RAND WATER

BID NO: RW10397155/22 - 3A & 3B

EARTHWORKS, PIPE LAYING, JACKING AND ASSOCIATED WORKS FOR PANFONTEIN PROJECTS PACKAGE 3 (3A AND 3B):
3A - THE SECOND PHASE OF THE SLUDGE PIPELINE FROM VEREENIGING PUMP STATION TO THE VAAL RIVER BRIDGE CROSSING AT MACCAUVLEI
3B – ZUIKERBOSCH SLUDGE PIPELINE AND CROSS CONNECTIONS FROM CENTRAL SLUDGE NO. 2 TO THE CROSS CONNECTION CHAMBER

SECTION D
SPECIFICATIONS AND OTHER DOCUMENTATION

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SCOPE OF WORK

General

The Standard Specifications for all associated civil work shall be the SABS 1200 – Standardized Specifications for Civil Engineering Construction.

The Standardized Specifications applicable to this Contract are listed in the Project Specification. These Specifications are not issued with this volume but are available at the Contractor's expense from: SA Bureau of Standards, Private Bag X191, Pretoria, 0001.

Scope

This Project Specification is set out in 3 portions:

Part 1: **PROJECT SPECIFICATION** covers a general description of the project, the facilities available and the requirements to be met.

Part 2: **VARIATIONS AND ADDITIONS TO THE STANDARDISED SPECIFICATIONS** covers variations to the standardised specifications and particular specifications which are applicable to the contract.

Part 3: **TECHNICAL SPECIFICATIONS** contains the Rand Water technical specifications for work that fall outside of the Standardized Specifications.

Status

Should any requirement of the Project Specification conflict with any requirement of the standardized or particular specifications, the requirements of the Project Specification shall prevail.

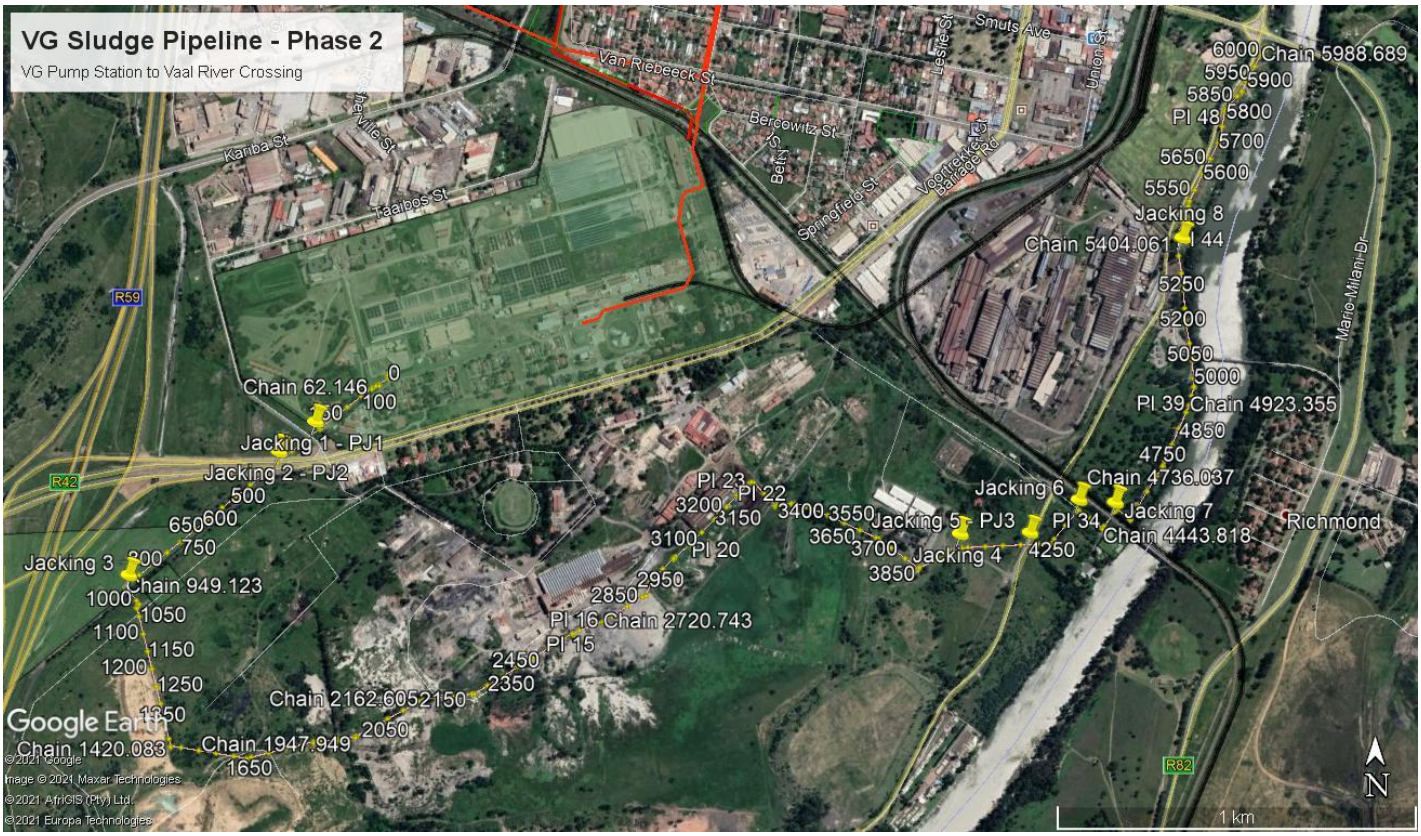
The "Engineer" in the Scope of Work shall mean the Programme Manager to Rand Water or other person duly authorised by him.

PART 1 – PROJECT SPECIFICATION

PS 1 DESCRIPTION OF THE CONTRACT

WORK PACKAGE 3A

The work consists of earthworks, pipe laying and associated civil works for 6020 m of 600mm nominal internal diameter steel sludge pipe with an 8mm wall thickness to be laid from Vereeniging Pumping Station to the Vaal River Crossing, while complying to the applicable SABS 1200 specifications, variations and additions to the standardized specifications applicable to this contract and the technical specifications of Rand Water for work that falls outside of the standardized specifications.



It should be noted that the Environmental Authorisation has only been procured for 4.2km of the pipeline length. The remainder portion will be procured during construction and should be secured by the time the construction team reaches the 4.2km mark. Hence, all planning activities for construction should start with the first 4.2km and thereafter, proceed to the remainder portion once the Environmental Authorisation has been secured.

A: Pipeline & Civil

The pipeline scope of work shall include, but not be limited to the following:

- Pipe specials and delivery to works
- Pipes installation including trenching and backfilling
- Pressure testing of Phase 2 of the sludge pipeline
- Cleaning and commissioning of Phase 2 of the sludge pipeline
- Cathodic Protection for the entire pipeline
- Service Detection

- Steel Pipe installation into Pipe Jackings
- Valves and pipe specials installation at valve chambers
- Pipeline external condition assessment and repair to pipeline/structural elements at tie-ins and pipe bridge crossing at Vaal River Bridge Crossing
- See PS 1.2 Overview of the works to be performed by the Contractor.

In addition to the works indicated above the Contractor shall also perform pipe jacking and the grouting of the pipe jacking sleeves. Grouting will be installed between the inside of the jacking sleeve and the installed sludge main.

The civil works to be performed by the Contractor will also include, but may not be limited to: (the list below is non-exhaustive and is to be read in conjunction with the project drawings and technical specifications – where omissions are identified the Tendering contractor should notify the Engineer): See PS 1.2 Overview of the works to be performed by the Contractor.

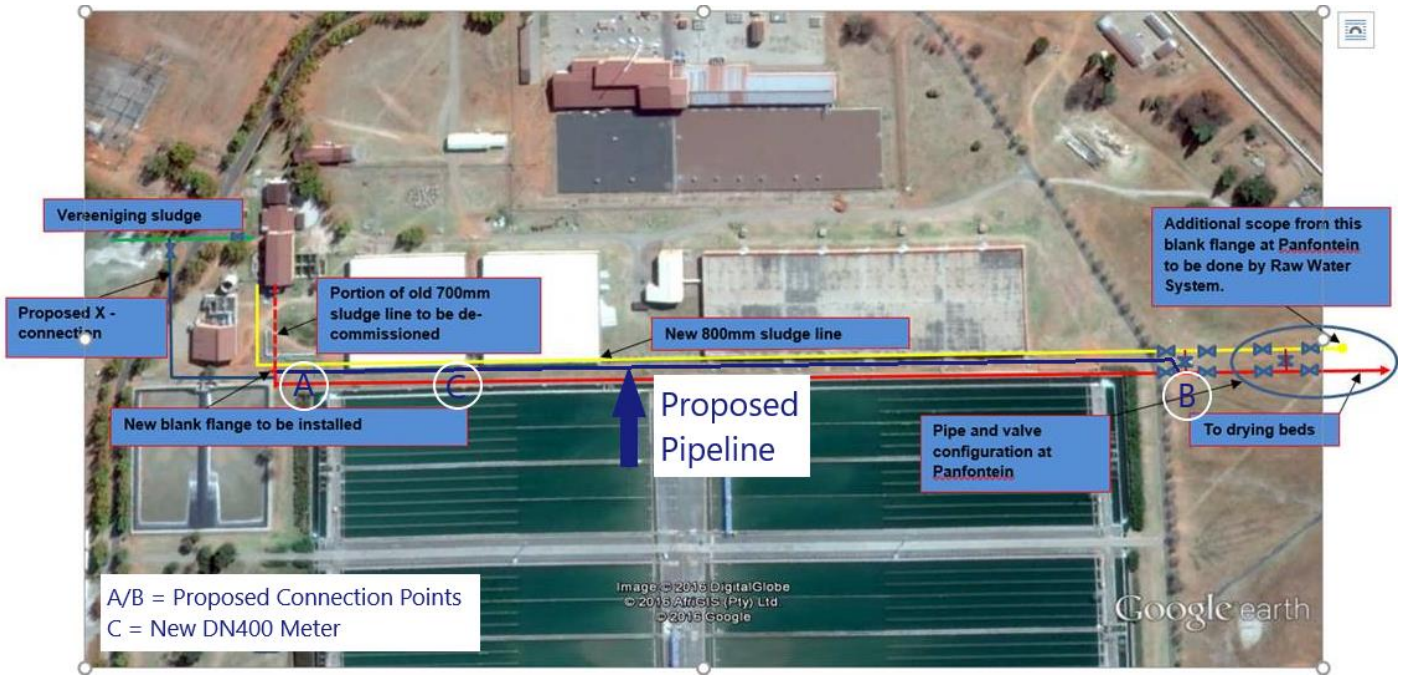
B: Cathodic Protection

The Cathodic Protection System scope of work shall include, but not limited to: (the following list is not comprehensive; it should be read in conjunction with the CP Design Report, BOQ, CP Technical Specification, and the CP drawings): See PS 1.2 Overview of the works to be performed by the Contractor.

WORK PACKAGE 3B

The ZB Bypass pipeline is intended to connect to the existing 700mm dia (red line). The connection point has not been finalised as a condition assessment is currently underway to establish its suitability. There are two potential connection points, proposed connection point A and B. The pipeline is currently designed to connect to proposed connection point B. This is the worst case scenario.

In the case that the condition assessment comes back and shows that the pipeline can be used with repairs, that will be the preferred solution. Should this be the implemented solution, chamber for the meter, Dosing point and the sampling point will be constructed as these currently will sits on the aboveground section.



A: Pipeline & Civil

The works consist of earthworks, pipe laying and associated civil works for 750m of 694mm internal diameter steel pipeline to be laid from Central Sludge No. 2 at Zuikerbosch Pump Station to an existing sludge pipeline within Zuikerbosch. Based on the results of the assessment of the old 700 mm sludge steel pipeline of approximately 600 m in length within the Zuikerbosch station; the scope of work may at the engineer's instruction be extended past the proposed connection point (200 m mark) so that it also covers the repair and replacement of parts or the entire old sludge pipeline portion which is under currently under assessment.

Further, as part of the scope is the installation of insulating flanges above ground level; the installation of dosing points and 400 diameter meter as per drawings. The work is to be executed while complying with the applicable SANS 1200 specifications, variations and additions to the standardized specifications applicable to this contract and the technical specifications of Rand Water for work that falls outside of the standardized specifications.

B: Mechanical

The mechanical scope of work shall comprise of design, supply, delivery, installation and put into service of two (2) electric valve actuators complete with gearboxes, actuator extensions and fittings at Rand Water Zuikerbosch Pump Station.

The scope includes for the provision of all the labour, materials and services, whether of a temporary or permanent nature, needed to meet the requirements of the specification supplied with this document
The work to be performed shall include but not limited to the following:

a) Supply and deliver two (2) electric actuators complete with gear boxes and fittings
b) Installation, commissioning and putting into operation of two (2) actuators complete with gearboxes and fittings
c) Supply and delivery of Maintenance & Operation Manual
d) Training of operations and maintenance personnel.

C: Electrical

The work comprises of the following items as a minimum:

- Detail design of parts of the electrical installation as per design criteria and Rand Water and national and international standards.
- Power supply point for the valve chamber distribution board and the magnetic flowmeter.
- Valve chamber distribution board for the sludge cross connection valve chamber.
- Valve isolating panels for each valve actuator.
- Sump pump control and isolating panels for each valve chamber.
- Electrical installation for each valve chamber consisting of conduiting, lighting and socket outlets.
- Cable installation for the power supply to the valve chamber and the magnetic flowmeter, including trenching and backfilling, installation of cables, cable sleeves, cable entry sealing, cable support systems, termination, testing and commissioning.
- Cable support systems in the valve chamber including unistrut, cable trays and angle iron supports.
- Earthing installation for the chambers.
- Summit all necessary project documentation such as signed As-Built drawings, test certificates e.g. Certificate of Compliance in terms of SANS 10142-1, operating and maintenance manuals.

D: Automations

The Automation Scope involved design, supply, install, test and commission the communication link between the valve actuators and the Central Sludge 2 SCADA. This involves communication cabling from the actuator to the PLC.

This scope also involves design, supply, install, test and commission a magnetic flow meter and establishing communication link between flow meter and Central Sludge 2 SCADA.

Design, supply, install, test and commission Kiosks to house the PLCs, power supplies and the Ethernet switches. Design, supply, install, test and commission of a communication link from the valve and flow meter kiosks to the Zuikerbosch Operational Technology network.

Design, supply, install, test and commission new redundant SCADA computers. Monitoring the sump pumps for each valve chamber and alarming when flooding occurs. Reading Flow Rate and Totalized flow from the magnetic flow meter and displaying at Central Sludge 2 SCADA. Programming the PLC, HMI and SCADA to display and control each of the actuated valves and flow meter.

General

The Contractor takes delivery of pipes with flanges and/or flanges by collecting them from the Rand Water Emhlangeni Depot and strung along the pipeline route (where available).

Pipe specials, valves and any instrumentation – To be supplied by Contractor

Rand Water reserves the right to withdraw the pipes, pipe specials, valves or any instrumentation.

The Contractor must supply all resources and equipment needed for the successful implementation of the pipeline.

PS 1.1 Employer's Objectives

This contract entails the installation of the new second phase sludge pipeline from Vereeniging Pump Station to the Vaal River Bridge Crossing at Maccauvlei (Work Package 3A). It further involves the installation of a bypass sludge pipeline within Zuikerbosch from central sludge No. 2 to a proposed connection point on the old sludge pipeline within the station (Work Package 3B). Upon the completion of the ongoing old sludge line condition assessment, the objective may also include the repair and/or replacement of the old sludge steel pipeline.

The Employer will avail all available and necessary information that will assist in the execution of the works.

The aim of this document is to successfully procure the construction/installation of the infrastructure covered in this document in a fair, equitable and unbiased manner.

PS 1.2 Overview of the works to be performed by the Contractor:

WORK PACKAGE 3A

1. All civil works will be executed in accordance with the applicable SABS 1200 series specifications and the relevant (attached) Rand Water Technical Specifications. The

Contractor must supply all resources and equipment needed for the successful construction and commissioning of the pipeline

2. The work to be performed by the Contractor:

- Examine the already procured steel pipes stored at Emhlangeni Depot as per the specifications of the Employer.
- Produce condition assessment reports after the inspection of the stored pipes, valves, specials and appurtenances.
- Transport, off load and lay down all pipes from the manufacturing plant at the works site.
- Conduct Holiday tests for the stored pipes

- Set out the centre line pegs and elevations for the Works as indicated in the technical specification and will be responsible for all subsequent setting out and care of pegs. Rand Water will provide Bench Marks.
- Notify landowners / tenants to be affected during construction in writing with attached photographs 14 working days prior to start of work. Way leaves and communications with Interested and Affected Parties will be handled by Rand Water;
- Excavate by hand proof trenches at 50m centers or appropriate intervals 1 week before the commencement of the construction process in the area of such services to locate the existing RW pipelines and other services to required procedures.
- Underground service detection must be conducted prior to any ground breaking activity taking place. Services detected must be exposed by hand 4 weeks before the commencement of the construction process in the area of such services.

- Excavate a 6020 m long and an average 1.6 m wide and 3.0 m deep trench from Vereeniging Pumping Station to the Vaal River Crossing.
- Inspect and collect, unload onto sandbags, lay and joint the 600mm internal diameter steel pipes on an approved bedding within the pipe trench.
- Holiday testing of pipes when loading at Emhlangeni Depot and when off-loading along the pipe trenches.
- Procure and install all required and specified valves.
- Install and supply all bends, sluice valves, and air valves with vacuum break valves, reflux valves, butterfly valves, and pipe work connections at the beginning and end of the pipeline. Also conduct tie-ins at pipe jackings and install pipe through jacking.
- Pipeline external condition assessment and repair to pipeline/structural elements at tie-ins and pipe bridge crossing at Vaal River Bridge Crossing

- Complete and repair the protective coatings, if necessary, as follows: Manufacturers recommended repair to procured pipe External Coating (currently Sintakote) and Epoxy internal lining or as investigated on site at Emhlangeni Depot for the steel pipes
- Wrap the flanged connections using stopaq or similar type coating including GRE for mechanical protection.
- Backfill the trench with fill material according to specification.
- Dispose of surplus material and reinstate the topsoil and surface area.
- Construct and/or install valve chambers and all associated steel work required within the chambers.

