scope of civil works required for the repair and refurbishment of Coal Silos 1 to 6 based on comprehensive condition assessments and structural performance data.

2.1.2 Applicability

This document applies to Tutuka Power Station coal Silo 1 to 6 only.

2.1.3 Effective date

This document will be effective from the date of its authorisation.

2.2 Normative/Informative References

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

2.2.1 Normative

[1] 240-50317699 Manage Technical Queries Procedure

[2] 240-53113685 Design Review Procedure.

[3] 240-56364537 Design of steel structures standards

[4] 240-56364545 Structural design and engineering standard

[5] ISO 9001 Quality Management Systems

[6] 240-75655504 Corrosion Protection Standard for New Indoor and Outdoor Eskom Equipment

[7] 240-106365693 Standard for the External Corrosion Protection

[8] 240-106628253 Standard for Welding Requirements on Eskom Plant

[9] 240-107981296 Constructability Assessment Guideline

[10] 240-106365693 Standard for the External Corrosion Protection of Plant, Equipment and Associated Piping with Coatings

[11] 240-83539994 Standard for Non-Destructive Testing (NDT) on Eskom Plant

[12] 240-57127953 Execution of Site Preparation and earthworks
[13] 240-57127955 Geotechnical and Foundation engineering standard
[14] 240-84418186 Roads Specification Manual
[15] 240-91244751 Specification for Geotechnical Investigations Standard
[16] CR 2014 Construction Regulations 2014
[17] 36-1126 Specification for corrosion of plant and equipment with coatings
[18] ISO 3834 Quality Requirements for Fusion Welding of Metallic materials
[20] Eskom Welding rule book

2.2.2 Informative

[1] ISO 9001 Quality Management Systems.
[2] ISO 14001 Environmental Management Systems
[3] OSH Act Occupational Health and Safety Act (Act 85 of 1993)
[4] 32-245 Eskom Waste Management Standard
[5] 32-421 Eskom Life Saving Rules
[6] 36-681 Eskom Plant Safety Regulations
[7] Construction Regulations, 2014

2.3 Definitions

Definition	Description
Contractor	The service provider appointed to execute the refurbishment works for Coal Silos 1–6 at Tutuka Power Station in accordance with the contract, Scope of Works and applicable standards.
Employer	Eskom Tutuka Power Station, represented by the authorised Employer's Representative / Project Manager for purposes of administering and accepting the works.
Engineer	A suitably qualified civil or structural engineering professional, or other technically competent person authorised by the Employer, with relevant experience in structural inspections, defect assessment and repair of reinforced concrete structures.
Employer's Representative	The person appointed by the Employer in terms of the NEC contract to administer the contract, review and accept submissions where required, issue instructions, assess compensation events, certify payments, and manage the contractual processes for execution and completion of the works.

Definition	Description
Supervisor	The person appointed by the Employer in terms of the NEC contract to act on behalf of the Employer in relation to technical oversight, quality verification, inspection of the Works, witnessing of tests and hold points, and assessment of whether the works comply with the Scope of Works, drawings, specifications and accepted quality documentation. The Supervisor does not relieve the Contractor of its responsibility to execute and complete the works in accordance with the contract.

2.4 Abbreviations

Abbreviation	Explanation
ITP	Inspection, Testing Plan
QCP	Quality Control Procedure
ISO	International Standards Organisations
OHS Act	Occupational Health and Safety Act
SANS	South African National Standards
BOQ	Bill of Quantity
ECSA	Engineering Council of South Africa
QC	Quality Control
QCP	Quality Control Plan
SANS	South African National Standards

2.5 Roles and Responsibilities

2.5.1 Contractor

a. Execute the defined scope according to contractual agreements.

b. Ensure Compliance with all requirements of the Occupational Health and Safety Act no 85 of 1993 and its regulations to ensure the health and safety of persons carrying out the works.

c. Ensure all employees undergo the relevant training as per their function requirement.

d. Ensure employees are informed of hazards identified in the risk assessment before commencement of Works. The Method Statement shall also be communicated to the employees before commencement of Works.

e. Ensure all employees are medically, physical and psychologically fit to perform the works.

f. Ensure that prescribed PPE for the specified works is worn at all times. The provision of PPE shall be the responsibility of the Contractor.

g. Ensure that all employees undergo safety induction on-site.

h. Ensure that all power tools are inspected as and when required.

2.5.2 Employer

a. Review and approves the Contractor's method statement, risk assessment, QCP and ITP
b. Is present for all applicable hold points of the QCP or ITP
c. Provide Engineering support and information relevant to the scope of work.

2.6 Process for Monitoring

Progress to be monitored via daily reports, hold point inspections, and formal progress meetings.

2.7 Related/Supporting Documents

N/A.

3. Scope of Works

3.1 Civil Works Scope (Applicable to Silos 1–6)

The scope of works shall cover comprehensive structural refurbishment measures applicable to both the internal and external concrete shell surfaces of all six silos. The repairs shall restore durability, prevent further deterioration and enhance the longevity of the silo structures.

3.1.1 General Repairs

- Repair all internal and external concrete deterioration, including but not limited to spalling, honeycombing, surface voids, and cracks.
- Seal structural cracks wider than 0.4 mm using high-performance epoxy injection or appropriate sealants.
- Remove and replace all failed patch repairs using class R4 structural repair mortars in accordance with SANS guidelines.
- Defective concrete shall be removed to sound substrate and reinstated with high-bond repair mortars.
- Rebar with visible corrosion greater than 10% section loss shall be replaced and Reinforcement shall be coated with corrosion inhibitors or protective primers before concrete reinstatement.

3.1.2 Protective Coatings

- Apply waterproof barrier coatings to all previously repaired external areas.
- Coat the full external concrete shell with a breathable, anti-carbonation protective coating to reduce water and air ingress.
- Apply abrasion-resistant coating to the full internal surface of the silos including containment walls and hopper structure.
- Prior to coating, all failed internal coatings must be fully removed and substrate prepared by mechanical means to expose sound concrete.

3.1.3 Stainless Steel Hopper Liner Replacement

- Remove and replace all damaged, missing, or excessively worn stainless-steel liner plates. Liner plates shall be fabricated from 3CR12 or equivalent with a minimum thickness of 5 mm.
- Prior to fabrication, grind and clean the exposed concrete surface and take accurate dimensions based on removed plates to ensure proper fitment.
- Liner plates on the top ring section shall be replaced using 3CR12 plates, installed with full-length and full-width continuous welding. All welds must be ground flush and free of sharp edges to minimize internal wear and improve corrosion resistance.
- Care must be taken during welding to prevent buckling or deformation of liner plates due to heat-induced distortion.
- All worn or corroded anchor bolts and caps securing the liner plates shall be replaced with equivalent approved fixings.
- After liner installation apply Norbak repair compound or equivalent cementitious filler between the upper liner plates and the adjacent concrete wall to ensure full bearing, alignment, and vibration isolation.
- Final extent of liner replacement shall be confirmed during site inspection and verified by the Employer's Representative.

NB!! As a requirement of ISO3834, The contractor is to provide WPQR (Welding Procedure Qualification Record) and WPS (Welding procedure Specification) for review and Acceptance.

3.1.4 Structural Strengthening for Silo 1

- Silo 1 shall be reinforced with carbon fibre wrapping from the level above the access openings up to a height of 36.5 m around the entire circumference.
- The carbon fibre system shall be an externally bonded fabric designed for confinement and axial load enhancement.

- Only qualified and experienced applicators shall install the system. Work shall include full substrate preparation, adhesive application, wrapping, anchorage detailing and post-installation quality control testing.

3.1.5 Mechanical and Ancillary Repairs

- Replace in-loading gratings with new gratings matching size and load rating.
- Replace all damaged or broken silo louvre panels and window glass where deterioration has been noted. Replacement material must be equivalent to the original or as approved by the Employer's Representative.

3.1.6 Materials Note

The contractor shall propose suitable repair materials that meet the performance specifications outlined in this scope. Materials must be equivalent to or better than those listed below subject to approval by the Employer's Representative:

Concrete Repair, Abrasion-Resistant, and Protective Coating Systems:

- EucoSeal.
- TammsCoat 1st Coat
- TammsCoat 2nd Coat
- Tammprime 689
- Carboguard 1340 WB
- Carboguard 891
- Carboguard 892 ARL
- Pro-Struct 528 VO-MCI
- Pro-Struct 529 MCI
- SikaTop Armatec 110 EpoCem
- Renderoc HB
- Renderoc LA
- SCP 743
- SCP 578
- Norbak Cement

Crack Injection Systems:

- Sikadur

- Nitofill

Carbon Fibre Wrapping Systems:

- PC Carbocomp 300
- Dural 632 Epoxy
- SikaWrap
- MapeWrap

Stainless Steel Hopper Liner Plates:

- 3CR12 Stainless Steel Plate: 1250 mm × 2500 mm × 8 mm thick

For a visual representation of the observed damage and typical deterioration conditions across Silos 1 to 6, refer to Appendices A to F. These include representative images captured during inspections to support the quantification and prioritization of the repair works.

4. Input Documentation

The documentation listed below provides essential technical background, structural assessments, and inspection data required for planning and executing the repair and refurbishment of Coal Silos 1 to 6. These documents will be made available to the appointed contractor upon contract award to inform the preparation of detailed method statements, repair strategies and execution planning.

- Approved Structural Condition Assessment Reports for Silos 1 to 6, which include findings from internal and external visual inspections, drone surveys, compressive strength testing, and non-destructive testing (NDT) results. These reports identify critical deterioration areas and contain detailed repair recommendations.
- Laser-Scanned 3D As-Built Drawings, capturing the current geometry of each silo shell and hopper, including shape deformations and deviations from original design to support repair profiling and accurate quantity determination.
- High-Resolution Inspection Photographs, including internal and external views of each silo, showing typical areas of spalling, cracking, exposed reinforcement, and coating failures.
- Repair Specification Guidelines and Repair Material Data Sheets used during the investigation phase to inform the development of this Scope of Works. These documents will serve as a baseline for proposing suitable materials.

5. Exclusions

This scope of Works excludes:

- Works beyond approved defect mapping.

6. Construction and Execution Requirements

6.1 Engineering Supervision and Defect Mapping

The Contractor shall include, as part of their core project team, a professionally registered Civil Engineer (PrEng or PrTech Eng registered with ECSA) who will be responsible for overseeing both the mapping and execution of the structural repair works on Silos 1 to 6. The duties of this in-house professional shall include, but are not limited to:

- Leading the detailed mapping of all internal and external structural defects, including cracks, spalling, honeycombing, exposed reinforcement, and failed coatings.
- Ensuring accurate documentation of all defect locations and extents through marked-up drawings, photographs, and mapping reports.
- Submitting silo-specific defect maps to the Employer's Representative for review and formal acceptance prior to the commencement of any repair works.
- Providing continuous engineering supervision during the execution phase to ensure all repairs are carried out in accordance with the accepted mapping, approved method statements, and the requirements of this Scope of Works.
- Verifying that all completed repairs meet the required performance and quality standards.

Repair activities shall not commence until the mapping documentation has been reviewed and accepted by the Employer's Representative.

6.2 Site Rehabilitation and Housekeeping

The Contractor shall fully rehabilitate all areas affected by the execution of the works and shall maintain a high standard of housekeeping throughout the contract period. Site rehabilitation shall not be left to the end of the project only, but shall be carried out progressively as work fronts are completed.

The Contractor shall, as a minimum, comply with the following requirements:

- All broken concrete, removed liner plates, weld off-cuts, spent abrasives, empty product containers, packaging material, used consumables, and general waste generated during the works shall be removed from the work area on a continuous basis. Waste shall not be allowed to accumulate inside the silos, on access platforms, roof levels, scaffold decks, or around the silo bases.
- Waste shall be separated into appropriate categories, including general waste, scrap steel, stainless steel liner waste, concrete rubble, hazardous waste, and chemical / coating-related waste. Disposal shall only be to approved and legally compliant disposal or recycling facilities. Disposal records, weighbridge slips, and proof of disposal shall be submitted to the Employer's Representative upon request.

- On completion of internal repairs in each silo, the Contractor shall remove all repair debris, dust, blasting residue, loose material, excess mortar, unused filler, welding residue, scaffold components, temporary supports, and foreign objects from the silo interior, hopper zones, access openings, and associated work areas. The internal surfaces shall be left in a clean and safe condition suitable for return to service.
- External work areas including scaffold footprints, rope access drop zones, laydown areas, storage zones, and access routes shall be cleaned and restored to their original or equivalent condition. No tools, materials, waste, temporary barricading, or unused consumables shall remain on site after completion of the works.
- All temporary works and temporary facilities introduced by the Contractor, including rigging anchors, temporary supports, suspended platforms, temporary storage sheds, barricades, signage, waste skips, temporary power supplies, and access control measures, shall be removed upon completion unless otherwise instructed by the Employer's Representative. Removal shall be undertaken without damaging permanent works.
- Any area damaged by the Contractor during access, execution, storage, transport, scaffold erection, rope access installation, or waste handling shall be repaired and made good at the Contractor's cost. This includes damaged concrete, coatings, steelwork, access routes, paving, drainage paths, grating covers, and surrounding infrastructure affected by the works.
- Any existing protective system, corrosion protection, or painted finish disturbed or damaged during the execution of the works shall be reinstated to a standard equal to or better than the original, in accordance with the applicable corrosion protection specification.
- The Contractor shall ensure that no waste, slurry, wash water, cementitious residue, coating residue, blasting media, or contaminants enter stormwater systems, soil, or surrounding plant areas. Spillages shall be cleaned immediately and contaminated material shall be removed and disposed of in accordance with site environmental requirements.
- Final site rehabilitation shall form part of practical completion and handover. The works shall not be regarded as complete until the Employer's Representative has verified that all work areas have been cleaned, all temporary works removed, all waste disposed of lawfully, and all disturbed areas reinstated to an acceptable condition.

