DETAILED DESIGN AND COMMISSIONING OF THE POINT CONTAINER TERMINAL AT THE PORT OF DURBAN

TERMS OF REFERENCE

NOVEMBER 2023

EXECUTIVE OVERVIEW

Transnet National Ports Authority (TNPA or 'Transnet') plays a critical role in the logistics business through its eight Ports located in the various provinces in South Africa (SA). To improve its service offering, TNPA must continuously take actions to create the necessary port capacity ahead of demand, whilst lowering the cost of doing business to keep the SA economy competitive.

TNPA has developed the KZN Ports Master Plan ("the Master Plan") to reconfigure both the Port of Durban (PoD or 'Port') and the Port of Richards Bay (PoRB), to enable the PoD to achieve the status of Container Hub Port, handling international container traffic, servicing both SA and Southern Africa. Hence, TNPA strives to reduce the costs associated with port activity and efficiencies to improve the attractiveness of South African ports to shipping lines.

To achieve the status of Container Hub Port, PoD must relocate dry bulk commodities (Durban Coal terminal) within the Bluff Precinct to the PoRB, relocate the Navy from the Salisbury Island to the PoRB and create a satellite station on the Bluff Precinct to monitor and protect the waters at the Port.

The segment strategy

Transnet adopted a new approach to infrastructure development to drive SA's trade competitiveness strategy. The strategy consists of 9 segments, one being the container segment strategy. The remaining 8 segments are comprised of Automotive, Coal, Iron Ore, Manganese, Chrome & Magnetite, Liquid Fuels, Gas and Multi-Segment & Other.

The container segment strategy is designed to foster improved maritime connectivity through the establishment of an internationally competitive hub port system, leveraging partnerships to rejuvenate the port terminal businesses, and reform the container rail business. To support its segment strategy, Transnet has conceptualized and developed the Master Plan underpinned by its objectives of:

- Positioning the Port as a regional container hub and a premier terminal for the automotive industry.
- Handling dry bulk including those relocated from the Port and Liquefied Natural Gas (LNG) from the PoRB.
- Relocating the SA Navy base from Salisbury Island in Durban to Naval and Pelican Islands in the Port of Richards Bay and have a Satellite Station at the Port.

The establishment of the Port as a regional hub will also enable the resolution of protracted infrastructure challenges and ensure provision of deeper berths to accommodate the latest generation of vessels in this container gateway port. In this segment, Transnet is striving to enhance its container capacity and efficiency through Private Sector Participation (PSP) initiatives.

For the Port to operate as a regional container hub, significant investment, of approximately ZAR100 billion, is required, across several infrastructure development activities, key amongst these initiatives, is the development of the Point Container Terminal at the Port to increase overall container capacity from 2.9m TEUs to 11.4m TEUs by 2026.

Figure 1 below provides a brief description of the key developments earmarked as part of the proposed developments. The proposed development of the Point Container Terminal (PCT) presents an opportunity of increasing the PCT's current capacity from 200,000 TEUs to 1.8m TEUs ("the Project").

Figure 1: Point Precinct Developments



Project Objectives

The overarching objective of these scope of services is to convert area D-G consisting of Automotive and Multi-Purpose Terminals within the Point Precinct, into one container terminal, thereby increasing container capacity from 200,000 TEUs to 1.8m TEUs at the Point precinct. The PCT will contribute 16% on the capacity ramp-up targeted by the proposed improvements identified in the Master Plan towards the increasing global demand for container capacity. TNPA intends to increase the PoD's overall container capacity from 2.90m to 11.4m TEUs.

The PCT development includes the following:

- Deep water quay wall with a minimum water depth of 18,5m.
- Undertake the reclamation works between the existing and proposed new quay walls.
- Deepening of the approach/entrance channels to accommodate the large vessels at PCT.
- Provide terminal stacking capacity to accommodate 1.8 million TEU capacity per annum.
- Providing new rail terminal with minimum train length of 60m.
- Upgrade all roads leading up to the terminal.
- Provide a new electrical supply to feed the terminal operations and equipment.
- Provide new bulk services including water, sewer, and telecoms to the boundary of the Project.
- Obtain all environmental and statutory approvals for construction of the Project.
- Provide technical support for the proposed new terminal operator to undertake the Project.

Location of the site and access

The PoD is located within the Durban City in the KwaZulu Natal Province of South Africa. The site is easily accessible via the existing N3 Highway and the King Shaka International airport is 36 minutes from the Port. There is adequate and efficient roads and rail to enable logistics requirements. The PoD is an old, constructed port, protected by two breakwaters, the northern is 0.335km in length, while a secondary southern breakwater 0.700km. The location is latitude 29.8628°S, longitude 31.0351'E.

Figure 2 : Site location



PROJECT SCOPE OF WORK AND DELIVERABLES

The scope of work and deliverables will be undertaken in different phases as per below:

- Phase 1 Detailed Engineering and Approved-For-Construction Designs
 - Task Order 1 Conceptual designs
 - Task Order 2 Completion of detailed designs and construction preparation
- Phase 2 Procurement Support and Construction supervision
 - Task Order 3 Development of the RFP, Evaluation, and appointment of Contractor
 Task Order 4 Construction Management and Engineering
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- Phase 3 Commissioning and Terminal Operator support • Task Order 5 – Technical support to the Terminal Operator

The Detailed Scope of Work and Deliverables for the Phase 1 are described below:

PHASE 1 – DETAILED ENGINEERING AND APPROVED-FOR-CONSTRUCTION 1. DESIGNS

1.1 Task Order 1 – CONCEPTUAL DESIGNS

The Deliverables under Task Order 1 (Conceptual Designs) are listed below:

- Options development and validation
- Geotechnical investigations •
- Surveys •
- Engineering model and philosophy •
- Traffic studies and Road & Rail preliminary designs •
- Work breakdown structure •
- Infrastructure breakdown structure •
- Works specifications for Early Works •
- Develop preliminary cost estimates •
- **Project Schedule** •
- Project conceptual designs and report

Options development and validation 1.1.1

The Service Provider will undertake development of options (a minimum of 4 options) including but not limited to, comparing the use of the existing quay wall and current layout APPENDIX B versus the proposed layout developed on APPENDIX B (Proposed Point precinct with Auto and PCT) and approved by TNPA as detailed in Figure 3. The options development shall include the following:

- Type of key structures •
- **Operational lavout**
- Phasing, and related infrastructure •

The Service Provider shall use appropriate technology to simulate, model, and develop various phasing options, while considering the required optimization of capital, to accommodate Transnet's phasing option requirements, as well as producing the proposed designs, schedules, cost estimates, constructability sequencing, risks and assumptions associated with the new phasing methodology.

DELIVERABLE: OPTION DEVELOPMENT REPORT

1.1.2 Geotechnical investigation

The scope of the geotechnical investigations includes the following:

- Review of the historical geotechnical report for PoD, for all landside and waterside infrastructure.
- Prepare the scope of works for all the required geotechnical investigations required for the Project, including all landside and waterside infrastructure, such as (but not limited to) soil sampling, borehole data and loading capacity.
- Issue the bid to the prospective geotechnical contractors, receive bids, evaluate, seek approval of Transnet for the recommended contractor, appoint the contractor, conclude a services agreement with the contractor.
- Manage the geotechnical contractor, and submit interpretative geotechnical investigation report to Transnet, for review and approval.

The geotechnical investigation scope must be based on the TNPA sampling and boreholes guidelines. All services rendered must comply with TNPA SHE Specifications. Transnet has undertaken the Front-End Loading 2 (Pre-feasibility Study) for this Project which has informed the initial estimate of the geotechnical costs and has undertaken similar geotechnical studies at other terminals within the Port and other ports under management. As a result, each bidder must allocate an amount of **ZAR 18 000 000 (eighteen million South African Rands)**, as part of this RFP, to contract and settle the costs of the contractor who will undertake the geotechnical investigations. This amount does not constitute the final amount to be spent for this deliverable, but rather a budget allocation subject to final costs sourced through the procurement process for the geotechnical contractor. Bidders may add, to this estimate, their cost of time for supervision, contract management and preparation of the geotechnical report.

DELIVERABLE 1: GEOTECHNICAL INVESTIGATIONS REPORT

1.1.3 Surveys

The scope of work for the Surveys includes the following:

- Prepare the scope of works for all the Surveys required for this Project. The scope of the Surveys must include, but are not limited to the following:
 - Land surveys.
 - Topographical surveys.
 - Hydrographic surveys.
 - Multi beam survey.
 - Bathymetric surveys.
- Issue the bid to prospective surveys contractors, receive bids, evaluate, seek approval of Transnet for the recommended contractor, appoint the contractor, conclude a services agreement with the contractor.
- Manage the contractor, and submit interpretative surveys investigation report to Transnet, for review and approval.

The Surveys must be based on standard surveying (Geomatics Regulation) for marine works. All services rendered must comply with TNPA Specifications, which will be provided to the preferred bidder following conclusion of a services contract. Transnet has undertaken the Front-End Loading 2 (Pre-feasibility Study) for this Project which has informed the initial estimate of the geotechnical costs and has undertaken similar geotechnical studies at other terminals within the Port and other ports under management. As a result, each bidder must allocate an amount of **ZAR 12 000 000 (Twelve Million South African Rands)**, as part of this RFP, to contract and settle the costs of the contractor who will undertake the Surveys. This amount does not constitute the final amount to be spent for this deliverable, but rather a budget allocation subject to final costs sourced through the procurement process for the geotechnical contractor. Bidders must add, to this, their cost of time for supervision, contract management and preparation of the report.

DELIVERABLE: SURVEYS REPORT

1.1.4 Engineering model and operating philosophy

The scope of the engineering model and operating philosophy includes the following:

- Review the historical data for port infrastructure and bulk services.
- Prepare the scope of works for the Engineering Model and Operating Philosophy for the Project.
- Issue the bid to prospective specialists, receive bids, evaluate, seek approval of Transnet for the recommended specialist, appoint the specialist, conclude a services agreement with the specialist.
- Perform a Simulation Study for the Project to confirm terminal throughput, electrical reticulation, and bulk services as well as the various scenarios and method of construction to satisfy the preliminary business requirements. This includes the development of the methodology for relocation of cargos in the existing terminal and interfaces for minimizing operational disruptions.

