SCOPE OF WORKS FOR THE CONSTRUCTION OF THE FLOOD MITIGATION STRUCTURE ALONG MHLATHUZANA CANAL FOR THE TRANSNET ENGINEERING DURBAN MAIN PLANT AT 311 SOLOMON MAHLANGU DRIVE

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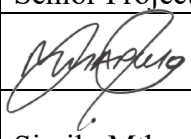
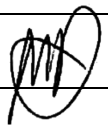
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1. Project Background and Business Need

Durban Main Centre is an administrative and operational facility of Transnet Engineering in KwaZulu-Natal. Flooding in April 2022 affected buildings, workshop bays, internal roads and sidewalks, created sinkholes and restricted access and use of parts of the Centre.

The business need is to reduce the risk of floodwater from the adjacent Mhlathuzana Canal entering the Centre by constructing an integrated flood mitigation barrier and associated civil, structural, fencing, lighting, electrical, testing and handover works.

Required outcome

- The completed barrier must form a continuous, inspectable flood-mitigation system along with the approved alignment.
- The wall crest must achieve the approved design level shown on the controlled drawings and must not contain unintended low points.
- The works must be safely constructed in a brownfields operational environment and must protect known services and adjacent assets.
- All civil, structural, fencing and electrical interfaces must be complete, tested and documented at handover.
- The completed works must be capable of contract administration, measurement, payment certification and defect correction using the approved documents.

2. Definitions and Contractual Hierarchy

Term	Meaning
Employer	Transnet Engineering.
Contractor	The successful tenderer appointed to execute the Works.
Project Manager	The person appointed under the contract to administer the contract.
Supervisor	The person appointed to inspect and test the Works under the contract.
Works Information	This specification, project-specific requirements, controlled drawings, Site Information and documents identified in the Contract Data.
Site Information	Information describing the Site, including approved geotechnical information made available to tenderers.
Hold Point	A stage beyond which work may not proceed until the specified evidence has been accepted.
Requirement ID	The unique identifier used to trace the Scope requirement to evaluation, pricing, evidence and acceptance.

3. Order of precedence

The final tender documents must state one verified order of precedence. Subject to contractual verification, the intended hierarchy is Contract Data and conditions of contract; project-specific Works Information; controlled project drawings; project-specific specifications; applicable standard specifications; and general technical references. Project-specific requirements prevail over general references where expressly stated. Measurement and payment are governed by the approved Contract Data and Pricing Data.

No unresolved template instruction or bracketed drafting note may remain in the tender issue version.

4. Scope Outcomes and Key Parameters

ID	Requirement	Baseline parameter	Acceptance basis
SOW-001	Flood mitigation wall	Approximately 900 m reinforced-concrete wall along the approved alignment; nominal exposed height approximately 2.6 m, subject to controlled design drawings	As-built survey, controlled drawings, and structural acceptance records
SOW-002	Platform and wall level	Platform and wall levels as shown on controlled drawings; wall crest design level presently identified as 8.1 m amsl	Independent as-built survey; no point below approved design level, subject to stated tolerance
SOW-003	Existing fence	Careful removal of approximately 500 m, with measured portions stored, relocated, reinstalled or disposed of as instructed	Measured records, condition register and Supervisor acceptance
SOW-004	Piling	Nominal 150 pile positions, nominal 10 m design depth and 6 m spacing, subject to final drawings and geotechnical information	Pile records, founding acceptance, testing and as-built schedule
SOW-005	New anti-climb fence	1 500 mm high anti-climb welded-mesh fence continuously installed above the wall for the full confirmed wall length of approximately 900 m. No gates are required.	Approved product data, fixing details, measured installed length, alignment, and final inspection records.
SOW-006	Area lighting and electrical works	Complete contractor-designed three-phase area-lighting installation comprising 46 no. 200 W LED floodlights at nominal 20 m centres over the approximately 900 m wall, mounted 2.0 m above the internal-side finished level. The installation includes a 400/230 V three-phase, four-wire supply from the existing source approximately 30 m from the wall, underground feeder cabling from the source to the wall, underground three-	Approved three-phase load schedule and electrical design, phase-balance calculation, cable and voltage-drop calculations, issued-for-construction drawings, product data, underground cable-route inspections, test results, COC, night survey and handover dossier.

		phase distribution cabling along the full wall length, and single-phase luminaire circuits split and balanced across phases L1, L2 and L3, together with controls, earthing, testing, commissioning and as-built drawings.	

5. Employer-Provided Information

The Employer will issue the following controlled information to all tenderers on the same basis:

- Approved Site Information, including the geotechnical report, groundwater observations, material profiles, limitations and contractual ground-risk assumptions.
- Controlled civil, structural and electrical drawings with unique drawing numbers, titles, sheet numbers, revisions and tender issue status.
- Approved Contract Data, Tender Data, Pricing Data and returnable schedules.
- Known-services information available to the Employer, clearly identified as information to be verified by the Contractor.
- The applicable CIDB contractor grading designation is Grade 7 CE. Tenderers must hold a valid CIDB grading of 7 CE or higher at tender closing, and the grading must be verified in the CIDB Register of Contractors before award.