6.3 General

The *Contractor*:

1. Adheres to the South African Environment Protection Act, the waste management code of practice and the South African Occupational Health and Safety Act No. 85 of 1993, the regulations promulgated thereunder and Eskom Safety, Health, Environment and Quality (SHEQ) Policy 32-727 and Waste Management Procedure, as well as the plan from KWS for all *works*.
2. Submits a comprehensive Method Statement of the entire *works* to the *Project Manager* for acceptance prior to the start of the *works.*
3. Submit a project specific safety file to the *Employer* for acceptance, prior to the start of the works.
4. Submit a detailed level 4 schedule for the *works* to the *Project Manager* for acceptance after contract award.

5. Manage his access to the working areas and the site to ensure none of the existing plant that is not in the scope is damaged during execution of scope.
6. Manage his activities on Site to ensure that no interference takes place between his work and that of others.
7. Complete "Contract Activities Daily Reports".
8. Identifies a registered waste disposal site, for dumping of waste, which must be approved by the *Project Manager.*
9. Maintain and promote labour harmony on the Site and in the working environment.
10. Immediately report any potential labour disharmony to the *Project Manager*.
11. Provides temporary environmental controls for all construction and production activities to prevent contamination, from the battery limits of the project area, for the *Project Manager's* approval.
12. Method statements, access control plans, waste management plans, and fall protection plans must be approved prior to commencement.

6.4 Subcontracting of Specialist Works

The Contractor may not subcontract any specialist repair activity, or any part of the Works requiring specialist competence, without prior notification to and acceptance by the Employer's Representative / Project Manager.

For each proposed subcontractor, the Contractor shall submit:

- The subcontractor's company details.
- The specific scope to be subcontracted.
- Qualifications, registrations, certifications and relevant project references.
- Names and CVs of key personnel.
- Method statements and quality documentation where applicable
- Confirmation that the subcontractor complies with the requirements of the Scope of Works.

Acceptance of a subcontractor by the Employer's Representative / Project Manager shall not relieve the Contractor of any obligation, liability or responsibility under the Contract. The Contractor remains fully responsible for the acts, omissions, defaults and performance of all subcontractors.

If any accepted subcontractor or key subcontracted resource becomes unavailable, the Contractor shall promptly provide an equivalent replacement, subject to acceptance by the Employer's Representative / Project Manager. Such replacement shall not entitle the Contractor to any extension of time, additional payment, or relief from its contractual obligations, unless otherwise determined in terms of the Contract.

6.5 Key Resources

The Contractor shall ensure the continuous availability of its own key personnel, supervisory staff, professionally registered resources, specialist applicators, skilled artisans, plant, tools and equipment required to execute the Works in accordance with the Accepted Programme and the requirements of the Scope of Works. This shall include, but not be limited to, the professionally registered Civil Engineer / Technologist, rope access personnel, coating applicators, carbon fibre installers, welding personnel, temporary works designer, and any other specialist resources necessary for the proper execution of the refurbishment works.

If any such resource becomes unavailable for any reason, including resignation, illness, reassignment, breakdown, non-performance, or any other cause, the Contractor shall immediately make suitable replacement arrangements at its own cost and risk. Any replacement resource shall be of equivalent or better qualification and experience and must submitted to the Employer's Representative / Project Manager for acceptance before undertaking the relevant duties. The unavailability or replacement of the Contractor's own key personnel, specialist resources, plant, tools or equipment shall not constitute grounds for delay, extension of time, additional payment, or relief from the Contractor's obligations under the Contract, unless otherwise determined in terms of the Contract.

6.6 Access and Work at Height Requirements

The majority of the repair activities on Coal Silos 1 to 6 will be executed at elevated positions, including areas above hopper levels and high wall zones. To enable safe and effective execution of the works:

- Access scaffolding required to reach elevated work zones will be provided by the Client. The Contractor shall inspect the provided scaffolding for safety and suitability before use and may request reasonable modifications if required for specific repair locations.
- In instances where scaffolding access is not feasible or practical due to space constraints or geometry, the Contractor shall make provision for rope access (hooking up) to perform the necessary repairs. Such work shall only be carried out by suitably qualified and certified rope access technicians, in compliance with legal safety standards.
- All personnel performing work at height, whether by scaffolding or rope access, shall hold a valid Working at Heights Certificate.
- The Contractor shall supply and maintain all necessary fall protection equipment, including harnesses, lifelines, helmets, and other PPE, and shall ensure compliance with Eskom SHEQ requirements and the OHS Act.
- A detailed Fall Protection Plan and Access Method Statement must be submitted to the Client for approval prior to commencement of any work at height.
- The Contractor shall design, check, certify and maintain all temporary works necessary for execution of the refurbishment, including but not limited to rope-access rigging arrangements,

temporary support systems, suspended work platforms, liner handling supports and any temporary load-transfer arrangements. All such temporary works shall be designed and certified by a professionally registered ECSA engineer and submitted to the Project Manager for acceptance prior to implementation.

6.7 Pre-execution technical submissions for repairs

Before commencing any repair activity listed in the Scope of Works, the Contractor shall submit to the Employer's Representative for acceptance the relevant detailed method statements, product data sheets, applicator qualifications, mock-up proposals where required, inspection and test plans, and hold-point schedules. Applicator qualifications shall include, as applicable, proof of relevant training / certification by the product manufacturer or equivalent recognised training body, together with project references demonstrating successful execution of similar works. No repair activity shall commence until the relevant submission has been reviewed and accepted by the Employer's Representative.

6.8 Surveying and Setting Out

- The Contractor shall conduct hammer tap surveys, core drilling, ultrasonic pulse velocity, GPR, and other NDT methods as instructed.
- Post-repair tests shall verify bond strength, concrete cover, and coating thickness.
- The Contractor is responsible for the verification of all survey data relating to setting out and to immediately inform the Project Manager of any discrepancies as soon as these are discovered.

6.9 Testing Requirements and Procedures

The Contractor shall conduct all concrete works, geotechnical works and structural works testing in accordance with the latest standard methods and procedures as outlined by the appropriate authorities (B.S/ Euro Code equivalent, A.S.T.M, A.A.S.H.T.O, I.S.R.M, S.A.B.S / S.A.N.S).

The Contractor is responsible for the transportation of all samples to the laboratory as well as the testing thereof.

Any other field testing that may be required in support of the objectives of the design must be carried out with notification to the Employer's geotechnical/civil engineer.

6.10 Acceptance Criteria

Work will be accepted upon verification that all repairs meet dimensional, material, and finish requirements; QCP records are complete; and photographic records are submitted.

7. Acceptance

This document has been seen and accepted by:

Name	Designation
Phathamandla Sithole	Civil Engineering Manager
Vusi Mhlari	Senior Civil Engineer
Nathi Mabaso	Auxiliary Engineering Manager
Hanerike Koekemoer	Auxiliary Engineer

8. Revisions

Date	Rev.	Compiler	Remarks
June 2025	1	O. Matodzi	New document
March 2026	2	O. Matodzi	Final document

