NKANGALA DISTRICT MUNICIPALITY

PROJECT NO: 185527

CONSTRUCTION OF BULK WATER SUPPLY AND STORAGE AT HLALINAKHLE & EXTENSION 5

C3: SCOPE OF WORK

Part C3: Scope of Work

C3.1 Scope of Works (SANS 10403:2003)
C3.2 Standard Specification
C3.3 Project Specification
C3.4 Particular Specification

C3.1: SCOPE OF WORK (SANS 10403:2003)

1. DESCRIPTION OF THE SCOPE OF WORKS

1.1. EMPLOYER'S OBJECTIVES

The Employers objective is to augment the supply water to Hlalanikahle & Extension 5 by establishing a new ground water source with water supply infrastructure that can serve the local communities.
The employer's objective is also to deliver public infrastructure using labour intensive methods to stimulate the local economy and in doing so also provide workplace training opportunities to local labour.

1.2. OVERVIEW OF THE WORKS

This project involves the provision of water to the communities of Hlalanikahle and extension 5 in Kwa-Guqa. The construction of bulk water supply lines, source development (drilling of boreholes), water treatment facility and the construction of a 1Ml elevated tank. All activities will be carried out within densely populated areas, necessitating the contractor's strict adherence to measures aimed at minimizing the impact of the project on the local community.

The project entails the following:

- Drilling x 2 boreholes
- The construction of a water treatment building with fencing to accommodate the reverse osmosis equipment
- Equipping x 3 boreholes.
- Supply and install Water treatment equipment (flow and proposed treatment).
- Supply and erection of a 1Ml Elevated Steel tank.
- Supply and installation of pipelines between infrastructure and the connection to the existing water distribution network (110mm to 160mm). This includes pipeline excavations, construction of a suitable bedding layer, installation of pipes, backfilling with appropriate material, compaction through the use of handheld compactors or pedestrian rollers, responsible disposal of excess materials.
- Isolating, air, scour valves with chambers
- Ancillary works

1.3. EXTENT OF THE WORKS

The Works to be carried out by the Contractor under this Contract comprise mainly the following:

(i) General

1. Contractor's establishment on site;
2. Training of Temporary Workforce;

(ii) Concrete Works

1. Clear the construction area of debris and vegetation.
2. Ensure proper excavation and grading to achieve the desired surface level.
3. Build temporary formwork or molds to shape the concrete structure.
4. Ensure formwork is securely braced and aligned to the design specifications.
5. Place steel reinforcement bars (rebar) within the formwork to provide structural strength.
6. Ensure proper spacing and alignment of the rebar.
7. Prepare concrete by mixing cement, aggregates, water, and sometimes admixtures.
8. Follow concrete mix design specifications for strength and durability.
9. Pour the concrete mixture into the formwork, taking care to prevent voids and air pockets.
10. Use vibration equipment to consolidate the concrete and remove air bubbles.
11. Smooth and level the surface of the concrete with trowels or screeds.
12. Apply surface finishes or textures as required (e.g., broom finish, exposed aggregate).
13. Protect the freshly poured concrete from drying too quickly by covering it with curing compounds or wet burlap.
14. Maintain appropriate curing conditions to achieve strength and durability.
15. After the concrete has cured sufficiently, remove the formwork without damaging the structure.
16. Install expansion and control joints to accommodate concrete expansion and contraction.
17. Seal joints and cracks to prevent water infiltration.
18. Conduct tests for concrete quality, such as compressive strength, slump, and air content where required.
19. Apply coatings or corrosion protection to the rebar to prevent rusting and deterioration.
20. Patch or repair any defects or surface imperfections in the concrete.
21. Implement safety measures such as barricades, safety barriers, and personal protective equipment for workers.
22. Remove excess concrete and construction debris from the site.
23. Dispose of waste materials in accordance with environmental regulations.
24. Maintain records of concrete mix design, curing procedures, and testing results.
25. Inspect the completed concrete work to ensure it meets design specifications and quality standards.

(ii) Boreholes

1. Conduct a geological survey to determine the most suitable location for the borehole.
2. Assess water quality and quantity requirements.
3. Obtain necessary permits and permissions from local authorities.
4. Mobilize drilling equipment and crew to the site.