5.1 Geotechnical Site Information

The geotechnical report is available to tenderers. Any stated provisional quantities for intermediate material, hard rock, groundwater, obstructions, additional pile depth or temporary support must be priced in the corresponding BOQ items. The final contract must define how conditions materially different from the Site Information are administered.

NB: The appointed bidder/supplier to verify the Geotechnical assessment prior to construction designs and any works take place.

6. Contractor General Obligations

- The supplier to acquire for any Authorisations or Licences that might be required prior to any works start
- Provide all labour, supervision, temporary works, equipment, plant, materials, consumables, transport, testing, documentation and incidental work necessary to complete the Works, except items expressly identified as Employer-provided.
- Validate setting-out information and record existing and final levels on survey drawings.
- Prepare a photographic and written pre-condition survey of adjacent assets before commencing physical work.
- Locate and protect known services and follow the approved process for unidentified services.
- Use new and compliant materials unless the Works Information expressly permits reuse.
- Submit product data, certificates, method statements, inspection and test plans, temporary-works information and shop drawings before the related work begins.

- Maintain the Site in a safe, orderly condition and prevent debris, silt, concrete washout, fuels or contaminants from entering the canal.
- Coordinate subcontractors and remain responsible for the entire Works.
- Provide all completion, testing and handover records required in Section 15.

6.1 Applicable Standards, Regulations and Codes

The Contractor shall execute all works in accordance with the latest editions of the Occupational Health and Safety Act (Act 85 of 1993), Construction Regulations, National Environmental Management Act, National Water Act, CIDB Regulations, SANS 10142-1, SANS 10160, SANS 2001, applicable SANS 1200 Specifications, relevant COTO Specifications, and all Transnet Engineering standards, procedures and permits applicable to the Works.

Legislation and Regulations

Occupational Health and Safety Act, Act 85 of 1993.
Construction Regulations, 2014 (as amended).
Electrical Installation Regulations.
Driven Machinery Regulations.
General Safety Regulations.
National Environmental Management Act, Act 107 of 1998 (NEMA).
National Environmental Management: Waste Act, Act 59 of 2008.
National Environmental Management Act: Biodiversity Act: Act 10 of 2004
National Environmental Management Act: Protected Area Act, 57 of 2003
National Water Act, Act 36 of 1998.
National Environmental Management: Integrated Coastal Management Act No. 24 of 2008
Construction Industry Development Board Act (CIDB) and Regulations.
Local Authority By-Laws and Statutory Requirements.
All applicable Transnet Engineering Standards, Procedures and Permit-to-Work Requirements.

Civil Engineering Works

SANS 1200 Series: Standardized Specifications for Civil Engineering Construction.
SANS 2001 Series: Construction Works Specifications.
COTO Standard Specifications for Road and Bridge Works.
Applicable SAICE Guidelines and Recommended Practice Manuals.
TRH, TMH and COLTO guidelines where applicable.

Geotechnical, Earthworks and Piling

- SANS 10160 Series: Basis of Structural Design and Actions for Buildings and Industrial Structures.
- SANS 2001-BE1: Earthworks.
- Applicable Geotechnical Investigation and Foundation Design Standards.
- ECSA and SAICE Guidelines for Foundation and Piling Works.

Structural Concrete and Reinforcement

- SANS 10100 (where applicable and referenced by the design).
- SANS 10160 Series.
- SANS 2001-CC1: Concrete Works.
- SANS 5861 Series: Methods of Testing Concrete.
- SANS 920: Steel Reinforcement for Concrete.
- SANS 282: Welded Steel Fabric for Reinforcement of Concrete.

Fencing and Corrosion Protection

- SANS 10244 Series: Steel Wire and Wire Products Coatings.
- SANS 675: Protective Coatings for Fabricated Steelwork.
- Manufacturer's Installation Specifications and Performance Requirements for Anti-Climb Security Fencing.

Electrical and Area Lighting Installations

- SANS 10142-1: The Wiring of Premises.
- SANS 10313: Protection Against Lightning.
- SANS 60598 Series: Luminaires.
- SANS 62271 Series: High-Voltage Switchgear and Control gear.
- Occupational Health and Safety Electrical Installation Regulations.
- Requirements for Certificates of Compliance (CoC), testing, commissioning and handover documentation.

Environmental Management Requirements

The Contractor shall undertake an environmental screening assessment to identify and confirm all applicable environmental legal requirements associated with the proposed works, including any Environmental Authorisations, licences, permits, approvals, registrations, and consents that may be required in terms of applicable legislation.

The Contractor shall ensure that all necessary Environmental Authorisations, licences, permits, and statutory approvals are obtained from the relevant competent authorities prior to the commencement of any construction, site establishment, or related project activities. No regulated activity requiring prior approval shall commence until the required authorisation, or permit has been duly issued.