9. Development Team

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

- Obert Matodzi
- Hanerike Koekemoer

Appendix A: Coal Silo 1 Drawings and Evidence of deterioration Images

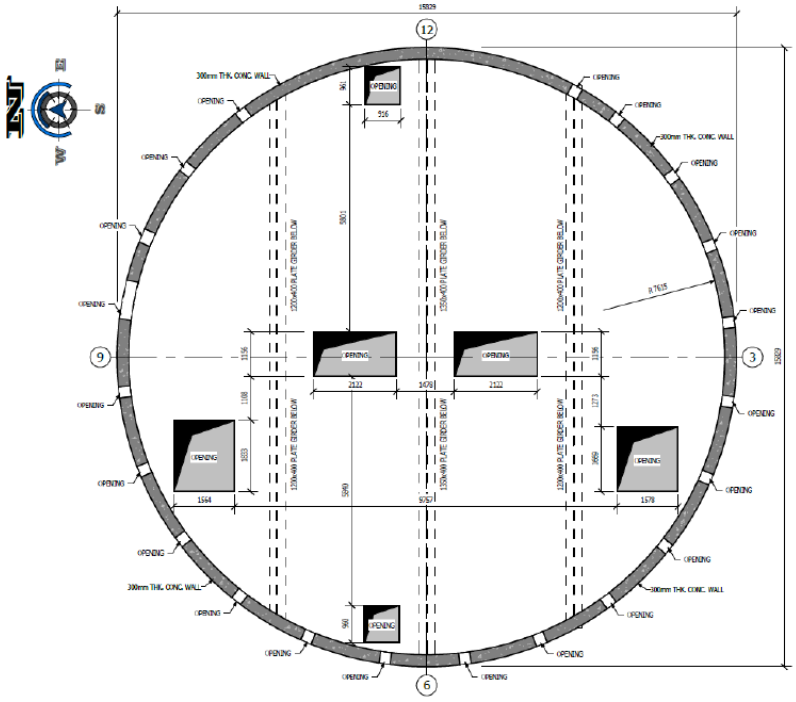


Figure 2: Plan on Silo Roof Slab

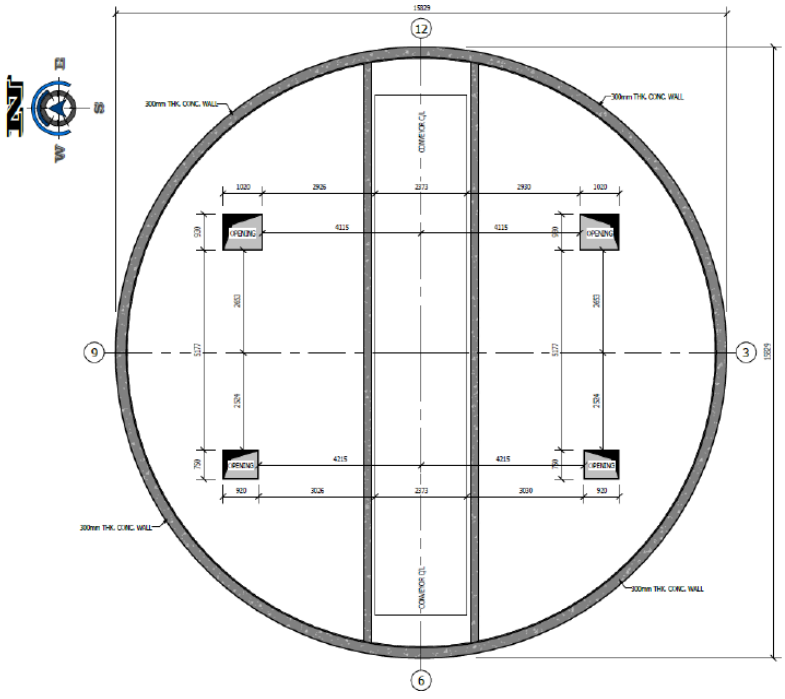


Figure 3: Plan on Hopper Slab

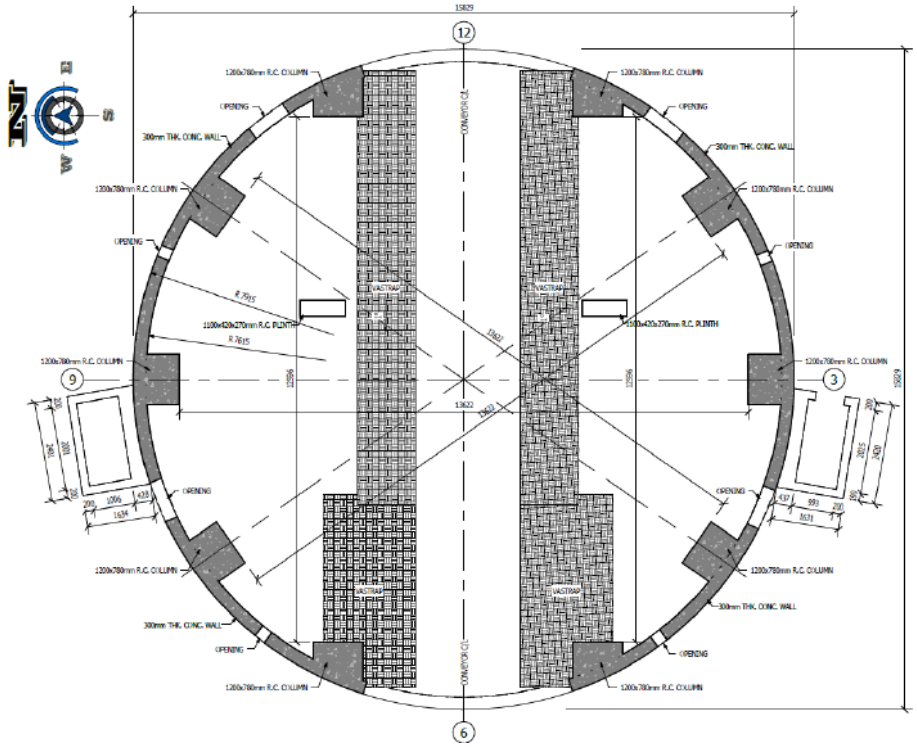


Figure 4: Plan on T.O.C Floor

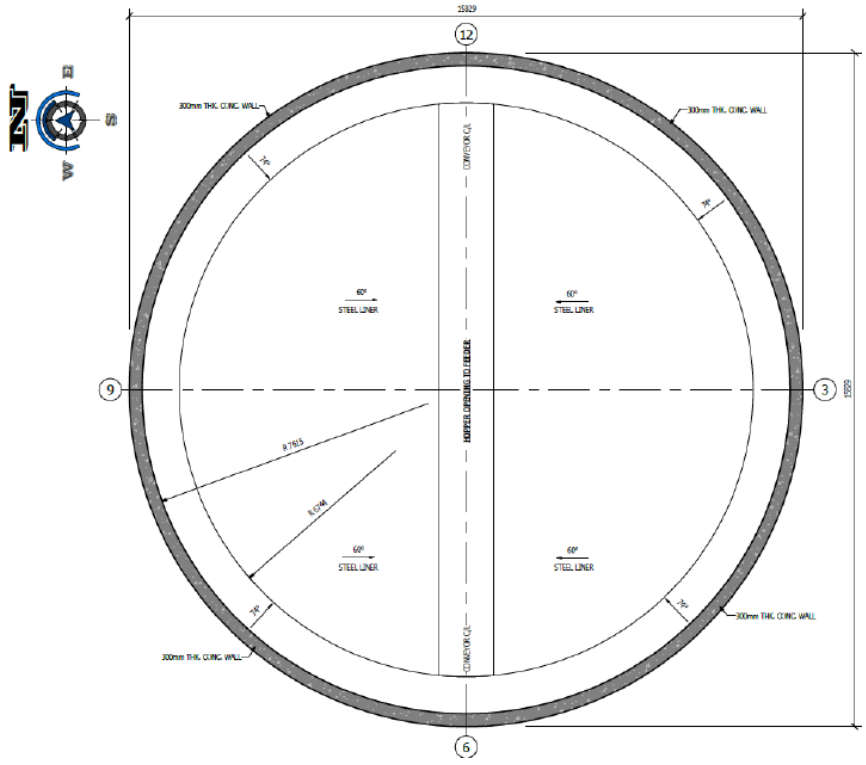


Figure 5:Plan on Top of Steel Liners

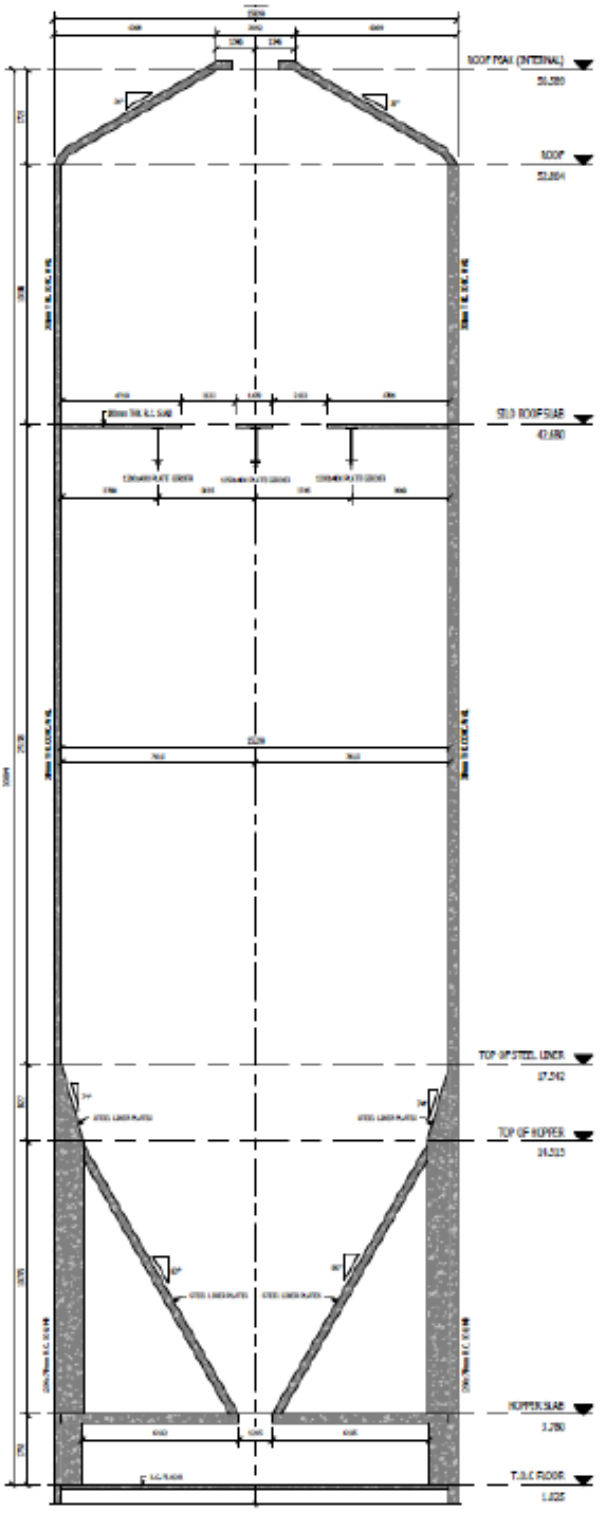


Figure 6: Coal Silo Sectional Elevation

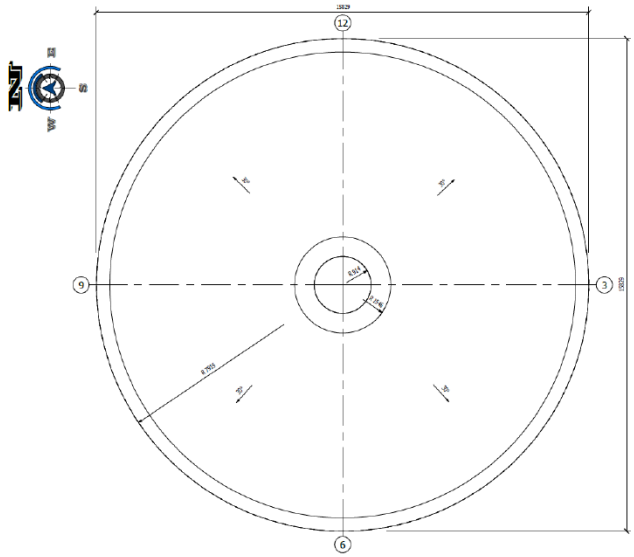
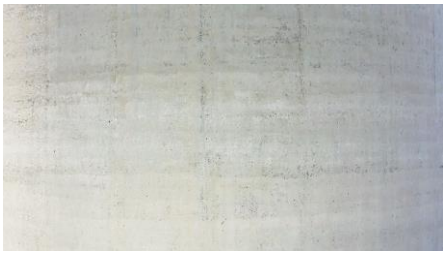
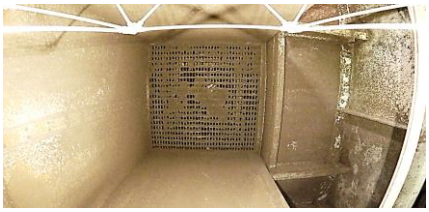


Figure 7: Plan on Silo Roof

Table 1: Silo 1 Photographic evidence

Photo	Description
	South-West, bottom of silo. Evidence of concrete deterioration and porous concrete, and deterioration of the previous concrete repairs on the concrete silo wall.
	West, bottom of silo. Evidence of deterioration of the concrete silo wall and porous concrete. Evidence of damage and corrosion to the bottom conveyor roof sheeting and flashing.
	West, bottom of silo. Evidence of deterioration of the concrete silo wall, and of porous concrete.
	West, middle of the silo. Evidence of deterioration of the previous repairs and of the concrete, and of porous concrete. Evidence of horizontal construction/cold joints with white sulphate deposits.
	West, at the silo roof slab level under the conveyor gantry. Evidence of deterioration of the concrete, previous concrete repairs, and of porous concrete.
	West, at the silo roof level. Evidence of a possible horizontal construction/cold joint, porous concrete, and deterioration of the concrete.

	West, at silo roof level. Evidence of deterioration of the roof waterproofing and corroded top steel cone.
	North-West, above the middle of the silo wall. Evidence of deterioration of the previous repairs and the concrete silo wall, and of porous concrete. Evidence of possible construction/cold joints.
	East (bottom), damage and missing areas of the stainless-steel hopper liner plates above the conveyor spiral bars on the south of the hopper wall.
	South (bottom), evidence of damaged, and missing areas of the stainless-steel hopper liner plates. Concrete surface of the hopper starts to show degradation. Immediate repairs and replacement of stainless-steel hopper plates needed.
	East bottom above the circumferential stainless-steel silo wall liner plate. Evidence of degradation, porous concrete, an, abrasion of the silo concrete wall. Evidence that a cementitious coating was applied on the existing concrete degradation face of the concrete silo wall. Evidence that this cementitious.
	North (top), evidence of corrosion of the roof slab steel support beams, and evidence of corrosion on the extraction fan steel casing and steel grid.