5. Drill the borehole to the desired depth, considering geological conditions.
6. Extract and analyse core samples to understand the rock or soil composition.
7. Insert a casing (usually PVC or steel) into the borehole to prevent collapse and contamination.
8. Seal the annular space around the casing with grout to secure it in place.
9. Develop the borehole.
10. Remove fine particles and debris from the borehole to clear obstructions.
11. Install a well screen in the lower portion of the borehole to filter out sediments and allow water entry if required.
12. Secure the screen in place and connect it to the casing, if required.
13. Lower a submersible pump into the borehole to extract water.
14. Install an electrical control panel and power supply for the pump.
15. Conduct water quality tests to ensure the water meets the required standards for drinking or other uses.
16. Perform a pump test to determine the borehole's sustainable water yield.
17. Connect the borehole to the Bulk line pumping to the wate treatment facility and elevated tank, including pipes, valves.
18. Ensure proper plumbing and backflow prevention.
19. Ensure compliance with safety regulations and standards.
20. Maintain records of drilling and equipping procedures, well construction details, and water quality data.
21. Inspect the entire borehole system to confirm its proper functioning.
22. Test water flow rates and system performance.
23. Provide documentation and training to the client or operators on borehole maintenance and operation.

(iv) Pipelines

1. Clear and grub and stockpile topsoil
2. Excavation of pipe trenches
3. Installation of suitable pipe bedding (insitu / imported)
4. Laying and testing of pipes
5. Backfilling of pipe
6. Installation of 110 to 160 mm diameter interconnecting uPVC pipelines between reservoir, pump station and community.

(v) Steel elevated tank

1. Clear the designated area of vegetation, debris, and obstructions.
2. Level and compact the ground to ensure a stable foundation.
3. Excavate holes for tank foundation Footing.
4. Construct concrete footing to support the tank structure.
5. Ensure the foundation meets design specifications for load-bearing capacity.
6. Fabricate the steel tank off-site according to design specifications.
7. Transport the tank to the installation site using appropriate equipment.
8. Assemble the steel support structure on top of the foundation.
9. Ensure all components are securely connected and properly aligned.
10. Lift and position the steel tank onto the support structure using cranes or other lifting equipment.

11. Ensure proper alignment and anchoring to the support structure.
12. Install inlet and outlet pipes for water supply and distribution.
13. Connect any required valves, fittings, and control systems.
14. Apply protective coatings to the steel tank to prevent corrosion.
15. Ensure the tank is sealed and painted as per specifications.
16. Implement safety measures, such as guardrails and access ladders for maintenance.
17. Ensure compliance with safety regulations and standards.
18. Conduct pressure and leak tests to verify the tank's integrity.
19. Inspect the entire installation for quality assurance.
20. Install any necessary electrical components, sensors, and control systems.
21. Ensure proper wiring and connection to control room if applicable.
22. Remove construction debris and restore the site to its original condition.
23. Dispose of waste materials according to environmental regulations.
24. Commission the tank and associated systems to ensure they function as intended.
25. Provide necessary documentation and training to the client or operators.

(vi) Water treatment (Mechanical & Electrical Works) (Sub Contractor)

1. Supply and installation of mechanical equipment, required for the various unit processes, to be caried out by a Subcontractor Selected in Consultation with Employer in accordance with Clause 4.4.4 of GCC 2015.

2. Supply and installation of all electrical equipment, controllers, instrumentation and telemetry to be caried out by a Subcontractor Selected in Consultation with Employer in accordance with Clause 4.4.4 of GCC 2015.

1.4. LOCATION OF THE WORKS

The proposed project is in Hlalanikahle and extension 5 which are sections of the large Kwa Guqa settlement in the Emalahleni Local Municipality (ELM) located west of Witbank Town bordering the N4 on the south. The project footprint is approximately 17km from the city centre.