The activities listed below may trigger the requirement for Environmental Authorisations, licences, permits, or other regulatory approvals. This list is not exhaustive, and the Contractor shall be responsible for determining and obtaining all approvals necessary for the lawful execution of the works:

Legislation requirements	Applicability	Permit/Authorisation
NEMA EIA Regulations: Listing Notice 1, Activity 12 (*The development of infrastructure or structures with a physical footprint of 100 m² or more occurring within a watercourse, within 32 metres of a watercourse measured from the edge of the watercourse (where no development setback exists), or within a prescribed development setback.*	This may apply where floodwall infrastructure and associated works meet the prescribed footprint threshold and occur within a watercourse, an adopted development setback, or the applicable distance from the edge of a watercourse.	Environmental Authorisation, where triggered, or documented confirmation that the activity is not triggered.
NEMA EIA Regulations: Listing Notice 3, Activity - *The development of or (ii) infrastructure or structures with a physical footprint of 10 square meters or more; where such development occurs (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse.*	This will apply only where the prescribed development threshold, proximity to a watercourse or adopted setback, and the applicable KwaZulu-Natal geographical sensitivity criteria are all met.	Environmental Authorisation, where triggered, or documented specialist screening confirming non-applicability.
National Water Act Section 21(c) - *Impeding or diverting the flow of water in a watercourse.*	Floodwall and temporary works may impede or divert the flow of water in a watercourse.	A General authorisation or Water use license (WULA) as determined by the competent authority.
National Water Act Section 21 (i) - *Altering the bed, banks, courses or characteristics of a watercourse.*	Excavation, piling, foundations, bank protection or other works may alter the bed, banks, course or characteristics of a watercourse.	A General authorisation or Water use license (WULA) as determined by the competent authority.

National Water Act Section 21 (j) - *Removal, discharge or disposal of groundwater encountered during excavation, piling, foundation construction or other construction activities where dewatering is necessary for the efficient continuation of the works or the safety of personnel.*	May apply where groundwater encountered during excavation or piling must be removed, discharged or disposed of.	A General authorisation or Water use license (WULA) and approved dewatering and discharge methods
Durban Metropolitan Open Space System (D'MOSS) and eThekwini Municipal Land Use	May apply where the works overlap a mapped D'MOSS area, river corridor, wetland, floodplain, ecological support area or other municipal environmental control area. The floodwall proposal may trigger D'MOSS requirements where: • The footprint falls within a mapped D'MOSS area. • Construction occurs within a river corridor, wetland, floodplain or ecological support area. • Vegetation removal is required. • Excavation, piling or earthworks could affect ecological functioning or biodiversity.	Municipal environmental approval and/or supporting specialist studies, where required by the eThekwini Municipality.

Survey and As-Built Information

- Applicable South African Land Survey Standards.
- South African Geomatics Council Requirements.
- Engineering Survey Requirements for Setting Out and As-Built Surveys.

SPECIFIC TECHNICAL REQUIREMENT

7. Civil Engineering Works

7.1 Existing fence removal and site clearance

- Prepare a measured condition schedule of the existing fence before removal.
- Carefully dismantle the instructed portions for reuse. Separate, label and store reusable materials to prevent damage.
- Relocate or reinstall measured portions only at locations instructed through the contract.
- Dispose of unusable material at an approved facility and provide disposal records.
- Clear and grub the approved working area to the limits on the drawings. Remove vegetation and debris without uncontrolled burning.

7.2 Existing services

- Prove known services before excavation and protect them throughout the Works.
- Immediately stop affected work and notify the Project Manager and Supervisor when an unidentified service is encountered.
- Do not alter, disconnect, uplift or repair a service without the required instruction and authorization.
- Record verified service positions in the as-built information.

7.3 Earthworks and excavations

- Excavate to the lines and levels shown on the controlled drawings.
- Classify and measure excavation according to the approved Pricing Data.
- Soft, intermediate and hard rock quantities must be distinguished where separate BOQ items are provided.
- Keep excavations safe and free of water. Design, provide and monitor temporary lateral support where required.
- Do not use clay as backfill. Imported material must meet the approved material class and compaction requirement stated in the drawings and BOQ.
- Place backfill in controlled layers and test compaction at the frequency stated in the inspection and test plan.

- Dispose of excess, contaminated or hazardous material only at an authorized facility and submit the required certificates.

7.4 Civil acceptance evidence

Activity	Minimum evidence	Acceptance point
Fence removal	Measured condition register, photographs, storage, and disposal records	Before new works obstruct verification
Clearing	Surveyed limits and inspection record	Before earthworks
Excavation	Level survey, material classification and temporary-support inspection	Before foundations or blinding
Backfill	Source certificates, layer records and compaction test results	Before covering and at completion
Disposal	Authorized disposal documentation	Monthly and at completion

8. Piling Works

- Piling and wall construction must comply with controlled Drawings TE-RET-001-1 and TE-RET-001-301, the approved geotechnical Site Information, the structural design, this specification and the applicable standards. The current design basis is approximately 895 m to 900 m of reinforced-concrete wall, nominally 149 to 150 pile positions, pile spacing generally 6 m, and nominal pile depth of 10 m, subject to the final engineer-approved pile schedule and founding criteria.