Appendix B: Coal Silo 2 Images

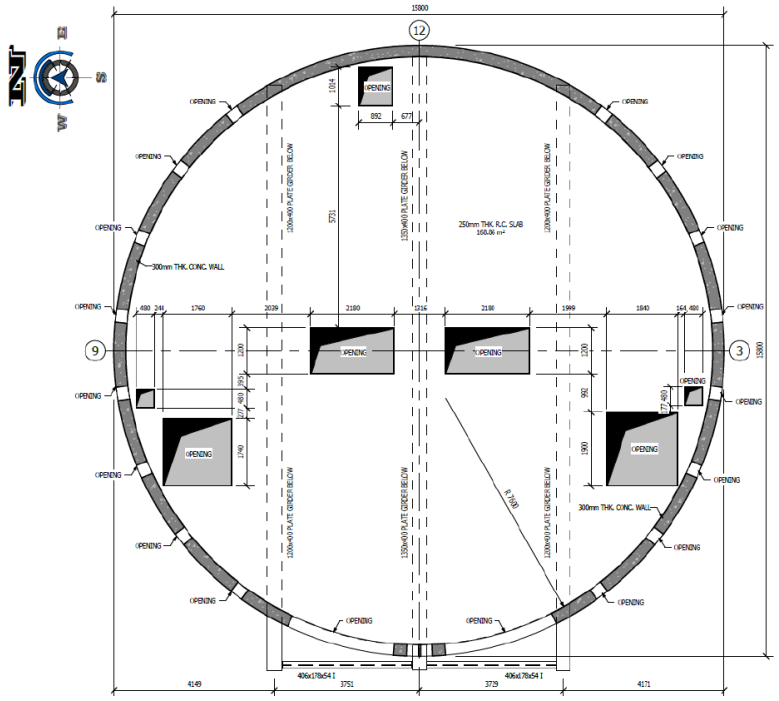


Figure 8:Plan on Silo Roof Slab

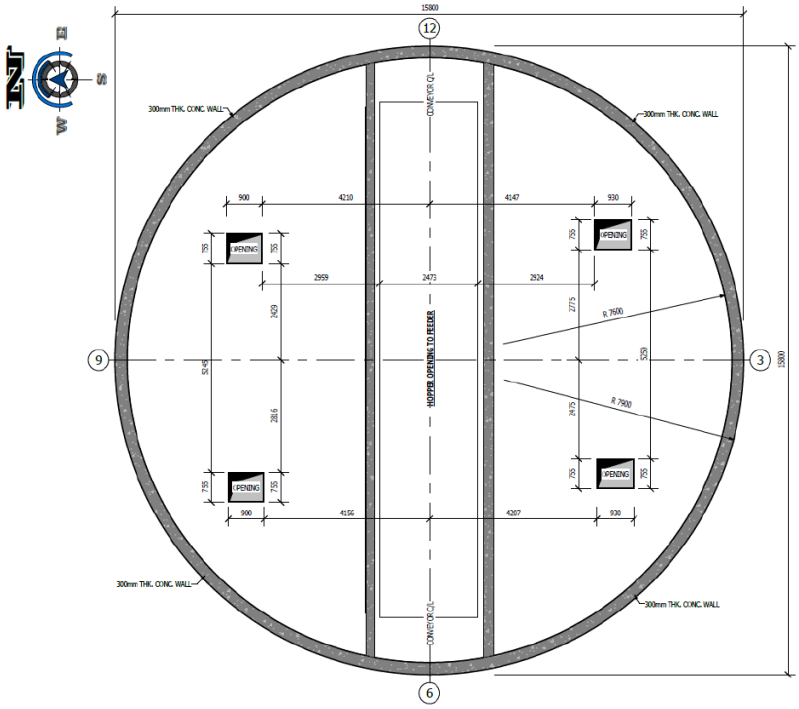


Figure 9: Plan on Hopper Slab

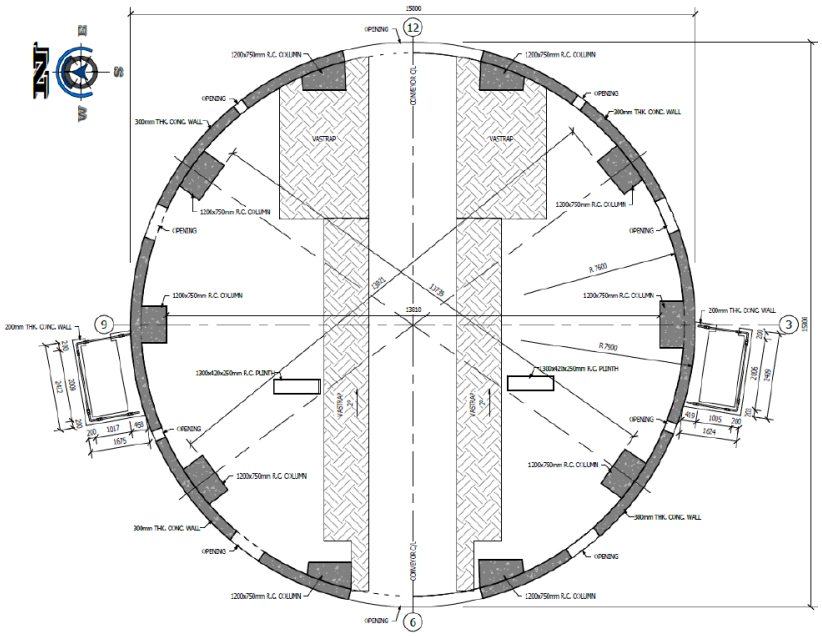


Figure 10:Plan on T.O.C Floor

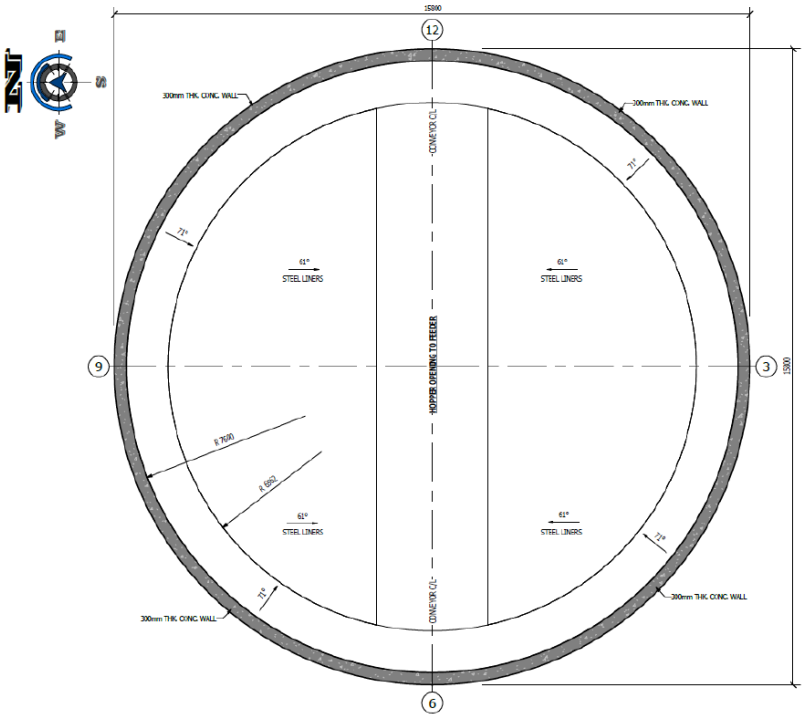


Figure 11:Plan on Top of Steel Liners

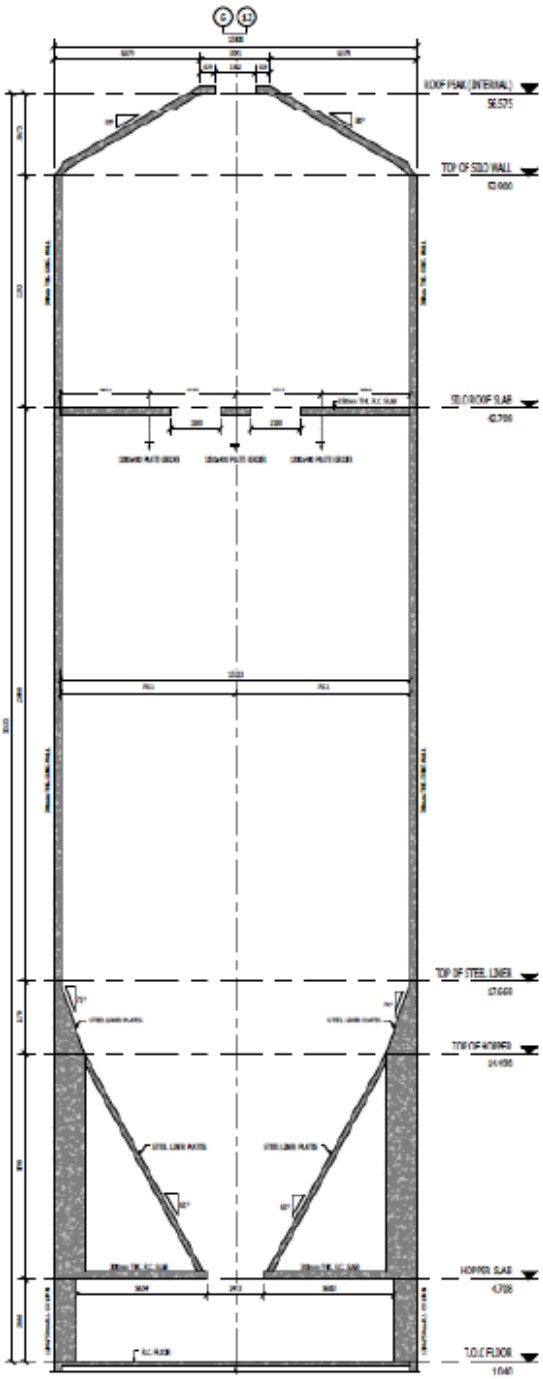


Figure 12:Section on Grid North - South

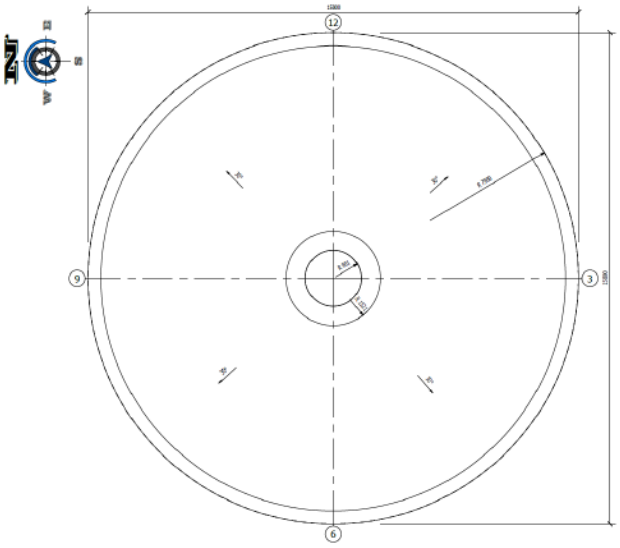
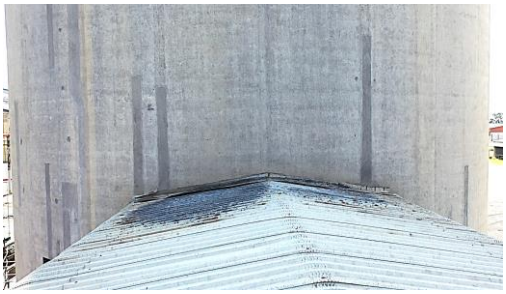
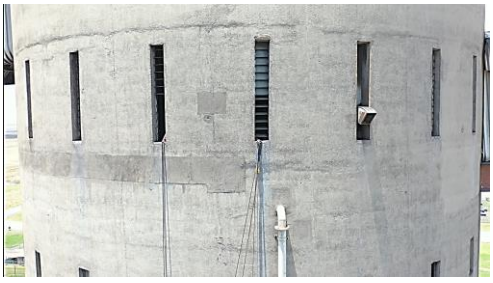
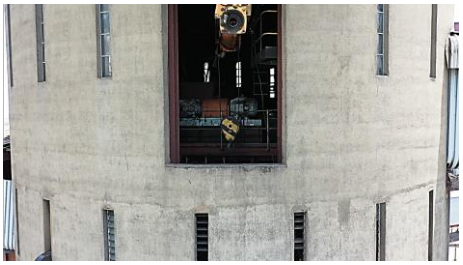


Figure 13:Plan on Silo Roof

Table 2: Silo 2 Photographic evidence

Photo	Description
	South-West, bottom of silo. Evidence of failure of previous repairs.
	West, bottom of silo. Evidence of previous repairs, still in good condition. Evidence of damage and corrosion to the bottom conveyor roof sheeting and flashing.
	North, at silo roof level. Evidence of concrete deterioration, and deterioration of the roof waterproofing.
	North above the roof slab level. Evidence of deterioration of concrete, and failure of the previous repairs. Evidence of a horizontal construction joint.
	East, bottom of the silo above the extraction conveyor gantry. Evidence of failure of the previous concrete repairs, and concrete deterioration.

	South, top of the silo. Evidence of concrete deterioration and previous concrete repairs. Evidence of a possible horizontal construction/cold joint.
	North-West corner (bottom), damaged and missing areas of the stainless-steel hopper liner plates.
	South (bottom), west corner, damaged and missing stainless-steel hopper liner plates. Concrete surface of the hopper starts to show degradation. Immediate repairs and replacement of stainless-steel hopper plates needed.
	North-West corner (bottom), damaged areas of the stainless-steel hopper liner plates. Evidence of corroded and damaged exposed rebar and degradation of the west mass concrete hopper wall.
	North (top), concrete degradation, abrasion, and sulphate deposits on the silo wall. Evidence of a small crack in the silo wall.
	South (top), soffit of the roof slab. Evidence of damage to the steel grid in the opening of the feed conveyor.