Transnet has undertaken the Front-End Loading 2 (Pre-feasibility Study) for this Project which has informed the initial estimate of the Engineering Model and Operating philosophy. As a result, each bidder must allocate an amount of **ZAR 5 000 000 (Five Million South African Rands)**, as part of this RFP, to contract and settle the costs of the Specialist who will undertake the model philosophy. This amount does not constitute the final amount to be spent for this deliverable, but rather a budget allocation subject to final costs sourced through the procurement process for the Specialist. Transnet will provide the relevant guidance and support to the bidder to facilitate the acceptance of the Engineering Model and Operating Philosophy with the relevant stakeholders.

DELIVERABLE: ENGINEERING MODEL AND OPERATING PHILOSOPHY

1.1.5 Traffic studies as well as the Road & Rail Plan

Transnet has undertaken the preliminary road and rail designs for the development of the Project. In these designs, Transnet intends to maximise the use of rail to move containers in and out of the PCT. Transnet wish to develop a road and rail plan that meets its own as well as the requirements of the eThekwini Metropolitan Municipality before the detailed designs for the road and rail packages are completed.

It is required that the appointed Service Provider must undertake a Traffic Study, which will be used to develop the Road and Rail Plan, to ensure there is sufficient provision for the efficient movement of goods within the PoD area. This will ensure that Transnet addresses any concerns by Interested and Affected Parties who may raise objections to the proposed terminal development.

Transnet has undertaken the Front-End Loading 2 (Pre-feasibility Study) for this Project which has informed the initial estimate of the Traffic Study. As a result, each bidder must allocate an amount of **ZAR 8 000 000** (Eight Million South African Rands), as part of this RFP, to contract and settle the costs of the Specialist who will undertake the Traffic Study. This amount does not constitute the final amount to be spent for this deliverable, but rather a budget allocation subject to final costs sourced through the procurement process for the Specialist.

DELIVERABLE: TRAFFIC STUDY AND ROAD & RAIL PRELIMINARY DESIGN

1.1.6 Work Break-down structure

The Service Provider will develop a detailed work breakdown structure and develop the procurement work packages. This information will be used to undertake and guide the detailed design phase in the subsequent phases. The Service Provider must produce a detailed Work Breakdown Structure (WBS) packages description for each infrastructure package.

DELIVERABLE: WORK BREAK-DOWN STRUCTURE

1.1.7 Infrastructure Breakdown Structure

The Service Provider shall prepare and develop the infrastructure Breakdown Structure (IBS) based on the PCT infrastructure scope and submit it to Transnet for approval. The Service Provider should track all scope changes and scope development against the IBS. The IBS includes all tangible assets envisaged, not only engineering, but all infrastructure to ensure a complete solution, e.g., infrastructure like, roads, rail, substations, quay side fenders, loading and off-loading facilities, ICT, and security access items such as perimeter fencing etc.

DELIVERABLE: INFRASTRUCTURE BREAKDOWN STRUCTURE

1.1.8 Works Specification for Early Works

Prepare and complete Works Information and specifications of the Early Works package for tender purposes DELIVERABLE: EARLY WORKS TENDER SPECIFICATIONS

1.1.9 Develop preliminary estimates

Prepare and complete the cost estimate (including a contingency value) for the total scope of works based on the preliminary designs and risk profile. In determining the cost estimates, the Service Provider should consider material and labour to be sourced at jurisdictions outside the Republic of South Africa, denominated in foreign currency, and make provisions for this portion of the cost estimate. These preliminary cost estimates will be the input into the development of the Bankable Business Case.

DELIVERABLE: COST ESTIMATES BASED ON PRELIMINARY DESIGNS

1.1.10 Project schedule

Prepare and complete a Level 4 project schedule (detailed schedule prepared by project leads to monitor dayto-day project activities to measure project progress and success) based on the preliminary design. Based on the risk profile sufficient time allowance will be made to baseline the schedule for full project execution. This schedule will become the basis for developing the Bankable Business Case.

DELIVERABLE: PROJECT SCHEDULE

1.1.11 Level of design for concept studies

Develop conceptual designs for all the terminal infrastructure. In this stage, a selection process will be undertaken to select the most suitable quay structure and terminal layout for the PCT. Produce concepts engineering design reports and high-level plans.

The Service Provider shall prepare an executive summary report, detailing a summary of all the activities undertaken during this Phase, risks, challenges, incomplete information, and, where applicable, a recommendation for the commencement of the next phase. Transnet will facilitate the acceptance and approval of the conceptual design and terminal layout with stakeholders such as the eThekwini Metropolitan Municipality and the Port Regulator.

Note: The scope of the Concept Designs must include, but not limited to the following terminal facilities:

- Quay wall and quay furniture
- Stack area
- Road and Rail
- Civil infrastructure and Buildings
- Bulk infrastructure such as water supply electricity supply, storm water reticulation
- Security systems and Equipment

DELIVERABLE: PROJECT CONCEPTUAL DESIGNS AND REPORT

1.2 Task Order 2 – DETAILED ENGINEERING AND CONSTRUCTION PREPARATION

The deliverables under this section are the following:

- Detailed engineering drawings
- Works Information
- Final cost estimates
- Construction schedule
- Project Execution Plan
- Gate Review Reports

1.2.1 Detailed engineering drawings

The Service Provider shall commence and complete the detailed engineering design work to a 100% Approved-For-Construction (AFC) level of detail which includes, the development of engineering design works to a level that is fit-for-purpose to support procurement, construction, and project controls. In addition, the Service Provider shall compile and deliver the scope of services and specifications for tender documentation for both **critical long lead equipment and construction** packages.

The Service Provider must note the following while developing the detailed engineering drawings:

- Design for safe operation and construction to a high level of safety and low operating cost.
- The Service Provider must compile drawings as required for detailed engineering, also taking cognizance of the layouts referenced in this document and apply correct final drawing number from Transnet and SAP numbers for the drawings, as well as any additional new drawings that are developed.
- "As-built" drawings related to the existing infrastructure may not be accurate. Therefore, the Service Provider must perform site verification of all drawings and confirm orientations, locations, dimensions, and tie-ins for facilities prior to working on the drawings, designs and installations.
- The Service Provider should propose staff with relevant experience to be formally mobilized to ensure these deliverables are met. Furthermore, Transnet (including owner's representatives) and the Service Provider should agree the interface particulars, as and when applicable, unless interfaces are already listed herein.
- The Service Provider shall ensure that all the AFC drawings are rigorously reviewed to avoid redesigns during construction. The level of engineering, including preparation of drawings, must be advanced quite considerably to be able to support a definitive estimate.
- Detailed engineering activities produce deliverables that are integral to enable Transnet to procure accurately sized and technically correct equipment, components, materials and enable construction and commissioning activities.

DELIVERABLE: DETAILED ENGINEERING DRAWINGS

1.2.2 Works information

Produce Works Information (i.e., scope of services) for procurement packages detailing sequences for proposed construction, quality, SHE requirements as well as all technical specifications. Where applicable, Transnet's Project Framework standards will be adopted for the construction works. The Works Information shall also specify tests that must be carried out and results that will be approved by the designer for acceptance of the Works. Applicable laws as well as environmental requirements shall be included in the Works Information.

DELIVERABLE: WORKS INFORMATION

1.2.3 Final cost estimates

The finalised cost estimates will be determined by the detailed designs, latest estimates for unit costs, forex costs, estimates for owner, project management and contingencies. Transnet's format for summarising the cost estimates shall be adopted. A basis report shall be produced by the Service Provider outlining the

methodology for determining the cost estimate, contingency and the degree of accuracy of the estimate. A MONTE CARLO analysis for cost risk estimation shall be undertaken to validate the contingencies. A full bill of quantities (BOQ) and monthly cash flows shall be produced for each of the work packages. A procedure for measuring Earned Value (EV) during construction shall be proposed.

The Service Provider must compile final cost estimates in accordance with the following:

Construction estimates for execution phase

- The Service Provider prepares an estimate as a deliverable during the detailed engineering design for the scope of the Project and services for the execution phase and commissioning including close-out.
- The estimate is based on the execution package and project execution strategy for the execution phase (engineering, procurement, and construction)
- The estimate shall be subject to a risk analysis exercise to assess risk and contingency.
- The estimate shall be reviewed by the Service Provider's and Transnet's project team prior to issue to Transnet for acceptance/approval. The aim is to confirm the Risk Adjusted Indicative Total Cost (RAITC) and continuously report on the RAITC.

Estimate methodology

- During the estimate kick-off meeting, the estimating methodology that shall be followed in preparing the estimate as discussed and agreed upon.
- A bar chart type programme is included outlining key estimating activities and corresponding durations.

Basis of estimate

The "basis of estimate" describes the estimating methodology, scope of work, listing of engineering documents used, definition of all cost elements, project execution philosophy, project programme, qualifications and assumptions, inclusions and exclusions, and any other items that may have an impact on the estimate.