Site Co-ordinates:
25° 50’ 26” S, 29° 07’ 05” E

1.5. TEMPORARY WORKS

All temporary works (scaffolding, shuttering, shoring etc) to be designed by the contractor and to be approved by the Employer’s Agent. (Clause 4.1.2 of the Contract)

2. ENGINEERING

2.1. DESIGN SERVICES AND ACTIVITY MATRIX

Works designed by, per design stage:

Description	Responsibility
Design of Works (All stages)	Employer's Agent
Concept, feasibility and overall process	Employer
Basic Engineering and detail layouts to tender stage	Employer's Agent
Final Design of Works	Employer's Agent
Final Design to be approved for construction stage	Employer
Preparation of tender documentation	Employer's Agent
Placement of Advertisements in newspapers	Employer
Application of Eskom connection point	Employer / Employer's Agent
Payment of Eskom connection fees	Employer
Appointment of sub-contractors	Contractor
Supervision	Employer's Agent
Preparation of as-built drawings	Contractor / Employer's Agent
Completion certificate	Employer's Agent / Employer / Contractor

2.2. EMPLOYER'S DESIGN

The permanent works included in this contract has been designed by the Employer's agent. The detail of the works is indicated on the drawing and in the specifications.

2.3. DESIGN BRIEF (CONTRACTORS DESIGN)

The Contractor is responsible for the design and upholding of the following items:

- Shoring where required;
- Dewatering excavations;
- All other temporary works required for the successful completion of the works.

2.4. DRAWINGS

The Employer's Agent will provide the Contractor with one full set of drawings (over and above the drawings supplied for construction, which will be used exclusively for the recording of as built information by the Contractor.

Only dimensions, positions, levels, co-ordinates etc. that change from the original values, will be required to be entered on these drawings. These drawings, fully marked up, will be handed to the Employer's Agent at the issue of the Certificate of completion, which will not be issued until the as-built information has been received.

The drawings listed below are attached under **Part C5: Annexures** and provide an overview of the project.

Additional construction drawings will, in terms of Clause 5.9 of the General Conditions of Contract (2015), be issued to the Contractor by the Employer's Agent/Employer on the commencement date and from time to time as required.

Drawing No	Title
GS-185527-PL-001	LOCALITY PLAN
GS-185527-W-001	NEW BULK LINE LAYOUT
GS-185527- W -102	NEW 1,0ML ELEVATED RESERVOIR
GS-185527- W -103	RESERVOIR SITE LAYOUT
GS-185527- W -203	TREATMENT FACILITY BUILDING DETAIL
GS-185527- W -301	PIPELINE LAYOUT
GS-185527- W -302	LINE VALVE CHAMBER
GS-185527- W -303	AIR VALVE & SCOUR VALVE CHAMBER

2.5. DESIGN PROCEDURES

As described in section 2.3 above, the contractor must submit his methodologies and designs as related to the works to the Employer's agent for approval before commencing with specific portion of works. Work on the specific portions may only commence once written approval has been received from the Employer's Agent.

3. PROCUREMENT

3.1. PREFERENTIAL PROCUREMENT PROCEDURES

a) Requirement:

Preferential procurement procedures are to be followed as specified in the PCY Particular Specification

b) Resource standard pertaining to targeted procurement:

Refer to PCY Particular Specification

3.2. SUBCONTRACTING

a) Scope of subcontract work

It is anticipated that the package water treatment plant (Mechanical and Electrical works) will be sub contracted to a specialist supplier. Consultation on the specifications and requirements is required with the employer's agent.

This subcontractor will be appointed in Consultation with the Employer as per Clause 4.4.4 of the GCC 2015. A provisional sum was included for the works.

b) Preferred subcontractors / Supplier
Details of preferred subcontractor / suppliers will be made available by the Employer a later stage

c) Subcontracting procedures
Pease refer to Particular Specification PCY 8

d) Attendance on subcontractors

- **Subcontractors appointed as per CPG specified**
  The contractor is to supply additional staff to assist and monitor appointed subcontractors as specified in Particular Specification PCY.