- Establish jacking pits and equipment using a competent jacking contractor
- Jacking excavations and disposal of material
- Supply and jacking of jacking pipes
- Install jacked pipe crossings where required in the contract

- Grouting between outside of sleeve and excavation face and grouting between inside of sleeve and water main, installed by Pipe laying Contractor in accordance with TS2 and TS1
- Backfilling and reinstatement of jacking sites
- Pressure tests the completed pipeline to required procedures.
- Inspections along the full length of the pipelines prior to internal handover of a specific section of the pipeline as specified in the tender document.
- Submit all required documentation with handover (internal and external) of the pipeline.

Cathodic Protection

- The Cathodic Protection System scope of work shall include, but not limited to: (the following list is not comprehensive; it should be read in conjunction with the CP Design Report, BOQ, CP Technical Specification, and the CP drawings):

- Supply and install an Impressed Cathodic Protection System (ICCP) capable of polarizing all parts of the buried pipeline to potentials more negative than -0.85mVcse as per SANS 11589 – 1: 2009
- Supply and install Sacrificial Anode Cathodic Protection System (SACP) capable of polarizing all parts of the buried pipeline to potentials more negative than -0.85mVcse as per SANS 11589 – 1: 2009
- Supply and install monitoring points
- Supply and install cross bonding facilities on all Rand Water lines
- Supply and install cross bonding facilities on all foreign lines
- Supply and install AC Mitigation System
- Supply and install insulation flange kits as per Rand Water's Technical Specification and drawing No. 9548 on the pipeline's outlet and inlet, and on both sides of the meg flow meter.
- Perform CIPS survey after installation of the ICCP system on the entire 6037.2m and compile a report.
- Perform a DCVG survey on the entire line (6037.2m) as soon as the pipe is backfilled, and repair all the pin pointed defects while the contractor is on site on site, as per Rand Water Technical Specification – Rev 7.5 rev 3.
- Testing and commissioning of the Cathodic Protection System and compiling of the report
- Final documentation and handover.

- Reinstate road layer works and surfacing as required;
- Make tie-ins to existing pipelines at start and end points. The tie-in pipeline must at all times remain operational except during scheduled shut down periods.

Civil works:

The civil works to be performed by the Contractor will also include, but may not be limited to: (the list below is non-exhaustive and is to be read in conjunction with the project drawings and technical specifications – where omissions are identified the Tendering contractor should notify the Engineer):

- Provide a construction methodology to be approved by the Engineer;
- Fencing off around designated site areas;
- Re-routing (if required) and protection of Services;
- Accommodation of traffic along existing road maintaining entry and access for the Employer's staff (where directed by the Engineer);
- Verification of service detection (including detecting the location and depth of services);

- Relocation and/or protection of existing services and structures;
- Setting out the benchmarks and levels verification;
- Removal of topsoil and stockpiling for later re-instatement;
- Excavation for the cast in-situ reinforced concrete valve chambers and precast air valve chambers, disposing of spoil material and preparation of layerworks;
- Temporary works design and erection, as part of formwork (through-tieless formwork);
- Construction of the cast in-situ reinforced concrete valve chamber fitted with paddle flanges as per the referenced drawings;
- Construction of the precast concrete air valve chambers with cast in-situ base slabs;
- Water tightness testing of the cast in-situ reinforced concrete valve chambers;
- Backfilling and compaction around the reinforced concrete valve chamber;
- Re-instatement of the top soil;
- Installation of steel sundry items;
- Generation of as-built drawings;
- Reinstatement of structures damaged or relocated during construction to their preconstruction condition / location and making good of site;

3. Other requirements of the Contractor:

- Evaluates and comments on the design package when a problem on site during construction occurs, identifies possible opportunities to reduce cost and time schedule while not compromising the integrity, safety and quality of the project.
- Informs the Project Manager and or designated Resident Engineer of all proposed design changes, for acceptance, prior to implementation.
- Establishes the risk associated with the implementation of the Works.
- Procures the required labour, services, plant and material.
- Receive and install the free issue items,
- Deliver and install all required plant and material to site,
- Manufacture, deliver and install all required pipeline specials and/or material to site;
- Ensures that he and his Sub-contractors meet the Quality Control Plan (QCP) requirements in terms of both Quality Assurance and Quality Control.
- Notify land owners and/or tenants in advance of construction activities to be undertaken over a given property or farm portion;
- Excavate by hand proof trenches at 50m centres or appropriate intervals to locate the existing RW pipelines;
- Expose by hand all underground services (other than the pipes noted above) one week before the commencement of the construction process in the area of such services;
- Backfilling and reinstatement of sites;
- Identify positions of existing consumer connections by interviewing owner/ tenant;
- Excavation at certain properties may be delayed while agreements with landowners are pending;
- The Contractor will take due care when working within private properties and ensure the property owners properties are not unduly disturbed by the works. The Contractor shall put measures in place to ensure public safety and that open trenches which are to be left open overnight are appropriately barricaded, appropriate warning lights shall be provided where trenches are in situated in public thoroughfare areas;
- Works in restricted widths, works will be restricted to 75m maximum of open trench at a time;
- Where the pipeline runs along and under public roads the Contractor will need to backfill trench work sections to road surface level;

- Where the pipeline runs along and under public roads the Contractor will start with the reinstatement of road layer works once at least a 500m continuous road length is ready to be reinstated.

SL1 – JACKING SECTIONS				DESCRIPTION	LENGTH (m)
REF:	CROSSING	FROM CHAINAGE	TO CHAINAGE		
PJ1	Colenso Str.	277.130	296.512	900 ND Class 100D	19.52
PJ2	Barrage Rd.	366.509	466.549	900 ND Class 100D	100.04
PJ3	Rand Water Pipelines	951.123	992.603	900 ND Class 100D	41.48
PJ4	Private Access Road	3942.018	3981.058	900 ND Class 100D	39.04
PJ5	Mario Milani Rd.	4153.814	4187.391	900 ND Class 100D	34.16
PJ6	Rand Water Pipelines	4330.851	4347.850	900 ND Class 100D	17.08
PJ7	Railway Line	4452.000	4510.561	900 ND Class 100D	58.56
PJ8	Rand Water Pipelines	5336.673	5385.473	900 ND Class 100D	48.80

WORK PACKAGE 3B

A: Civil

1. All civil works will be executed in accordance with the applicable SANS 1200 series specifications and the relevant (attached) Rand Water Technical Specifications. The Contractor must supply all resources and equipment needed for the successful construction and commissioning of the pipeline

2. The work to be performed by the Contractor:

   - Set out the centre line pegs and elevations for the Works as indicated in the technical specification and will be responsible for all subsequent setting out and care of pegs. Rand Water will provide Bench Marks.
   - Service detection to be done in order to ensure all services are identified that need to moved or if pipeline alignment need adjustment.
   - Excavate by hand proof trenches at 50m centres or appropriate intervals to locate the existing RW pipelines;
   - Expose by hand all underground services (other than the pipes noted above) one week before the commencement of the construction process in the area of such services;
   - Collect DN700 and DN760 pipes from Emhlangeni Plant at Rand Water, including detection of defects and repairs, off-loading either next to pipe trench or at lay-down area, and removal of internal bracing.

- Removal of existing CML lining and relining of pipes with Epoxy internal lining
- Supply and deliver to site pipe specials, valves and all other materials and equipment instrumentation.
- Excavate approximately 218m long by 1,3 m wide, by 1,9 m deep (on average) trench for the installation of a 710 mm OD pipe with minimum 1,0 m cover within Zuikerbosch and minimum 1m cover in roadways;
- Excavate and construct concrete plinths/ anchors to support the pipeline which will be above ground. (Approximately 578m of pipe is above ground)
- Transport DN700 pipes from lay-down areas to side of trench and plinths.
- Construct approximately 155 m of concrete encasement according to Drawing No. R027141
- Inspect, unload onto sandbags, lay and joint the DN700 steel pipes on approved bedding within the pipe trench. Install all bends, and scour valve and air valve installations, pipe connections at the start and end.
- Complete and repair the protective linings and coatings (Fibre-glass reinforced bitumen external coating and abrasion epoxy internal lining, carbomastic coating (UV protection) for pipe above ground).
- All flanges that will be buried need to be wrapped and locations marked and this information must provide with the As-builts.
- Backfill the trench and dispose of surplus material and reinstate the topsoil and surface area.
- Construct valve chambers and all associated steel work required within the chambers.
- Construct chambers for all dosing and testing points at the engineer's instruction.
- Backfilling and reinstatement of sites.
- Pressure test and disinfect the completed pipeline to required procedures.
- Conduct CCTV inspections along the full length of the pipelines prior to handover of a specific section of the pipeline as specified in the tender document.
- Submit all required documentation with handover (internal and external) of the pipeline.
- Supply and Installation of Cathodic protection system; (Insulation flange 300mm above ground at chainage ± 117m and ±650m)
- Reinstate road layer works and surfacing as required;
- Make tie-ins to existing pipelines at start and end points. The tie-in pipeline must at all times remain operational except during scheduled shut down periods.
- Remove existing stairs or step ladders, refurbish and reposition it for access to chambers after the pipeline installed.

3. Other requirements of the Contractor:

- Evaluates and comments on the design package when a problem on site during construction occurs, identifies possible opportunities to reduce cost and time schedule while not compromising the integrity, safety and quality of the project.
- Informs the Project Manager and or designated Resident Engineer of all design changes, for acceptance, prior to implementation.
- Establishes the risk associated with the implementation of the Works.
- Procures the required labour, services, plant and material.
- Receive and install the free issue items,
- Install steel pipeline and associated components at the engineer's instruction.
- Manufacture, deliver and install all required pipeline specials and/or material to site; (unless otherwise noted)
- Ensures that he and his Sub-contractors meet the Quality Control Plan (QCP) requirements.
- The Contractor will take due care when working within private properties and ensure the property owners properties are not unduly disturbed by the works. The

Contractor shall put measures in place to ensure public safety and that open trenches which are to be left open overnight are appropriately barricaded, appropriate warning lights shall be provided where trenches are in situated in public thoroughfare areas;

- Works in restricted widths, works will be restricted to 100m maximum of open trench at a time;
- Where pipeline run along and under public roads the Contractor will need to backfill trench work sections to road surface level;

PS 1.3 Taking over of the Works:

- The responsibility for operation and routine maintenance passes to the Employer at Completion. The Contractor ensures clean-up requirements at Completion and ensures that it is implemented.
- The Contractor transmits a complete set of marked-up drawings to the Employer before the testing of the Works.
- The Contractor compiles quality control (QC) hand-over documentation files (Data-pack which must be kept up to date as the contract progresses) for each piece of material individually which consists of:

    - Notice and acceptance of completion form.
    - Checkout conformation form.
    - Checklist applicable to Equipment.
    - Punch / Defects list.
    - Certificate of compliance by an accredited person for the portion of installation.
    - Tests, calibration, material, SABS and QC certificates.
    - Completed data sheets; Accepted for construction drawings.
    - Relevant drawings;
    - Material certificates indicating material compliance and type.
    - Engineering and design changes.
    - Safety requirements for installation and maintenance.
    - The detailed maintenance procedure documentation.
    - Fabrication and inspection plan.
    - List of tagged items for transport and construction.
    - Internal verification documents.
    - Guarantees that the Contractor and his Sub-contractor’s or suppliers provide.
    - A list of Equipment to undertake NDE.

PS 1.4 Supply of Pipes

WORK PACKAGE 3A

All pipes required for this contract shall be free issued to the Contractor and Contractor shall collect the pipes from Emhlangeni Depot. The pipes will have an inside diameter of 610mm, a nominal wall thickness of 8mm and will be supplied in lengths of between 18 and 19m complete with loose flanges if available. Grade of pipe to be confirmed by Contractor and Rand Water.

The coordinates for the Emhlangeni Depot are: 26°21'7.99"S and 28° 3'40.68"E.

WORK PACKAGE 3B

All pipes and pipe specials shall be supplied by Rand Water Emhlangeni Plant. The DN700 pipes will have a thickness of 8 mm and the DN760 pipes wall thickness of 11 mm. The pipes are required to have the existing CML lining removed and relined with Epoxy lining by the Contractor. These pipes shall include the replacement pipes for the old sludge line upon the engineer's instruction to replace and/or repair the old sludge line.

PS 1.5 Duration of the Contract

Refer to Commercial document.

PS 1.6 Method and Procedures

The Contractor proceeds in the sequence and at progress rate as anticipated in the Contract.

- The bulk of the site is within the industrial areas and open velds within Vereeniging. The construction area is fully serviced with surfaced roads, storm water system, sewer and water systems, electricity, telecommunications overhead street lighting and other services.
- The Contractor shall be responsible for the setting out of the works. Rand Water will provide bench marks that can be used by the Contractor for the setting out of the works. Rand Water surveyors to set out the centre line pegs, level for the work and reference beacons as indicated in the technical specification and the Contractor is responsible for all subsequent setting out and care of pegs. The Contractor will also be responsible to record existing road centreline and edge levels where these are to be trenched for the installation of the pipeline. The affected roads will be reinstated to the existing line and level and ensure that all affected stormwater inlet structures are reinstated to a full working condition. During construction care will be taken by the Contractor to avoid the material form excavation from entering into stormwater inlets and blocking them.
- The Contractor will need to conduct inspection of all affected properties and areas well in advance of construction commencement; the inspections will record the current state of the property (including, structures, gardens, fences and boundary walls) as well as all existing defects seen. The requirements, constraints and requirements, requested by the landowner will be recorded in the report. The inspection report with accompanying relevant photographs will be signed off by both the land owner and the Contractor and a signed copy thereof shall be submitted to the Engineer prior to commencement of the works.
- The Contractor personnel are to notify all affected landowners in writing with attached signed reports and photographs 14 working days prior to start of work on the said properties. The initial wayleaves and communications with Interested and Affected Parties will be handled by Rand Water. Thereafter, the Contractor will be responsible for the up keeping and maintenance of the wayleaves for duration of the contract.
- The Contractor takes delivery of pipes, pipe specials, valves and instrumentation. He excavates lays, joints and backfills the pipeline, constructs valve chambers, pressure tests the completed pipeline, and hands over the pipeline after acceptance.
- The Contractor shall grout between the jacked sleeves and the steel pipeline laid by the Contractor, at points along the pipe route to the Rand Water technical specifications and to SANS1200LG
- When the construction operation is under way the construction train extends from the forward site clearing and setting out the excavation of pipe trenches, the trench floor and pipe bed preparation, the pipe laying operation, including Cathodic protection installation, followed by the final backfilling, construction of the valve chambers and structures, the reinstatement of boundary walls/fences, road layer works and surfacing, road verges, the cleaning up and reinstatement of the working space.
- The progress rate is based on continuous progress of all necessary operations taking into account all equipment, labour movements at crossings of roads, railways, any watercourses, various services and a reduced progress rate of advance in soils which have low shear strength.

- If excavations and/or pipe laying at a point along the route of the pipeline are discontinued, out of the sequence prescribed above and recommences at another point the Contractor transfers on the written instructions of the Engineer, his operations and supply system to the new point and continues in the rearranged sequence. Items are included in the price schedules to cover transfers not foreseen and allowed for in the sequence set out in this Tender.
- Pipe jacking underneath roads, railway line and Rand Water services and the placing of steel pipe through the jacked pipe sleeve is for the responsibility of the Contractor. The Contractor is still responsible for placing the steel pipe through the jacked pipe sleeve without holding up the pipe-jacking sub-contractor should one be utilized.

PS 1.7 Location of and access to the works

WORK PACKAGE 3A

The Works are located between Vereeniging Pump Station and the Vaal River Bridge Crossing at Maccauvlei. Phase 2 of the sludge pipeline starts from the sludge pumping station inside Vereeniging Treatment works runs through mostly the established industrial area in the south of Vereeniging. The industrial area is fully serviced with surfaced roads, stormwater system, sewer system, water supply, electricity gas pipelines and communication services. The proposed sludge pipeline runs alongside as well as across some of these services which also include Rand Water Bulk Water Pipelines.

The proposed sludge pipeline starts from Vereeniging Pumping Station and crosses the Barrage Road (R42) and traverses through an open veld. There are some old mining dumps along the open veld in close proximity of the pipeline route. From the open veld, the pipeline traverses through the well-established industrial area in the south of Vereeniging. The only major road crossing is the Barrage Road (Provincial Road 42) just outside Vereeniging Water Treatment Works. This is a dual carriageway and the crossing will be achieved by means of 100m of pipe jacking.

The pipeline will follow the alignment proposed by Rand Water within the Rand Water servitude. It will share the same servitude with the existing sludge pipelines and other Rand Water pipelines. Due to space constraints, there will be restricted work conditions experienced along the pipeline route where spacing varies between 1.5m and 3m between the proposed and existing pipelines.

The Works are to be planned in order that preparations or arrangements can be made for any conditions stipulated by the land owners can be accommodated and met with in order to avoid any possible conflict and delays.

WORK PACKAGE 3B

The site is located about 55km south of the Johannesburg Central Business District, within Three Rivers in The Emfuleni Local Municipality, Gauteng Province.

The Pipeline is within the Zuikerbosch Pump Station

Refer to Drawing no S1188 for the Locality Plan.