Estimate preparation

The Service Provider uses their own in-house computerized estimating programs/resources to achieve the estimate requirements. A Basis of Estimate Report to be compiled to guide the estimating process for the Project, shall include (but not limited to) the following:

- All allowances are detailed and described within the basis of the estimate. While completing the estimate(s), carefully consider the following:
 - The Service Provider must request the following information from technology suppliers and include it in the estimate:
 - The costs (per process block) of all major equipment items.
 - Technical information (per process block) of all minor equipment items, as well as for all those items for which they cannot provide costs.
 - Indicate which mechanical equipment items cannot be fabricated locally as either being proprietary equipment, or otherwise (percentage foreign content to be supplied as a minimum).
 - The cost bases, i.e., currency, validity, and location (e.g., ex-works, free-on-board, Cost, Insurance and Freight (CIF), etc.) to be clearly indicated.
 - Service Provider estimates the costs (per process block) of all equipment items, for those items which technology suppliers could not supply costs for.
 - Service Provider solicits budget quotes from the market (confirm/verify with Transnet's procurement department prior to engaging suppliers) to gain representative prices for selected/appropriate equipment items, plus database machinery/equipment/ material prices and escalation indices to adjust for inflation.
 - Service Provider applies norms for estimating the costs of all materials, labour, and engineering services.
 - Service Provider provides splits between local and foreign supplies of material and labour (if applicable), as well as that of Service Provider services, shall be indicated in the estimate.
 - Service Provider ensures that the estimates are applicable to local/site-specific conditions.
 - A set of exchange rates (valid for a specific date) is supplied by Transnet, during the kick-off meeting.
 - Service Provider provides a list of all exclusions from the estimate.

- Service Provider indicates the contingency percentage and proves that the accuracy of the estimate is within the preferred range of +10%, -5%, for the stage of the Project.
- Undertakes a MONTE CARLO analysis to produce a risk adjusted estimate as well as allowances for contingency.

Estimate format

The Service Provider prepares estimate formats and presents them to Transnet for review. The overall cost summary, as well as the individual cost summaries (per work package and per discipline, to be agreed at the estimate kick-off meeting), is split into different categories to include the major cost elements, as outlined below:

- Bulk services.
- Work packages per discipline/per area.
- Information technology, pipeline/cable chambers.
- Materials and equipment supply.
- Compile or prepare BOQs per each engineering discipline (including field overheads such as site establishment, temporary construction facilities - including camps and catering), construction services, supplies and consumables, scaffolding, construction equipment rental (including heavy lifts and scaffolding), field staff travelling, accommodation and business expenses.
- Labour costs and disbursements, such as travelling, accommodation and business expenses for:
 - Detail engineering
 - Procurement
 - Project management
 - Construction management/supervision, etc.
 - Project support services.
 - 3rd party Service Providers and specialist contracts
- Pre-production and commissioning costs:
 - Contingencies (as agreed during estimate review)
 - o **Risks**
 - \circ Escalations.
 - o laydowns for sheet piles, dredgers, barges etc

Estimate reviews

An estimate review meeting shall be arranged by the *Service Provider* after the initial estimate has been issued to Transnet. During the review meeting *Transnet's* team will consider the following:

- Traceability Information presented in a traceable fashion containing supporting documentation and technical data (supporting facts and findings). The *Transnet* review team should be able to, with the given information, trace all the final values within the presented cost estimate.
- Reasonableness Information presented in a logical manner with appropriate analogies and cost estimating relationships.
- Soundness Information, assumptions, and recommendations presented should be sound arguments.
- Validity Information presented should be logically correct, justifiable, and well-grounded. Transnet's review team will review the methodology and assumptions.
- Accuracy/consistency Information presented should be well organized, cohesive, supportable, and easily understood.
- Completeness Information presented should contain all necessary data, assumptions, and pertinent information.
- Verification Information presented should be verifiable by Transnet's review team.

DELIVERABLE: FINAL COST ESTIMATES

1.2.4 Construction schedule

The finalised construction schedule will be determined by the detailed engineering, considering latest weather predictions, and construction methodology that is determined by the Service Provider's designs, A basis of schedule report shall be produced by the Service Provider outlining the sequences, dependencies, long lead items and constraints. The Service Provider shall make adequate allowances for schedule float, based on the risk profile for construction activities. A full schedule shall be produced for each of the work packages outlining the baseline, early start, late finish, and critical path in the schedule. A procedure for measuring Earned Value (EV) during construction shall be proposed.

DELIVERABLE: CONSTRUCTION SCHEDULE

1.2.5 Project Execution Plan

The Service Provider, in consultation with Transnet, shall deliver a comprehensive Project Execution Plan (PEP) with all the relevant supporting management plans for construction of the Works (project execution). The PEP as a minimum shall contain:

- Execution engineering management plan
- Procurement execution plan
- Scope and cost management plan
- Execution quality management plan
- Health and safety management plan
- Execution risk management plan
- Construction execution plan
- Execution handover and close-out management plan
- Commissioning plan
- Implementation phase communication plan
- Project execution systems plan
- Project initiation and set-up plan
- Project controls execution plan
- Basis of schedule execution phase
- Industrial relations policy
- Execution document management plan
- Environmental and community/social impact management plan
- Site quality plan
- Communication plan including a Responsibility, Accountability, Confirmed and Informed (RACI) matrix
- Interface management plan
- Logistics plan
- Security management plan
- Systems/ICT execution plan
- Operational readiness plan

Furthermore, the Service Provider produces the following ready-for-execution deliverables amongst others:

- Project specific procedures and templates
- Procurement package plan
- Procurement status and schedule report
- Progress procurement packages (ready for enquiry)
- Delegation of authority matrix
- RACI and Training matrix
- Execution systems configuration
- Execution organizational structure
- Project reporting calendar and reporting format issued for client approval
- Project risk matrix; and
- Setup audit.

DELIVERABLE: PROJECT EXECUTION PLAN

1.2.6 Gate Review process

Prepare and undergo a gate review process to completion (i.e., to follow the project lifecycle process as defined by Transnet). Refer to gate review documents attached in the **APPENDIX A**. The Service Provider must prepare the relevant reports and presentations required for the gate review process. Transnet will facilitate the gate review setup as well as the gate review panel for the execution of the gate review process. Where there are updates required to the reports or deliverables, the Service Provider will execute the necessary changes.

Upfront in the initiation of the Project, Transnet with the Service Provider will undertake a gate review set-up to determine the deliverables required for the Project and for the gate review process. Furthermore, there will be an interim review of the deliverables prior to the gate review process.

At this stage, the Service Provider must provide allowance for interface with the Financial and Legal Advisors of this Project (to be procured separately), for the development of the Financial Model, structuring options, and Legal Due Diligence.

DELIVERABLE: GATE REVIEW REPORTS

The Scope of Facilities for the Detailed Design included in **Section 5** of these Terms of Reference must be considered as part of this deliverable.

2. PHASE 2 – PROCUREMENT SUPPORT AND CONSTRUCTION SUPERVISION

2.1 Task Order 3 - Development of the RFP, Issue, Evaluation, Appointment, and conclusion of contract

The deliverables of Task Order 3 are the following:

- Preparation of the Request for Proposal documentation
- Procurement strategy for long lead equipment

The Service Provider shall provide procurement support to Transnet during Phase 2 (Procurement Support and Construction Supervision). The support includes the Service Provider's involvement in technical queries, tender clarification, site visits, technical evaluation and producing technical documentation.

All procurement activities for the Project shall be led and executed by Service Provider. Transnet will coordinate to ensure compliance with Transnet Procurement Guidelines and relevant approval activities.

2.1.1 Preparation of Request for Proposal documents for construction

The Service Provider shall produce all the Request for Proposal documents for each construction work package. The Request for Proposal document shall include, but not limited to, the following:

- Works information
- Evaluation criteria
- Technical and functional returnables
- Tender drawings
- Pricing data BOQ
- Technical and functional specifications (Health and safety, environmental)
- Works contract

DELIVERABLE: REQUEST FOR PROPOSAL FOR CONSTRUCTION

2.1.2 Long lead equipment/material

The Service Provider should compile and prepare the scope of services and specification documentation to form part of the tender enquiry documents for the critical long lead items and work packages. Furthermore, the Service Provider, upon interpreting the scope during the tendering process, shall propose a list of additional equipment/material deemed necessary to be ordered in advance and make allowance thereof in this proposal. All such identified material/equipment should have a lead time of at least twelve months as a minimum or falling in the critical path.

The table below provides an indicative delivery timeline (as an example) for a possible long lead item. It is the responsibility of the Service Provider to further investigate the delivery timelines and use informed timelines in the schedule.

Critical long lead items – national supply

Long lead item	Duration in months (includes shipping)
Quay Wall fenders	12

DELIVERABLE: PROCUREMENT STRATEGY FOR LONG LEAD EQUIPMENT

2.2 Task Order 4 – Construction Management and Engineering Management

The deliverables under Task Order 4 are the following:

- Detailed Construction Management Plan
- Detailed Engineering Management Service

2.2.1 Task Order 4(a) – Construction Management

The Service Provider shall undertake the execution and construction management for the Project on behalf of Transnet. These include the following:

- Quality acceptance control,
- Pre-commissioning activities including planning, coordination, management and up to ready-forcommissioning activities, and
- Compliance with health and safety, environmental, labour relations and material standards.

In summary the following key activities will be undertaken by the Service Provider:

- NEC contract management
- NEC project manager
- NEC site supervision
- Schedule, cost, quality, SHEQ management
- Asset capitalisation
- Contract close out and submission of data packs
- Social and stakeholder monitoring

The detailed scope of the Construction Management Plan includes the following:

The Service Provider prepares a construction management plan for all the proposed construction actions to construct all items as indicated in the Scope of Facilities section during the detailed design stage and prior to issuing the construction work packages. The structure of the Construction Management Plan is developed with the following headings.

- 1. Introduction and general information, including a description of the following:
 - Project construction philosophical statement.
 - Indicating the overall duration.
 - Main construction items and the possible methodologies that can be followed for the construction of them.
 - The critical path using primvera P6 or MS Projects software.
 - Peak man loading.
 - Construction interface and interdependence.
 - Other items of concern.
- 2. Construction safety
 - Site access plans, permits, induction, permits.
 - Identifies emergency plans in case of injuries on site and how the injured personnel are taken to hospitals/doctors and the related administrative issues including payments at the medical facilities.
 - List the ambulance services, clinics, hospitals, and doctors close by the works and make upfront arrangements to enable smooth admissions in case of an emergency.
 - A construction safety target is proposed.