8.1 Minimum piling controls

- Confirm pile number, position, diameter, reinforcement, design depth, founding criterion and cut-off level from the controlled drawings.
- Submit a project-specific piling method statement, plant details, proposed sequence, obstruction procedure, concrete-placement method and records format.
- Set out and survey every pile position.
- Obtain acceptance of founding conditions or termination criteria by the authorized professional before completing each pile where the design requires such acceptance.
- Maintain a pile installation record for every pile, including date, location, depth, encountered strata, groundwater, concrete volume, reinforcement, interruptions and anomalies.
- Testing shall include low-strain pile integrity testing on 100% of production piles. For pricing, allow for 150 integrity tests. Static load testing shall comprise one preliminary sacrificial or trial load test before production piling and three working-pile verification load tests, distributed along the wall alignment.

- The Engineer may revise the final test locations or frequency in response to pile records, anomalies or ground conditions. All tests must be undertaken and reported by an independent competent testing entity, and no affected pile cap or ground beam work may proceed until the relevant results are accepted.
- Load tests must be carried out to the approved test method and test load stated by the Structural Engineer. The Contractor must include reaction systems, instrumentation, calibrated certificates, access, attendance, reinstatement, and signed reports.
- Any pile with an anomalous integrity result must be investigated and, where instructed, subjected to supplementary testing or remedial work at the Contractor's cost where non-compliance is confirmed.
- Trim piles to the approved cut-off level without damaging reinforcement or sound concrete.

9. Structural Concrete Works

9.1 General

All structural concrete work must comply with the project-specific drawings as per **Annexure D: Controlled Drawing Register**, approved concrete specification and the applicable referenced standards. Measurement and payment provisions in general technical standards apply only where adopted in the approved Pricing Data.

The flood mitigation wall shall be constructed in nominal 6 m long reinforced concrete panels separated by 10 mm vertical movement joints as detailed on Drawing TE-RET-001-300. These joints shall function as crack-control and minor movement joints.

Full expansion joints shall be provided only where specifically indicated on the approved structural drawings.

All movement joints shall incorporate approved waterstops and sealant systems to maintain the continuity and watertight integrity of the flood mitigation barrier.

9.2 Concrete classes

Application	Tender baseline
Blinding concrete	50 mm thick; concrete strength of 10Mpa as per approved design
Cast-in-situ piles	30 MPa, 19 mm aggregate
Reinforced wall and structural elements	30 MPa, 19 mm aggregate
Non-shrink grout	Approved project-specific strength and application

9.3 Quality controls

- Submit a project quality plan and concrete inspection and test plan before concrete work starts.
- Submit approved mix designs, constituent certificates and trial information where required.
- Do not place concrete until excavation, founding surface, formwork, reinforcement, cover, embedded items and construction joints have passed the relevant hold point.
- Maintain daily concrete records including pour location, date and time, grade, supplier, batch references, slump, test samples, curing method, formwork removal and test results.
- Cure concrete for the approved period and by an approved method appropriate to the material and environmental conditions.
- Repair defects only to an accepted remedial method. Do not conceal defects before inspection.
- Provide an as-built survey of wall alignment, crest level and relevant dimensions.

9.4 Wall crest and continuity acceptance

- The completed wall must form a continuous barrier at the approved alignment and crest level, including joints, interfaces, penetrations and end tie-ins.
- Acceptance requires an as-built survey identifying chainage, coordinates and crest levels at the specified intervals and all changes in direction or level.
- No surveyed point may be below the approved design level, subject only to the final stated tolerance.

10. Anti-Climb Fence Works

- Provide a supplier-neutral anti-climb welded-mesh fence system, 1 500 mm high above the completed wall, continuously along the approximately 900 m wall length confirmed by final measurement. No gates are required.
- Include panels, posts, brackets, caps, clamps, tamper-resistant fixings, end treatments and all accessories necessary for a complete installation.
- Include panels, posts, brackets, caps, clamps, tamper-resistant fixings, end treatments, and all accessories necessary for a completed system.
- Provide coating and corrosion-protection performance suitable for the stated site environment.
- Submit product data, samples where required, shop drawings and structural fixing calculations for acceptance before manufacture or installation.
- Coordinate inserts and fixings with reinforcement and concrete work.
- Unapproved drilling that may affect reinforcement is prohibited.
- Install to the approved line, level, height, post spacing and fixing detail.
- Repair damaged protective coatings using an accepted method.

10.1 Fence acceptance

Check	Evidence
Height and installed length	Measurement record by chainage
Post spacing and alignment	Inspection checklist and survey where required
Fixings and brackets	Approved detail and inspection record
Corrosion protection	Manufacturer certificate and repaired-area inspection
Gates and end treatments	Functional inspection and snag closure

11. Electrical and Area-Lighting Works

The Contractor shall design, supply, deliver, install, test, commission and hand over a complete area-lighting and electrical installation for the flood mitigation wall. The installation shall comply with SANS 10142-1, SANS 60598, SANS 10313 and all applicable statutory, Transnet Engineering and manufacturer requirements. The Contractor remains responsible for final cable sizing, discrimination, fault-level verification, voltage-drop compliance, protection coordination, earthing, lightning and surge protection, photometric performance and certification.