Coordinates 26°40’42” S 28°00’22” E

The proposed route traverses the following areas:

- Within the built up water treatment plant area.
- Varies services.

PS 1.8 Work carried out by others Work carried out by others

There are no works planned for execution by other contractors under this scope of work. The following will, however, be noted with regard to required interaction and liaison with other Contractors and/or those carrying out other activities:

I) A portion of the works is to be carried out within the road reserves of both National and Municipal roads, the roads are mobility routes which provide public road user access to various suburbs situated along the route as well as direct access to private properties. It is therefore imperative that safe and adequate access is provided at all times to road users and private landowners.

II) The existing road reserves are populated with numerous existing services belonging to various utility owners. These owners may from time during the period of the contract need to service and or upgrade their service using specialized contractors. The contractor will need to take account of the need to liaise with these contractors should such requirements occur during the duration of the contract.

III) Certain constraints may exist in the supply of new pipes Rand Water will endeavour to a schedule for the availability of pipes but it will however, remain the responsibility of the contractor to plan the execution of the works to accommodate the scheduled availability of pipes and to use what pipes are available to best effect within the programme

PS 1.9 Geotechnical Information

WORK PACKAGE 3A

Geotechnical investigation reports for the pipe route are available, the investigations were variously conducted in 2016 and the reports are referenced in this document under Part 6: Site information and attached to the Bid documents.

WORK PACKAGE 3B

No geotechnical report is available.

PS 1.10 Occupational Health and Safety

The employer's Occupational Health and Safety (OH&S) Specifications have been included under Part 4 this document. The contractor shall comply with all requirements of the OH&S specifications.

The Contractor will not be permitted to commence construction until such time as their completed SHREQ file has been approved by Rand Water.

PS 1.11 Environmental Management Plan

The Environmental Management Plan has been included under Part 5 of this document. The contractor shall comply with all requirement set out in the EMP.

PS 2 GENERAL PROCEDURE AND METHOD FOR THE INSTALLATION OF THE PIPELINE

PS2.1 Introduction

WORK PACKAGE 3A

The SL1 Pipeline will be located within a Rand Water servitude and will traverse mostly open velds and a few private properties. The pipe line will start at Vereeniging Pumping Station and terminates just before the Problem Road Bridge which is over the Vaal River.

The route layout of the pipeline is indicated on Drawing No. RA27304/07/01.

The proposed route traverses the following areas:

- Open velds.
- Perennial river channel (the Vaal River)
- and roads,
- A railway line.
- Eskom pylons
- Minor and major public roads namely, Colenso Street, Mario Milani Road and the R42 (Barrage Road)
- Railway line crossing
- Industrial areas

The pipe route crosses **4 roads, 3 sets of Rand Water pipelines and a Railway line** where open cut trenching is undesirable and hence pipe jacking will be employed.

All along the pipeline route the installation of the pipeline will be constrained by the limited working space available, the presence of existing services that need to be kept in service at all times and dealing with vehicular traffic along the pipeline route.

WORK PACKAGE 3B

The Sludge Pipeline will be located within existing and fully developed water infrastructure within Rand Water premises. The route comprises of connecting to the Vereeniging pipeline entering Central Sludge No. 2 than run southward in front of the Recovered Wash Water Plant turn in eastward direction and meet up with other existing pipes thereafter it will surface and run above ground, and again be underground before crossing a road and connect to existing sludge line within the Zuikerbosch Pump Station.

Upon the findings of the assessment report of the old 700 mm sludge pipeline, the engineer may instruct the repair and replacement of the pipeline, which is approximately 600 m.

Working space for the installation of the pipeline along the pipeline route is very limited. In particular, the section of pipeline along filter house that runs above ground which is in between existing service and building and along the building. All along the pipeline route the installation of the pipeline will be constrained by the limited working space available, in the presence of existing services that need to be kept in service at all times.

PS2.2 Basic Principle for Installation of the Pipeline

The basic principle to be followed in the planning and programming of the installation of the pipeline is that the installation of the pipeline must be substantially completed in short sections. Each section must be substantially completed before work on the next section can commence.

The total length of an individual section shall be a maximum of 100 m in built-up areas and 500m in green fields provided all risks are properly considered prior to commencement. Adherence to the length restrictions is strictly required unless otherwise approved by the Engineer.

Substantial completion will comprise the installation of the pipeline up to the stage where the pipeline has been installed, welded, tested (excluding the final hydrostatic test) and all backfilling has been completed. Completion of air valve, scour and other valve or meter installations will be required to consider the pipeline as substantially completed for purposes of commencing to the next section of pipeline to be installed.

PS2.3 Working Fronts

WORK PACKAGE 3A

It is envisaged that the construction and installation of the SL1 Pipeline will ideally commence at CH 0 and terminate at CH 6020. Should the Contractor consider that more than one working front will be required to complete the Works within time, he should clearly state so in his tender and qualify his tender accordingly.

WORK PACKAGE 3B

It is envisaged that the construction and installation of the Sludge pipeline will ideally commence at CH 0 and terminate at CH 749.168m where it will be cross connected to the existing sludge pipeline at beginning and end.

If the Contractor wants to install the pipeline from more than one working front he shall provide at least the following information in his tender:

- The number of working fronts to be used in the construction and installation of the pipeline.
- The start point of the working front, working direction and ultimate length of pipeline to be installed from the working front.

PS2.4 Preparatory Work

The completion of certain preparatory work will be necessary before the installation of the pipeline within the next section to be installed can commence.

Preparatory work will comprise the following:

- Setting out pipeline and protection of bench mark
- Removal of all trees along the pipeline route to a temporary site and planting at the site. On completion of the installation of the pipeline the trees will be again be removed and replanted in their original positions by others.
- Prepare laydown areas and working strip along the pipe where necessary for delivery of pipes.
- Notify affected stakeholders in advance.
- Expose existing services by hand.

- Erect temporary fences and gates.
- Relocation of existing services (Electrical, telephone, etc) to positions out of the way of the pipeline where required.
- Other preparatory activities not listed here.

PS2.5 Water Supply

WORK PACKAGE 3A/B

The SL1 pipeline is a sludge pipeline and its installation will not affect the water supply to consumers.

PS2.6 Relocation of Trees

WORK PACKAGE 3A

Large trees are located along the servitude from Chainage 3450 to Chainage 3650. These trees will hamper and will be in the way of construction activities for the pipeline. **The trees shall be removed and replaced as approved by EMP.**

PS2.7 Construction Phasing

Based on the basic principle for the installation of the pipeline (See PS2.2), it is expected of the Contractor to plan and program his work for each section of the pipeline to be installed, in terms of the basic successive phases given below:

- Identify next pipeline section (Maximum length given in PS2.2) for installation.
- Complete preparatory work.
- Install pipeline section (Substantial completion).

Once the pipeline has been substantially completed (See PS2.2), the remaining work can be completed.

PS2.8 Dealing with Topsoil and Material from Trench Excavation

Bulk trench excavation for the pipeline is estimated to be on average about 21m^3/m (SL1) and 8m^3/m (SL2) of pipeline where shoring is not used (from battering recommendations outlined in the Geotechnical Report). Due to the limited space available along the pipeline servitude, open spaces along roads and open veld were identified where material from trench excavation and topsoil can be temporarily stockpiled until such time that the pipeline trench can be backfilled or the topsoil re-used.

The temporary stockpile areas (if available) are given in **PS4.2.**

PS2.9 Reinstatement/Rebuilding of Existing Roads

WORK PACKAGE 3A

The SL1 pipe line traverses a private road which will be excavated during construction. Heavy vehicle travel and tracked equipment is expected to further damage the existing roads, stormwater drainage channels and underlying road foundation layers.

On completion of the installation of the SL1 Pipeline, the roads, road foundation layers and drainage infrastructure along roads and crossing shall be reinstated and rebuilt.

In principal, the works shall comprise the following:

- Clearing and stripping the site.
- Roadbed preparation.
- Limited cut to fill.
- Construction of one or more selected layers.
- Construction of subbase and base layers for the surfaced road section (And only a subbase layer for the gravel road section).
- Surfacing of the surface road section and construction of a final gravel layer for the gravel road section.
- Reinstatement and/or rebuilding of stormwater drainage infrastructure.

Provision has been made for the reinstatement of roads under Sch3 WP 3A Prov Sums: Provisional Sums in the BOQ. The design of the roadworks will be undertaken during the construction period but should adhere to original conditions where not stated. When completed, the Contractor will be presented with a Bill of Quantities which he shall complete. No work shall commence until the Bill of Quantities have been completed and all rates agreed between Rand Water and the Contractor.

The Contractor must programme this work as part of his proposed construction programme to be submitted as part of his tender in terms of clause PS6.

WORK PACKAGE 3B

The existing road comprise of surfaced roads. There is stormwater drainage along the buildings, comprise of open stormwater pipes and with catch pits. The Pipeline will transverse a road via open cuts so that the pipe will be below the road travel surface. The road surface and foundation layers of the roads will thus be excavated during the construction and installation of the pipeline. Heavy vehicle travel and tracked equipment is expected to further damage the existing roads, stormwater drainage channels and underlying road foundation layers.

On completion of the installation of the pipeline, the roads, road foundation layers and drainage infrastructure along roads and crossing shall be reinstated and rebuild.

In principal, the works shall comprise the following:

- Clearing and stripping the site.
- Roadbed preparation.
- Limited cut to fill.
- Construction of one or more selected layers.
- Construction of subbase and base layers for the surfaced road section (And only a subbase layer for the gravel road section).
- Surfacing of the surface road section and construction of a final gravel layer for the gravel road section.
- Reinstatement and/or rebuilding of stormwater drainage infrastructure.

A provisional sum for undertaking this work is included in under Sch3 WP 3B Prov Sums: Provsional Sums of the Bill of Quantities.

PS 3 SUB-CONTRACTING

Should the Contractor appoint Sub-contractors; each Sub-contractor must comply with the CIDB grading equivalent to the worth of the works sub-contracted to them. The Contractor has to make a deliberate effort to support the affirmative procurement initiative. Therefore, PDI and BEE Sub-contractors should be included in the team and allocated sections of the work. However, this does not imply a contract between the Employer and the Sub-contractor, or a responsibility or liability on the part of the Employer to the Sub-contractor.

1) Chamber construction
2) Earthworks portion
3) Welding and associated Works
4) Steel platforms supply - No grading required
5) Jacking excavations and disposal of material
6) Supply of jacking pipes
7) Hiring of plant and equipment – No grading required
8) Fencing and gates - No grading required
9) Any other section of the Work: Contractor to specify clearly

If the Contractor fails to complete any part of the Works according to schedule or it becomes apparent to the Engineer that the work is not completed according to schedule and if such failure is due to the Contractor, then the Contractor submits his plan of action to deal with the delay and the Contract reports on daily on the success of his plan of action.

The Contractor shall maintain a rate of progress of the excavation work, preparation of the trench floor, the pipe bed, backfilling and reinstatement not less than the stipulated in the programme. In this connection continuous stretches of trench shall be excavated and rock and hard granite/quartzite shall be removed as encountered. The presence of rock shall not be accepted as a factor delaying the rate of progress.

No payment shall be made for discontinuous stretches of trench except where reasonable lengths of trench in hard material have been completed ahead of the work.

Rand Water shall not be liable for any additional costs incurred by the Contractor while the work proceeds at a rate slower than the average rate as set out in the programme.

PS 4 DESCRIPTION OF THE SITE

PS 4.1 Site Locations

WORK PACKAGE 3A

The site is located at Vereeniging approximately 50km to the south of Johannesburg in the Gauteng Province. The site can be accessed from the roads R28 and R716. Both roads serve as the main accesses to the north and south of the site respectively. The longitude and latitude co-ordinates of the site are 26°41”39’S and 27°55”27’E respectively, with an altitude of approximately 1436m above sea level. Refer to the attached Locality Plan RA27304/06/01.

The pipeline route traverses the following areas:

- National, Provincial and municipal road reserves
- Major road and railway crossings.
- Eskom pylons and power lines
- Numerous utility services and overhead power lines and street lights
- Minor and major (public and private) surfaced and gravel roads.

- Private Residential areas
- Municipal sidewalks
- In some instances, construction may be across water courses and closer to wetlands.

WORK PACKAGE 3B

The site is located about 55km south of the Johannesburg Central Business District, within Three Rivers in The Emfuleni Local Municipality, Gauteng Province.

The Pipeline is within the Zuikerbosch Pump Station

Refer to Drawing no S1188 for the Locality Plan.

Coordinates 26°40'42" S 28°00'22" E

The proposed route traverses the following areas:

- Within the built up water treatment plant area.
- Varies services.

PS 4.2 Laydown and Temporary Stockpile Areas

WORK PACKAGE 3A

Open spaces on some sections along the pipeline route were identified for use as lay down areas. The open spaces can also be used for temporary stockpiling of material from trench excavation or topsoil removed during site clearance. It is the Contractors responsibility to ensure lay down and stockpile areas conform to all specifications/regulations and adheres to the guidelines stated in the EMP.

The open spaces that were identified for use are shown on the Cross Section Drawing No R027304/13/01

WORK PACKAGE 3B

Due to the limited space available along the route, open spaces within the Station were identified where material from trench excavation can be temporarily stockpiled until such time that the pipeline trench can be backfilled. The open spaces can also be used as temporary laydown areas for pipes and pipeline materials and for temporary stockpiling of material from trench excavation or topsoil removed during site clearance. The Contractor can make use of these open spaces should he wish to do so.

The open spaces that were identified for use are the following:

Undeveloped area east of the Filter House and smaller parts north of the Recovery Washwater building

PS 4.3 Site Boundaries

The Contractor shall confine his construction activities to within the boundaries of the site and the approved working strips. The Contractor shall not extend his activities outside the boundaries of the site unless the Engineer has specifically authorized the extension in writing. The boundaries of the site and the approved working strips shall be temporarily fenced where applicable for the duration of construction.

In restricted areas, e.g. buildings and structures, the construction activities are to be confined to the minimum possible working space.

The Contractor shall confine his transport and traffic to the pipeline working area/strip. The Contractor shall not extend transport or construction vehicle traffic to defined or private roads unless the Engineer and the relevant Property Owner have specifically authorized this in writing. Access can be gained from public roads after approval from the relevant authority or property owner in writing. Access onto the working strip will be authorized by the Engineer prior to the Contractor starting any work on the site.

PS 4.4 Geotechnical Investigations

The following geotechnical report is available:

WORK PACKAGE 3A

Consultant	Title	Report Number	Date
WAX ENGINEERING CONSULTANTS	FINAL GEOTECHNICAL INVESTIGATION REPORT ON THE RANDWATER PROJECT: B19 SLUDGE PIPELINE PHASE 2 ZUIKERBOSCH-VEREENIGING	-	NOVEMBER 2016

WORK PACKAGE 3B

No geotechnical report is available.

PS 5 METHOD STATEMENTS AND QUALITY REQUIREMENTS

PS 5.1 Method Statements

The contractor shall prepare method statements for submission with his tender. A method statement will be required for each and every activity, including the excavation and installation of the residue pipeline in constricted areas (areas with insufficient working strip), excavation along the existing Rand Water steel pipe lines, shoring of trench, internal and external welding procedures, field joint protection and site establishment.

Rand Water to check and approved these method statements and give written permission for proceeding of any work. The workforce is to be briefed on each method statement and Rand Water's safety inspectors will query the workforce periodically to confirm that this is taking place.

The following headings will be required for each method statement;

- Goal of activity
- Person responsible
- Dangers identified
- Safety measures to be instituted based on risk assessment
- Work methodology
- Personnel and plant and equipment
- Clearing of site
- Diagrams, sketches drawn to scale
- Timeframes and indication if the activity is on a critical path or not
- Other headings shall include:

    - Detailed description of work to be completed in terms of pipe laying, jacking's, pipe specials and fittings (including access tee) to be finalized prior to commencing with the shut-down procedure.
    - Construction methodology
    - Security and lighting required for shutdown.
    - Safety contingency plan for unforeseen circumstances.

- Welding method and materials used for repairs of coatings and linings.
- Working inside existing culverts.
- Working in private property
- Working in confine space areas
- Traffic management at shopping centre and estates.
- Estimated time to perform tie-in Works, excluding scouring.

PS5.2 Quality Control

The contractors Quality Management System shall include quality management objectives, policies, procedures and work instruction that comply with the requirements of ISO 9001 latest edition.

The contractor shall within 20 days from the commencement date submit a Project Quality Plan for the Contract. The Plan shall indicate how the Quality System shall apply to the specific requirements of the Contract to ensure compliance of the works with the requirements of the scope of works. The Project Quality Plan shall be subject to the approval of the Engineer.

Quality control plans shall be prepared by the contractor and/or his subcontractors for each group of activities. Where applicable, approved plant, equipment or services required to realize the specific component shall be included.

Quality control plans shall be submitted to the engineer for approval and for the inclusion of his construction monitoring activities before any construction of the permanent works may commence.

The following surveillance requirements shall be included for affirmation by the Engineer or his representative.

Record (R) Documentary evidence of the activity and statistical analysis of the data to be retained and copied to the Engineer.

Verification (V) The Engineer or his representative will not necessarily be present during the activity but documentary evidence to permit verification of compliance with the requirements is generated, retained and copied to the Engineer.

Witness (W) The Engineer or his representative required notification to permit witnessing of the activity.
The notice period shall be agreed to depending on the nature of the activity and shall be reviewed from time to time. Documentary evidence shall be retained and copied to the engineer.

Hold (H) The Contractor may not proceed to the following activity until the Engineer or his representative has approved the proceeding activity. Documentary evidence shall be retained and copied to the Engineer.

Random (R) Construction monitoring by random inspection. Random construction monitoring may be carried out at any stage of the activity or preparation for the activity. Documentary evidence shall be retained and copied to the engineer.