4. CONSTRUCTION

a) Works specification

- **Applicable SANS standards**
  Refer to Standard Specifications in the contract
- **Applicable national and international standards**
  Refer to Standard Specifications in the contract
- **Particular/generic specifications**
  Refer to Particular Specifications in the Contract
- **Certification by recognized bodies**
  Only certification by SABS will be allowed
- **Acrément certificates**
  None

a) Plant and material

- **Plant and material supplied by the employer**
  No plant or material will be supplied by the employer

- **Material, samples and shop drawings**
  All materials used, where such mark has been awarded for a specific type of material, bear the SABS mark.

b) Construction Equipment

- **Requirements for equipment**
  The following equipment is deemed necessary for the successful completion of the project:
  - Excavators
  - Drilling Rig
  - Tipper trucks
  - TLBs
  - Water Carts
  - Compactors (Wackers)
  - LDVs

  Point will be assigned for the number of plant supplied as per Returnable Schedule O

- **Equipment provided by the employer**
  No equipment will be supplied by the employer

c) Existing Services

- **Known services**
  There are no known services on site. This needs to be confirmed by the contractor prior to excavation in any area.
- **Treatment of existing services**
  Existing services which are encountered must be reported to the Employer's Agent who will instruct on which action to be taken.
- **Use of detection equipment for the location of underground services**
  None foreseen
- **Damage to services**
  The contractor shall repair any amend any services damaged directly due to the construction activities. The cost of which will be covered by the rate for crossing of services in the bill of quantities.
- **Reinstatement of services and structures damaged during construction**
  As per the previous item.

d) Site establishment

- **Services and facilities provided by the employer**

  No services or facilities will be provided by the employer. The contractor will be responsible to make his own arrangements for the supply of water, electricity and communication. **There will be no municipal services to connect to. This includes water for testing the tank and pipelines.**

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- **Storage and laboratory facilities**

  No on-site laboratory facilities will be required. The contractor must ensure that he provides adequate storage for the construction activity needs.

- **Other facilities and services**

  No temporary services will be supplied by the Employer. The contractor must ensure to supply his own foreseen required services

- **Vehicles and equipment**

  As stated under “Facilities provided by the Contractor”

- **Advertising rights**

  No additional advertising will be allowed other than branding of vehicles, equipment and employee clothing.

- **Notice boards**

  The contractor shall supply 2 x name board as per the details indicated on the construction drawings for the entire duration of the contract.

e) Site Usage

Site usage is limited to functions associated with the project only. The water treatment works and pipeline are all located on government land or servitudes registered in the name of the government. The contractor may not traverse on any private properties without written approval from Employer’s Agent and the Landowner. It is however not foreseen that access will be required to any privately owned land.

f) Permits and way leaves

The Contractor to apply for the construction permit.

g) Alterations, additions, extensions and modifications to the existing works

Not applicable.

h) Inspection of adjoining properties

Not applicable.

i) Water for construction purposes

The contractor shall make his own arrangements regarding a suitable supply of water for the project and he must make adequate provision in his tender for all negotiations and procurement of water for construction activities and all related costs will be deemed to be included in his tendered rates.

Water for use in the concrete mix must be suitable for concrete and be approved by the Engineer, before any construction commences. Should ready mix concrete be used, the waters quality will be deemed covered by the supplier’s design engineers.

Water may not be abstracted from the local river, streams or Irrigation canals. If the contractor wishes to do so he must submit a request to the Employers agent which includes all the necessary permissions, permits or licenses required to do so.

j) Survey control and setting out of the works

The Employers Agent will provide survey beacons. The contractor shall be responsible for the true and proper setting out of the Works and for the correctness of the position, levels, dimensions and alignment of all parts of the Works and for the provision of all necessary instruments, appliances and labour in connection therewith.

The Contractor shall take care that property beacons, trigonometrical survey beacons or setting-out beacons are not displaced or destroyed without the consent of the Employer's Agent. Property beacons and trigonometrical survey beacons that have been displaced or destroyed shall be replaced by a registered land surveyor, who shall certify such replacement.

The cost of replacing all beacons displaced or destroyed during the course of the Contract without the consent of the Employer's Agent shall be borne by the Contractor.

5. MANAGEMENT

5.1. Management of the works

a) Applicable SANS standards

The Contractor is referred to SANS 1921: 2004 parts 1, 2 and 3: Construction and Management Requirements for Works Contracts. These specifications shall be applicable to the contract under consideration and the Contractor shall comply with all requirements relevant to the project.

Certain aspects however require further attention as described hereafter.

b) Particular / Generic specifications

Refer to Part C3.4

c) Planning and programming

Preliminary programme

The Contractor shall include with his tender a preliminary programme on the prescribed form to be completed by all Tenderers. The programme shall be in the form of a simplified bar chart with sufficient details to show clearly how the works will be performed within the time for completion as stated in the Contract Data.