11.1 Minimum scope

- Lighting equipment, supports, high masts or other structures shown on the final drawings.
- Foundations, mounting arrangements, conduits, cable routes, cables, terminations and associated civil reinstatement.
- Distribution boards or kiosks included in the final design.
- Earthing and lightning protection for new and affected installations.
- Factory Acceptance Testing for designated boards or kiosks where specified.
- Site inspection, testing, commissioning and issue of applicable Certificates of Compliance.
- RMD 9 certificates for high masts where applicable to the final design.
- Night lighting survey using the approved measurement grid and performance criteria.
- As-built drawings, circuit schedules, test sheets, certificates, operation information and maintenance information.

11.2 Commercial Pricing Control

- Inspect and test the complete three-phase installation in accordance with SANS 10142-1 and the approved inspection and test plan. Testing must include continuity, insulation resistance, polarity, phase sequence, earth continuity, earth-electrode resistance where applicable, protective-device operation, measured phase loading and phase balance, functional operation

of photocells and contactors, DB verification, underground cable test results, luminaire operation, night aiming and lighting survey.

- Submit signed test sheets, calibration certificates, Certificate of Compliance, commissioning report, approved phase load schedule, as-built drawings, circuit schedules, operating instructions, warranties, and maintenance data.

11.3 Testing, Commissioning and Handover

- Drawings must be prepared and signed by a professionally registered competent electrical engineer or technologist where required, submitted for review before procurement or construction, revised to issued-for-construction status after acceptance, and updated as accurate as-built drawings at handover. Employer review does not relieve the Contractor of design responsibility.
- The Contractor shall provide the complete three-phase electrical design for the new installation. Deliverables shall include design calculations, a phase-by-phase load schedule, maximum-demand assessment, phase-balance calculation, voltage-drop calculations, fault-level and protection-selection calculations, discrimination study where applicable, earthing design, surge and lightning-protection design, cable schedule, DB schedules, single-line diagram identifying L1, L2 and L3 circuit allocation, underground cable-routing and trench drawings, luminaire layout, mounting details, control schematic, photometric calculations and construction details.

11.4 Contractor Electrical Design and Drawings

- Provide earthing and bonding of all exposed conductive parts, poles, or brackets, DBs, cable armour and associated metalwork. Provide lightning and surge protection appropriate to the final risk assessment and installation layout.
- Lighting control shall be automatic by adjustable day/night photocell sensors operating contactors, with selector control for AUTO/OFF/MANUAL operation. Sensors must be positioned to avoid false operation from the controlled luminaires. Manual override must be located in the main DB and must not defeat protective devices.
- Provide a complete main lighting DB and all required sectional DBs, including lockable weatherproof enclosures, main isolators, suitably rated MCBs or MCCBs, earth-leakage protection where required, contactors, surge-protection devices, neutral and earth bars, circuit labels, schedules, and spare capacity of at least 20%.

11.5 Controls, Protection and Distribution Boards

- Provide the complete underground cable installation from the existing supply point to the wall and along the full wall length, including route proving, excavation, trenching, compliant bedding, protective covers or sleeves, marker tape, route markers, ducts at crossings, draw pits where required, cable glands, lugs, ferrules, junction boxes, labels, testing, backfilling, compaction and reinstatement. Underground cable depth and mechanical protection shall comply with the approved design and SANS 10142-1. Cable routes must be coordinated with structural reinforcement, foundations, and existing services.
- Arrange the wall lighting in not fewer than six final circuits supplied from the three-phase distribution system. Divide the 46 single-phase 200 W luminaires as evenly as practicable across phases L1, L2 and L3, with the final connected load not exceeding an acceptable phase imbalance demonstrated in the approved load schedule. No final circuit may serve more than

eight luminaires. Clearly identify the phase serving every luminaire and circuit on the DB schedules, single-line diagram, luminaire layout, and as-built drawings. Provide sectional weatherproof distribution points where required to maintain compliant voltage drop and fault protection. All outdoor enclosures shall be minimum IP65 and corrosion resistant.

- Minimum tender cabling basis: provide three-phase, four-wire copper XLPE/SWA/PVC feeder and distribution cabling, complete with a separate protective earth conductor where required by the approved design. Allow for 33 m of underground feeder route from the existing supply source to the main lighting DB, comprising the approximately 30 m route plus 10% routing and termination allowance. Allow for 990 m of underground three-phase distribution cable along the wall, comprising the approximately 900 m wall route plus 10% routing and termination allowance. Final connections from the three-phase distribution system to each 230 V luminaire shall be single-phase and arranged sequentially across phases L1, L2 and L3. All cable conductor sizes are subject to the Contractor's signed load, voltage-drop, fault-level, disconnection-time, and protection-coordination calculations.
- The nearest identified power-supply point is approximately 30 m from the wall. The installation shall be supplied from a 400/230 V, three-phase, four-wire source. The feeder from the existing source to the new main lighting distribution board at the wall shall run underground for approximately 30 m, following the approved route. The Contractor must verify available capacity, fault level, phase sequence, earthing arrangement, and route before construction.