Appendix C: Coal Silo 3 Images

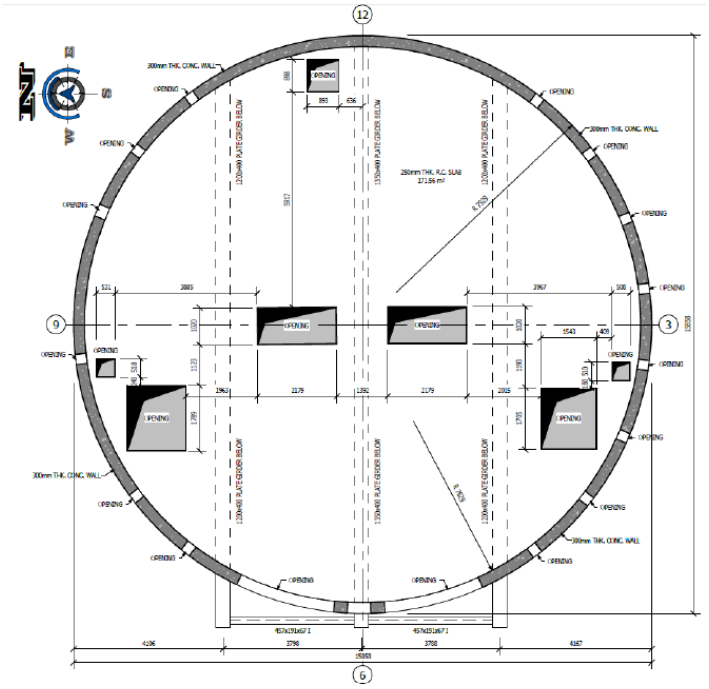


Figure 14:Plan on Silo Roof Slab

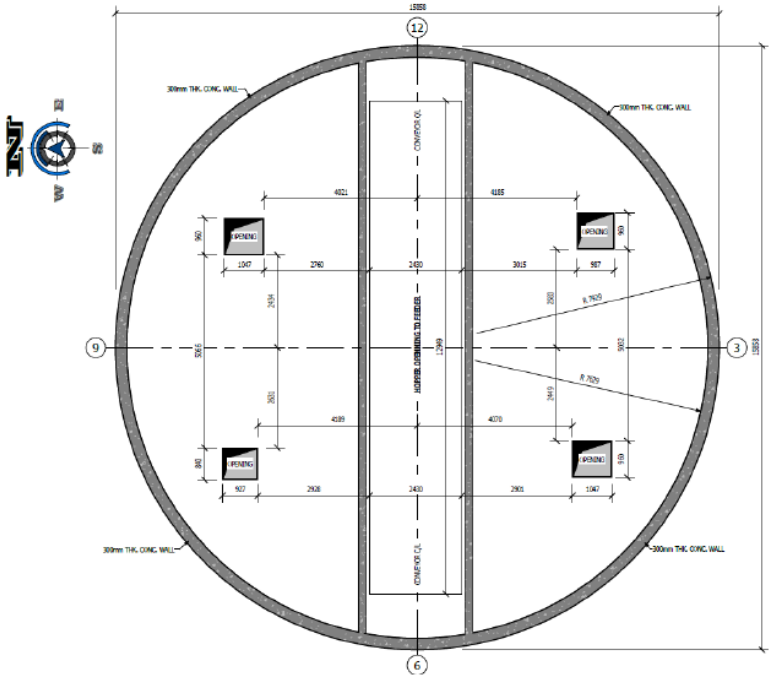


Figure 15:Plan on Hopper Slab

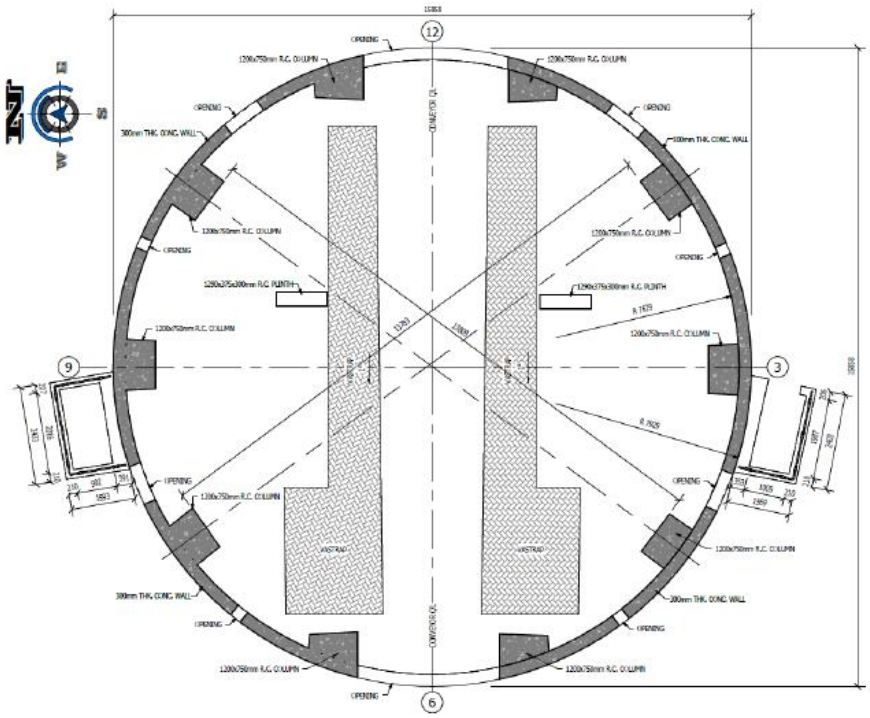


Figure 16:Plan on T.O.C Floor

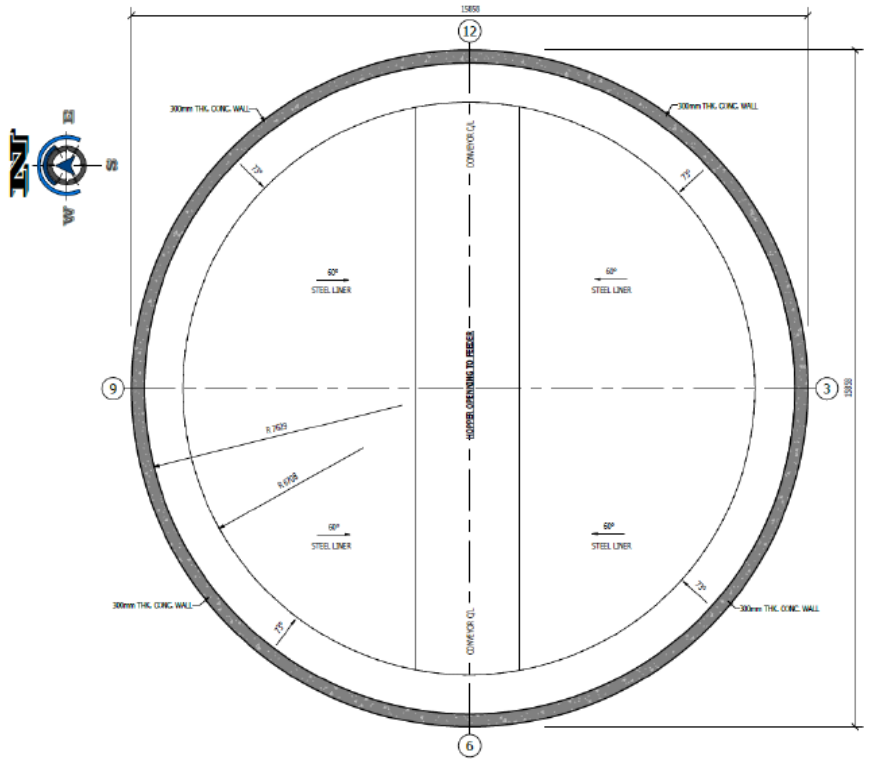


Figure 17:Plan on Top of Steel Liners

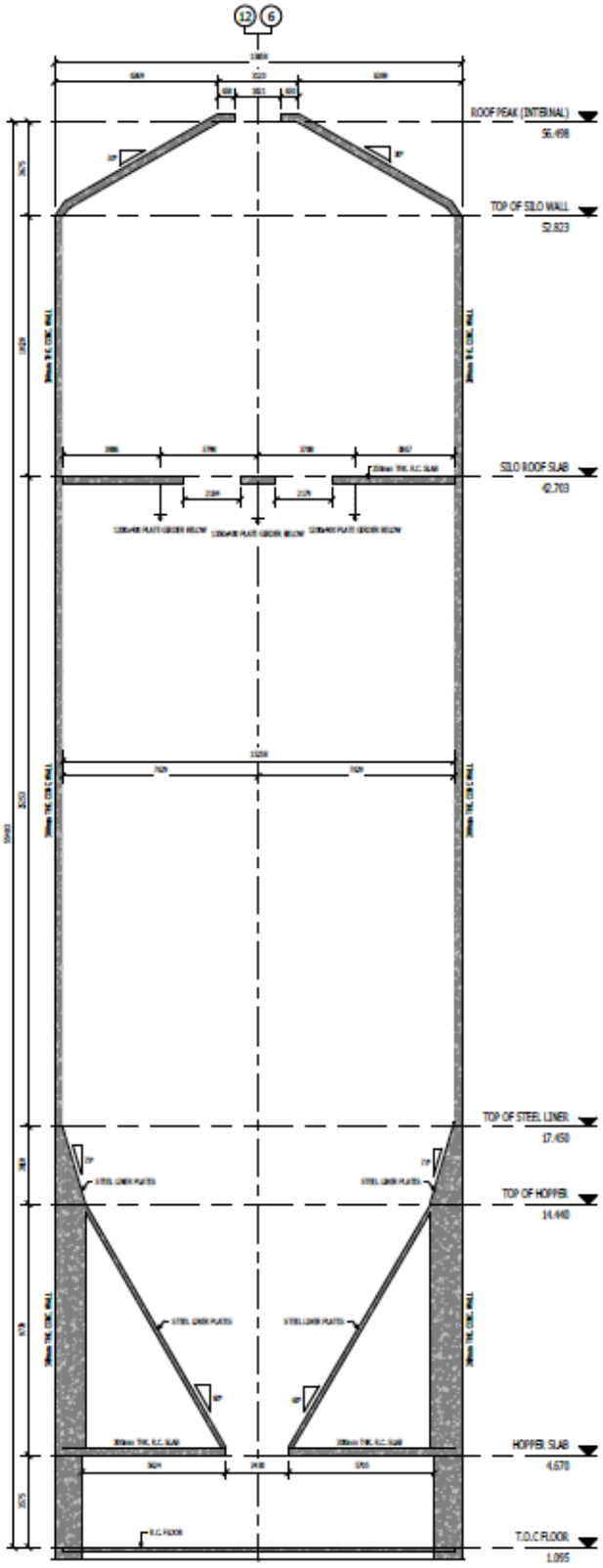


Figure 18:Section on Grid North – South

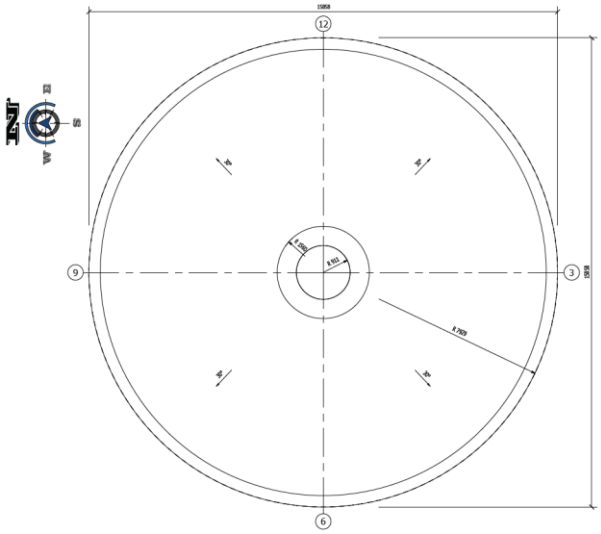
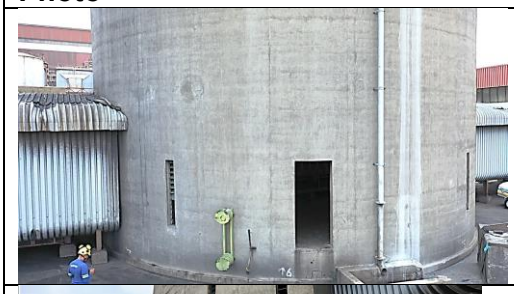
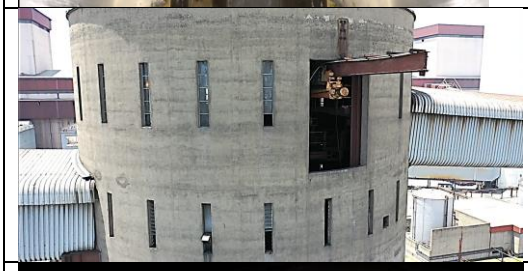


Figure 19:Plan on Silo Roof

Table 3: Silo 3 Photographic evidence

Photo	Description
	South-West, bottom of silo. Evidence of severe corrosion and damage to the conveyor roof sheeting. Evidence of a construction/cold joint and deterioration of the previous concrete repairs and concrete silo wall.
	West, at silo roof slab level under the conveyor gantry. Evidence of deterioration of a previous repair and the concrete, and corrosion of the steel conveyor. Evidence of possible horizontal cracks.
	North, above the roof slab level. Minor concrete spalling at windowsills and evidence of concrete deterioration. Evidence of previous concrete repair deterioration and failure, and possible horizontal cracks.
	East, top under the silo roof slab. Evidence of concrete deterioration and missing and broken windowpanes.
	South, top of the silo. Evidence of concrete deterioration, failure of previous concrete repairs, and concrete spalling at the openings. Evidence of possible horizontal cracks and a construction/cold joint. Location of the top concrete core and NDT tests.
	South, between the bottom and the middle of the silo. Evidence of concrete deterioration, porous concrete, and failure of previous concrete repairs. Evidence of a possible horizontal crack, and a horizontal construction/cold joint.

	West, north and south -corners (bottom), damage and missing areas of the stainless-steel hopper liner plates above the conveyor spiral bars.
	South, top of the silo. Evidence of concrete deterioration and previous concrete repairs. Evidence of a possible horizontal construction/cold joint.
	South (bottom), damage and missing area of the stainless-steel hopper liner plates. Concrete surface of the hopper starts to show degradation. Immediate repairs and replacement of stainless-steel hopper plates needed.
	South(bottom), damage and missing areas of the stainless-steel hopper liner plates. Evidence of degradation of the concrete hopper wall.
	East (top), evidence of degradation, and abrasion on the concrete silo wall under the roof slab. Evidence of a vertical crack.
	South-East (top), soffit of the roof slab. Evidence that the Q-Deck used as permanent shutters has corroded away and is missing. Exposed aggregates with missing fines in the concrete silo roof slab.