Tenderers may submit tenders for an alternative Time for Completion in addition to a tender based on the specified Time for Completion. Each such alternative tender shall include a preliminary programme similar to the programme above for the execution of the works, and shall motivate his proposal clearly by stating all the financial implications of the alternative completion time.

The Contractor shall be deemed to have allowed fully in his tendered rates and prices as well as in his programme for all possible delays due to normal adverse weather conditions and special non-working days as specified in the Special Conditions of Contract, in the Project Specifications and in the Contract Data.

The following constraints shall be taken into account in preparing the preliminary construction programme which must be submitted with the Tender. These same constraints shall apply to the final construction programme:

(a) the Contractor must indicate in his tender the proposed contract period;
(b) plant and personnel requirements to complete the project must be incorporated in the Tender and shown on the programme;
(c) Provision must be made for the incorporation of the M&E sub-contract;
(d) All costs associated with the planning, programming and administration of the M&E contract will be deemed covered under the mark-up provided for it;

Programme in terms of Clause 5.6 of the General Conditions of Contract
It is essential that the construction programme, which shall conform in all respects to Clause 5.6 of the General Conditions of Contract, be furnished within the time stated in the Contract Data. The preliminary programme to be submitted with the tender shall be used as basis for this programme.

The following must be stated on the programme:

(a) The quantity of work applicable to each bar item as well as the rate at which the work will be completed.
(b) A budget of the value of completed work, month by month, for the full contract period.
(c) The critical path.
(d) Works to be undertaken by Local Contractor (if applicable).
(e) Works to be undertaken by Sub-Contractors.
(f) Schedule of plant and resources to be utilized.

The Contractor's attention is also drawn to clause 5.6 of the General Conditions of Contract 2015.

d) Sequence of the works

The contractor may programme the work as to ensure that the works is completed within the duration stated I the Contract Data. This program must make allowance for the M&E contractor to commission his works and complete a 28-day, trouble free, trial operational period.

e) Software application for programming

All programmes must be compiled in Microsoft Projects

f) Methods and procedures

- Cleanliness of the site:
  The contractor shall ensure that the site remains clear off all rubbish

- Protecting of trees and shrubs:
  Protection of trees and shrubs to be as per EMP and ROD

- Blasting operations:
  Blasting operations must adhere to the following acts:
  1. OCCUPATIONAL HEALTH AND SAFETY ACT (85 OF 1993)
  2. EXPLOSIVES ACT, 1956 (ACT 26 OF 1956)

- Borrow pits, disposal of access material, deposition of material etc. in earthworks activities:
  Spoil sites shall be determined on site in conjunction with the Employers Agent, the PSC, and the local authority. The Contractor shall be permitted to use only those spoil areas approved by

the Engineer. Should the Contractor wish to use any other spoil area for the disposal of soil, rubble, vegetation, etc., its use shall be subject to the approval of the Employers Agent and the landowner.

- The management and disposal of water on site: *(Read with SANS 1921 - 1: 2004 clause 4.6)*
  The Contractor shall pay special attention to the management and disposal of water and stormwater on the site. It is essential that all completed works or parts thereof are kept dry and properly drained. Claims for delay and for repair of damage caused to the works as a result of the Contractor's failure to properly manage rain and surface water, will not be considered

- Access, roads, maintenance of accesses
  The contractor will maintain the access roads to the works at all times.
  Access to all properties affected by the construction activities must remain open, and any temporary closures must be arranged in writing with the affected parties.

- Hours of work:
  Hours of work are daylight hours from Monday to Saturday.

- Training of operators
  The contractor must train the municipal staff who will be taking over works

g) Quality plans and control

- Quality Assurance (QA) (Read with SANS 1921 – 1: 2004 clause 4.4)
  The Contractor will be solely responsible for the production of work that complies with the Specifications to the satisfaction of the Engineer. To this end it will be the full responsibility of the Contractor to institute an appropriate Quality Assurance (QA) system on site. The Engineer will audit the Contractor's quality assurance (QA) system on a regular basis to verify that adequate independent checks and tests are being carried out and to ensure that the Contractor's own control is sufficient to identify any possible quality problems which could cause a delay or failure.