11.6 Electrical Supply and Cable Schedule

- The contractor shall complete a lighting calculation and night survey demonstrating uniform coverage along the internal wall route and the absence of unacceptable dark zones, glare or spill toward operational rail and adjacent properties. Final aiming angles must be locked after commissioning.
- Each floodlight must be suitable for exposed industrial and coastal service, rated 200 W nominal, 220-240 V AC, minimum IP66, minimum IK08, power factor at least 0.90, minimum system efficacy 100 lm/W, colour temperature 4 000 K to 5 700 K, CRI at least 70, minimum 6 kV surge protection, corrosion-resistant die-cast aluminium housing, stainless-steel fasteners and replaceable control gear where available. Submit product data, photometric files, and warranty information.
- Provide 46 no. 200 W LED floodlights, nominally evenly spaced at 20 m centres along the 900 m wall. The first and last luminaires must be positioned not more than 10 m from the wall ends. Mount each luminaire 2.0 m above the internal-side finished level, measured to the luminaire mounting point, on hot-dip galvanized or corrosion-resistant brackets fixed without damaging structural reinforcement. Final spacing may be reduced where required by the approved photometric design, but may not be increased beyond 20 m without the Employer's acceptance.

12. Quality, Inspection and Testing

- The Contractor must plan, perform, record and submit all inspections and tests necessary to demonstrate compliance.
- Specified compliance testing is included in the tendered rates or designated BOQ items.
- Additional testing instructed outside the specified regime is administered under the contract.

12.1 Minimum Inspection and Test Plan content

Work package	Hold / witness points	Records
Survey and setting out	Baseline acceptance; wall alignment and crest survey	Signed survey reports and coordinates
Earthworks	Excavation, founding level, backfill layers	Inspection records and compaction results
Piling	Set-out, founding/termination, reinforcement, concrete and testing	Individual pile records and test reports
Concrete	Formwork, reinforcement, cover, embeds, pre-pour release, testing and curing	Pour cards, cube results and nonconformance records
Fence	Samples/product evidence, fixing detail and final inspection	Certificates and installation checklist
Electrical	Design review, FAT where applicable, pre-energization and final survey	FAT, test sheets, COCs, RMD 9 where applicable and survey report

12.2 Nonconformance

The Contractor must identify, isolate, record and correct nonconforming work. A proposed concession or repair does not become acceptable until processed under the approved contract and quality procedures. Corrected work remains subject to reinspection and retesting.

13. Health, Safety and Environmental Requirements

- Comply with the applicable health, safety, environmental and railway or operational requirements identified in the final tender documents.
- Submit the required safety health & environmental (SHE) compliance file with a SHE plans, method statements, risk assessments, appointments, permits and emergency arrangements before the relevant work.
- The appointed Contractor shall appoint a competent and suitably qualified Environmental Officer for the duration of the project to monitor environmental performance, verify compliance with the approved

Environmental Management Plan (EMP), and ensure the effective implementation of all required environmental mitigation measures.

- Facilitate appointment of Environmental Assessment Practitioner (EAP) and Environmental Control Officer (ECO) should it be required as per legislative requirements prior to construction works NB: The appointment of a EAP and ECO are mandatory legislated requirements.
- Provide edge protection, access control, barricading, temporary lighting and excavation safety appropriate to the work and Site conditions.
- Manage flood, weather and canal-interface risks, including an emergency response and evacuation arrangement.
- Prevent pollution, uncontrolled discharge, concrete washout, siltation and contamination of the canal.
- Manage waste through authorized facilities and retain documentary evidence.
- Coordinate work with Centre operations and maintain approved access routes.

13.1 Environmental Management

The Contractor shall implement a comprehensive Environmental Management Plan (EMP) for the duration of the Contract, ensuring compliance with the National Environmental Management Act (NEMA), National Water Act, Environmental Authorisation conditions and all applicable Department of Water and Sanitation requirements. Particular attention shall be given to protecting the Mhlathuzana Canal and preventing pollution of surrounding watercourses.

The Contractor shall:

- Prevent contamination of the canal from fuels, oils, lubricants, chemicals, concrete washout, and construction waste.
- Implement erosion and sediment control measures before earthworks commence.
- Install silt barriers, sediment traps and stormwater diversion measures where required.
- Prohibit the discharge of contaminated water into the canal.
- Maintain spill response kits at all active work fronts.
- Immediately report and remediate any environmental incident.
- Preserve existing vegetation outside approved construction areas.
- Suppress dust through approved watering or dust-control measures.
- Control construction noise and vibration to minimise disruption to adjacent operations.
- Rehabilitate all disturbed areas upon completion of the works.

13.2 Waste Management

The Contractor shall prepare and implement a Waste Management Plan.

Requirements shall include:

- Segregation of general, recyclable and hazardous waste.

- Use of approved and licensed waste disposal facilities.
- Monthly disposal records and waste manifests.
- Removal of surplus excavated materials from site.
- Prohibition of uncontrolled dumping and open burning.
- Safe management of hydrocarbon-contaminated materials.

Waste disposal certificates shall form part of the handover documentation.

13.3 Health and Safety Management

The Contractor shall comply with the Occupational Health and Safety Act (Act 85 of 1993), Construction Regulations and all Transnet Engineering safety procedures applicable to the Site.