- The possible incentives and a description of the actions to implement a safety drive for the different contractors is proposed and the costs of these actions determined.
- The Service Provider develops a construction H&S plan, for the construction phase. This plan shall be in accordance with the requirements and stipulations of the safety management standard.
- The Service Provider develops an emergency evacuation plan for the construction workers during peak construction period.
- Health and Safety Relevant Notifications and Compliances. The Service Provider shall appoint a Registered Safety Agent to represent Transnet on the coordination of the duties and designer as set out in the Construction Regulations 2014.
- 3. Environmental Management
 - Relevant environmental permits and licenses requirements/conditions
 - Ongoing environmental management and monitoring
- 4. Construction administrative guidelines
 - Construction organizational structure and description of functionaries.
 - Construction working hours.
 - Other site conditions and rules.
 - Manage changes in construction methodology.
 - Proposed cleaning teams and cleaning actions.
- 5. Industrial relations and human resources
 - The Service Provider adheres to the Transnet Broad Based Black Economic Empowerment (BBBEE) labour targets (targets for local labour) and determines methodologies of how these targets can be achieved. As well as the predetermined supplier development targets.
 - Industrial relations management roles, responsibilities, and interfaces.
 - Dealing with industrial issues including employment of locals.
- 6. Identified shutdown and pre-shutdown work
 - The Service Provider to manage and ensure contractors adhere the Transnet builder's shutdown process.
 - Adherence to security during builder's shutdown.
- 7. Mobilization and laydown areas
 - The Service Provider provides preliminary calculations of required laydown area per construction area and per construction discipline.
 - The proposed/possible requirements per construction contractor.
 - Negotiates with owners regarding the laydown areas.
 - Identifies dumpsite.
- 8. Construction facilities and amenities

The Service Provider provides an indication on what is to be done for and in regards of the following facilities and amenities.

- Parking areas in terms of the area required.
- Construction vehicles for use by key site personnel and management thereof.
- Access routes and security entry point for construction labour from the parking area to the construction site.

- Access routes and suitability of access routes for material and equipment.
- Canteen and cafeteria services including mess facilities.
- Temporary offices, office furniture, stationeries, etc.
- Communication radios.
- Information and communications technology infrastructure for site.
- Electrical power distribution (requirements for electrical power distribution).
- The Service Provider provides a proposal for the material storeroom and warehousing arrangements. A cost is determined for the proposal.
- The Service Provider provides a proposal for logistics to access, transport, and delivery of material/equipment to site including security requirements.
- Navigational requirements for construction are considered.
- Dredging and reclamation requirements are implemented.
- Interface with operations, Private Sector Participation (PSP), and the municipality are being managed.

The Service Provider manages the following items as a minimum requirement during construction:

- The Service Provider develops the further detail breakdown of activities as per its own construction management systems.
- The Service Provider to manage the contracts as Transnet's representative, project manager or service manager.
- Design verification.
- Design team support and site supervision during construction period.
- Site supervision mechanical, electrical, buildings, earthworks, structural & civils.
- Preparation and input for as-built drawings.
- Support and interface with operations, (PSP).
- Manage legal and dispute resolution.
- Monitor authorization requirements and take corrective actions as may be necessary.
- Cold commissioning and provide support for hot commissioning activities until the system is certified to operate.
- Mentorship to Engineering site staff.
- FEL 4 close-out
- Engineering and construction management close-out report
- Produce monthly progress reports and present these to Transnet at the monthly progress meeting.
- Prepare MS PowerPoint presentations related to progress on site as well as information & slide pack for ongoing stakeholder management during the various stages of execution.
- Facilitate, respond and close-out field engineering queries.
- Manage the interface between operations, PSP, and the construction site.
- Manage all the SHEQ requirements.

DELIVERABLE: DETAILED CONSTRUCTION MANAGEMENT PLAN

2.2.2 Interface/interdependences

The Service Provider should (in this proposal) allow for managing the following interfaces/interdependences as part of this Project, including the use of previous knowledge and experience to allow for applicable and unidentified interfaces necessary for the Project of this nature.

The execution interfaces identified for the Project are (but not limited to) the following:

- Auto Terminal (RoRo) The Transnet Port Terminals (TPT) RoRo terminal is relocating to the T-Jetty, the bulk services infrastructure may be common use facility. The Service Provider should manage the technical interfaces to meet the Project requirements. The Service Provider is responsible for designing and installation of all other bulk electrical services, e.g., substations, cabling, etc. The *Service Provider* should manage the technical interfaces from substations to quay side equipment's to meet the project requirements.
- *Pier 2 Berth Deepening* The construction phase of the berth deepening of DCT Pier will affect the container volume at the PoD. Transnet will facilitate volume diversion. However, Service Provider shall ensure phasing of the construction is not in conflict with the construction of berth deepening at DCT Pier 2.
- Road and Rail The TPT and Transnet Freight Rail (TFR) shall undertake the full engineering and design of the operational road and rail. The Service Provider shall manage the technical interfaces from road and rail to container stack/ quay side to meet the project requirements.
- Bulk Information Communication and Technology (ICT) Transnet will develop and implement its own ICT infrastructure (equipment, fibre, cabling, etc.) and systems (such as ECOS) together with the port infrastructure for this Project. However, the appointed Operator may wish to operate the Project using its own ICT infrastructure and systems. The Service Provider should manage the technical interfaces between Transnet and the appointed Operator, to meet Project requirements.
- Bulk Services Transnet to provide the existing layouts. The Service Provider should manage the technical interfaces to meet the project requirements. The operator shall be responsible for the design and installation of all other bulk services within operational area, e.g., water, power, wastewater, etc. The Service Provider must manage the technical interfaces from their scope to the bulk system to meet the project requirements.
- Detailed Electrical engineering design The inhouse TNPA engineering team will be responsible for detailed electrical engineering design. The Service Provider should manage the technical interfaces to meet the project requirements.
- Environmental authorizations permits and licences The Service Provider should manage all the environmental related interfaces including managing and supporting the Environmental Authorizations Permits (EAP).
- Identify, compile, and manage permits and/or wayleaves for all statutory requirements and site permits including the necessary applications, from other 3rd party approval authorities (e.g., Durban city etc.).
- Terminal design interfaces The Service Provider should manage all the interfaces between all 3rd parties involved in the Project including identifying Rail, Road, port operator facility deliverables for them to complete this part of the scope and notify the other service providers to action such deliverables.
- Permits and site occupations The Service Provider should manage all the interfaces relating to the issuing of permits, management of optimal use of occupations and site occupation throughout the execution phase. The Service Provider should (in advance) familiarize himself with all Transnet requirements relating to permits and site occupations.
- Stakeholder engagement The Service Provider should identify and engage with all stakeholders where existing structures may be impacted due to planned designs. The Service Provider should develop the list of stakeholders to be impacted during the execution phase.
- *Operational readiness* Transnet should implement operational readiness activities; the Service Provider shall manage the information gathering and flows to support the Transnet BU representative.

DELIVERABLE: CONSTRUCTABILITY PLAN

2.2.3 Task Order 4(b) – Engineering Management

The Service Provider shall undertake the engineering management for the Project on behalf of Transnet to ensure compliance and good workmanship. In addition, undertake pre-commissioning activities, engineering management and up to ready-for-commissioning and support project commissioning until the Project is certified to operate.

The Service Provider shall develop the detail breakdown of each activity as per its own engineering systems, including, but not limited to the following:

- Assurance of technical integrity
- Assurance of reliability
- Obtain performance guarantees for the terminal and confirm liabilities.
- Confirm and correct engineering drawings.
- Manage and work-off technical assumptions concerns log.
- Compensation event reporting and justification.
- Design conformance to Occupational Health and Safety Act (OHS Act).
- Definition and management of interfaces and battery limits.
- Plot plan deviations and revisions.
- Develop a commissioning and start-up framework plan.
- Develop an interdependence framework plan.
- Manage, approve, and lead systematic studies (plot plan, HAZOP, infrastructure communications plan, etc.)
- Incorporate outcome of systematic studies.
- Ensure process integrity with regards to design deviations.
- Incorporate all approved changes into the services and facilities.
- Manage and control the project safety files.
- Approve all design packages.
- Availability requirements.
- Maintainability and operability.
- Provide representatives to perform work and decisions on the Project for the following:
 - Participate and certify portion of systematic studies.
 - o Design procedures.
- Mentorship to Transnet engineering staff
- The Service Provider prepares and presents design documents to Transnet at the following review meetings as a minimum:
 - Plot plan review meetings
 - Technical design coordination meetings
 - Process flow diagram (in PFD format) review meetings
 - HAZOP review meetings
 - Safety integrity level review meeting
 - 30% and 100% 3D CAD model review meetings
 - o Memorandum of change
 - Value improving practices (value engineering)
 - Technical risk reviews.
- All the above review meetings shall be facilitated and led by the accredited facilitator provided by the Service Provider.
- The Service Provider consolidates the HAZOP/design review comments and job sheets and updates other design documentation to AFC status.
- The Service Provider arranges and chairs all design review sessions.
- The Service Provider leads the VIP (value improvement engineering) meetings as scheduled and incorporates decisions and findings into and updates other design documentation to AFC status.

DELIVERABLE: ENGINEERING MANAGEMENT SERVICE

3. PHASE 3 – COMMISSIONING AND TERMINAL OPERATOR SUPPORT

Task Order 5 - Technical support to the Terminal Operator

Prepare technical documentation completed during Phase (Detailed Design) to support the operator's design requirements. This includes, the quay wall loading, stack loading, electrical reticulation, and rail yard requirements and other important infrastructure. Service Provider shall provide support to the Operator to inform the Operator's designs for the implementation of the supporting infrastructure and superstructures.