The following categories shall apply in determining the requirement for a quality control plan:

Critical A component, group of components or structure, the failure of which to comply with the specifications may affect the performance of the works of

which it is a part and will cause a detrimental environmental impact, and/or may result in hazardous or unsafe conditions.

Major — A component, group of components, structure, the failure of which to comply with the specifications may affect the performance of the works of which it is a part and will result in increased maintenance and/or impact negatively on the quality of the works.

Minor — All items other that those categorised as Critical or Major and which are visible and capable of rectification during routine inspections.

PS5.3 Quality Requirements

The Contractor shall comply in full with the Employer quality requirements. During execution of the Tender no actions to provide the Works are implemented at any part of the site before the relevant quality control documentation is submitted and the Project Manager accepts the procedures.

The Contractor is responsible for all quality assurance requirements imposed on his Sub-contractors and suppliers, in terms of SABS ISO 9000 Series.

The Contractor is responsible to inspect, expedite, administer and monitor in a pro-active manner Sub-contractors and supplier's work and the enforcing of the terms and conditions of their Tenders, except where extraordinary circumstances warrant the inclusion of Employer's participation.

A Quality Control Plan (QCP), which includes hold points and an inspection plan, shall be provided by the Contractor to the Project Manager for all fabrication, supply (transport) and installation of components for approval prior to start of manufacturing. The Employer may use or modify the Contractor's QCP's and this includes inspection hold points, dimensional checks, material quality checks, tagging procedure for items, etc.

Contractor shall submit 3 (three) copies of his QCP to the Project Manager for review and acceptance within 2 (two) weeks after tender award.

PS5.4 Contractor's QA/QC Responsibilities

All machinery, material and workmanship shall comply with the appropriate specifications and codes, and bear the official mark of such specifications and codes;

All machinery and material shall be new and of the most suitable grade, and suitable to withstand and to operate satisfactorily under all possible climate and weather conditions which are reasonably expected at the Site. Such machinery and material shall be subject to inspection and/or testing by the Engineer, who shall be granted access by the Contractor and Sub-Contractor.

The Contractor shall conduct a continuous programme of construction quality control for all work performed on the Site. All relevant inspections and tests shall be adequately documented and signed off by the Engineer;

The Contractor shall comply with any quality assurance procedures required by the Employer.

The Supervisor will monitor the Contractor's adherence to quality requirements independently. Any rejections by the Supervisor based on design, specifications, codes and the like will be binding.

PS5.5 Quality Audits

The Employer reserves the right to perform quality audits at any time during the execution of the Works.

The Contractor shall give 48 (forty-eight) hours' notice (in writing) to the Engineer, prior to testing. The Supervisor will exercise the option to witness or not, such tests.

PS5.6 Inspection Authority

If an authorised inspection authority (AIA) is appointed and he is paid for by the Employer, in terms of the OHS act, the Project Manager will compile and submits the scope of work for the AIA.

PS 5.7 Recording Weather

The Contractor shall be permitted to take his own rainfall measurements on site subject to the Engineer's approval, but access to the measuring gauge(s) shall be under engineer's control. The Contractor it to provide and install all the necessary equipment for accurately measuring the rainfall as well as to provide, erect and maintain a security fence plus gate, padlock and keys at each measuring station, all at his own cost.

PS 5.8 Format of Communication

All contract communication shall be in English and in writing (letters, faxes and electronic mail).

PS 5.9 Key Personnel

The contractor shall be required to allocate sufficiently experienced personnel to execute the contract successfully.

PS 5.10 Forms for Contract Administration

The contractor shall maintain a file (hard copy and electronically) per contract project, which shall contain:

a) The details of the sub-contractors, if any;
b) Project programme, with commencement and completion date;
c) Procurement information;
d) Progress reports, minutes, letters, faxes, emails of all project or project related correspondence;
e) Record documentation, reports, designs, and drawings;
f) A copy of the Health and Safety Plan and the Environmental Management Plan;
g) Record of cost implications, variations, claims and disputes; and
h) Empowerment records.

At the end of this period of performance the contractor shall hand-over such hard copy files to the Employer, including all electronic records, documentation, reports, designs, and drawings.

PS 5.11 Daily Records

The contractor is to provide a site diary, which is to be kept on site, for the purpose of keeping daily records in respect of work performed on the site.

PS 5.12 Bonds and Guarantees

If the tenderer, when notified on the acceptance of his tender, fails to provide guarantee within the period stipulated in the Contract Data and the Employer elects to cancel the contract on that ground, the employer may demand a sum of R500,00 per day, or the employer may take other action whether by way of a claim for loss or damage suffered by the employer arising out of such breach.

PS 5.13 Payment Certificates

The service provider shall be required to complete a progress report before he will be allowed to complete the standard payment certificate required to be submitted with his tax invoice. To this end the service provider shall make himself available for a progress reporting training session to be facilitated by the Employer.

PS 5.14 Use of Documents by the Employer

All information (communications, designs, drawings, documents or reports) provider to the Employer by the service provider, in the course of performing the service required for this contract, are intended to ensure that the projects are implemented successfully.

PS 5.15 Property provided for the service providers use

The service provider shall provide all physical resources, including properties, for the successful execution of the project.

PS 5.16 Proof of compliance with the law

The service provider shall ensure that he complies to all prevailing legislation that applies to the provision of his services as part of this contract and indemnifies the employer where he deliberately neglects compliance with such legislation.

PS 6 CONSTRUCTION PROGRAMME

The tender must include a programme in bar chart format to indicate the expected duration and completion dates of all tasks.

The Contractor’s programme must include the following, as per section of work:

- Contracted dates
- Sub-contractor activities and interface points.
- Activity duration
- Activity inter-dependency
- Activity early start and finish dates
- Activity late start and finish dates
- Free and total float for each activity

- Critical path/s indication

The following reports are required as supporting documentation to the programme:

- Time analysis print-out
- Critical activities report
- Resource schedules and histograms

It is the Contractor's responsibility to assess the available data and available knowledge explicitly. Any technical detail, policies, imposed organisational conditions, contract conditions, specification, overall programme constraints, resource availability or any other factor of significance to implement the project successful must be identified by the Contractor.

Based upon the assessment described above the Contractor shall decide to what level to break down to for his internal planning purposes.

The Contractor will be expected to submit the indicated actual progress against this approved bar chart (planned) programme in all progress reports during the execution of the project.

The Contractor shall to submit a weekly labour alert report, if the Contractor's available manpower is not sufficient to meet the time schedule, for performance of the work.

During the final stages of the construction activities and prior to delivering notice of completion, the Contractor shall submit his plan for demobilisation of the project site to the Project Manager for acceptance and he shall comply with such demobilisation plan as accepted by the Employer.

The Contractor shall submit a procurement schedule for the procurement and receipt of material and sub-contract services and a monthly status report on these items.

The Contractor shall commence with the work in accordance with the accepted program schedules, or such other date(s) mutually agreed between the Contractor and the Project Manager and shall complete the work not later than the mile stone dates and Completion Date indicated on the Accepted Programme.

If the Contractor fails to complete any part of the Works according to schedule or if it becomes apparent to the Project Manager that the work is not being completed according to schedule and if such failure is due to the Contractor, then the Contractor shall submit a plan of action to deal with the delay and the Contractor shall report daily on the success of his plan of action.

The Contractor shall maintain a rate of progress of the trench excavation work, preparation of the trench floor, the bedding of the pipe, backfilling and reinstatement not less than stipulated in the programme.

Continuous stretches of trench shall be excavated and rock shall be removed as encountered. The presence of rock shall not be accepted as a factor delaying the rate of progress.

The Contractor is required to give Rand Water shut down notices 28 days in advance to enable him to tie into the existing pipelines. A total of **6 shutdowns** are anticipated for the duration of the Contract.

No payment shall be made for discontinuous stretches of trench except where reasonable lengths of trench in hard material have been completed ahead of the work. **The maximum open trench length should not exceed a maximum of 100m at each working head unless otherwise approved by the Engineer.**

Rand Water shall not be liable for any additional costs incurred by the Contractor while the work proceeds at a rate slower than the average rate as set out in the programme.

The Contractor is required to furnish a realistic programme showing the order of activities and methods of construction which he proposes to use in executing the Works, within 7 (seven)) days from the date of delivery of the letter of acceptance. The Contractor shall allow for preparing the Safety and Quality Plans (the Contractor's responsibility) and subsequent approval thereof by Rand Water prior to work commencing on site. All labour of the Contractor will be inducted prior to be allowed on site to perform any work, this applies for the full duration of the project

The Contractor shall submit an updated copy of the programme at each site meeting clearly indicating actual versus scheduled progress.

The contractual programme must be submitted in Microsoft Project format (latest version) and in hard copy at each site meeting and if any change or delay has impacted on the critical path. Fourth nightly construction works programmes must be submitted to the Engineer throughout the duration of the Contract.

PS 7 SITE AND TECHNICAL MEETINGS

The Contractor shall attend monthly site and technical meetings with representatives of Rand Water and the Engineer at dates and times determined by Rand Water.

PS 8 PROTECTION OF WORK

The Contractor shall in particular keep free from water those portions of the site as are necessary to allow the Works to be carried out in the dry throughout the duration of the Contract, including times when the Contractor is offsite. The Contractor must make the necessary allowances in his tender price to cater for dewatering.

The Contractor shall, where applicable and at the earliest practicable opportunity, at his own cost provide the temporary drainage required to protect the Works from storm water and any other water, including seepage that may enter the Works

The Contractor shall supply, operate and maintain such pumping plant as may be necessary to remove, control and dispose of water, including seepage water that may enter the Works.

The Engineer may take or order the Contractor to take additional precautions where he is not satisfied with the Contractor's arrangements. The Contractor shall not be relieved of his responsibility by reason of the Engineer taking or ordering additional precautions, or by reason of the Engineer failing to do so. All expenditure incurred by Rand Water in taking any additional precautions or otherwise in remedying the default of the Contractor and making good of the Works shall be recovered from the moneys due to the Contractor.

The Contractor shall be responsible to effect all dewatering to enable the Contractor to access and execute the Works.

PS 9 FEATURES REQUIRING SPECIAL ATTENTION

PS 9.0 Excavation over break

The Contractor shall take care to keep over break to a minimum.

The extent of the payment line for grouting between the outer face of the sleeve and the excavation face will be limited to 10% of the outside diameter of the sleeve. Therefore, the excavation payment line will be up to 1200mm dia. for the different sections of sleeves for 600mm steel pipelines in sleeves.

PS 9.1 Accesses to Properties

Numerous access ways to properties will cross the pipeline. The Contractor shall only make use of access onto the site of Works as agreed in writing by the Engineer in consultation with each relevant property owner. The main access onto the site of Works will be at agreed public roads and along the construction working area itself. The Contractor shall contact the primary occupant of each property in writing, including photographs of existing access, 14 working days prior to start of work, to ensure that he is informed of the work taking place and that he is satisfied with the alternative access provided while the work is in progress. Safety measures must be in place to prevent any incident.

With construction completed at the point, the Contractor shall reinstate the access to the satisfaction of the owner/occupier and the Engineer to the same state or better condition. The Contractor must get the written acceptance of the reinstatement from the occupant.

PS 9.2 Traffic Accommodations on Roadways (where applicable)

The pipeline route traverses Barrage Road which is a major tarred traffic route (as indicated on the detail drawings). The pipeline route also crosses as well as run alongside Mario Milani Road is quite a busy road.

The pipeline route traverses or runs parallel to major and minor traffic routes. Traffic accommodation will need to be carefully planned during the construction work in these areas.

The Contractor is to contact the applicable roads department in writing to ensure that they are aware of the work taking place and submit and receive written approval from the Departmental –
and Local Authority for any safety plans and requirements before any construction activity can commence. Special care needs to be taken in these areas because it may include twenty-four-hour traffic control. The Contractor must at all times comply with the way leave conditions that are relevant. Copies thereof will be handed to the successful Contractor. Gravel and minor roads will be crossed by means of open cut.

Access to private properties is to be maintained at all times. Notwithstanding the requirement for traffic accommodation all trenches that located within the road pavement shall be barricaded with water filled plastic New Jersey type barriers.

PS 9.3 Public Safety

During the performance of the Work, the Contractor shall erect and maintain temporary fences, bridges, railings and barriers and takes all other precautions to ensure public safety, including keeping the excavations dewatered and the site protected against surface stormwater, the placing of proper guards for the prevention of accidents and putting up and maintaining signs, notices and sufficient lights.

He shall indemnify the Employer from all damages and costs to due to injury to persons or property damage resulting from the Contractor's negligence or carelessness in the implementation of the Works, or in guarding the same, or from any improper materials or equipment used in its construction, or by or on account of any act or omission of the Contractor. In addition, the Contractor shall take all practical precautions to prevent the public from being injured.

PS 9.4 Damage to Public and/or Private Property

The Contractor shall indemnify and keep indemnified Employer against all losses and claims for injuries or damage to any person or property whatsoever, which arises out of or in consequence of the construction and maintenance of the Works and against all claims, demands, proceedings, damages, costs, charges and expenses whatsoever in respect thereof or in relation thereto.

The Contractor shall confine his activities to the minimum possible construction working area. As far as possible the Contractor shall avoid unnecessary damage to buildings, structures, reservoirs, canals, roads, pavements, parks, trees, gardens, fences, gates, walls and other ground level services, etc. The liability for all necessary and reasonable damage within a construction working area shall be pre-determined by the Project Manager and conveyed in writing to the Contractor, is borne by the Employer. The Contractor shall be liable for all unnecessary and unreasonable damage, the cost of repair and reinstatement of which shall be deducted from monies due to the Contractor. Provision has been made that the construction working area be temporarily fenced off during construction activities. In cultivated areas very careful coordination and management of construction activities together with farming activities are required. In servitude areas and sidewalks areas very careful coordination and management of construction activities together with Property Owners are required.

Specific stretches along the pipeline route will be demarcated to widen the access along the pipeline route to accommodate traffic to pass in both directions. These areas will be agreed in writing by the Engineer in liaison with the Property Owner prior to the start of construction.

The Contractor must keep photographic record in digital format of all stages of construction (prior, during and after completion), along the full length of the pipeline. A digital and a hard copy thereof shall be made available to the Engineer and the relevant property owner for the full duration of the contract and be included in the handover documentation at the completion stage of the contract.

PS9.5 Fences and Adjacent Structures

The pipeline route runs parallel to and affects different types of fences and walls. The fences or walls or part thereof must be kept in place during construction. Measures must be taken to ensure the stability of the fences or walls, kept in the original position, for the duration of construction. Measures must be taken to ensure the safety and stability of the excavation parallel to these fences or walls.

Where construction operations require removal of a fence or wall the Contractor shall obtain the agreement of the owner and occupier of the property bounded by the fence or wall and shall then submit his proposals to the Project Manager for approval prior to the removal of the fence or wall. On receiving the approval in writing from the Engineer, the Contractor shall provide a temporary fence or barrier and take the necessary precautions to prevent children and animals from straying. When the construction at the point is completed the Contractor shall reinstate and where necessary replace and/or repair the fence or wall to the satisfaction of the owner, the occupier and the project Manager, to the same state or better condition. Different types of fencing have been allowed for in the BoQ.

PS9.6 Inspection of Adjacent Structures

The Contractor lodges to the Project Manager an inspection with details of the conditions and stability of all structures, which includes, without derogating in any way from the generality of the terms, gate piers, garden walls, houses, outbuildings, swimming pools, bridges, canals and reservoirs, etc., within 30m of the centre line of the trench.

The inspection covering the first 1 000m of the pipeline trenches is lodged before excavation is commenced. The inspection for the remainder of the length is lodged on or before completion of the first 1 000m of excavation.

The inspection lists details of:

- Structural cracks in brickwork, masonry, pool structures, concrete or other building materials;
- Plaster cracks;
- Condition of embankments with particular imperfections noted;
- Condition of sidewalks/road verges, parking areas and driveways;
- Any other features such as paintwork and boreholes.

Each structure or building is inspected both externally and internally in the presence of a representative of Project Manager and photographs of all existing defects, deterioration and/or imperfections is taken and included in the inspection.

The inspection is drawn up by the Contractor and is signed by the owner of the property and a representative of Project Manager who thereby agrees to the contents of the inspection being correct.

PS9.7 Existing Services

PS 9.7.1 Existing Services

The Works crosses and runs parallel to numerous existing services. The Contractor identifies and protects all existing services. The existing services should be marked on site with markers and danger tape as applicable. Any damage to existing services is reported to the Employer immediately and is repaired by the Contractor. Where the Contractor cannot do this work, the Employer rectifies the damage for the Contractor at the Contractor's account. Each service is inspected externally in the presence of a representative of Project Manager and photographs of the prevailing condition and all existing defects, deterioration and/or imperfections is taken and included in the inspection. Should damage occur, then the Contractor has to ensure that follow up action is initiated and taken by him/her and the necessary liaison; repair and reporting are done within practical timeframes.

PS 9.7.2 Existing Rand Water Pipelines

The works cross and run parallel to several existing Rand Water pipelines. No construction vehicle traffic or any other traffic will be allowed to travel on or closer than 5m from the centreline of these pipelines. Where the scope of work is extended at the engineer's instruction, further services detection shall be conducted by the contractor prior to construction.

No additional loading will be allowed on these existing pipelines i.e. material storage, stockpiling of materials, etc. Sections along the pipeline route where workspace is restricted due to existing Rand Water pipelines the Contractor will limit or confine the working strip as per the Engineers instruction up to a minimum of 9m wide. Refer to **Drawing No R027304-13-1 (WORK PACKAGE 3A)** for Cross Sections.