Prior to commencement of work, the Contractor shall submit a safety file consisting of the following documents but not limited to:

- Construction Health and Safety Plan.
- Baseline Risk Assessment.
- Task-specific Risk Assessments.
- Method Statements.
- Legal Appointments.
- Emergency Response Plan.
- Medical Fitness Certificates.
- Training and Competency Records.
- Incident Reporting Procedure.
- Toolbox Talk Programme.

No work shall commence until the required documentation has been reviewed and accepted.

Once the file is approved by the SHE Department the contractor will then be required to undergo a SHE induction session, prior to the commencement of the project.

13.3.1. Excavation and Earthworks Safety

Considering the scale of excavation, piling and earthworks associated with the flood mitigation wall, the Contractor shall:

- Conduct a geotechnical and excavation risk assessment.
- Notify the Department of Labour and Employment within 7 days, on writing prior to the excavation work
- Inspect excavations daily.
- Provide suitable shoring, benching or battering where required.
- Prevent unauthorised access to excavations.
- Install barricading and warning signage.
- Provide safe access and egress from excavations.
- Protect and support exposed services.

- Ensure excavation supervisors are appointed and competent.

All excavation activities shall comply with the Construction Regulations.

13.3.2. Working Adjacent to the Mhlathuzana Canal

Specific controls shall be implemented for canal-interface activities:

- Continuous monitoring of weather forecasts and rainfall warnings.
- Flood emergency response procedures.
- Emergency evacuation routes.
- Safe working distances from canal edges.
- Prevention of materials, debris and waste entering the canal.
- Suitable life-saving equipment where required.
- Provision of canal-side exclusion zones during high-risk activities.
- Erosion and sediment control
- Protection of vegetation and animal protection
- Water quality control

The Contractor shall suspend activities where flood conditions may endanger personnel or infrastructure.

13.3.3. Plant and Equipment Safety

All construction plant shall:

- Be fit for purpose.
- Possess valid inspection certificates.
- Be operated only by competent personnel.
- Undergo daily pre-use inspections.
- Be maintained in accordance with manufacturer requirements.

Special attention shall be given to:

- Piling equipment.
- Cranes.
- Excavators.
- Concrete pumps.
- Mobile elevated work platforms.
- Electrical test equipment.

13.3.4. Electrical Safety

Electrical installations and temporary supplies shall comply with SANS 10142-1 and applicable Electrical Installation Regulations.

The Contractor shall:

- Implement Lock-Out/Tag-Out procedures.
- Protect underground services before excavation.
- Provide Certificates of Compliance upon completion.
- Ensure only authorised persons perform electrical work.
- Conduct testing and commissioning prior to energisation.
- Maintain safe clearances around temporary electrical installations.

13.3.5. Access Control and Site Security

The Contractor shall:

- Establish controlled access points.
- Maintain temporary fencing and barriers.
- Separate construction activities from operational Transnet Engineering areas.
- Maintain safe pedestrian routes.
- Provide warning signage, safety notices and directional signs.
- Protect the public and Transnet personnel from construction activities.

13.3.6. Emergency Preparedness

The Contractor shall establish emergency arrangements including:

- First aid facilities.
- Trained first aiders.
- Fire-fighting equipment.
- Incident reporting procedures.
- Emergency contact lists.
- Flood response procedures.
- Spill response procedures.
- Evacuation drills conducted quarterly.

All emergency arrangements shall be communicated during site induction.

13.3.7. HSE Performance Monitoring

The Contractor shall submit monthly HSE reports detailing:

- Man-hours worked.
- Safety observations.
- Toolbox talks conducted.
- Environmental inspections completed.
- Incidents and near misses.
- Waste disposal records.
- Corrective actions and close-out status.

- Audit findings and improvement actions.

The Employer reserves the right to conduct audits and inspections at any time during the Contract.

13.3.8. HSE Handover Requirements

At project completion, the Contractor shall submit an HSE Close-Out Dossier containing:

- Approved HSE Plans.
- Risk Assessments and Method Statements.
- Environmental Inspection Records.
- Environmental Authorisation/Licences
- All correspondences with relevant stakeholders i.e. authorities, interested and affected parties, etc.
- Specialist studies/reports
- Waste Disposal Certificates.
- Incident Registers.
- Training and Induction Records.
- Emergency Drill Records.
- Audit Reports.
- Environmental Rehabilitation Records.
- Final Site Reinstatement Acceptance Documentation.

Acceptance of the HSE Close-Out Dossier shall form part of the final project handover requirements.

13.4 Temporary fencing and screening

Where temporary perimeter control, screening or public protection is required, the requirement must be described by function, extent, height, material, duration, access points, inspection and removal. The ambiguous generic term “hoarding” must not be used without this definition. The corresponding BOQ item must state the same requirement.

14. Programme, Interfaces and Reporting

The contractual completion period must be stated once in the approved Contract Data and used consistently in the Scope, Technical Evaluation Criteria and BOQ. The current ten-month BOQ baseline must not be issued unless confirmed as the approved period.