DELIVERABLE: TECHNICAL SPECIFICATIONS AND GUIDELINES

4. EVALUATION CRITERIA

TECHNICAL EVALUATION CRITERIA FOR POINT CONTAINER TERMINAL					
Evaluation Criteria	Description	Built Environment	Sub- weighting	Weighting	
Management and CV's of EPCM resources. Criteria: CV, Qualification, and valid Professional Registration Certificates	Engineering Manager: BSc/BTech/BEng (NQF Level 7) in the relevant field of Engineering, with a minimum of 8 years of experience as an Engineering Manager for Port/Marine and/or coastal projects in the past 20 years. All design engineers to have a Professional Registration (ECSA) or international equivalent regulative professional body.	Management and Supervision of Design (Concept and Detailed Engineering) and implementation (Preparation of bidding documents and Construction Supervision) of a minimum of two container seaport terminals with a capital cost of USD400 million or more, that have been implemented and are operational = 5 Management and Supervision of Design (Concept and Detailed Engineering) and implementation (Preparation of bidding documents and Construction Supervision) of a minimum of two container seaport terminals with a capital cost of USD250 million or more, that have been implemented and are operational = 3.5 Management and Supervision of Design (Concept and Detailed Engineering) and implementation (Preparation of bidding documents and Construction Supervision) of a minimum of two seaport terminals (Break bulk, multipurpose, etc.) with a capital cost of USD250 million or more, that have been implemented and are operational (Break bulk, multipurpose, etc.) with a capital cost of USD250 million or more, that have been implemented and are operational, demonstrating experience working in multi-disciplinary teams developing projects using project finance or similar alternative structures= 3.5	5	25	
	Senior Design Engineer BSc/BTech/BEng (NQF Level 7) in the relevant field of	Design (Concept and Detailed Engineering) of a minimum of two container seaport terminals each with a capital cost of USD400 million or more, that have been implemented and are operational = 5			
	Engineering, with a minimum of 8 years of experience as a Design Engineer (Concept and Detailed Engineering) for	Design (Concept and Detailed Engineering) of a minimum of two container seaport terminals each with a capital cost of USD250 million or more, that have been implemented and are operational = 3.5			

Port/Marine and/or coastal projects in the past 20 years.All design engineers to have a Professional Registration (ECSA) or international equivalent regulative professional body.	Design (Concept and Detailed Engineering) of a minimum of two of similar type seaport terminals (Break Bulk, Multi- purpose, etc.) each with a capital cost of USD250 million or more, that have been implemented and are operational = 2	5	
LeadMarine/StructuralEngineer:BSc/BTech/BEng (NQF Level 7)intherelevantfieldofEngineering, with a minimum of8 yearsofexperienceasStructuralDesignEngineering)forPort/MarineprojectsintheprofessionalRegistration(ECSA)orinternationalequivalentregulativeprofessionalbody.	Design (Concept and Detailed Engineering) of a minimum of two container seaport terminals each with a capital cost of USD400 million or more, that have been implemented and are operational = 5 Design (Concept and Detailed Engineering) of a minimum of two container seaport terminals each with a capital cost of USD250 million or more, that have been implemented and are operational = 3.5 Design (Concept and Detailed Engineering) of a minimum of two of similar type seaport terminals (Break Bulk, Multi- purpose, etc.) each with a capital cost of USD250 million or more, that have been implemented and are operational = 2	5	
Civil/Transportation Engineer BSc/BTech/BEng (NQF Level 7) in the relevant field of Engineering, with a minimum of 8 years of experience as a Civil/Transportation Engineer for Port/Marine projects in the past 20 years. All design engineers to have a Professional Registration (ECSA) or international equivalent regulative professional body	Design (Concept and Detailed Engineering) of a minimum of two container seaport terminals each with a capital cost of USD400 million or more, that have been implemented and are operational = 5 Design (Concept and Detailed Engineering) of a minimum of two container seaport terminals each with a capital cost of USD250 million or more, that have been implemented and are operational = 3.5 Design (Concept and Detailed Engineering) of a minimum of two of similar type seaport terminals (Break Bulk, Multi- purpose, etc.) each with a capital cost of USD250 million or more, that have been implemented and are operational = 2	5	

Lead Electrical Engineer	Electrical Design (Concept and Detailed Engineering) of a		
	minimum of two container seaport terminals each with a		
BSc/BTech/BEng (NQF Leve	7) capital cost of USD400 million or more, that have been		
in the relevant field	of implemented and are operational = 5		
Engineering, with a minimun	of Electrical Design (Concept and Detailed Engineering) of a		
8 years of electrical des	ign minimum of two container seaport terminals each with a		
experience for Port/Ma	ine capital cost of USD250 million or more, that have been		
projects in the past 20 years	implemented and are operational $= 3.5$	5	
	Electrical Design (Concept and Detailed Engineering) of a		
All design engineers to have	e a minimum of two of similar type seaport terminals (Break		
Professional Registrat	on Bulk, Multi-purpose, etc.) each with a capital cost of USD250		
(ECSA) or internation	nal million or more, that have been implemented and are		
equivalent regula	ive operational = 2		
professional body.			
Project Manager:	Project Management of Detailed Design and Construction		
	Management (Task Orders 1 – 4) of a minimum of two		
BSc/BTech/BEng or relev	ant container seaport terminals each with a capital cost of		
qualification (NQF Level 7) in	the USD400 million or more, that have been implemented and		
field of Project Managem	ent, are operational = 5		
with a minimum of 8 years	of Project Management of Detailed Design and Construction		
experience in managing	the Management (Task Orders 1 – 4) of a minimum of two		
development of Port/Ma	ine container seaport terminals each with a capital cost of	5	
projects in the past 20 years	USD250 million or more, that have been implemented and		
	are operational = 3.5		
Project Manager to have	a Project Management of Detailed Design and Construction		
Professional Registrat	on Management (Task Orders 1 – 4) of a minimum of two of		
with a project managem	ent similar type seaport terminals (Break Bulk, Multi-purpose,		
regulatory professional be	dy etc.) each with a capital cost of USD250 million or more, that		
either locally	or have been implemented and are operational = 2		
(PMI/SACPCMP) or similar	Management of the second stiller (Test Orders O.A) of a		
Construction Manager:	Management of the construction (Task Orders 3-4) of a		
DCo/DToob/DEng. or role	minimum of two container seaport terminals each with a		
	and capital cost of USD400 million of more, that have been		
field of Construe	$\frac{1}{100} = \frac{1}{100} = \frac{1}{100}$		
Management or Construct	with minimum of two container construction (Task Orders 3-4) of a		
Environment with a minimum	unit minimum of two container seaport terminals each with a		
	in implemented and are operational - 25	5	
o years or experience	in pimpiementeu anu are operational = 3.3	5	

managing the construction of Port/Marine projects in the past 20 years. Construction Manager to have a Professional Registration (SACPCMP) or international equivalent regulative professional body.	Management of the construction (Task Orders 3-4) of a minimum of two of similar type seaport terminals (Break Bulk, Multi-purpose, etc.) each with a capital cost of USD250 million or more, that have been implemented and are operational = 2		
Quantity Surveyor: BSc/BTech/BEng or relevant qualification (NQF Level 7) in the field of Quantity Surveying with	Experience in undertaking cost management and control of a minimum of two container seaport terminals each with a capital cost of USD400 million or more, that have been implemented and are operational = 3		
a minimum of 8 years of experience in Port/Marine projects in the past 20 years.	Experience in undertaking cost management and control of a minimum of two container seaport terminals each with a capital cost of USD250 million or more, that have been implemented and are operational = 2.5	3	
Professional Registration (SACQSP) or international equivalent regulative professional body.	Experience in undertaking cost management and control of a minimum of two similar type seaport terminals (Break Bulk, Multi-purpose, etc.) each with a capital cost of USD250 million or more, that have been implemented and are operational = 1		
Project Control Manager	Experience in development and implementation of		
BSc/BTech/BEng or relevant qualification (NQF Level 7) with a minimum of 8 years of experience in Port/Marine projects in the past 20 years.	standardized project controls to manage budgets, scheduling and quality for engineering and construction, for a minimum of two container seaport terminals each with a capital cost of USD400 million or more, that have been implemented and are operational = 3 Experience in development and implementation of standardized project controls to manage budgets, scheduling and quality for engineering and construction, for a minimum of two container seaport terminals each with a capital cost of USD250 million or more, that have been	3	
	implemented and are operational = 2.5	5	

	Experience in development and implementation of standardized project controls to manage budgets, scheduling and quality for engineering and construction, for a minimum of two (Break Bulk, Multi-purpose, etc.) terminals each with a capital cost of USD250 million or more, that have been implemented and are operational = 1		
Safety Agent: BSc/BTech/BEng in the Built Environment/Safety	Experience as a Safety Agent during the construction of at least two container seaport terminals each with a capital cost of USD400 million or more, that have been implemented and are operational = 3		
Management with a minimum of 8 years of experience on Port/Marine project.	Experience as a Safety Agent during the construction of at least two container seaport terminals each with a capital cost of USD250 million or more, that have been implemented and are operational = 2.5	3	
Safety agent to have a Professional Registration (SACPCMP).	Experience as a Safety Agent during the construction of at least two seaport terminals (Break Bulk, Multi-purpose, etc.) each with a capital cost of USD250 million or more, that have been implemented and are operational = 1		
Quality Officer: BSc/BTech/BEng or relevant qualification (NQF Level 7) in the Built Environment/ Engineering with a minimum of 10 years of experience in Port/Marine I	Experience in developing, controls, inspections, etc. of the construction of at least two container seaport terminals each with a capital cost of USD400 million or more, that have been implemented and are operational = 3 Experience in developing, controls, inspections, etc. of the construction of at least two container seaport terminals each with a capital cost of USD250 million or more, that have been implemented and are operational = 2.5		
projects in the past 20 years. Quality Officer to have an ISO 9001 2015 Certificate.	Experience in developing, controls, inspections, etc. of the construction of at least two seaport terminals (Break Bulk, Multi-purpose, etc.) each with a capital cost of USD250 million or more, that have been implemented and are operational = 1	3	