Appendix D: Coal Silo 4 Images

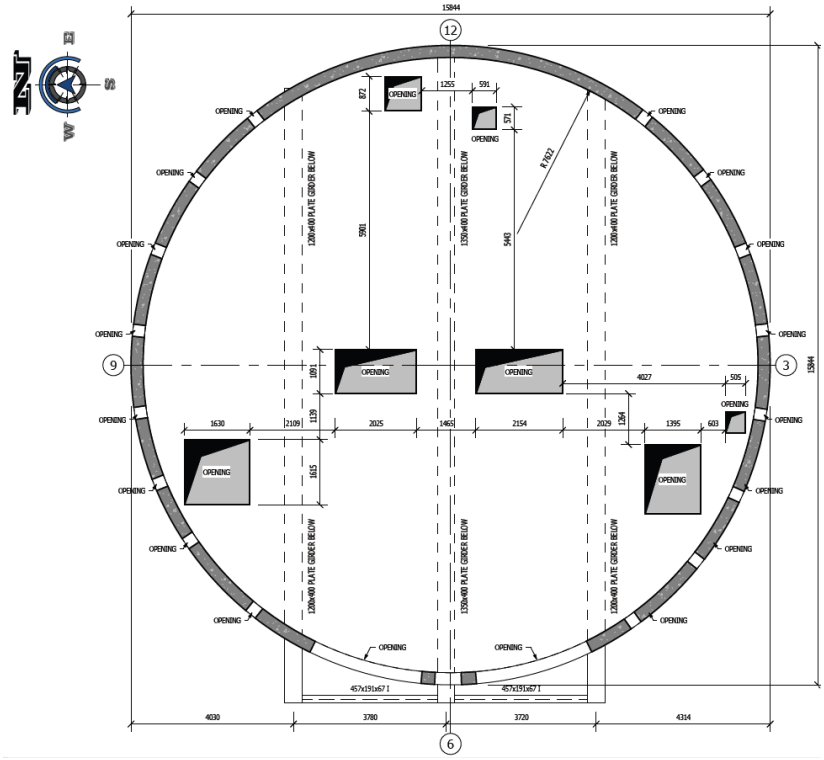


Figure 20:Plan on Silo Roof Slab

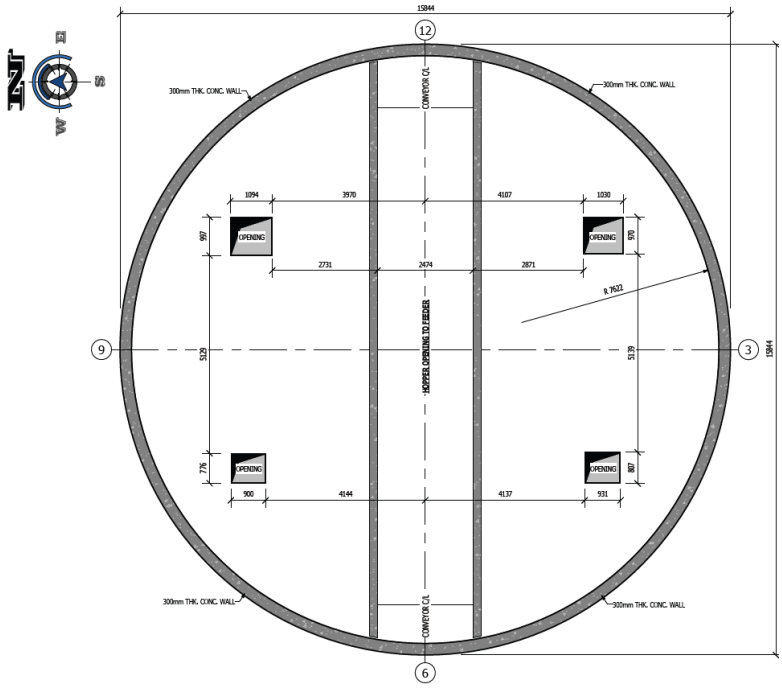


Figure 21:Plan on Hopper Slab

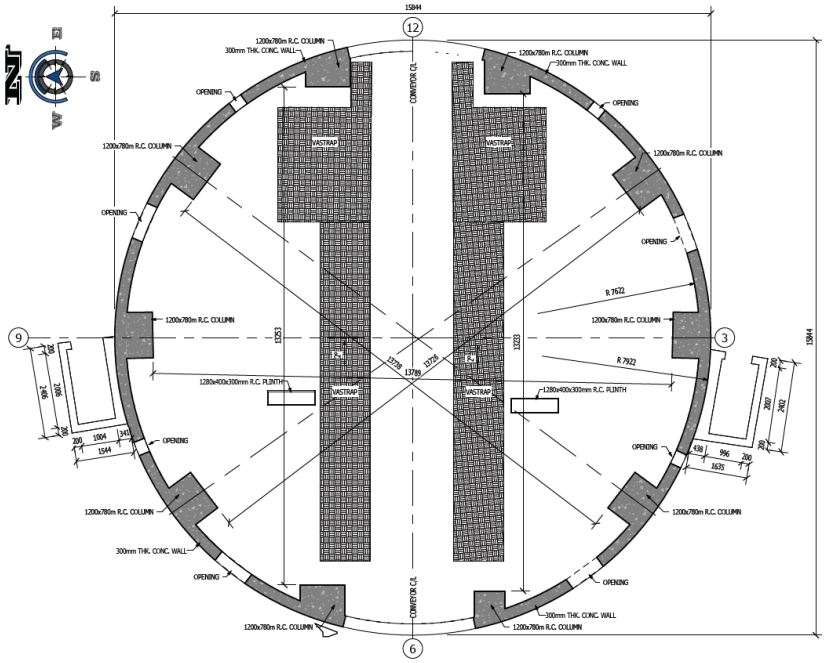


Figure 22: Plan on T.O.C Floor

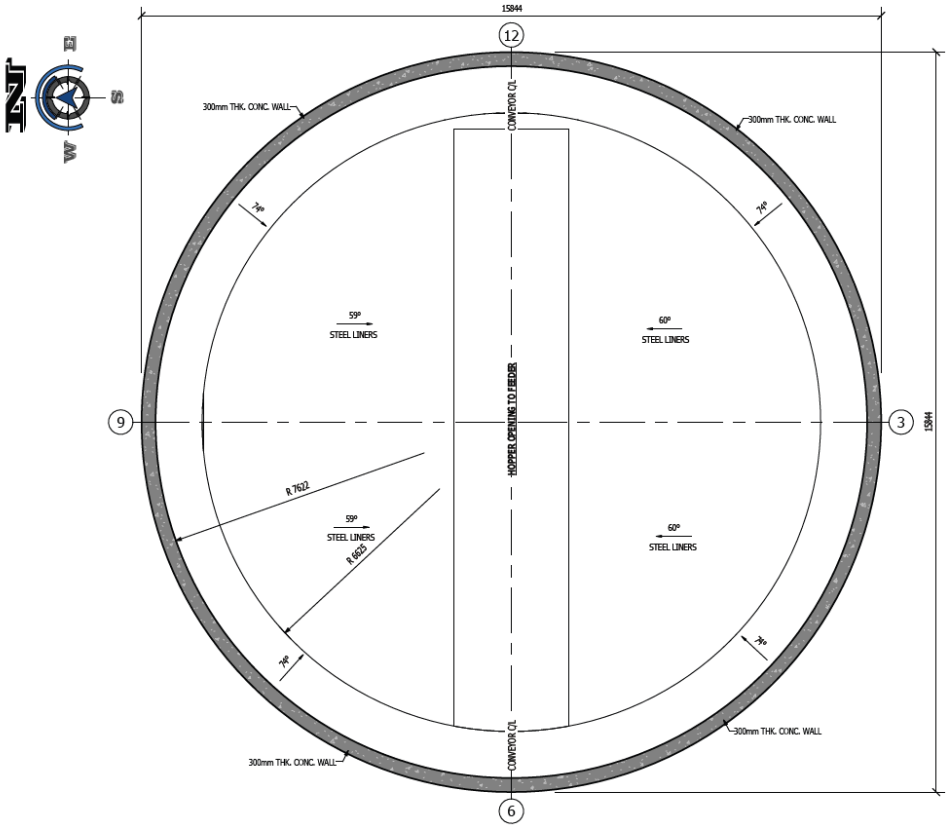


Figure 23:Plan on Top of Steel Liners

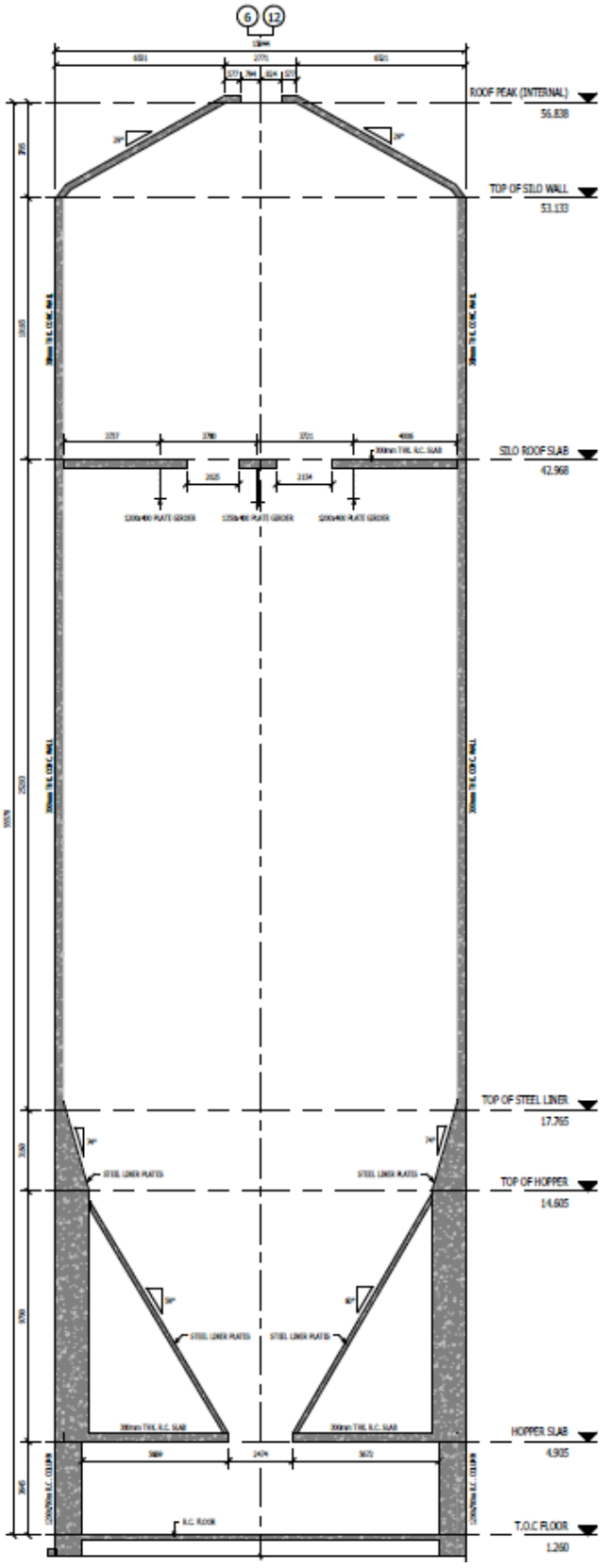


Figure 24:Section on Grid North - South

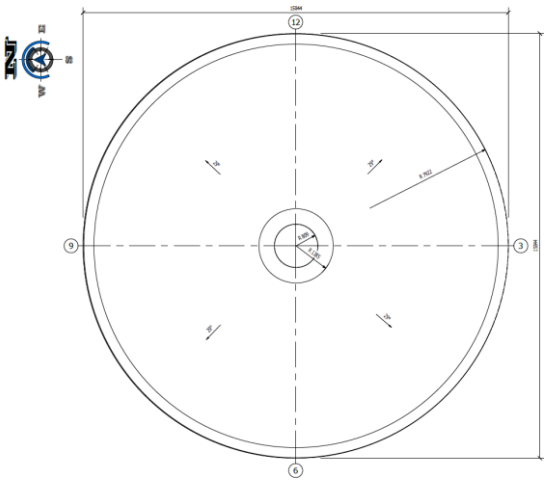
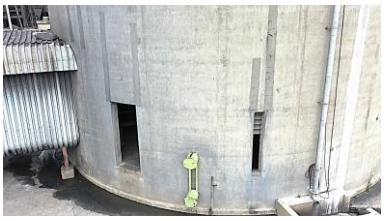
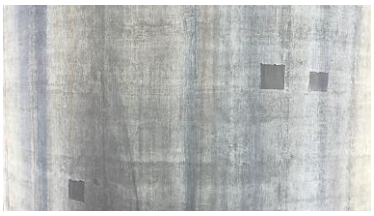
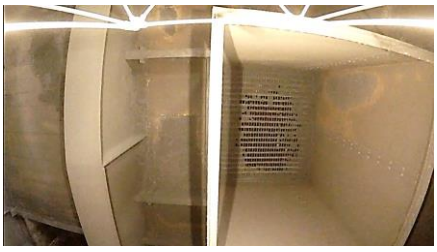


Figure 25:Plan on Silo Roof

Table 4: Silo 4 Photographic evidence

Photo	Description
	South-West, bottom of silo. Evidence of concrete deterioration and porous concrete, and deterioration of the previous concrete repairs on the silo concrete wall. Evidence of a possible horizontal construction/cold joint.
	West, between the middle and the top of the silo. Evidence of deterioration of the concrete, previous concrete repairs, and porous concrete. Evidence of a possible vertical crack.
	East, under the silo roof slab. Evidence of previous concrete repair and concrete deterioration, and of porous concrete.
	East, top of the silo. Evidence of concrete deterioration, porous concrete, and concrete spalling on the roof edge, and deterioration of the roof waterproofing. Evidence of cracks on the roof, and corrosion of the top steel cone.
	East (bottom), damaged and corroded rebar. Deterioration and loss of fines on the concrete hopper wall above the stainless-steel hopper liner.
	East (bottom), damaged and corroded rebar. Deterioration and loss of fines on the concrete hopper wall above the stainless-steel hopper liner.