14.1 Programme content

- Kick-off and handover meetings; design verification and approvals; procurement; Site establishment; services proving; fence removal; clearing; earthworks; piling; concrete; fence; electrical works; testing; commissioning; as-built documentation; snag correction and completion.
- Logic links, critical path, key resources, hold points, access constraints, weather and flood risks, subcontractor interfaces and reporting dates.
- A procurement schedule for long-lead materials and equipment.
- A two-week or other accepted look-ahead schedule updated at the required reporting frequency.

14.2 Reporting

Progress reports must record completed quantities, programme status, safety and environmental performance, quality results, instructions, risks, information required, photographs, upcoming work and corrective actions.

15. Completion, Handover and Acceptance

Completion will not be achieved until the physical Works, testing, certification, records, as-built information, training or briefing where specified, snag correction and Site reinstatement have been completed in accordance with the contract.

15.1 Handover dossier

Deliverable	**Minimum content**
As-built survey	Wall chainage, alignment, crest levels, key coordinates, pile positions, and relevant service records
Civil records	Earthworks tests, disposal certificates and reinstatement records
Pile dossier	Pile schedule, individual records, concrete data and test reports
Concrete dossier	Mix approvals, pour records, cube results, curing records, nonconformance and repair records
Fence dossier	Product data, coating certificates, fixing information and inspection records
Electrical dossier	Approved drawings, FAT where specified, test sheets, COCs, RMD 9 where applicable, lighting survey and circuit information

Quality dossier	Approved plans, inspection records, test results, NCR register and closure evidence
Operation and maintenance information	Manufacturer information, maintenance instructions, warranties and spares information where applicable
Completion record	Snag list, closure evidence, Site clearing and reinstatement acceptance

15.2 Final acceptance criteria

- The approved alignment, dimensions and wall crest levels are verified by as-built survey.
- Piles and structural works have complete accepted quality and test records.
- All joints, interfaces, penetrations and end tie-ins are complete and free of unresolved defects.
- The anti-climb fence is complete to the approved height, length and fixing detail.
- Electrical works have passed specified tests and all required certificates have been submitted.
- The Site has been reinstated and all waste, temporary works and surplus materials have been removed as required.
- The handover dossier is complete, indexed and accepted.
- All material nonconformances and snag items are closed or administered under an approved contract process.

16. Requirement Traceability Schedule

ID	Scope requirement	Evaluation / compliance evidence	Pricing interface	Acceptance evidence
SOW-001	Complete flood mitigation wall	Project methodology, programme, and structural compliance	Earthworks, piling, concrete and related BOQ sections	As-built survey and structural dossier
SOW-003	Existing fence removal and reuse	Methodology and condition-management approach	Separate measured fence-removal schedule	Condition, storage, reinstallation and disposal records
SOW-004	Piling	Piling methodology, resources and key personnel capability	Piling establishment, depth, reinforcement, concrete and testing items	Pile records and test reports
SOW-005	1 500 mm anti-climb fence	Product evidence and installation approach	Metre-based fence and special-item schedule	Inspection and measured record

SOW-006	Electrical and area lighting	Complete contractor-designed three-phase area-lighting installation comprising 46 no. 200 W LED floodlights at nominal 20 m centres over the approximately 900 m wall, mounted 2.0 m above the internal-side finished level. The installation includes a 400/230 V three-phase, four-wire supply from the existing source approximately 30 m from the wall, underground feeder cabling from the source to the wall, underground three-phase distribution cabling along the full wall length, and single-phase luminaire circuits split and balanced across phases L1, L2 and L3, together with controls, earthing, testing, commissioning and as-built drawings.	Approved three-phase load schedule and electrical design, phase-balance calculation, cable and voltage-drop calculations, issued-for-construction drawings, product data, underground cable-route inspections, test results, COC, night survey and handover dossier.	Tests, certificates, lighting survey and as-builts
SOW-007	Quality and testing	Quality plan and ITP evidence	Trade test items and P&G quality obligations	Complete quality dossier
SOW-008	Programme and completion	Logic-linked programme and resource plan	Time-related P&G aligned to contract period	Accepted completion and handover record
SOW-009	Safety and environmental controls	HSE Plan and HSE mandatory evidence.	Defined fixed/time-related obligations	HSE Plans, inspections, audits, Authorisations/licences, and close-out records

Annexure D: Controlled Drawing Register

Drawing number	Sheet	Revision	Title	Tender status	Related requirement / BOQ
TE-RET-001-1	1 of 1	Rev 1 / tender issue to be confirmed	Layout plan, longitudinal section, and details	Controlled - verify final tender issue stamp	SOW-001 to SOW-005 / earthworks, piling, concrete, and fence
TE-RET-001-300	1 of 1	Rev 1	Flood mitigation wall layout, elevation, and section	Controlled - verify final revision and issue status	SOW-001 / structural concrete and wall geometry
TE-RET-001-301	1 of 1	Rev 1	Flood mitigation wall reinforcement layouts and section	Controlled - verify final revision and issue status	SOW-001 and SOW-004 / reinforcement, piling and concrete
Contractor electrical drawings	As required	IFC and As-built	Single-line diagram, lighting layout, cable routes, DB schedules, controls, earthing, lightning protection, and details	Contractor design deliverable - submit before construction	SOW-006 / Electrical BOQ Section 07