WORK PACKAGE 3B

Where there is a requirement to replace a length(s) of pipe(s), then the Tenderer must provide a lump sum item for the undertaking of the work. The Sum entered into the BOQ must include all work associated with site establishment, site clearance, topsoil removal, storage and replacement,

excavation around existing pipe section to be replaced and dealing with services, cutting out and removal of the section of pipe to be replaced and the transport to Rand Water's Emhlangeni Pipe, bedding preparation, pipe supply and installation, field joint welds and field joint coating / lining, all the required coating and lining test, and the repair of coating and lining damage will be at the Contractors expense, supply, placement and compaction of bedding and bulk fill material, replacement of topsoil and rehabilitation, as well as the removal of spoil material from site and/or filling the existing with sludge.

The Tenderer must supply a separate letter providing a complete breakdown of the cost items for the various items under this Payment Item.

PS9.8 Protection of Water Mains and Boreholes

PS 9.8.1 Water Mains

The Works crosses and runs parallel to existing pipelines. The position of these pipelines, relative to the centre line of the Works are shown on the drawings.

Requirements and restrictions on work adjacent to existing water mains:

The Contractor demarcates the centreline of the existing pipeline. The centre is demarcated by means of a 60 mm by 60 mm by 6 mm thick rolled steel angle stake 1,5 m long with alternate bands of red and white markings and embedded in a concrete foundation block placed at spacing not more than 200 m between stakes.

The Contractor supplies and erects the stakes before excavation commences, and maintains the demarcation system during the whole period that excavating, unloading and laying of the pipes, backfilling of trenches and construction of the structures takes place along the route of the pipeline.

Once erected a stake is maintained in position until in the Project Manager's opinion it serves its purpose and he authorizes its removal.

The following restrictions apply within the demarcated strip:

- No loaded vehicle travels along the length of the demarcated strip.
- Transverse crossings, other than existing roads and tracks, the Contractor provides an approved vehicle bridge to transmit vehicle loads to the undisturbed soil along both edges of the backfilled trench.
- No excavation is permitted within 5m of any pipeline until the written permission of the Project Manager is obtained.
- The Contractor is responsible for the protection of the water mains and is liable for any claim for damage.

PS 9.8.2 Boreholes

When the pipeline is situated in close proximity to an existing borehole, the Contractor shall arrange with the owner to certify and carry out a 4-hour water delivery test and determine the average hourly water quantity produced from the borehole. Upon completion of the pipe laying, this test shall be re-done and recertified for comparison reasons.

PS9.9 Protection of Power Lines

Before any excavation is carried out within an electrical servitude or reserve the Contractor notifies the relevant authority that the work inside the servitude or reserve is to commence and the Contractor ascertains any regulations or conditions required by the authority for working in the vicinity of its services.

The use of cranes, excavating machinery and mechanical Equipment is restricted in the vicinity of an overhead power line. The Contractor allows for the work beneath a power line to be carried out manually and to proceed at a slower rate than that of the normal trench and that the excavation, blasting and backfilling is in accordance with the regulations prescribed by the authority and subject to the continuous supervision of an official of the authority.

The Contractor takes special care when excavating the trench not to damage the underground cables associated with each power line or disturbs the stability of any tower or pole supporting the power line.

The Contractor is responsible for the protection of the cables, towers and poles and liable for any claim for damage arising from his operations.

PS9.10 Protection of Sewers and Drains

Portions of the trenches are crossing a number of sewers and drains. The use of cranes, excavating machinery and mechanical equipment is restricted in the vicinity of any sewer and drain. The Contractor allows for the work to proceed at a slower rate than that of the normal trench excavation and that the excavation including blasting and backfilling is subject to the continuous inspection of the owner of the services.

The following specific requirements apply to the work in the vicinity of a sewer and/or drain:

- The owner is notified at least 14 days before the excavation adjacent to or under to the sewer and/or drain commences and arrangements made for an inspection of the site.
- No excavation with mechanical equipment is carried out within 5m if a sewer or drain without the authority of the owner. The sewer and/or drain are exposed by hand before any blasting or mechanical equipment is used for the trench excavation.
- The sewer and/or drain are supported to the satisfaction of the owner and Project Manager before the trench is excavated under the sewer and/or drain.
- If blasting is required within 30m of a sewer and/or drain a specific report containing the recommendations of the Explosives Engineer or of an explosives factory or blasting consultant, is submitted at least 7(seven) days before the work is carried out to the owner, with a copy to the Project Manager, and the approval of both parties obtained.
- If required by the owner, the Project Manager instructs the Contractor to construct a 0,8m wide by 300m thick concrete slab reinforced with four 25mm diameter steel bars on top of the compacted backfill to support the sewer and/or drain across the pipeline and limit its settlement.
- No backfilling is placed around the sewer and/or drain without the approval of the owner.

PS 9.11 Protection of Cables, Pipes, Telephone lines etc.

The Contractor takes special care when excavating the trench, when the trench is open, or while carrying out any work under the Contract not to damage any underground or over ground service.

The approximate position of underground and over ground services is pointed out to the Contractor by the Project Manager but failure to do so does not relieve the Contractor of his responsibility.

Before any excavation is carried out within 10m of the approximate position of an underground cable of water pipe the Contractor notifies the owner of the service and the Inspector that the crossing is to be made and ascertain and comply with any conditions that are imposed for the crossing. No excavation is carried out within 10m of the service until it is exposed and protected by the Contractor under the supervision and to the satisfaction of the owner and/or the Project Manager.

Excavation work above, below and in the vicinity of an underground service is undertaken in accordance with the requirements of the owner of the service and whether excavated by hand or with the use of excavating machinery is paid at the scheduled rate for bulk excavation and not as additional excavation.

The Contractor is liable for any damage that occurs to any cable, sewer, pipe, etc. and immediately notifies the Project Manager of any such damage. The Project Manager arranges for the damage to be repaired by the owners of the damaged service and the cost of such repairs is deducted from any monies due to the Contractor.

PS 9.12 Risk Management

The Contractor ensures that his risks are managed to enable the successful execution of the project. The Contractors' risk that occurs or develops during construction is brought to the Employer's attention in writing immediately. A risk register must be kept for the duration of the project.

A general risk analysis is performed prior to starting with the construction work, which must form part of the Safety Plan. All work will be carried out in conformance to the Occupational Health and Safety Act, 1993 (latest amendment) and the Contractor shall adhere to all the legislative requirements as per the latest Construction Regulations currently 2014.

PS 9.13 Work in Dolomitic Areas

Reference should be made to the Geotechnical Report to confirm Dolomitic Areas and protection measures. The Contractor will comply with all the technical specifications and precautions applicable to any dolomitic area.

PS 9.14 Controlled Blasting

The geotechnical investigations for the pipeline route have indicated that blasting will not be required. The Contractor shall immediately communicate to the Engineer should conditions vary from the Geotechnical Report. No blasting may take place without the necessary legislative requirements being met and without Rand Water consent.

This section covers the principal requirements of the Contractor wherever blasting takes place:

If controlled blasting is required within 30m of a structure, water pipeline, sewer and/or drain, and/or any other service or structure a specific report containing the recommendations of the Explosives Engineer or of an explosives factory or blasting consultant, is submitted at least 7 (seven) days before the work is carried out to the owner, with a copy to the Project Manager, and the approval of both parties obtained.

The Contractor should accommodate the following guidelines (but not be limited to) for tender purposes:

- A zero fly rock situation.
- Ground vibration must be controlled and exact charging as per the detailed method statement should be adhered to at all times.
- Third party audit and control on blast preparation and initially for the first few blasts will be required.
- All blast holes to be drilled to the depth given in the detailed method statement by the Contractor.
- Peak particle velocity (PPV) to be limited to 50mm/s.
- In proximity to existing pipelines the Maximum Allowable Combined Stress Level of the existing pipe during blasting should not exceed 55%.
- Should the Contractor require a trial blast to be carried out prior to normal blasting operations, then this should be clearly mentioned in the tender. Allowance to cover for this should be made in the rates in the BOQ. Should the Engineer require such a trial blast, then the Contracts Manager will issue such an instruction in writing. The latter will happen if there is doubt that the methods statement given by the Contractor will in practice comply with the requirements of “controlled” blasting. In the event that the outcome of a trial blast is not approved by the Engineer in consultation with a blasting expert (blasting Engineer), then the cost of such trial blast will be carried by the Contractor.
- Monitoring of all relevant parameters of the blasting operation will be required for the full duration of the contract. The successful Contractor will be required to submit his/her proposal as part of the quality and safety plan prior to any blasting taking place on site.

The Contractor is liable for any damage that occurs to any structure, cable, sewer, pipe, etc. and immediately notifies the Project Manager of any such damage. The Project Manager arranges for the damage to be repaired by the owners of the damaged service and the cost of such repairs is deducted from any monies due to the Contractor.

Should the Contractor differ from the guidelines mentioned above; technical details of such an alternative method statement should be provided at tender stage.

If it so happens that blasting is required, this section covers the principal requirements of the Contractor wherever blasting takes place.

PS 9.14.1 Management of Risks

The Contractor will, prior to commencement of blasting operations, conduct hazard identification and risk assessments related to all the drilling and blasting processes. Strategies to deal adequately with the risks will be developed and submitted to the Engineer.

In addition to baseline risk assessments, issue based and continuous risk assessments should be carried out during the period of the contract.

The strategies adopted must ensure that damage does not occur to the surrounding pipelines and there will be no resultant loss of water. The Contractor will be liable for all damages to services caused as a result of the Contractor’s negligence.

PS 9.14.2 Standard Procedures

The Contractor will, prior to commencement of blasting operations, develop and submit to the Engineer their standard procedures for conducting the total blasting and/or rockbreaking procedures for the following areas:

- Control of explosives
  - Handling, transport and storage
  - Security of explosives/initiating systems
- Drilling
- Use of explosives
  - Blast layouts/designs/volumes/explosives and initiating systems
  - Priming
  - Charging
  - Stemming
  - Timing and connecting
  - Firing procedures
- Treatment of misfires
- Destruction of explosives

It is a requirement of this contract that the Contractor is fully competent in the processes associated with blasting trenches in close proximity to other services and accepts responsibility for the development and implementation of these procedures.

The Engineer reserves the right to submit these procedures for specialist review and call for a re-examination of the procedures where significant deficiencies are identified.

PS 9.14.3 Environmental Blasting Aspects

The Contractor will take into account in the development and application of the designs and procedures, the various impacts on the environment.

PS 9.14.3.1 Determination of safety zones during blasting

The Contractor will evaluate and demarcate safety zones for each blast and take measures to minimize/control fly-rock so as to prevent injury to people and animals as well as damage to equipment and services.

It is expected that it will be necessary to provide cover for the majority of the blasts.

PS 9.14.3.2 Air Blast (Sound-over-pressure)

The accepted levels for air blast will be applied, i.e.

- 128dB – reasonable level for public concern (no more than 10% of measurements to exceed this value)
- 134dB – damage should not occur below this level (no measurements to exceed this value outside the safety zones for each blast).

Thus it will be necessary to take regular measurements, particularly in the early stages of blasting to establish benchmarks, which can be reviewed based on performance history.

PS 9.14.3.3 Ground Vibrations (Peak Particle Velocity and Frequency)

It is expected that it will be necessary to conduct test blasting in the various site specific conditions such as areas adjacent to steel pipes and/or asbestos concrete pipes as well as sections of “elastic”

rock properties and/or rocks with higher uniaxial compressive strengths, e.g. dolerites.

In these instances, it will be expected that results will be obtained of blasting efficiencies and excavation stabilities, but it will also be necessary to conduct vibration analysis at strategic points.

From several results, it will be possible to determine the range of site specific constants in the equation to estimate peak particle velocity, distance from blast and maximum charge per delay, i.e.

$$PPV = a\left(\frac{D}{\sqrt{E}}\right)^b$$

PPV in mm/sec (peak particle velocity)
D in metres (distance from blast)
E in kg (mass charge per delay)
A site characteristic (intercept with y axis)
B site characteristic (gradient on line)

In addition, the frequency of ground vibrations will be measured. Damage to structures can be expected in the range of 5-25Hz. Whilst these lower frequencies are regularly achieved in surface mining and quarrying, they are less common in construction/civil blasting but should be protected against.

PS 9.14.3.3.1 Services

The initial blast designs should aim to produce less than 5mm/sec (ppv) and greater than 25Hz at the closest pipeline(s) to the blast.

However, trial blasting may indicate the need for higher factors of safety with a lower ppv.
In the higher risk areas of asbestos concrete pipes and live/operational pipelines it is recommended that use be made of electronic initiating systems to eliminate the variations encountered in pyrotechnic initiating systems.

Other forms of Rockbreaking may have to be considered and utilised at no extra cost to the client.

PS 9.14.3.3.2 Buildings and other structures

Vibration measurements will be taken at strategic buildings and structures and measures put in place to ensure the South African guidelines are not exceeded: (greater than 50Hz)

Blast Situation	**Recommended Maximum Level mm/s**
Heavily reinforced concrete structures	120
Property owned by concern performing blasting operations	84
Commercial property in reasonable repair	25
Private property – public concern (blasting frequent/regular)	10

Notwithstanding these guidelines and limits, the Contractor will at all times be responsible for the safety of the works, persons, animals, equipment, property and services in the vicinity of the blasting operations.

It is expected that the Contractor will obtain photographic evidence plus other measurements of buildings and structures prior to blasting taking place. It will be the responsibility of the Contractor to make good at his own expense any further damage to houses, buildings, structures, services

which have resulted from this blasting.

PS 9.14.3.4 Occupational Hygiene (Blasting)

Adequate precautions should be taken to minimise exposure to:

- Blasting fumes (nitrous oxides, carbon monoxide, etc.)
- Airborne pollutants (dust)
- Water pollution (nitrates)

The limits expressed in Chapter 22 of the Mine Health & Safety Acts Regulations should be used as occupational exposure limits.

PS 9.14.4 Statutory Compliance

PS 9.14.4.1 Acts and Regulations

The Contractor must ensure his staff are fully cognizant of the current legislation and processes must be in place to ensure compliance.

In addition to the requirements of the Explosives Act No. 15 of 2003, it is notified that new Explosives Regulations under this Act are due to be promulgated shortly.

These regulations impose additional duties and administrative burdens including revised applications for licences, permits, certificates, authorisations and written permissions. In particular, certain employees will require Police Clearance Certificates. This includes the appointment of a legal person – Explosives Supervisor/Manager – to be responsible for the control and use of explosives.
In addition to the relevant regulations, the Contractor must conform to the relative SANS standards particularly regarding the use of initiating systems.

The Contractor will supply the Engineer with copies of all the relevant blast permits, licences and authorisations prior to commencement of blasting operations.

PS 9.14.4.2 Competence

The Contractor will ensure that all his personnel involved in the blasting processes have been trained and assessed competent to perform their assigned duties.

Copies of related certificates, training undertaken as well as work experience will be provided to the Engineer for all employees involved with the blasting processes, both on and off site, prior to start of blasting operations.

PS 9.14.5 Blasting Operations

Prior to starting any drilling for blasting operations, the Contractor shall submit the blast plan to the Engineer indicating details of the drill holes (diameter, depths, inclinations, directions, sub-drill) as well as the blast pattern/design (burden, spacing, charge details, stemming, pattern, timing, powder factor, mass charge per delay).

These should be indicated on sketches and/or tables with additional information on the geology as required (weathered zones, voids, presence of water).

The Engineer may submit these plans for specialist review, more particularly in cases where change takes place and/or anomalous conditions exist.

The Engineer will then agree a programme (dates and times) for the blast(s) to be conducted. Whenever blasting operations consistently approach agreed limits and/or the safety factors are reduced to the extent that damage with serious implications could occur, the Engineer reserves the right to order the Contractor to modify his methods and procedures of drilling and blasting or other Rockbreaking techniques without invalidating this contract.

The Contractor shall have no claim for extra payment, over and above his tendered rates, due to being instructed to modify the methods and procedures of drilling, blasting and Rockbreaking regardless of any prior acceptance of procedures submitted to the Engineer.

Within 24 hours of each blast, the Contractor will submit to the Engineer, the actual data related to the blast including the volumes of rock blasted.

In the event of any non-conformances, e.g. misfires, fly-rock, excessive ground vibrations, gassing, damage/injuries to persons/equipment/structures/services, these will be reported to the Engineer or his representative immediately.

PS 9.15 Recording Weather

The Contractor shall be permitted to take his own rainfall measurements on site subject to the Engineer's approval, but access to the measuring gauge(s) shall be under engineer's control. The Contractor it to provide and install all the necessary equipment for accurately measuring the rainfall as well as to provide, erect and maintain a security fence plus gate, padlock and keys at each measuring station, all at his own cost.

PS 9.16 Format of Communication

All contract communication shall be in English and in writing (letters, faxes and electronic mail)

PS 9.17 Key Personnel

The contractor shall be required to allocate sufficiently experienced personnel to execute the contract successfully.

PS 9.18 Forms for Contract Administration

The contractor shall maintain a file (hard copy and electronically) per contract project, which shall contain:

a) The details of the sub-contractors, if any;
b) Project programme, with commencement and completion date;
c) Procurement information;
d) Progress reports, minutes, letters, faxes, emails of all project or project related correspondence;
e) Record documentation, reports, designs, and drawings;
f) A copy of the Health and Safety Plan and the Environmental Management Plan;
g) Record of cost implications, variations, claims and disputes; and
h) Empowerment records.

At the end of this period of performance the contractor shall hand-over such hard copy files to the Employer, including all electronic records, documentation, reports, designs, and drawings.

PS 9.19 Daily Records

The contractor is to provide a site diary, which is to be kept on site, for the purpose of keeping daily records in respect of work performed on the site.