	West looking East (bottom), evidence of damage to the stainless-steel hopper liner plates on the south and north hopper walls, below spiral bar openings.
	South (top), evidence of concrete degradation, porous concrete, and abrasion on the silo wall. Evidence of white sulphate deposits.
	North (top), evidence of concrete degradation, porous concrete, and abrasion, of the silo wall. Evidence of corrosion of the steel roof slab support cleat, and the Q-Deck permanent shuttering used during construction. Evidence of water leaking through the silo roof slab.
	East (top), evidence of corrosion of the roof slab steel support beams and the Q-Deck used as permanent shuttering during the construction of the silo roof slab. Evidence of corrosion of the open grid cover and frame.
	North (top), evidence of corrosion of the roof slab steel support beams, and evidence of corrosion on the extraction fan steel casing and steel grid.
	South (top), evidence of corrosion of the roof slab steel support beams, and evidence of corrosion on the extraction fan steel casing and steel grid.

Appendix E: Coal Silo 5 Images

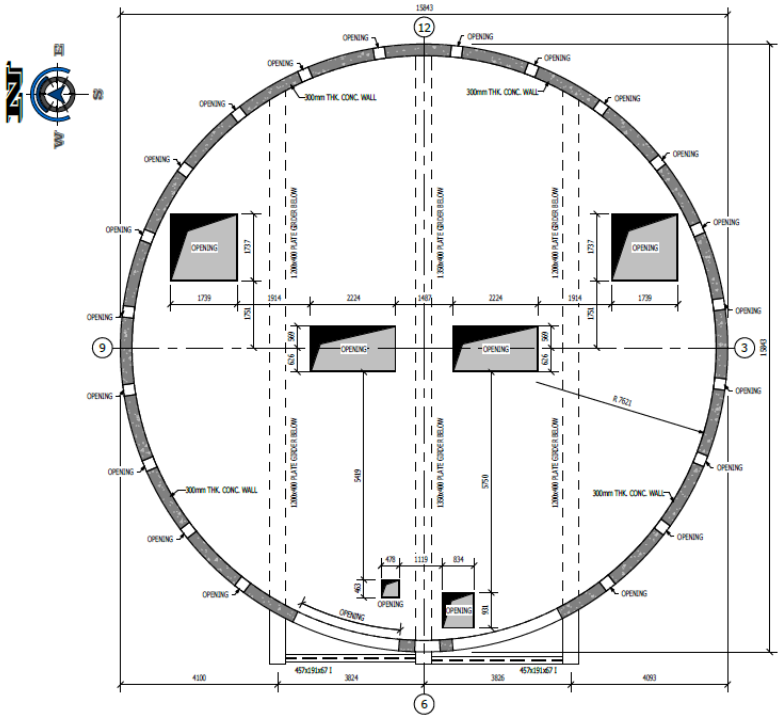


Figure 26: Plan on Silo Roof Slab

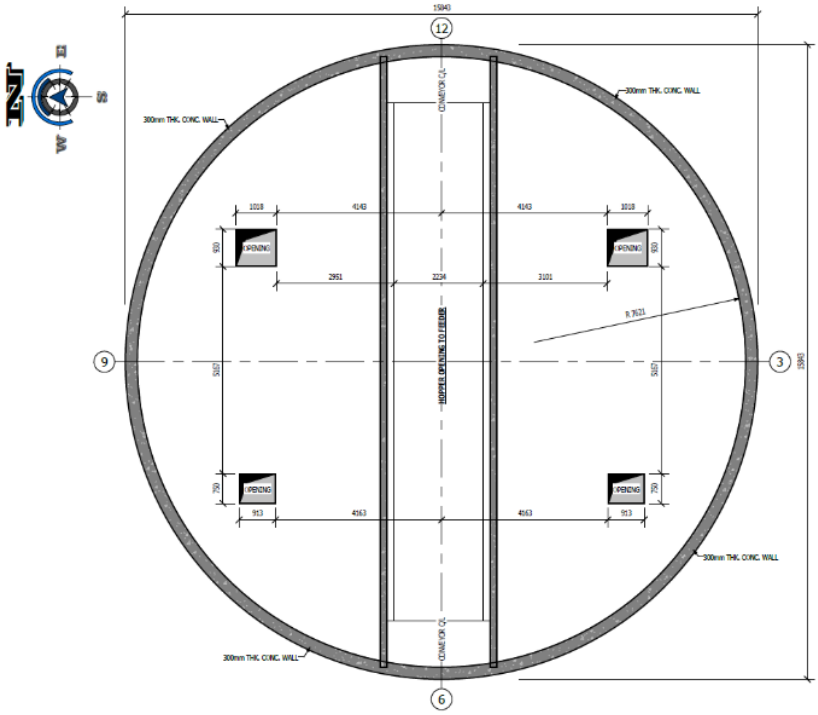


Figure 27:Plan on Hopper Slab

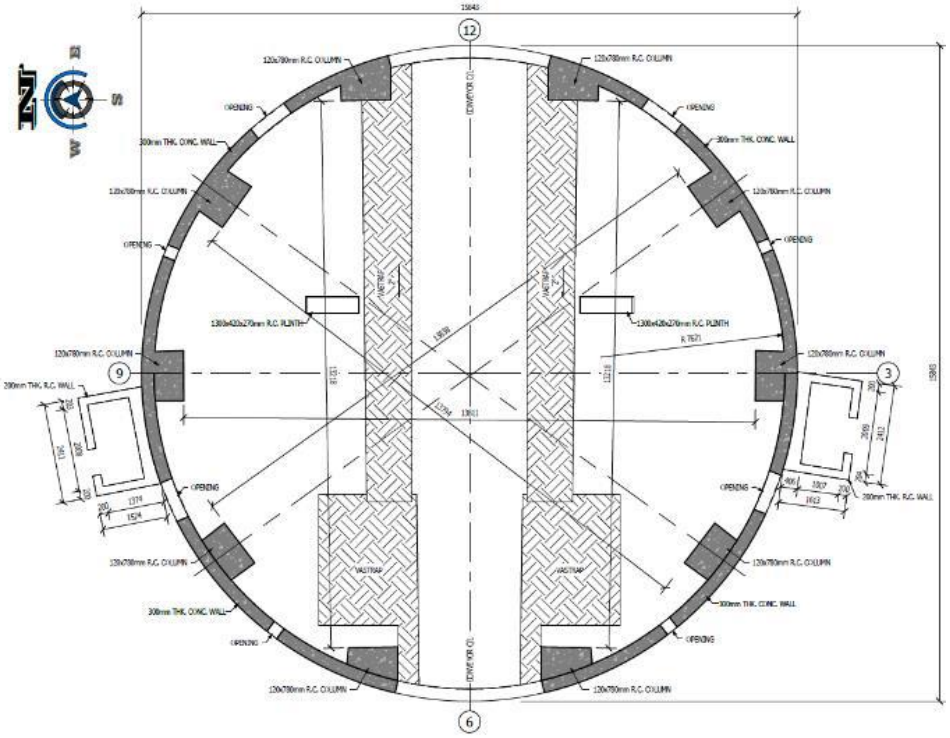


Figure 28: Plan on T.O.C Floor

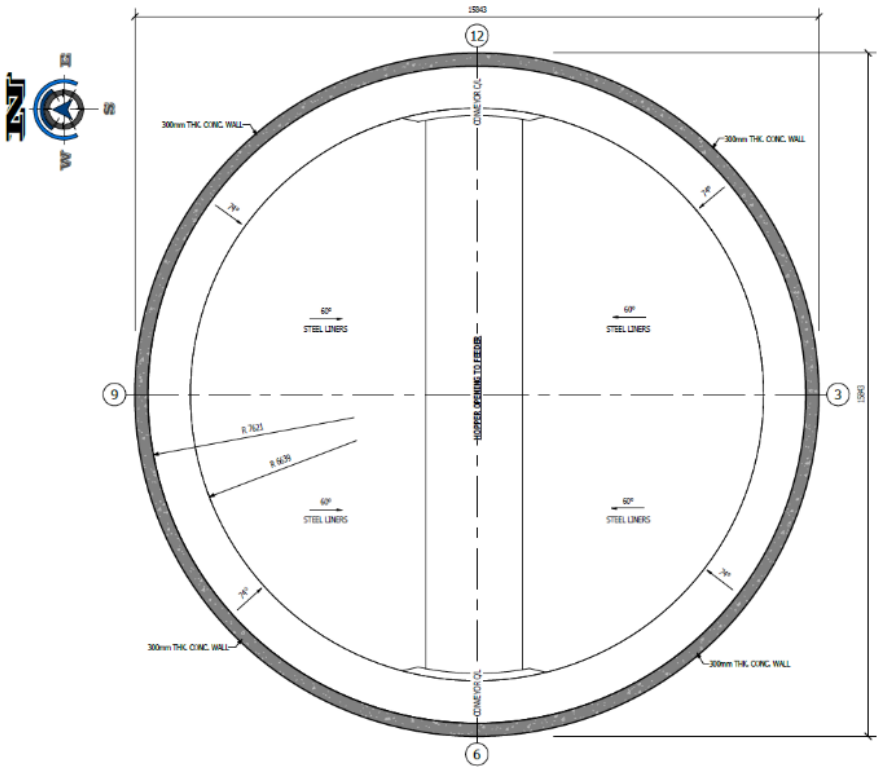


Figure 29:Plan on Top of Steel Liners

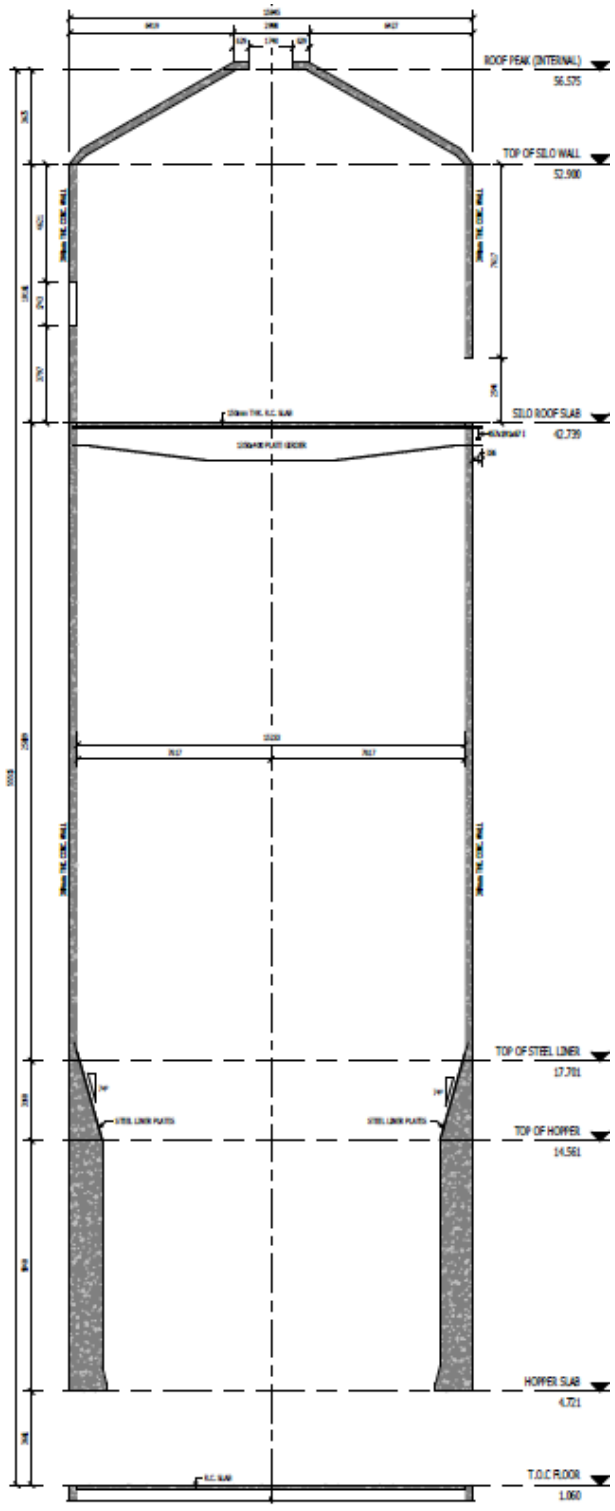


Figure 30: Section on Grid North - South

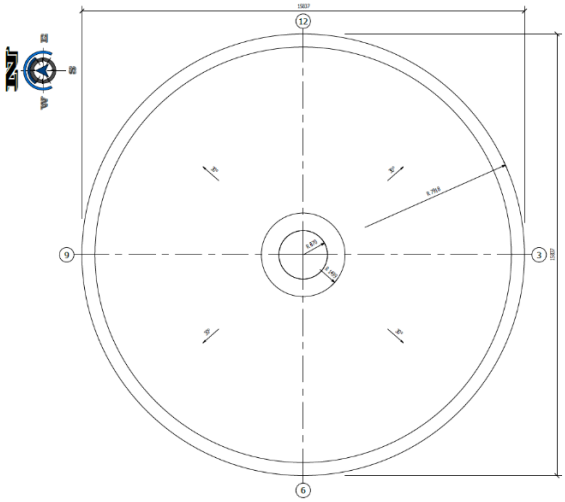
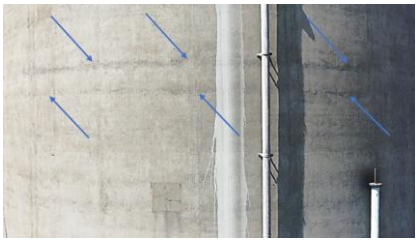
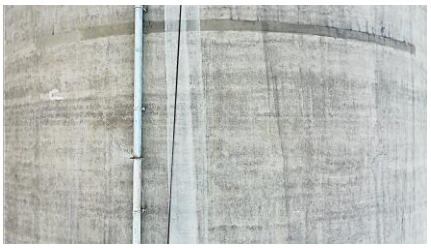


Figure 31: Plan on Silo Roof

Table 5: Silo 5 Photographic evidence

Photo	Description
	West, bottom of silo. Evidence of previous repairs, still in good condition. Evidence of damage to the bottom conveyor roof sheeting and flashing.
	West, at silo roof slab level under the conveyor gantry. Evidence of concrete deterioration.
	North-West, above the roof slab level. Evidence of deterioration of concrete, failure of the previous repairs, and of horizontal cracks.
	North, above the bottom of the silo wall. Evidence of failure of the previous concrete repair and deterioration of the concrete silo wall. Evidence of possible horizontal cracks.
	South, top of the silo. Evidence of concrete deterioration, and failure of previous concrete repairs.
	South-East, top of the silo. Evidence of previous concrete repair failure, concrete deterioration, and concrete spalling at the window openings.