Contracts Administrator:BSc/BTech/BEng in the Supply/ Business/ Quantity Surveyor/ Legal or relevant qualification (NQF Level 7) with a minimum of 10 years of experience in Port/Marine projects in the past 20 years.The Contract Administrator must be in the position of NEC Certificate (Professional Qualification).	Experience in providing contract administration services for construction of at least two container seaport terminals each with a capital cost of USD400 million or more, that have been implemented and are operational = 3 Experience in providing contract administration services for construction of at least two container seaport terminals each with a capital cost of USD250 million or more, that have been implemented and are operational = 2.5 Experience in providing contract administration services for construction of at least two seaport terminals each with a capital cost of USD400 million or more, that have been implemented and are operational = 1	3	
Projectexecutionplan: (Position paper for execution of the project)DetailedProject execution plan with technical support, including project approach, organization and authority, schedule management, budget/cost management, risk management, Project work activities, environmental management, administration, stakeholder management and engineering design methodology/management, inclusive of a Skills Transfer Plan to Transnet employees across all disciplines.Management tools and system (Consultant must be accredited or certified with Quality ISO	 Robust and Innovative and Agile Project Execution Plan, detailing: Methods (engineering design methodology) to improve the project outcomes and the quality of the outputs. a) Outline of proposed approach b) Concept design development approach c) Design Reviewing process d) Detailed list of other resources, professional skills and utilized including a resource matrix e) Management tools and system f) Works Information (design philosophy) Is flexible to address changes that may occur during the execution of the Project; and the Approach to Risk Management, is specifically tailored to address the critical characteristics of the Project and supported by sample Quality Controls. Score: 25 High quality Project Execution Plan, detailing:		25

9001, Environmental ISO 14001 and Health and safety ISO 45001)	 Methods (engineering design methodology) to improve the project outcomes and the quality of the outputs. a) Outline of proposed approach b) Concept design development approach c) Design Reviewing process d) Detailed list of other resources, professional skills and utilized including a resource matrix e) Management tools and system f) Works Information (design philosophy) Is flexible to address changes that may occur during the execution of the Project; and the Approach to Risk Management, is specifically tailored to address the critical characteristics of the Project and supported by sample Quality Controls. Score: 18 Acceptable Project Execution Plan, detailing: a) Outline of proposed approach b) Concept design development approach c) Design Reviewing process d) Detailed list of other resources, professional skills and utilized including a resource matrix e) Management tools and system f) Works Information (design philosophy) to improve the project outcomes and the quality of the outputs. a) Outline of proposed approach b) Concept design development approach c) Design Reviewing process d) Detailed list of other resources, professional skills and utilized including a resource matrix	
	Score: 10	

Bidder experience in the development of Concept and Detailed Engineering Designs (Task Orders 1 and 2) of Port/ Marine/ Coastal projects in the past 20 years. Criteria: Number of Projects.	Bidder's EPCM track record for conceptual design, detailed engineering design, and development of the Feasibility Study Report for Port/Marine and/or similar type of coastal projects in the past 20 years.	 ≥ 5 Projects involved in the Design (Concept and Detailed Engineering) of container seaport terminals each with a capital cost of USD400 million or more, that have been implemented and are operational = 15 4 Projects involved in the Design (Concept and Detailed Engineering) of container seaport terminals each with a capital cost of USD250 million or more, that have been implemented and are operational = 10 3 Projects involved in the Design (Concept and Detailed Engineering) of seaport terminals (break bulk, multipurpose, etc.) each with a capital cost of USD250 million or more, that have been implemented and are operational = 7 	15	15
Company Experience in the development of Bidding and Construction Supervision (Task Orders 3 and 4) of Port/ Marine/ Coastal projects. Criteria: Number of Projects.	project lifecycle process documents by bidding company for all services required / their partner / subcontractor/ environmental specialist, in the last 20 years, with a similar type of Port/Marine project.	 ≥ 5 Projects involved in the Design (Concept and Detailed Engineering) of container seaport terminals each with a capital cost of USD400 million or more, that have been implemented and are operational = 10 4 Projects involved in the Design (Concept and Detailed Engineering) of container seaport terminals each with a capital cost of USD250 million or more, that have been implemented and are operational = 7 3 Projects involved in the Design (Concept and Detailed Engineering) of seaport terminals (break bulk, multipurpose, etc.) each with a capital cost of USD250 million or more, that have been implemented and are operational = 4 		10

Estimated Project Duration Criteria: Detailed Gantt chart schedule with delivery dates of all key deliverables, timeframe indicated and in a logical sequence.	Estimated duration of number of work months from award to completion of conceptual and detailed engineering design (Task orders 1 to 2).	<pre> ≤ 15 work months = 5 > 15 work months & < 18 work months = 4 = 18 work months = 3 > 18 work months & ≤ 20 work months = 2 > 20 work months = 0 </pre>	5
	TOTAL RATING		100

5. SCOPE OF FACILITIES FOR THE DETAILED DESIGN



The overall layout of the terminal is Figure 3 shown below:

Scope of facilities

For the TNPA scope of work the infrastructure related to the Port Authority function in a landlord roll is applicable to this scope of works for this contract, it includes the following:

- Quay walls
- Crane beams and rails for the quay side cranes.
- Dredging
- Reclamation
- Bulk services to the boundary of the container terminal
- Technical specifications to be supplied to the PSP

The infrastructure within the terminal is broadly grouped into two main areas, the landside and marine-side area. The sub-areas within the two main areas are detailed in the table below.

Table 5-1. Figh level infrastructure description	Table	5-1:	High	level	infrastructure	description
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Area	Location	Infrastructure
Sub-area	Landside infrastructure	Reclamation, bulk services, road, rail, electrical, security systems
Sub-area	Marine infrastructure	Quay walls, quay furniture, dredging

Landside infrastructure

The main landside infrastructure required for the terminal development includes the following:

Table 5-2: Landside infrastructure

Sub-area	Description
Land and property	Transnet National Ports Authority (TNPA) owns all the required land for the development except for the reclamation that needs to be undertaken between the existing quay line and the proposed new quay line.
Road and Rail	 Major upgrades to the existing roads leading up to the terminal boundary. Including the upgrade of quayside road and road entrances from Mahatma Ghandi as well as Shepstone Road. A road traffic study will be required to confirm the concept layout prior to completing the detail design. Upgrades to the rail lines and rail terminals leading up to container terminal. Currently the rail terminal does not have container handling
	equipment and on the new proposed rail terminal the provision of the handling container equipment (such as RMG's) must be considered. A rail traffic study will be required to confirm the concept layout prior to completing the detail design.
Bulk Services	• As much as the current site is a brown field development with existing sewer, water, and storm water provisions, these infrastructure needs to be re-evaluated and re-constructed where necessary to meet the requirements of the new container terminal. The approved concepts layout will confirm the bulk services requirement
Electrical infrastructure	• As much as the current site is a brown field development with existing power supply, high mast layout and technical workshops. these

Sub-area	Description
	 infrastructure needs to be re-evaluated and re-constructed where necessary to meet the requirements of the new container terminal such as high voltage for cranes at the quayside, location of technical workshops and high mast light new layout. The provision for renewable infrastructure and energy storage equipment must be made available for energy regeneration from Ship-To-Shore (STS) cranes and future sustainability initiatives at the quayside
Security systems	• The provision for the security infrastructure must be made available for securing operations in the container terminal. Evaluations will be required for recommending an accredited security system for the container terminal.

Marine infrastructure

The marine infrastructure required for the terminal development includes to the following:

Sub-area	Description
Quayside furniture	A latest recommended quay wall container terminal fender system will be installed. A validation will be required to confirm the appropriate fender system for the Project. The quayside must be fitted with crane rail beams for STS cranes. The new position of the ballards to be validated and confirmed with Transnet.
Quay wall	A sheet pile quay wall is recommended; however, a validation is required to confirm the suitable quay wall design for the PCT. The quay wall must make provision of the current and the future loading of the STS
Dredging	The provision of dredging to a depth of -18.5m is required to meet the proposed terminal capacity. Evaluate where necessary to meet the required depth for the new container terminal.

Table 5-3: Marine infrastructure

Scope exclusions

Whilst the following are excluded from the scope of services, the interfaces related to it form part of the scope for the Service Provider. As such, the Service Provider should conceptualize, coordinate, plan and manage all the related interfaces to ensure that the overall project is completed on time and seamlessly and hence the schedule prepared should integrate the following:

- Rail terminal yard detailed design and construction (interfacing between rail yard and container stack)
- Container stack yard (normal boxes & reefer boxes) detailed design and construction (interfacing between container stack and quay side operation)
- Port equipment acquisition for terminal operation (STS, RMG, RTG and hauler & trailers)
- Terminal buildings detailed design and construction (admin, workshops, staff facilities and staff parking)
- Mobilization of the operational readiness team. The responsibilities for coordinating and implementing the operational readiness team is detailed in the operational readiness plan.
- The detailed design for the electricity reticulation, will be carried out by the TNPA inhouse engineering team.

Procedure for submission and acceptance of Service Provider's design

The Service Provider shall undertake design safety reviews as detailed in HAS-STD-001 included as **APPENDIX C** with the defined project team. The Service Provider shall also undertake design engineering reviews, stakeholder engagement reviews and engineering integration reviews as detailed in this services information with the project team.

The Service Provider documentation should be issued to the project manager under cover of the Service Provider transmittal note, including complete contract references (i.e., project number, contract number, etc.), as well as the Service Provider's project document number, revision number, title, and chronological listing of transmitted documentation. The format of the Service Provider data to be submitted should be in accordance with the project procedure as accepted by the project manager.

The Service Provider should allow the project manager two (2) weeks to review and respond to the Service Provider's submission of their documentation, i.e., from the time of receipt by the project manager to the time of despatch.

On receipt of the reviewed documentation the Service Provider should make all modifications as requested or as marked-up on the documentation and resubmit the revised documentation to the project manager within two weeks. Any queries regarding comments and/or changes should be addressed with the project manager prior to re-submittal.

Documentation submission

In undertaking the 'services' (including all incidental services required), the Service Provider should conform and adhere to the requirements of the Contractor Documentation Submittal Requirements standard (DOC-STD-0001), included as **APPENDIX D**.