PS 9.20 Bonds and Guarantees

If the tenderer, when notified on the acceptance of his tender, fails to provide guarantee within the period stipulated in the Contract Data and the Employer elects to cancel the contract on that ground, the employer may demand a sum of R500,00 per day, or the employer may take other action whether by way of a claim for loss or damage suffered by the employer arising out of such breach.

PS 9.21 Payment Certificates

The service provider shall be required to complete a progress report before he will be allowed to complete the standard payment certificate required to be submitted with his tax invoice. To this end the service provider shall make himself available for a progress reporting training session to be facilitated by the Employer.

PS 9.22 Use of Documents by the Employer

All information (communications, designs, drawings, documents or reports) provider to the Employer by the service provider, in the course of performing the service required for this contract, are intended to ensure that the projects are implemented successfully.

PS 9.23 Property provided for the service providers use

The service provider shall provide all physical resources, including properties, for the successful execution of the project.

PS 9.24 Proof of compliance with the law

The service provider shall ensure that he complies to all prevailing legislation that applies to the provision of his services as part of this contract and indemnifies the employer where he deliberately neglects compliance with such legislation.

PS10 HEALTH AND SAFETY

The employer's Occupational Health and Safety (OH&S) Specifications have been included under **Part 4** this document. The contractor shall comply with all requirements of the OH&S specifications. The Contractor will not be permitted to commence construction until such time as their completed SHREQ file has been approved by Rand Water.

The work under this contract is defined as "Construction Work" and regulated under the Occupational Health and Safety Act, 1993 (latest amendment) and the Contractor shall adhere to all the legislative requirements as per the latest Construction Regulations currently 2014.

The Contractor shall provide for the cost of the health and safety measures in the Bill of Quantities.

The Contractor shall notify the Provincial Director in writing of the construction activities before work commences, if required.

The Site Representative shall be present on site during working hours and any orders or instructions, which the Engineer may give to the Site Representative, shall be deemed to have been given to the Contractor.

The Contractor shall develop and demonstrate to Rand Water a suitable and sufficiently documented Health and Safety plan based on the safety specification.

The Contractor shall if called upon to do so, submit a preliminary Health and Safety Plan, failing to do so may lead to the disqualification of this tender.

PS11 HEALTH AND SAFETY SPECIFICATION

The employer's Occupational Health and Safety (OH&S) Specifications have been included under Part 4 this document. The contractor shall comply with all requirements of the OH&S specifications. The Contractor will not be permitted to commence construction until such time as their completed SHREQ file has been approved by Rand Water.

a) The Contractor shall appoint and notify the Engineer in writing, a competent Site Representative, with the duty of supervising the construction work.

b) The Contractor shall appoint, and notify the Engineer in writing, a competent person to perform a risk assessment before construction work commences, during construction work and which shall form part of the Health and Safety Plan.

c) The Contractor shall appoint and notify the Engineer in writing, a competent person responsible for the preparation of a fall protection plan, amending, maintaining and adherence thereto.

d) The Contractor shall execute the necessary steps to prevent uncontrolled collapse of new or existing structures and no part shall be loaded in a manner that would render it unsafe.

e) The Contractor shall appoint and notify the Engineer in writing, a competent person responsible that all formwork and support work structures are adequately designed, erected, supported, braced and maintained.

f) The Contractor shall appoint and notify the Engineer in writing, a separate competent person with relevant experience for each of the operations whose first duty will be to, and who shall, supervise all stages in the operation. The operations are:

   i) Excavation, blasting and trimming of the excavations, backfilling and formation of embankments.
   ii) Supply of concrete aggregates and the batching, mixing, transporting, placing, compacting and curing of concrete.
   iii) Loading, unloading, transport and installation of steel pipes including areas where pipe jacking has occurred.
   iv) Cutting and welding of steel pipes
   v) Installation of valves, dirt boxes and water meters
   vi) Preparing and making good coatings and linings at pipe welded field-joints

g) All scaffolding shall comply with the Occupations Health and Safety Act 1993 (latest amendment).

h) The Contractor shall appoint and notify the Engineer in writing, a competent person responsible for suspended platform and that all erectors, operators and inspectors are competent to carry out their work.

i) Every material hoist and its tower shall be constructed of sound material in accordance to the Construction Regulations 2014 (latest amendments).

j) All explosive power tools shall comply to and be in accordance to Construction Regulations 2014 (latest amendment).

k) Notwithstanding the provisions of the Driven Machinery Regulations (Government Notice No. R533, latest amendment), the Contractor shall ensure that work is carried out in a safe manner where tower cranes are used.

l) The Contractor shall ensure that all construction vehicles and mobile plant are maintained, operated and used in a safe manner by competent operators.

m) Notwithstanding the provision of the Electrical Installations Regulations (Government Notice R2920 latest amendment) and the Electrical Machinery Regulations, (Government Notice R1953 latest amendment), the Contractor shall take the necessary steps to provide a safe environment for construction work to proceed.

n) Notwithstanding the provisions for the use and storage of flammable liquids as determined in the General Safety Regulations (Government Notice No. R1031, latest amendment), flammable liquids shall be stored in such a manner to prevent fires and explosions.

o) The Contractor shall provide lifejackets for workers where construction work is done near or over water.

p) Notwithstanding the provisions of the Environment Regulations for Workplaces (Government Notice No. R2281, latest amendment), implement and maintain suitable housekeeping.

q) Notwithstanding the provisions for the stacking of articles in the General Safety Regulations (Government Notice R1031, latest amendment) the Contractor shall appoint a competent person in writing, responsible for supervising all stacking and storage on site.

r) Subject to the provisions of the Environment regulations for Workplaces (Government Notice No. R2281, latest amendment), the Contractor shall take appropriate measures to avoid risk of fire.

s) Notwithstanding the provisions of the Facilities Regulations (Government Notice No. R1593, latest amendment), the Contractor shall provide clean and maintained facilities as required.

t) The Contractor shall take all reasonable steps to ensure co-operation between all sub-contractors to enable each sub-contractor to comply with provisions of the Act.

PS12 ENVIRONMENTAL AUTHORIZATION (ROD) AND ENVIRONMENTAL MANAGEMENT PLAN (EMP)

Included in Part 5 of this document.

WORK PACKAGE 3A

It should be noted that the Environmental Authorisation has only been procured for 4.2km of the pipeline length. The remainder 2km portion will be procured during construction and will be secured by the time the construction train reaches the 4.2km mark. Hence, all planning activities for construction should start with the first 4.2km and thereafter proceed to the remainder portion once the Environmental Authorisation.

WORK PACKAGE 3B

The project site within Zuikerbosch where the sludge bypass will be constructed had not obtained an Environmental Authorisation, therefore it should be noted that it was not procured for this particular area. A project specific environmental specification and EMP have been attached to the bid document.

PS 12.1 Introduction

This is a generic Environmental Management Plan (EMP) based on information, conditions and specifications of typical Rand Water construction activities and is not restricted to a single or specific site of construction. A site specific EMP can be found in Part 5 of this document when available.

Should further site information and/or environmental requirements become available as part of the Environmental Impact Assessment (EIA) process, it will be included to form part of this EMP (and attached site specific EMP) where necessary.

Provisions already included within the General and Specific Conditions of Contract have not been included in this EMP. The guidelines contained in this EMP and the provisions contained within the General and Special Conditions will apply. The guidelines should be implemented as appropriate for each work site.

The Contractor shall comply with the requirements described in this EMP and any additions and/or alterations hereto.

All maintenance, construction and associated activities should be confined to the applicable servitude and identified or indicated areas for construction purposes.

PS 12.2 Objectives

The objectives of the EMP are to:

a) Ensure that the maintenance and construction of the Works are carried out within the concepts of Integrated Environmental Management; and
b) Identify measures, which, may be necessary to manage and ensure mitigation of environmental impacts associated with the maintenance and construction of the Works.

PS 12.3 Scope

The management of impacts on the environment is categorized as indicated below:

PARAGRAPH	DESCRIPTION
3.1	Soil Preservation
3.2	Water, rivers, streams and wetlands
3.3	Air Pollution
3.4	Pollution control
3.5	Noise and other disturbances
3.6	Social and Cultural
3.7	Aesthetics
3.8	Archaeology and cultural sites
3.9	Fauna and flora
3.10	Infrastructure
3.11	Safety
3.12	Waste
3.13	Rehabilitation

PS 12.3.1 Soil Preservation

i. If any Borrow Pit is to be established it should be done in accordance with the Minerals Act No. 51 of 1993, as amended. An Environmental Impact Assessment must take place prior to the development of any borrow pit.
ii. Topsoil (minimum 300 mm) should be temporarily stockpiled separately from subsoil or rocky material when areas are cleared (the topsoil contains both the seedbed and the nutrient supply necessary for plant growth: if mixed with subsoil layers the usefulness of the topsoil for rehabilitation of the site will be lost).
iii. The stockpiled topsoil should be replaced as the final soil layer.
iv. No imported topsoil should be used as the final soil layer.
v. The surface topsoil should not be used for bedding material.
vi. Stockpiled topsoil should not be compacted; this includes the movement of any form of vehicle over the stockpiles.
vii. Stockpiled soil should be protected by erosion-control berms if exposed for a period of greater than 14 days during the wet season.
viii. Soil stockpiles should be located away from rivers, streams, drainage lines and areas of temporary or permanent inundation.
ix. Soil should be exposed for the minimum time possible once cleared of vegetation to avoid prolonged exposure of soils to wind and water erosion.
x. Topsoil stockpiles must not be contaminated with oil, diesel, petrol, waste or any other foreign matter, which may inhibit the later growth of vegetation and micro-organisms in the soil.
xi. Vehicular access must be limited across rocky outcrops and ridges.
xii. Appropriated measures must be taken to stabilize all cut and fill surfaces on completion of construction.
xiii. Erosion and donga crossings must be dealt with as river crossings. Appropriate soil erosion and control procedures must be applied to all embankments that are disturbed and destabilized.
xiv. Soil contaminated with oil must be appropriately treated and disposed of at a permitted landfill site or regenerated using bio-remediation methods.
xv. Run-off must be reduced and controlled by channeling water into existing surface drainage system.

xvi. No impediments to natural water flow other than approved erosion control Works should occur.

12.3.2 Water, rivers, streams and wetlands

i. Construction disturbances in the vicinity of riverside areas, riverbeds and river crossings must be restricted to the absolute minimum.
ii. Adequate sedimentation control measures shall be instituted at any river crossings where excavations or disturbance of riverbanks, riverbeds or drainage lines of wetlands may take place.
iii. Sedimentation weirs shall be placed downstream of the crossing.
iv. During construction at river crossings as much as possible of the full flow of the river should be allowed to pass downstream. In-river bed diversions should be used rather than the construction of new channels.
v. During construction through a wetland, the majority of the flow of the wetland should be allowed to pass downstream.
vi. Due to the sensitivity of the riverbanks, erosion control measures must be employed both during and after construction. Erosion matting must be used on all exposed/disturbed riverbanks and these must allow for the re-growth of the natural vegetation.
vii. The surface of the work area should be re-profiled so that the pre-excavation drainage patterns and hydrology are restored.
viii. Use appropriate structures and methods to confine accidental spillages such as the construction of berms and pans, or through the application of surface treatments that neutralize the toxic effects prior to the entry into a watercourse.
ix. Oil absorbent fibres must be used to contain oil spilt in water.
x. Vehicular traffic across wetland areas must be avoided.
xi. Dumping of foreign materials and/or object in rivers, streams and wetlands is not allowed.
xii. The wetland area and/or river must not be drained, filled or altered in any way including alteration of a bed and/or, banks, without prior consent from the DWS. The necessary licenses must be obtained in terms of Section 21 and 22 of the National Water Act, 36 of 1998 from DWS.
xiii. No fires or open flames are allowed in the vicinity of the wetland, especially during the dry season.
xiv. No swimming, washing (including vehicles and equipment), fishing or related activity is permitted in a river stream or wetland.

PS12.3.3 Air Pollution

i. Dust generation should be kept to a minimum by the implementation of dust suppression measures where appropriate. Special care should be taken in areas where the route passes close to inhabited areas.
ii. Water used for the purpose of dust suppression must be used in quantities that will not result in the generation of run-off.
iii. Speed limits must be implemented in all areas, to limit the levels of dust pollution.
iv. Waste must be disposed of, as soon as possible at a municipal transfer station, skip or on a permitted landfill site. Waste must not be allowed to stand on site to decay, resulting in mal-odours.
v. No fires are allowed as smoke from such fires could cause a nuisance to landowners and other parties in the vicinity of the construction site.

PS12.3.4 Pollution control

i. Soil and water pollution through fuels, oils or other substances must be avoided.

ii. No maintenance work on earth moving equipment, vehicles or other large machinery should take place within the vicinity of river or stream crossings, wetlands or other sensitive sites as may be identified during the EIA process. Such work should only take place on and within a designated workshop area.
iii. Littering, discarding or burying of any material (excluding the pipeline) on site should not be allowed.
iv. All machinery is to be maintained and in good working order so as to prevent soil or water pollution from oil, fuel or other leaks.
v. Contaminated water should be appropriately disposed of and should not be allowed to discharge to the surrounding environment. This includes water used for cleaning of pipes and which may contain rust, chemical residues, etc.

PS12.3.5 Noise and other disturbances

i. Construction activities should be restricted to between 07:00 and 17:00 Monday to Friday, unless otherwise approved by the Engineer, subject to the Contractor having obtained appropriate consent of the affected landowners and affected parties.
ii. The Contractor must inform all adjacent landowners of any after-hour construction activities and any other activity that could cause a nuisance e.g. the application of chemicals to the work surface.
iii. No loud music is allowed on site and in construction camps.

PS12.3.6 Social and cultural

i. Open liaison channels should be identified and developed to ensure that all queries, complaints from all affected persons/parties may be addressed with the shortest possible delay. This is particularly important in the vicinity of habitation.
ii. If work is to take place on privately owned land, i.e. not belonging to Rand Water, the landowners should be informed of all work to take place and permission should be obtained before any work commences.
iii. Access to the site should be restricted to employees of the Contractor.
iv. Construction staff should be educated as to the need to refrain from destruction of animals and plants, as well as from indiscriminate defecation, waste disposal and or pollution of local soil and water resources.
v. Contractors to ensure that labourers remain within the servitude and construction areas, especially at sensitive sites such as river crossings, wetland areas and koppies.
vi. Machine/vehicle operators should receive clear instructions to remain within identified access routes and operational/construction areas. Penalties should be introduced to ensure that this requirement is adhered to.
vii. Staff should be informed that access to adjacent/private properties is strictly off-limits, and that it will be deemed a serious offence if any person is found trespassing (i.e. no fences should be jumped at any time and no gates are to be opened without permission from the relevant landowner.
viii. The Contractor's crew must be easily identifiable by means clothing, identification cards or other methods.
ix. Sub-Contractors and their employees must comply with all the requirements of this document and supporting documents e.g. the Contract document that applies to the Contractor. Absence of specific reference to the sub-contractor in any specification does not imply that the sub-contractor is not bound by this document.
x. The Contractor must arrange for all his employees and those of his sub-contractors to be informed of the requirements of the environmental report before the commencement of construction to ensure:

a) A basic understanding of the key environmental features of the work site and environments, and

b) Familiarity with the requirements of this document and the site-specific report.

xi. The Contractor must maintain a detailed complaints register, together with solutions and appropriate actions taken where necessary, which must be forwarded to the authorities on request.
xii. The contractor should ensure proper supervision of employees at all times.

PS12.3.7 Aesthetics

i. Measures to limit damage to the natural environment will be sustained by the Contractor.
ii. Trees and tall shrubs must be protected from damage to provide a natural visual shield.
iii. The clearing of all sites must be kept to a minimum and surrounding vegetation must, as far as possible, be left intact as a natural shield.
iv. Marking and painting of natural features will not be allowed.
v. Above ground structures (valve chambers, hammer tanks, reservoirs, etc.) should be located in areas where the visual impact from roads, houses etc is minimized.
vi. Above ground structures could be treated or painted to blend in with the natural environment.
vii. Cut and fill areas, river and stream crossings and other soil stabilization Works must be constructed to blend in with the natural environment.
viii. Natural outcrops, rocky ridges and other natural linear features, must not be bisected. Vegetation on such features must, as far as possible, not be cut unless absolutely necessary for construction.
ix. Excavated material must be flattened (not compacted) or removed from site. No heaps of spoil material must be left on site once the Contractor has moved from site.
x. Any complaints regarding the appearance of the construction site must be recorded and addressed promptly by the Contractor.

PS12.3.8 Archaeology and cultural Sites

i. All finds of human remains must be reported to the nearest police station.
ii. Human remains from the graves of victims of conflict, or any burial ground or part thereof which contains such graves and any other graves that are deemed to be of cultural significance may not be destroyed, damaged, altered, exhumed or removed from their original positions without a permit from the South African Heritage and Resource Agency (SAHRA).
iii. Work in areas where artefacts are found must cease immediately.
iv. Under no circumstances must the Contractor, his/her employees, his/her sub-contractors or his/her sub-contractors' employees remove, destroy or interfere with archaeological artefacts. Any person who causes intentional damage to archaeological or historical sites and/or artefacts could be penalized or legally prosecuted in terms of the National Heritage Resources Act, 25 of 1999.
v. All known and identified archaeological and historical sites must be left untouched. A fence at least 2m outside the extremities of the site must be erected to protect the site.
vi. Work in the area can only be resumed once the site has been completely investigated and the Engineer has given his consent to do so.