  The Contractor shall ensure that efficient supervisory staff, the required transport, instruments, equipment and tools are available to control the quality of his own workmanship in accordance with his QA-system. His attention is drawn to the fact that it is not the duty of the Engineer or the Engineer's representative to act as foreman or surveyor.

- Process control
  The Contractor shall arrange for his own process control tests. The Contractor may establish his own laboratory on site for this purpose, or he may employ the services of an independent commercial laboratory. Whatever method is used, the Contractor must submit the results of tests carried out on materials and workmanship when submitting work for acceptance by the Engineer. The costs for these tests shall be deemed to be included in the relevant rates and no additional payment will be made for testing as required.

- Acceptance control
  The process control test results submitted by the Contractor for approval of materials and workmanship may be used by the Engineer for acceptance control. However, before accepting any work, the Engineer shall have his own acceptance control tests carried out by the dedicated site laboratory as approved by the client. The cost of acceptance testing shall be to the account of the client.

h) Environmental

Refer to the Environmental Plan in the Particular Specification

i) Accommodation of traffic on public roads occupied by the contractor

- Basic Requirements

The travelling public shall have the right of way on public roads, and the Contractor shall make use of approved methods to control the movement of his equipment and vehicles so as not to constitute a hazard on the road.

The Contractor shall ensure that all road signs, barricades, delineators, flagmen and speed controls are effective and that courtesy is extended to the public at all times.

Failure to maintain road signs, warning signs or flicker lights, etc., in a good condition shall constitute ample reason for the Engineer to suspend the work until the road signs, etc., have been repaired to his satisfaction.

The Contractor may not commence constructional activities affecting existing roads before adequate provision has been made to accommodate traffic in accordance with the requirements of this document and the South African Road Traffic Signs Manual.

The Contractor shall construct and maintain all temporary drainage works necessary for temporary deviations.

The Contractor shall provide and grant access to persons whose properties fall within or adjoin the area in which he is working.

- Payment

The Contractor's tendered rates for the relevant items in the Bill of Quantities shall include full compensation for all possible additional costs which may arise from this, and no claims for extra payment due to inconvenience as a result of the modus operandi will be considered.

j) Other contractors on site

No other contractors other than appointed sub-contractors are foreseen to be on site.

k) Recording of weather

The Contractor shall provide a rain gauge close to the office of the Employer's Agent or as directed by the Employer's Agent and precautions shall be taken to restrict access to the rain gauge.

l) Format of communications

All communication to be done via electronic mails or written correspondence.

m) Key personnel

Key personnel must be as stipulated in the Returnable schedules under Tender Data. Points will be allocated for the qualifications and experience of the key personnel listed.

n) Management meetings

- Site Meetings:

Times: Site walk through Every two weeks
Location: Site office
Attendance: Contract manager, Site Agent, Health and Safety Officer and Sub-contractor representatives as required.

- Technical Meetings:
  Times: Every four weeks
  Location: Site office
  Attendance: Contract manager, Site Agent, Health and Safety Officer and Sub-contractor representatives as required.

o) Forms for contract administration
To be formalized after appointment

p) Electronic payment
Requirements for electronic payments to be communicated by the Employer after appointment.

q) Daily records
A daily site diary must be kept on site whereby the deliveries, rainfall, daily progress, plant, staff and general daily events are recorded. Both the Site agent and Employer's Agent's Representative must sign each entry off at the end of the day.

r) Bonds and guarantees
As specified in the Contract Data

s) Payment certificates
As specified in the Contract Data

t) Permits
No permits are foreseen to be required, excluding statutory permits

u) Proof of compliance with the law
Refer to Contract Data

v) Insurance provided by the employer
Refer to Contract Data

w) Quality plans and control
The contractor will be provided with a set of standard Quality Control Check sheets which will be used to monitor the quality of the works. Each portion of the works must be signed off by the Employer's Agent and the Site Agent.

6. HEALTH AND SAFETY

Refer to the Baseline Risk Assessment and Health and Safety Specifications contained in the Document's Annexures.

7. ANNEXURES

Refer to **Part C5: Annexures**.