	North (bottom), damage to the hopper liner at the joint between two liner sections.
	North (bottom), damage to the hopper liner at the joint between two liner sections.
	North-West (bottom), corner of the hopper, exposed aggregate, fines missing due to abrasion of the coal.
	North (top), the extraction fan casing is still intact but shows signs of corrosion.
	East (top), Evidence of corrosion on the roof slab steel support beam.
	West, evidence of concrete degradation with white and yellow/brownish sulphate deposits. Evidence of corrosion on the roof slab steel support beam.

Appendix F: Coal Silo 6 Images

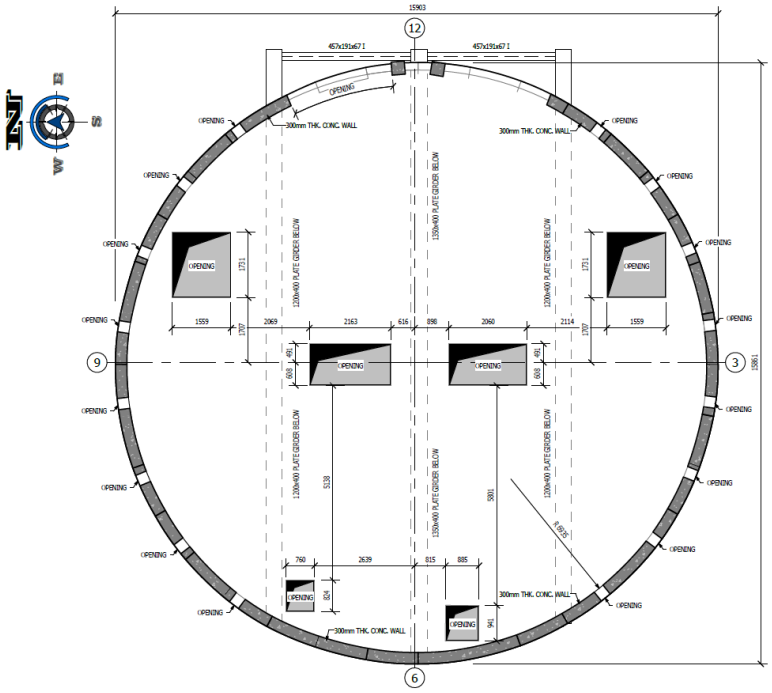


Figure 32: Plan on Silo Roof Slab

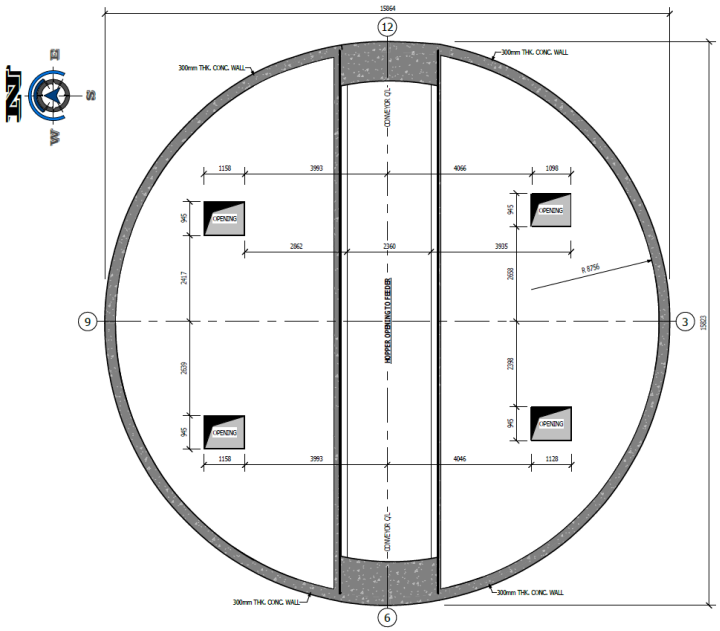


Figure 33: Plan on Hopper Slab

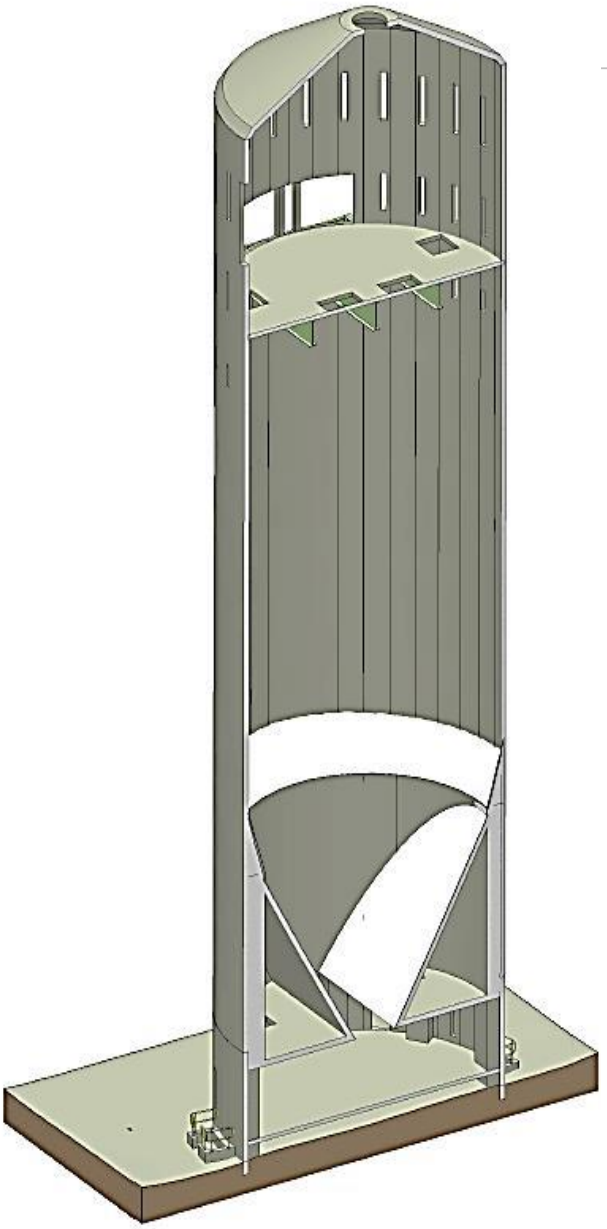


Figure 35: North-South sectional 3D view of the silo

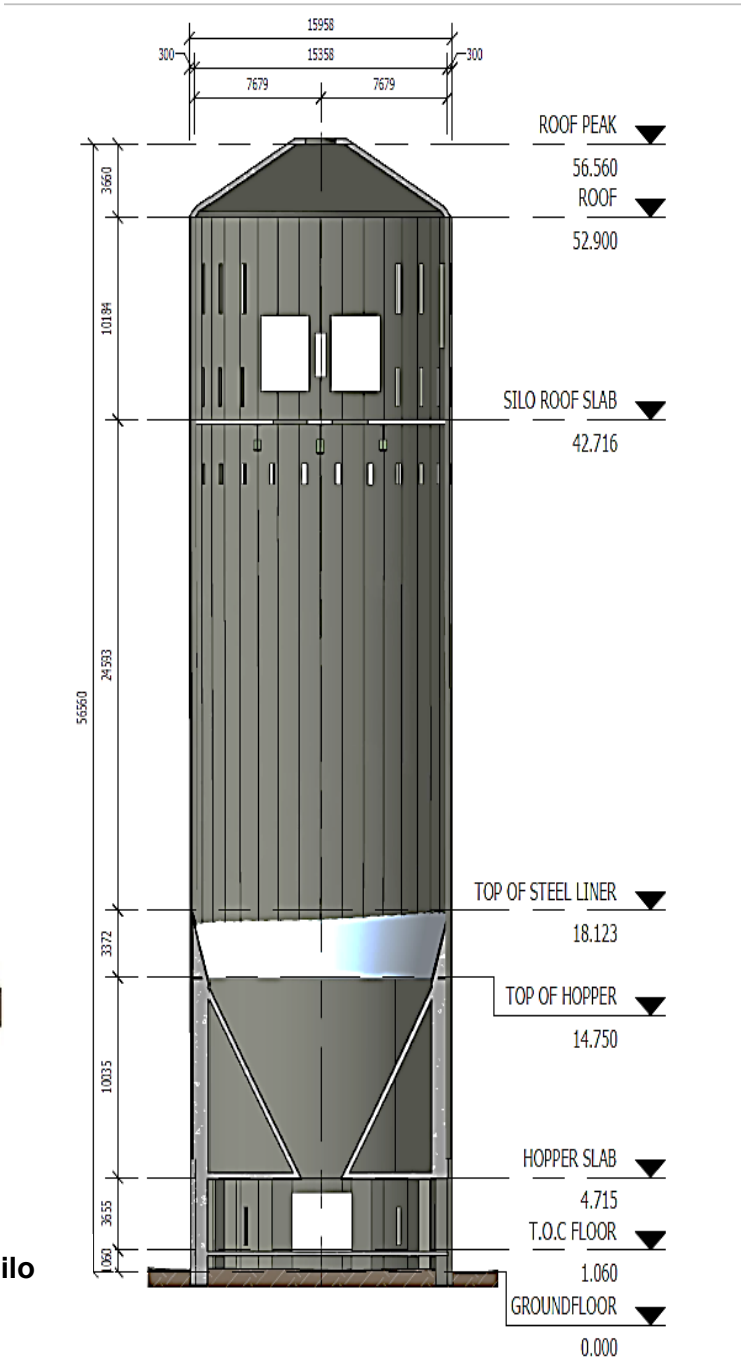
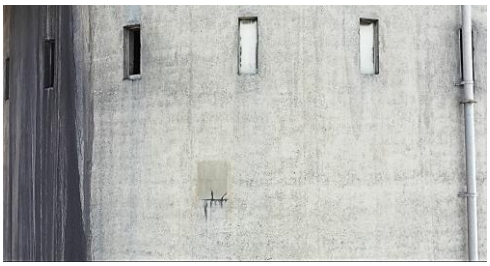
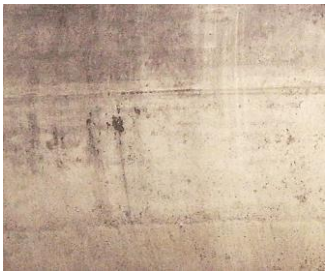


Figure 34: North – South section trough the silo

Table 6:Table 5: Silo 6 Photographic evidence

Photo	Description
	West, bottom of silo, evidence of previous repairs, still in good condition
	North, at silo roof slab and conveyor gantry level. Evidence of previous repairs with minor deterioration.
	North, evidence of concrete deterioration on the silo tube, below the silo roof.
	East, previous repairs still in good condition.
	East, Horizontal crack.
	South-West, previous concrete repairs with evidence of minor failure of the previous concrete repair.

	North-West, concrete degradation, vertical cracks, and abrasion on the silo wall. Evidence of possible horizontal cracks on the rebar above the stainless -steel liner plate at the silo wall and concrete hopper transition.
	North, concrete degradation, vertical cracks, and abrasion on the silo wall. Evidence of possible horizontal cracks on the rebar above the stainless -steel liner plate at the silo wall and concrete hopper transition.
	North, concrete degradation, vertical cracks, and abrasion on the silo wall. Evidence of horizontal cracks on the rebar.
	North, concrete degradation, sulphate deposits, and abrasion on the silo wall under the silo roof slab. Evidence of corroded extractor fan casing.
	North-East, concrete degradation, sulphate deposits, and abrasion on the silo wall under the silo roof slab.
	South, abrasion on the silo wall and evidence of a previous core hole repair.