Use of Service Provider's design

The Service Provider grants *Transnet* a licence to use the copyright in all design data presented to *Transnet* in relation to the services for any purpose in connection with the construction, re-construction, refurbishment, repair, maintenance, and extension of the designs with such licence being capable of transfer to any third party without the consent of the Service Provider. The Service Provider vests in the *Transnet* full title guarantee in the intellectual property and copyright in the design data created in relation to the services.

Review and acceptance of Service Provider documentation

In undertaking the 'services' all documentation and data prepared and submitted by the Service Provider should conform and adhere to the requirements of: Contractor Documentation Submittal Requirements standard (DOC-STD-0001) included as **APPENDIX D** and Revision of Technical Documents (ENG-GL-0103) as **APPENDIX E**.

Note:

A 'starter kit' containing the standard project drawing templates should only be issued upon contract award in electronic 'native' format under cover of the project transmittal note.

Each supplier of documentation and data for the Project is responsible for ensuring that all documentation and data submitted conforms to the project standards and data quality requirements in terms of numbering, uniqueness, quality, accuracy, format, completeness, and currency of information. Data not meeting the project standards and data quality requirements, may be rejected, and returned to the Service Provider for corrective action and re-submission.

Should any change be made to documentation or data, which has already been submitted to the project manager, then new or revised documentation or data should be issued to replace the outdated information. All drawings supplied should comply with the programme CAD standards, i.e., Project Development and Execution: Engineering CAD Standards (ENG-STD-0001) as **APPENDIX F**.

It is the responsibility of all project participants undertaking work within this Project to ensure they obtain and comply with the relevant requirements to suit their deliverables and scope of work.

The Service Provider is to ensure that the latest versions of the required application software and a suitable 'IT' Infrastructure are in place to support the electronic transmission of documentation. Electronic files submitted to the Project should be clear of known viruses and extraneous "macros". The issuer of documentation is required to have, always, the latest generation of virus protection software and up-to-date virus definitions.

All documentation and data created for the project should be numbered and named according to the TNPA codification procedure. Such numbering is only available from the project's document control group. The *Service Provider* should, prior to acceptance of a purchase order/contract, determine that he can satisfy the requirements for documentation and data as specified within the standards, i.e., DOC-STD-0001 (APPENDIX D): Contractor Documentation Submittal Requirements standard and ENG-STD-0001 (APPENDIX F): Programme CAD standards.

The *Service Provider* should be responsible for the supply of all sub-supplier/sub-Service Provider/submanufacturer, etc. documentation and data related to their package of work and should ensure that these service providers have the capability to supply the necessary documentation and data in the required timeframe and quality as outlined in the specified standards prior to awarding sub-orders.

The required format of documentation and data should as a minimum be as follows:

- Hard copy (full size), PDF and 'native' file format that is compatible with Transnet systems.
- The required number of copies of documentation and data should be specified in the Service Provider Documentation Schedule (CDS). The required number of copies should as a minimum be four (4) hard copies, with the corresponding PDF and 'native' file formats upon final submission, unless otherwise specified in the CDS.
- The Service Provider should apply "wet or electronic signatures" to the original documentation before scanning the signed original and prior to formal submission to the project.
- Final issues of all documentation should be supplied to the project in "wet signature" or electronic signature (with delegated authority) format along with the associated corresponding electronic 'native files' and PDF renditions.
- The Service Provider should ensure adequate resources are available to manage and execute the document control function as per the requirements of the project.
- The Service Provider should retain copies of all documentation issued in connection with the project for a minimum period of five (5) years after the completion of the construction phase of the project.

Site access, facilities and constraints during detailed engineering design and construction planning

Access to Port of Durban

Access to the Port of Durban is strictly controlled. Access permits are issued by Transnet National Ports Authority (TNPA) against receipt of a written request from an entity already operating within the Port. Positive identification (identity document or driving licence) is required for each person requesting an access permit. The *Transnet* will assist the *Service Provider* to obtain the required access permits.

Use of vehicles within the port (dependent on Port)

The speed limit for vehicles on the roads within the port boundary is 40km/h and is strictly enforced. Vehicles should always travel with their headlamps on and, in addition, must display a roof-mounted amber flashing beacon when in motion. The speed limit for vehicles travelling on the quayside is 20 km/h. Special permits are required for vehicles operating on the quayside.

Personal protective equipment

Personal protective equipment (PPE) should be always worn when in the operational areas of the port. The minimum requirements for PPE are hard hat, reflective vest, and safety footwear. It is strongly recommended that hearing and eye protection is also used. The use of PPE in the office areas is not compulsory.

Health and safety facilities on site

The *Transnet* does not provide any health and safety facilities on site. The *Service Provider* provides facilities in accordance with the requirements of the *Transnet's* health and safety standard. (HAS-STD-0002 – Health, Safety and Security Requirements).

Environmental controls, fauna & flora, dealing with objects of historical interest

The Service Provider complies with the requirements of the *Transnet's* standard environmental specification TGC-ENV-STD-002 included as **APPENDIX G** and construction environmental management plan TGC-ENV-STD-001 included as **APPENDIX H**.as well as Project Environmental Specifications (e.g., Environmental Authorisation, relevant permits, and licenses).

Cooperating with and obtaining acceptance of others

In performing the services, the *Service Provider* shall be required to engage with all stakeholders, including, but not limited:

- Transnet National Ports Authority
- Transnet Port Terminals or PSP Operator
- Transnet Freight Rail
- Local Authority –eThekwini Municipality

Department of Forestry, Fisheries and Environment

- Small businesses
- Business Forums

Publicity and photographs

No photographs are to be taken unless the photographer is in possession of a photographic permit issued by the chief security officer, Port of Durban. Photographs are to be taken for record purposes only.

The Service Provider treats all information gained through his appointment on this project as strictly confidential. The Service Provider is not allowed to prepare or present any paper, publish any article in a technical journal, or derive publicity for his business which makes any reference to any aspect of the work on this Project unless the *Transnet* grants special permission, in writing, for that purpose.

The Service Provider does not advertise the contract or the Project to any third party, nor communicate directly with the media (in any jurisdiction) whatsoever without the express written notification and consent of the *Transnet*.

Facilities provided by the Transnet and the Service Provider

Transnet <u>does not</u> provide any facilities for the *Service Provider's* exclusive use. Construction sites camps will be determined during the constructability workshop and all costs for this arrange will be covered by TNPA

For regular project meetings and ad-hoc meetings the *Transnet* will provide facilities at its premises.

Facilities provided by the Service Provider

The Service Provider provides all facilities necessary for the execution of the work.

APPENDIX A: Gate Review Process

APPENDIX B: Drawings issued by TNPA

Refer to the list of drawings below issued as part of the scope of services for review. Transnet is not responsible to provide as-built drawings to the Service Provider.

Table 4: List of drawings issued by Transnet

Drawing number	Drawing title
DH63A0000-000-00	Proposed Parking – Container Terminal Layout Plan
DH63A0000-000-00	Proposed Parking – Container Terminal Layout Plan A
DH63A0000-000-00	Proposed Section Layout Plan

APPENDIX C: Health & Safety Plan and Specification (HAS-STD-001)

APPENDIX D: Contractor Documentation Submittal Requirements standard (DOC-STD-0001)

APPENDIX E: Revision of Technical Documents (ENG-GL-0103 REV 0C)

APPENDIX F: Project Development and Execution – Engineering CAD Standards (ENG-STD-0001)

APPENDIX G: Standard Environmental Specification (SES) ENV-STD-002

APPENDIX H: Construction Environmental Management Plan (CEMP) ENV-STD-001

APPENDIX I: TIMS Policy

APPENDIX J: Health and Safety Guidelines (HAS-GL-0001)

APPENDIX K: Daily Safety Task Instruction (DSTI) (HAS-STD-0002)

APPENDIX L: Governing Codes, Standards and Specifications

The list of Codes, standards, and specification

All design, procedures, materials, tests, and analysis should be in accordance with the latest editions of national and international codes, standards, and specification. These codes, standards and specifications include but are not limited to the following:

Title	Document no.	Revision
National or international standards		
Standard Methods of Testing Road Construction Materials	TMH1	1986
South African National Building Regulations Act (103)		1977
Design of Highway Bridges and Culverts in South Africa	TMH7	1989
Geometric Design of Rural Roads	TRH17	*
SA Road Drainage Manual		1986
British Soil Classification System (BSCS)	BS 5930	1981
Guidelines for the Design of Storm Water Drainage Systems	Durban Metro Design	
	Manual, Part 2	
Standard Specifications for Subsurface Investigations	SANRAL	2010
Site Investigation Code of Practice; The Geotechnical Division of	SAICE	2010
SAICE		
Code of Practice for Site Investigations	BS 5930	1999
Guidelines for Soil and Rock Logging in Southern Africa, 2nd		1990
Impression 2001 eds. A.B.A. Brink and R.N.H. Bruin, Proceedings,		
Geo-terminology The Scope-hop organised by AEG, SAICE &		
SAIEG		
Standardised Specification for Civil Engineering Construction -	SANS 1200A	*
General (Part A)		
Site Clearance	SANS 1200C	*
Earth Services	SANS 1200D	*
Earth Services (Pipe Trenches)	SANS 1200DB	
Earth Services (Roads Sub-grade)	SANS 1200DM	*
Earth Services (Railway, Sidings)	SANS 1200DN	*
Piling	SANS 1200F	*
Concrete (Structural)	SANS 1200G	*