PS12.3.9 Fauna and flora

i. It is possible that red data animal and plant species may occur within the construction area and it is imperative that disturbance be minimized and that labourers do not pouch any animals.
ii. Construction activities should avoid destruction of areas of extensive animal habitation.

iii. If animal habitats, e.g. warrens, have to be destroyed, this should be done with prior approval from the environmental site officer or the environmental consultants.
iv. Excavations left open during construction should be checked periodically (especially once the rain season begins) such that animals falling in can be safely removed and released away from construction activities.
v. No species of animal may be poached, snared, hunted, captured or wilfully damaged or destroyed.
vi. Snakes and other reptiles that may be encountered on the construction site must not be killed unless the animal endangers the life of an employee.
vii. Anthills and/or termite nests that occur must not be disturbed unless it is unavoidable for construction purposes.
viii. Disturbances to nesting sites of birds must be minimized.
ix. Disturbances to nesting, breeding and roaming sites of animals in or adjacent to wetland areas must be minimized.
x. The Contractor must ensure that the work site is kept clean and free from rubbish, which could attract pests.
xi. Only vegetation falling directly in demarcated access routes or construction/operational areas should be removed to provide essential access for construction purposes.
xii. The spread of alien vegetation must be minimized.
xiii. A minimum servitude width should be used on koppie slopes.

PS12.3.10 Infrastructure

a.) Services

i. The relevant authorities must be notified of any interruptions of services. In addition, care must be taken to avoid damaging any services.
ii. The integrity of property fences must be maintained.
iii. All crossings of services must be protected, raised or relocated with the consent of the relevant authority.

b.) Storage

i. Proper storage facilities should be provided for the storage of oils, grease, fuels, chemicals and any hazardous materials to be used during construction.
ii. These storage facilities (including any tanks) should be stored on an impermeable surface and surrounded by a bund wall, in order to ensure that accidental spillage does not pollute local soil or water resources.

c.) Equipment

i. Refueling and maintenance of vehicles should occur within specified depots only. Working/fuel transfer areas within these depots should be underlain by an impermeable surface and should have grease traps to ensure that no spillage of greases, oils or fuels occur into local soil or water resources.
ii. All equipment must be inspected regularly for oil or fuel leaks before it is operated. Leakages must be repaired on mobile equipment or containment trays placed underneath immobile equipment until such leakage has been repaired.

d.) Hazardous materials

i. An inventory of any hazardous chemicals/substances (including that within equipment), along with a description of possible ill effects and treatment of health-related afflictions resulting from accidents, should be kept in the storage area as well as by the appropriate manager.

ii. Workers should at all times be made aware of the health risks associated with any hazardous substances used (e.g. smoking near refueling depots), and should be provided with appropriate protective clothing/equipment in case of spillages or accidents.

e.) Traffic and access

i. Any traffic diversions should be undertaken with the approval of all relevant authorities and in accordance with all relevant legislation.
ii. Wherever possible traffic diversion should only take place on existing disturbed areas and remain within the existing road reserve.
iii. Traffic diversion routes may need to be rehabilitated as per the rehabilitation guidelines as described by the relevant authority.
iv. Access routes to the servitude and work site should be controlled such that only vehicles and persons directly associated with the work at a particular section of the pipeline have access.
v. Temporary access roads must not be opened until required and must be restored to its former state as soon as the road is no longer needed.

f.) Construction camp and stockpile areas

i. The siting of construction camp(s), offices, workshops, maintenance and refueling sites and materials storage areas should not be in the vicinity of sensitive sites e.g. areas of periodic water logging (at any point in time), draining lines, rivers, stream, wetlands, steep slopes and areas of extensive animal habitation.
ii. These facilities should be constructed in areas, which are already disturbed (e.g. adjacent to existing/old buildings; within an existing servitude).
iii. The erection of signs alongside or near roads should comply with all relevant legislation and meet with the approval of the relevant authorities.
iv. Stockpiling of pipes, bedding, padding and other material must not be carried out near sensitive areas such as river and stream crossings, wetland areas, steep slopes and koppies or other areas, which may be identified by the environmental consultants as part of the EIA process.
v. Stockpile areas must remain within the appropriate servitude.

g.) Other

i. Cement and other potential environmental pollutants should be stored and mixed on an impermeable substratum. There should be no opportunity for environmental contamination.
ii. The Contractor must ensure that accidental spillage does not pollute soil and water resources.
iii. Chemical toilet facilities should be managed and serviced by a qualified company. No disposal or leakage of sewerage should occur on or near the site or during its transport.
iv. All material imported for use on site, e.g. for fills, cement mixing etc. should be obtained from a legal, commercial source. No waste or mine dump material may be used on site without prior approval from the environmental consultant.

PS12.3.11 Safety

a.) General

i. Measures must be taken during thunderstorms to protect workers and equipment from lightning strikes.
ii. All tall structures must be properly earthed and protected against lightning strikes.

b.) Fire

i. Smoking should be prohibited in the vicinity of flammable substances.
ii. The contractor should ensure that fire-fighting equipment is available on site, in particular where flammable substances are being stored or used.
iii. Any welding or other sources of heating of materials should be done in a controlled environment wherever possible and under appropriate supervision, in such a manner as to minimize the risk of veld fires and/or injury to staff.
iv. A fire started for comfort (warmth) is prohibited, due to the risk of veld fires and risk to adjacent property owner's lands.
v. No waste material must be burned.
vi. No fires or open flames are allowed on site unless directly used for construction purposes, e.g. acetylene blowtorch.

c.) Excavations

i. Excavations should only remain open for a minimum period of time and during this time they must be clearly demarcated so as to prevent accidental ingress of people, animals or vehicles.
ii. Where there is any obvious well used path or tracks which cross the work area, care must be taken to ensure thoroughfare without injury or prejudice to those using the path.
iii. Open trenches and excavations must be clearly demarcated. If excavations place the public at risk these sites must be fenced.
iv. The residents directly affected by open trenches must be notified of the dangers. This will be done during the site-specific phase.

d.) Blasting

i. If any blasting is to take place all surrounding landowners and businesses, as appropriate, should be informed of the blasting plan at least two (2) weeks prior to blasting.
ii. Full precautions (mats etc.) should be taken during all blasting operations to avoid missile damage to society and the environment, in particular any riparian (riverine) vegetation.
iii. Any areas where the blasting residue (nitrates etc.) could accumulate should be avoided or washed out.
iv. All the provisions of the Explosives Act, 26 of 1956 and the Minerals Act, 50 of 1991 must be complied with.

PS12.3.12 Waste

a.) Solid

i. Littering on site and the surrounding areas is prohibited.
ii. Clearly marked litterbins must be provided on site. All bins must be cleaned of litter regularly.
iii. All domestic waste generated in the site camp(s) should be disposed of in a proper manner off site, and only at legal dumping sites.
iv. All construction waste should be either a) removed from site and disposed of at an appropriate municipal dumping site, or b) temporarily stored in a clearly demarcated area on site for future use. The position of such a site should be approved by the

Environmental Consultants or Environmental Site Officer prior to the disposal of such wastes.

v. Contaminated soil must be treated and disposed of at a permitted waste disposal site, or be removed and the area rehabilitated immediately.
vi. Any spoil generated in the process of maintaining, repairing or laying of the pipelines should only be stockpiled within the appropriate servitude or within areas approved by the environmental consultants or environmental site officer.
vii. Spoil which is to remain on site after the completion of the contract must be shaped, trimmed and vegetated as soon as possible.
viii. All waste generated during construction, other than natural materials, e.g. soil and rock, should be disposed of in a proper manner off site, i.e. at a registered site.

b.) Liquid

i. All wastes generated by the ablution and kitchen facilities shall be disposed of in a proper manner off site.
ii. The site should be serviced by properly managed and maintained toilet facilities. Chemical toilet facilities should be managed and serviced by a qualified commercial company.
iii. The Contractor is to ensure that permanent on-site toilet facilities are properly maintained and are in working order. No disposal, or leakage, of sewage should occur on or near the site.
iv. The waste generated under i) and ii) above must be discharged into a municipal sewer system, at a discharge point and in a manner approved by the local authority.
v. All waste oils, greases, fuels etc. should be collected and disposed of in an appropriate manner off site. The contents of grease traps or other waste oil, grease and/or fuel disposal/storage containers, should under no circumstances be voided to the surrounding area.

c.) Hazardous

i. No hazardous materials must be disposed of in the veld or anyplace other than a registered landfill for hazardous material. Hazardous waste must be stored in containers with tight lids that must be sealed and must be disposed at an appropriately permitted hazardous waste disposal site. Such containers must not be used for purposes other than those originally designed for.
ii. The Contractor must maintain a hazardous material register.

PS12.3.13 Rehabilitation

i. Once construction is completed, all redundant infrastructure, waste and construction materials should be removed from site by the Contractor and disposed of in an appropriate manner, i.e. at a registered site.
ii. Disturbed areas, which are to remain free of infrastructure, should be rehabilitated to a state comparable to the surrounding vegetation (this should be determined and prescribed by the environmental consultant).
iii. Areas compacted by vehicles during construction may have to be scarified (ripped) to allow penetration of plant roots and the re-growth of natural vegetation.
iv. Large disturbed areas may need to be rehabilitated as per a rehabilitation plan. This may make provision for the control or removal of invasive vegetation at specified time intervals.

v. All drainage deficiencies including abandoned pit latrines and waste pits must be corrected.
vi. Borrow pits must be re-shaped into even slopes and surfaces to blend with the natural terrain and topsoil must be replaced.

PS 12.4 Site Specific Environmental Management Plan

The following Site Specific Environmental Management Plan is provided on the CD included with this document:

Consultant	Title
RAND WATER EMS TEAM	**WORK PACKAGE 3A** PHASE 2: PROPOSED CONSTRUCTION OF A 4.2KM LONG SLUDGE PIPELINE WITH AN INTERNAL DIAMETER OF 1000MM STARTING FROM VEREENIGING INTAKE ONE TO VEREENIGING
RAND WATER EMS TEAM	**WORK PACKAGE 3B** DESIGN, MANUFACTURE, SUPPLY, DELIVERY, INSTALLATION, TEST, COMMISSION AND MAINTAIN PIPE LAYING AND CIVIL WORKS FOR THE CONSTRUCTION OF 750m, 694mm ID (8mm THICK) SLUDGE STEEL PIPELINE FROM CENTRAL SLUDGE NO. 2 TO THE CROSS CONNECTION CHAMBER

A copy of the Environmental Management Plan has been included in electronic copy on the CD issued as part of this Tender Document. The Contractor shall comply with all requirement set out in the EMP.

PS 12.5 Method Statements

In terms of the Site Specific Environmental Management Plan (PS12.4) at least the following method statements will be required:

- Method statements for protocols to be followed in the event of:
  - Contamination of natural water resources from spills.
  - Contamination of soils from spills
  - Fire on the site.
- Method statement for cement and concrete batching.
- Method statement for diesel tanks and refueling procedures.
- Method statement for crew camps and construction laydown areas.
- Method statement for solid waste management.
- Method statement for dust control.
- Method statement for management of topsoil.
- Method statement for workshop maintenance and cleaning of plant.

PS13 APPLICABLE STANDARDIZED SPECIFICATIONS

Although not bound in or issued with this document, the following SABS 1200 Standardized Specification for Civil Engineering Construction as approved by the Council of the South African Bureau of Standards shall apply to this Contract. The Contractor shall be in possession of these Standardized Specifications and their related SABS 0120 Code of Practice that apply equally and shall keep a copy of each on site for reference by him and the Engineer for the duration of the Contract.

For "Workmen's Compensation Act" read "Compensation for Occupational Injuries and Diseases Act, 1993 (Act No. 130 of 1993)" wherever it appears. For "Machinery and Occupational Safety Act" and "Mines and Works Act" read "Occupational Health and Safety Act, 1993 (Act 85 of 1993)" wherever they appear.

SABS 1200 Specifications applicable are:

SANS 1200 A – 1986	:	General
SANS 1200 AB – 1986	:	Engineer's Office
SANS 1200 C – 1980	:	Site Clearance
SANS 1200 DA – 1988	:	Earthworks (Small Works)
SANS 1200 DB – 1989	:	Earthworks (Pipe Trenches)
SANS 1200 DK – 1996	:	Gabions and Pitching
SANS 1200 DM – 1981	:	Earthworks (Roads, Sub-grade)
SANS 1200 GA – 1982	:	Concrete (Small Works)
SANS 1200 GE – 1984	:	Precast Concrete (Structural)
SANS 1200 HA – 1990	:	Structural Steelwork (Sundry Items)
SANS 1200 LB – 1983	:	Bedding (Pipes)
SANS 1200 LE – 1982	:	Stormwater Drainage
SANS 1200 LG – 1983	:	Pipe Jacking
SANS 1200 ME – 1983	:	Subbase
SANS 1200 MFL – 1996	:	Base (Light Pavement Structures)
SANS 1200 MM – 1984	:	Ancillary Roadworks

Civil Works

The variations and additions to the applicable standardized specifications have been compiled to provide supplemental site and project specific information to SANS 1200; SANS 10120; SANS 2001 and the Technical Specifications contained in this document.

In addition to the below tabulated applicable specification standards to the project, variations and additions are provided below:

Specification No.	Description
SANS 1200 - A	Standardized Specification for Civil Engineering Construction – General
SANS 1200 - D	Standardized Specification for Civil Engineering Construction – Earthworks
SANS 2001 – BE1	Construction Works – Earthworks (General)
SANS 2001 – BS1	Construction Works – Site Clearance

SANS 2001 – CC1	Construction Works – Concrete Works (Structural)
SANS 2001 – CS1	Construction Works – Structural Steelwork
SANS 2001 – DP1	Earthworks for Buried Pipelines and Prefabricated Culverts

Copies of SABS 1200 Standardized Specifications are available from the South African Bureau of Standards, Private Bag X191, Pretoria, 0001.

Specifications applicable to TS2 unloading, laying, jointing etc. of pipes, supply and installation of specials and installation of valves etc. are:

American Petroleum Institute Standard 1104: Welding of pipelines and relocated facilities.

American Petroleum Institute Standard 5L: Specifications for line pipe
SANS 1217 (latest available): Internal and external organic coating protection for buried steel pipelines.

PS14 APPLICABLE TECHNICAL SPECIFICATIONS (RAND WATER)

PIPELINES

Rand Water Technical Specifications, TECHNICAL SPECIFICATION FOR PIPELINE EXCAVATION, BACKFILLING AND PIPE TRENCHES AND PIPE LAYING, SPECIAL AND TESTING AND INVESTIGATIONS AND RETURNABLE SCHEDULES (TS) TS1 to TS6 shall apply to this Contract, specifically:

- TS1 – EXCAVATION, BACKFILLING, ETC OF PIPE TRENCHES
- TS2 – PIPE LAYING, SPECIALS AND TESTING
- TS4 – INVESTIGATION
- TS5 – MEASUREMENTS AND PAYMENTS
- TS6 – RETURNABLE SCHEDULES (RS)

The following Rand Water Technical Specifications shall apply to this Contract. The Contractor shall be in possession of these Technical Specifications and shall keep a copy of on site for reference by him and the Engineer for the duration of the Contract.

MECHANICAL

- RW-0310-AS-460 - SPECIFICATION FOR SLUICE-, AIR-, REFLUX-, BUTTERFLY-, RESILIENT SEAL GATE- AND BALL VALVES AND POWERED ACTUATORS.

CATHODIC PROTECTION

- RAND WATER CATHODIC PROTECTION SYSTEM TECHNICAL SPECIFICATION – REVISION 7.5 (RW ELS 00001 TS)

CIVIL

- CIVIL FUNCTIONAL SPECIFICATION: Part of the Civil Technical Specifications Document (VG SLUDGE PIPELINE CHAMBER SPECIFICATION - CIVIL TECHNICAL SPECIFICATION)

The applicable technical specifications are bound in this document as Part 3 of the Bid.

Note: The trench excavation and bedding details will be in accordance with the SANS 1200DB and 1200LB specifications, except where qualified by the Rand Water drawings and specifications.

WORK PACKAGE 3B

The above technical specifications are applicable to Work Package 3B including the following:

ELECTRICAL

- ELECTRICAL SYSTEM SPECIFICATION AND RETURNABLE SHCHEDULES REV 2 – RW10397155/21
- ELECTRICAL ENGINEERING STANDARD FOR EARTHING AND SUPPRESSION
- ENGINEERING STANDARD FOR THE CONTROL OF PLANT AND EQUIPMENT
- STANDARD SPECIFICATION FOR FACTORY BUILT ASSEMBLIES OF LOW VOLTAGE SWITCHGEAR AND CONTROL GEAR
- GENERAL ELECTRICAL SPECIFICATION FOR THE INSTALLATION OF ELECTRICAL PLANT AND EQUIPMENT

- GENERAL ELECTRICAL SPECIFICATION FOR BUILDING LIGHTING AND SMALL POWER INSTALLATIONS
- GENERAL ELECTRICAL SPECIFICATION FOR THE DESIGN AND SELECTION OF ELECTRICAL PLANT AND EQUIPMENT
- SPECIFICATION FOR PLANT CODIFICATION LABELS
- ELECTRICAL ENGINEERING STANDARD RWB-EES-002

AUTOMATION

- AUTOMATION SYSTEM SPECIFICATION FOR RW10397155/21

MECHANICAL

- MECHANICAL SCOPE RW10397155/21-Mech-Spec
- TECHNICAL SPECIFICATION FOR ELECTRICALLY OPERATED VALVES AT RAND WATER (RC01108)
- SUBMERSIBLE SUMP PUMP SPECIFICATION (RC 01100- Rev 2)

CIVIL

- P.03743 VG TO PANFONTEIN SLUDGE PIPELINE CONNECTION AT CENTRAL SLUDGE 2- CIVIL PROJECT SPECIFICATION
- CIVIL CHAMBER CONSTRUCTION SPECIFICATION

PS 15 APPLICABLE SPECIFICATIONS (DEPARTMENT OF PUBLIC WORKS)

If required by the Engineer, the following Department of Public Works Specifications shall apply to this Contract, as per Portion 3 of the Scope of Work. The Contractor shall be in possession of these Specifications and shall keep a copy of on site for reference by him and the Engineer for the duration of the Contract.