Table W: Codes, standards, and specification

Title	Document no.	Revision
Concrete (Small The Scope)	SANS 1200GA	*
Precast Concrete	SANS 1200GE	*
Structural Steel	SANS 1200H	*
Bedding (Pipes)	SANS 1200LB	*
Storm Water Drainage	SANS 1200LE	*
Ancillary Road The Scope	SANS 1200MM	*
Low Voltage Electrical Supply	IEC 439	*
Isolating Transformers	IEC 742	*
Electrical Plugs and Sockets	IEC 309	*
Structural Use of Concrete	SANS 10100	*
Code of Practice for Wiring of Premises	SANS 10142	*
Basis of Structural Design (Loading Code)	SANS 10160	*
Design of Foundations for Buildings	SANS 10161	*
Structural Use of Steel	SANS 10162	*
Wind Loading on Structures	SANS 10280	*
Railway safety management – Part 1: General.	SANS 3000-1:2009	
Railway safety management – Part 2-2: Technical	SANS 3000-2-2:2008	
requirements for engineering and operational standards – Track,		
civil and electrical infrastructure.		
Railway safety management – Part 2-2-1: Technical	SANS 3000-2-2-	
requirements for engineering and operational standards – Track,	1:2012	
civil and electrical infrastructure – Level crossings		
Railway safety management – Part 2-3: Technical	SANS 3000-2-3:2008	
requirements for engineering and operational standards – Rolling		
stock.		
Railway safety management – Part 2-4: Technical	SANS 3000-2-4:2013	
requirements for engineering and operational standards – Train		
authorization and control, and telecommunications.		
Railway safety management – Part 2-4: Technical	SANS 3000-2-4:2013	
requirements for engineering and operational standards – Train		
authorization and control, and telecommunications.		
Railway safety management – Part 2-5: Technical	SANS 3000-2-5:2013	
requirements for engineering and operational standards -		
Operational principles for safe movement on rail.		
Railway safety management – Part 2-6: Technical	SANS 3000-2-6:2013	

Title	Document no.	Revision
requirements for engineering and operational standards –		
Interoperability, and interface and intra-face management.		
Series (suite) of standards – Code of practice – The application of	SANS 10400	
the National Building Regulations		
Quality management systems – Guidelines for configuration	SANS 10007/ISO	
management.	10007	
Electricity Supply – quality of supply	NRS 048-2:2007	Issue 3
Standard Specification for Roads & Bridge The Scope for State	Series 6000	
Road Authorities (COLTO)		
Continuous Mechanical handling equipment – Belt conveyors with	ISO 5048	
carrying idlers		
Mobile Equipment for continuous handling of bulk materials Part 1-	ISO 5049	
Rules for design of steel structures		

(a) Statutory requirements and design conditions for electrical engineering design

All work should be carried out to comply with the latest requirements of the statutory authorities having jurisdiction over the site.

The following South African safety requirements should be used as a minimum:

- Occupational Health and Safety Act, Act 85 of 1993.
- Minerals Act and Regulations, Act 50 of 1991.
- Mine, Health and Safety Act, Act 29 of 1996.
- The National Building Regulations and Building Standards, Act 103 of 1998.
- Compensation for Occupational Injuries and Diseases Act, Act 130 of 1994.

All work should be undertaken in accordance with ISO 9001.

(b) Applicable documents

The **contractor** should adhere to the requirements of the following project specifications and any specifications/standards/codes, etc. to which these specifications may refer.

The latest revisions should be used in all cases.

Document title	Document number
3125740-2-120-E-DC-0001	Electrical design criteria

Governing codes, standards, and specifications

The electrical lighting and power design engineering solution should be in accordance with the latest edition of the following specifications and codes where applicable.

Where reference is made to a code, standard or specification, the reference should be taken to mean the latest edition of the code, standard or specification, including latest amendments, supplements, and revisions thereto.

Codes of practice

The following codes of practice should apply and form part of the design criteria.

Specification number	Description
TPD-007-MVSWITCHSPEC	Technical specification for indoor medium/high voltage (1kV to 33kV) alternating current switchgear and control gear
TPD-004-EARTHINGSPEC	Technical specification for earthing and the protection of buildings and structures against lightning
TPD-003-CABLESPEC	Technical specification for the installation of medium and low voltage cables
TPD-010A-HIGHMASTSPEC-A	Specification for the design, supply and installation of high mast lighting
TPD-008-MINISUBSPEC	Specification of the supply, delivery, offloading and installation of miniature substations
TPD-002-DBSPEC	Technical specification for low voltage distribution boards
TPD-001-EL&PSPEC	Technical specification for electrical installations to building other than dwelling houses

Table X: Transnet specifications

Table Y: SANS codes

Specification no.	Description
SANS 10114-1	Interior lighting Part 1: Artificial lighting of interiors
SANS 10114-2	Interior lighting Part 2: Emergency lighting
SANS 10389-1	Exterior lighting Part 1: Artificial lighting of exterior areas for work and safety
SANS 10389-2	Exterior lighting Part 2: Exterior security lighting
SANS 10389-3	Exterior lighting Part 3: Guide on the limitation of the effects of obtrusive light from outdoor lighting installations
SANS 1091	National colour standards for paint
SANS 10108	The Classification of Hazardous Locations and the Selection of Electrical Apparatus for use in such Locations.
SANS 10199	Bulkhead Lighting Fittings (surface mounted).
SANS 10400	The Application of the National Building Regulations
SANS 10198-1	The selection, handling and installation of electric power cables of rating not exceeding 33 kV Part 1: Definitions and statutory requirements
SANS 10198-2	The selection, handling and installation of electric power cables of rating not exceeding 33 kV Part 2: Selection of cable and methods of installation

Specification no.	Description
SANS 10198-3	The selection, handling and installation of electric power cables of rating not exceeding 33 kV Part 3: Earthing systems-General provisions
SANS 10198-4	The selection, handling, and installation of electric power cables of rating not exceeding 33 kV Part 4: Current ratings
SANS 10198-5	The selection, handling, and installation of electric power cables of rating not exceeding 33 kV Part 5: Determination of thermal and electrical resistivity of soil
SANS 10198-6	The selection, handling, and installation of electric power cables of rating not exceeding 33 kV Part 6: Transportation and storage
SANS 10198-7	The selection, handling, and installation of electric power cables of rating not exceeding 33 kV Part 7: Safety precautions
SANS 10198-8	The selection, handling, and installation of electric power cables of rating not exceeding 33 kV Part 8: Cable laying and installation
SANS 10198-9	The selection, handling, and installation of electric power cables of rating not exceeding 33 kV Part 9: Jointing and termination of extruded solid dielectric-insulated cables up to 3,3 kV
SANS 10198-10	The selection, handling, and installation of electric power cables of rating not exceeding 33 kV Part 10: Jointing and termination of paper-insulated cables
SANS 10198-11	The selection, handling, and installation of electric power cables of rating not exceeding 33 kV Part 11: Jointing and termination of screened polymeric-insulated cables
SANS 10198-12	The selection, handling, and installation of electric power cables of rating not exceeding 33 kV Part 12: Installation of earthing system
SANS 10198-13	The selection, handling, and installation of electric power cables of rating not exceeding 33 kV Part 13: Testing, commissioning, and fault location
SANS 10198-14	The selection, handling, and installation of electric power cables of rating not exceeding 33 kV Part 14: Installation of aerial bundled conductor (ABC) cables
SANS 1507-3	Electric cables with extruded solid dielectric insulation for fixed installations (300/500 V to 1 900/3 300 V) Part 3: PVC Distribution cables
SANS 10200	Neutral earthing in medium voltage industrial power systems
SANS 62271-1	High-voltage switchgear and control gear Part 1: Common specifications
SANS 60076	Power transformers Part 1: General
SANS 62305-1	Protection against lightning Part 1: General principles
SANS 62305-2	Protection against lightning Part 2: Risk management
SANS 62305-3	Protection against lightning Part 3: Physical damage to structures and life hazard
SANS 62305-4	Protection against lightning Part 4: Electrical and electronic systems within structures
SANS 10313	Protection against lightning - Physical damage to structures and life hazard

Specification no.	Description
SANS 10199	The design and installation of earth electrodes
SANS 1063	Earth rods, couplers, and connections

(c) Controls & instrumentation for codes and standards

The design of the process control systems should be done in accordance to, but not limited to the following standards:

Standard no.	Description
SANS 10111	Engineering drawings
IEC 60617	Graphical symbols for diagrams
SABS ISO 9000	Quality management systems
SANS IEC 60529	Degrees of protection provided by enclosures (IP code)
SANS IEC 60793	Optical fibres
SANS IEC 60794	Optical fibre cables
SANS 61073-1	Splices for optical fibres and cables
IEC 61274	Fibre optic adaptors
SANS IEC 61131	Programmable controllers - all parts
IEC 61508-1	Functional safety of electrical/electronic/ programmable electronic safety related systems - Part 1: General requirements
IEEE 12207.0	Standard for Information Technology – Software Lifecycle Processes
IEC 60073	Basic and safety principles for man-machine interface, marking and identification - Coding principles for indicators and actuators
IEC 81714	Design of graphical symbols for use in the technical documentation of products
IEC 82045	Document management
IEC/PAS 62953	Industrial communication networks - Fieldbus specifications - ADS-net
IEC 60099	Surge arresters
IEC 60115	Fixed resistors for use in electronic equipment
IEC 60134	Rating systems for electronic tubes and valves and analogous semiconductor devices
IEC 60812	Analysis techniques for system reliability - Procedure for failure mode and effects analysis (FMEA)
IEC 60381	Analogue signals for process control systems
IEC 60417	Graphical symbols for use on equipment
IEC 60730	Automatic electrical controls

Table Z: Controls & instrumentation codes and standards

Standard no.	Description
IEC 61010	Safety requirements for electrical equipment for measurement, control, and laboratory use
IEC 61069	Industrial-process measurement, control and automation - Evaluation of system properties for the purpose of system assessment
IEC 61131	Industrial-process measurement and control - Programmable controllers
IEC 61158	Industrial communication networks – Fieldbus specifications
IEC 61160	Design review
IEC 61636	Software interface for Maintenance Information Collection and Analysis (SIMICA)
IEC 61757	Fibre optic sensors
IEC 61882	Hazard and operability studies (HAZOP studies) - Application guide
IEC 61926	Design automation
IEC 62008	Performance characteristics and calibration methods for digital data acquisition systems and relevant software