PW344: Appropriate Development of Infrastructure on Dolomite: Manual for Consultants

The applicable specifications can be obtained from the Department: Public Works – Republic of South Africa or from their website: www.dpw.gov.za

PS 16 DELIVERABLES AND WORK BREAKDOWN STRUCTURE

The Contractor shall be responsible for the provision of the following deliverables and work, which in turn must comply fully with the supplied drawings, schedule of quantities, Rand Water's applicable specifications, and in particular the specification supplied as part of the Tender.

PHASE 1: COMPILATION AND SUBMISSION OF PRELIMINARY DOCUMENTATION

Detailed Project Programme: Provide the Engineer with a detailed project programme within 14 (fourteen) days of signing the Contract.

Declaration of Insurance: Submit to the Engineer the completed Schedule: Declaration of Insurances, together with copies of the insurance policies concerned within 14 (fourteen) days of signing the Contract.

Surety: Provide to the Engineer a surety, issued on an official letterhead of a bank or insurance company having an office in the Republic of South Africa, within 14 (fourteen) days of delivery of signing the Contract.

Appointment of OHS Site Representative: Submit to the Engineer a copy of the appointment and acceptance document; of the full-time employee that shall be the Contractor's Site Representative in terms of the OHS act requirements within 14 (fourteen) days of delivery of signing the Contract.

Health and Safety Plan: Compile a Health and Safety Plan in compliance with the OHS ACT and latest amendment of the construction regulations, 2014. This document shall be submitted to the Rand Water Site OHS Officer for approval, within 14 (fourteen) days of delivery of signing the Contract. A copy of the approved document shall be submitted to the Engineer.

Risk Assessment Plan: Submit to the Engineer a comprehensive risk assessment plan, within 14 (fourteen) days of delivery of the Letter of Acceptance.

Quality Assurance Plan: Submit to the Engineer a comprehensive proposal for a quality assurance plan (in accordance with the requirements of SANS – ISO 9000), within 21 (twenty one) days of delivery of signing the Contract.

Team Members Document: Submit to the Engineer a team member list, within 14 (fourteen) days of delivery of the Letter of Acceptance, which has at minimum the following information:

- Team member's name.
- Team member's ID numbers and copies of ID documents.
- Team member's job description.
- Team member's qualifications, certifications and experience.
- Team members contact details.

Site Induction: Arrangement with the Rand Water Site OHS Officer for an induction date and attendance the Site's Induction Course all of the Contractor's (and sub-contractor's) team members who will be working on the site. Proof of successful completion of the Induction course by all team members shall be submitted to the Engineer within 14 (fourteen) days of the completion of this induction. This proof shall have at a minimum a list of all the members that have attended the induction together with their ID numbers and signatures as well as the signature of the Site OHS Officer who conducted the induction.
The Contractor must ensure that all his site construction management and supervision team, including the labour force and plant operators have undergone a medical assessment in accordance with the OHS Act with respect to their roles on site. These medical assessments must be submitted to the Engineer and or Rand water's safety Officer for his acceptance prior to anybody mobilising or stating work on site.

Site Access Certificate: Following approval of the Health and Safety Plan submitted to the Rand Water Site OHS Officer, obtain a Site Access Certificate from the Site Executive Manager

PHASE 2 – SITE ESTABLISHMENT AND BUILDING CONSTRUCTION

Establish on site (following the obtaining of a Site Access Certificate from Rand Water).

PHASE 3 – PROCUREMENT, PREPARATION, TESTING AND DELIVERY PHASE

Procurement of all equipment needed, including, but not limited to valves and all specials and fittings. The preparation of Inspection and Factory Acceptance Testing of the pipework and fittings, in conjunction with Rand Water personnel at the place of manufacture.

Preparations for and delivery of all equipment to site as per specifications. All equipment delivered to site shall be safely stored by and shall be the responsibility of the Contractor.

Preparations for and delivery of the approved spares and tools to Rand Water's stores or workshops.

PHASE 4: INSTALLATION AND COMMISSIONING PHASE

WORK PACKAGE 3A

Excavate an 6020m long, and an average 1.6m wide and average 3.0m deep, trench from Vereeniging Pumping Station to the Vaal River Crossing.

Inspect and collect, unload onto sandbags, lay and joint the 600mm internal diameter steel pipes on an approved bedding within the pipe trench.

Supply and install all bends, sluice valves, scour valves, air valves with vacuum break valves, and pipework connections at the start, the end and at cross connections other pipes along the pipeline. Also conduct tie-ins at pipe jackings.

Complete and repair the protective linings/coatings as follows: Manufacturers recommended repair to procured pipe external coating (currently Sintakote but TBC at Emhlangeni Plant) and Epoxy internal lining.

Backfill the trench with fill and dispose of surplus material and reinstate the top surface area.

Construct and/or install valve chambers and all associated steel work required within the chambers.

Installation of Jacking by:

On receipt of Jacking Geotechnical Investigation Results:

- Establish jacking pits and equipment.
- Jacking excavations and disposal of material.
- Supply and jacking of jacking pipes.
- Grouting between outside of sleeve and excavation face.
- Grouting between inside of sleeve and water main, installed by Pipe laying Contractor.
- Backfilling and reinstatement of sites.

Pressure tests the completed pipeline (witnessed and approved by Rand Water) as required by the OHS Act and regulations. All compliance certificates must be provided to Rand Water.

Obtain a Construction Acceptance Certificate from the Engineer after completion of the construction, installation and preliminary commissioning work.

Successfully commission and put the complete pipeline in to operation in conjunction with Rand Water staff.

WORK PACKAGE 3B

Excavate a 218m long, and an average 1,3m wide and average 1,9m deep, trench and construct pipe plinths/ supports over 600m from DN700 pipeline including installation at the engineer's instruction.

Store, inspect and collect, unload onto sandbags, lay and joint the DN700 steel pipes on approved bedding within the pipe trench and plinths.

Supply and install all bends, sluice valves, scour valves, air valves with vacuum break valves, and pipework connections at the start, the end and at cross connections other pipes along the pipeline.

Complete and repair the protective coatings as follows: Fibre-glass reinforced Bitumen external coating and carbomastic coating for above ground pipe and Epoxy internal lining.

Backfill the trench with fill and dispose of surplus material and reinstate the top surface area. Strap pipes to plinths.

Construct and/or install valve chambers and all associated steel work required within the chambers. this includes additional chambers at the engineer's instruction.

Installation of Jacking by: (not applicable)

On receipt of Jacking Geotechnical Investigation Results:

- Establish jacking pits and equipment.
- Jacking excavations and disposal of material.
- Supply and jacking of jacking pipes.
- Grouting between outside of sleeve and excavation face.
- Grouting between inside of sleeve and water main, installed by Pipe laying Contractor.
- Backfilling and reinstatement of sites.

Pressure tests the completed pipeline (witnessed by Rand Water) as required by the OHS Act and regulations. All compliance certificates must be provided to Rand Water.

Obtain a Construction Acceptance Certificate from the Engineer after completion of the construction, installation and preliminary commissioning work.

Successfully commission and put the complete pipeline in to operation in conjunction with Rand Water staff.

PS 17 TRAINING

The Contractor shall provide in-task training of local labour during the construction of the Works. In-task training shall consist of training and guidance of team leaders, assistants, and labour in those construction activities where the labour is engaged. The in-task training shall cover all training and guidance required to ensure that the leaders and labour are able to carry out the project tasks in accordance with the requirements of the project specification. The in-task training shall be carried out by the Contractor's own key and skilled personnel.

The Contractor shall allow for all the necessary material, staff, liaison, support, etc so as to ensure that the local labour obtains the required in-task training. The Employer shall satisfy himself that the Contractor's training covers all the requirements of the in-task training according to the Industrial Relations Guidelines, Principles and Requirements for Rand Water Tenders, where applicable

PS 18 FREEHAUL AND OVERHAUL

Notwithstanding any clauses in any Standardized Specification or any Particular Specification or Standard Specification Section dealing with the definition, measurement and/or payment for transport, freehaul and/or overhaul, no measurement or payment for overhaul will be made. All haulage will be considered to be freehaul and the cost thereof will be deemed to be covered by the rates for the provision or disposal of the applicable material.

PS18.1 DISPOSAL OF SPOIL OR SURPLUS MATERIAL (Read with SANS 1921 - 1: 2004 clause 4.10)

No indiscriminate spoiling of material will be allowed. All surplus or unsuitable material shall be spoiled in designated areas as identified and acquired by Contractor. Contractor to be responsible for identification, negotiations and final agreements with relevant authorities, stock pile yards, etc. Waste material, empty cement pockets, pipes, manhole rings, etc., are not to be left lying at the site of operation.

PS 19 LIST OF DRAWINGS

The drawings issued to tenderers as part of the tender documents must be regarded as provisional and preliminary for the tenderer's benefit to generally assess the scope of work.
The work shall be executed in accordance with the latest available revision of the drawings approved for construction.

At the commencement of the Contract, the Engineer shall deliver to the Contractor copies of the construction drawings and any instructions required for the commencement of the Works. From time to time thereafter during the progress of the Works, the Engineer may issue further drawings or revisions for construction purposes as may be necessary for the adequate construction, completion and defects correction of the Works.

The following drawings form part of the Tender Document and are separately issued in digital format as Part 7: Tender Drawings on the CD issued with this Tender Document. These drawings are for tender purposes only. A set of construction drawings will be issued to the Contractor on the commencement date.

WORK PACKAGE 3A

Drawing Number	Drawing Title
RA27304/04/01	DRAWING REGISTER
RA27304/07/01	KEY PLAN
RA27304/07/02	GEOTECHNICAL LAYOUT PLAN
RA27304/06/01	LOCALITY PLAN
RA27304/02/01	SERVITUDES
RA27304/03/01	WORKING STRIP
R027304/09/01	HYDRAULIC LONG SECTION
R027304/10/01	PLAN AND LONGITUDINAL SECTION CH 0.000m - CH 2000.000m
R027304/10/02	PLAN AND LONGITUDINAL SECTION CH 2000.000m - CH 4000.000m
R027304/10/03	PLAN AND LONGITUDINAL SECTION CH 4000.000m - CH 6016.445m
R027304/12/01	GEOTECHNICAL LONGITUDINAL SECTION CH 0.000m - CH 2000.000m

Drawing Number	Drawing Title
R027304/12/02	GEOTECHNICAL LONGITUDINAL SECTION CH 2000.000m - CH 4000.000m
R027304/12/03	GEOTECHNICAL LONGITUDINAL SECTION CH 4000.000m - CH 6037.000m
R027304/11/01	PIPE JACKING 1 (COLENSO STREET)
R027304/11/02	PIPE JACKING 2 (BARRAGE ROAD)
R027304/11/03	PIPE JACKING 3 (RAND WATER PIPELINES)
R027304/11/04	PIPE JACKING 4 (PRIVATE TARRED ACCESS ROAD)
R027304/11/05	PIPE JACKING 5 (MARIO MILANI DRIVE)
R027304/11/06	PIPE JACKING 6 (RAND WATER PIPELINES)
R027304/11/07	PIPE JACKING 7 (RAILWAY LINE)
R027304/11/08	PIPE JACKING 8 (RAND WATER PIPELINES)
R027304/13/01	CROSS SECTIONS
R027304/14/01	600mmDia INLINE VALVE FITTINGS DETAILS AT CH3050.0m
R027304/14/02	600mmDia INLINE VALVE FITTINGS DETAILS AT CH6010.047m
R027304/14/03	GENERAL ARRANGEMENT FOR 100mm DIA. AIR VALVE CHAMBERS
A4085	SURFACE REINSTATEMENT FOR PIPES
A5478	STANDARD COLOUR CODE FOR MARKING STEEL PIPES
A7406	STANDARD GALVANISED CATLADDER DETAILS WALL MOUNT
A8879	DETAILS OF CAST IN FRAME FOR VALVE CHAMBER
A9858	STANDARD DETAILS OF GRAB RAIL AT ACCESS MANHOLES
A11791	STANDARD FLANGE DIMENSIONS
A12210	TYPICAL VALVE SUPPORT DETAILS
RA26695/001	DETAILS OF GATE VALVE ACCESS STEEL PLATFORM
RA26695/002	DETAILS OF GATE VALVE ACCESS STEEL PLATFORM
RA26695/003	DETAILS OF GATE VALVE ACCESS STEEL PLATFORM
RA17038	FABRICATION DETAILS OF PLAIN ENDED STEEL PIPES-BITUMEN COATED AND INSITU EPOXY LINED
RA26448	TYPICAL PUDDLE FLANGE DETAILS

Drawing Number	Drawing Title
RA26732	TYPICAL STANDARD DETAILS OF TAPERS AND BENDS
RA27141	DETAILS OF TRENCH EXCAVATIONS AND BACKFILLING
RB18951	TYPICAL RIVER CROSSINGS

Civil Drawings:

Drawing Number	Drawing Title
R027304/16/01	GENERAL ARRANGEMENTS FOR DN600 SLUICE GATE VALVE CHAMBER AT CHAINAGE No. 3050.00m
R027304/16/02	GENERAL ARRANGEMENTS FOR DN600 SLUICE GATE VALVE CHAMBER AT CHAINAGE No. 6010.047m
R027304/16/03	GENERAL ARRANGEMENTS FOR DN100 AIR VALVE CHAMBERS ALONG THE LINE

Cathodic Protection Drawings (Package 3A & 3B):

Drawing Number	Drawing Title
RA_17300	DETAIL OF CHAMBER BOND
RA_17302	CROSS BOND INSTALLATION
RA_22675	INSTALLATION OF HORIZONTAL ANODE GROUND BED
RA_23994	RAND WATER DETAIL OF SHALLOW/DEEP VERTICAL ANODE BED WITH ANODES
RA_27373	CATHODIC PROTECTION VOLTAGE LIMITING DEVICE CONNECTION
RA_27374	CATHODIC PROTECTION PRE AND COUPON INSTALLATION
RA_27375	CATHODIC PROTECTION EXTERNAL EARTH MAT INSTALLATION
RA_27376	CATHODIC PROTECTION TYPICAL CABLE TRENCH
RA_27645	SACRIFICIAL ANODES CATHODIC PROTECTION INSTALLATION VALVE CHAMBER
RA_27646	SACRIFICIAL ANODE CATHODIC PROTECTION MONITORING POST

A-9548	INSULATION FLANGE DRAWING

WORK PACKAGE 3B

Drawing Number	Drawing Title
RA27786/04/1	Drawing Register
R0 0000_001	Site Layout
RA27786/10/1	Sludge line (SL2) Cross Connection Longitudinal Section Ch. 0.00 – Ch. 749.168m
R027786/16/01	General Arrangement of Cross Connection
RA27786/16/04	Pipe Plinth Anchor – General layout and details
RA27786/18/01	150mm ø Air Valve
Rand Water Standard Drawings	
A5478	Standard Colour for Markings of Pipes
A7249	Surface Reinstatement For Pipelines
A7406	Cat Ladder Details
A8879	Detail Of Cast In Frame For Valve Chamber Sumps
A9548	Insulation Flanges
A9858	Details Of Grab Rail Access Manhole
A11791	Standard Flange Dimensions
A12210	Valve Support Details
RA26695/001, RA26695/002 RA26695/003	Steel platform
RA23557	Fabrication Details of Plain Ended Pipes
RA26448	Typical Puddle Flange
RA26732	Details of Tapers and Bends
R027141	Trench Excavation Details of Pipeline Trench
A4085.	Surface reinstatement
11860	Details of Manhole Cover And Frame
Mechanical drawings	
RA 26809/04	Typical Arrangement of Elec operated actuator extension for sluice valves
RA 26809/0	Typical Arrangement of Elec operated actuator extension for butterfly valves

Electrical drawings	
B 6477	Re-Instatement detail for Blacktop Road
RB 21046	Electrical Cable Numbers and Details
RB 20093	Typical Boundary Valve Chamber Distribution Board Single Line Diagram
RB 6443	Cable Trench Cross Section
RB 20100	Typical Sump Pump Control Circuit
RB 21044	Typical Boundary Valves DB SLD
Automation drawings	
RA 29317/001	STANDARD AUTOMATION KIOSK GENERAL ARRANGMENT
RA 29317/002	STANDARD AUTOMATION KIOSK GENERAL ARRANGMENT
RA 40676	SLUDGE CROSSCONNECTION VALVE CHAMBER AUTOMATION NETWORK DIAGRAM ZUIKERBOSCH PUMP STATION
RA 40677	SLUDGE CROSSCONNECTION VALVE CHAMBER AUTOMATION NETWORK DIAGRAM ZUIKERBOSCH PUMP STATION
RB 40674	TYPICAL SUMP PUMP LOOP DIAGRAMS ZUIKERBOSCH PUMP STATION
RB 40675	TYPICAL PANEL CHASSIS AND PLC RACK LAYOUT ZUIKERBOSCH PUMP STATION

PART 2 - VARIATIONS AND ADDITIONS TO THE STANDARDISED SPECIFICATIONS

Civil Variations and Additions to the Standardised Specifications and Functional Specification: Part of the Civil Technical Specifications Document (submitted separately)

PSA GENERAL (SABS1200A-1986)

PSA 3 MATERIALS

PSA 3.1 Quality

Where there is a standardization mark programme for any material, all such material supplied shall bear the official standardization mark.

Alternative materials or equipment proposed by the Contractor shall be tested. The test, as well as the materials or equipment, shall be approved by the Engineer prior to any such materials or equipment being built into the Works and all costs involved in testing shall be deemed to be included in the rates tendered.

PSA 4 PLANT

PSA 4.2 Contractor's Office, Stores and Services

The Contractor's camp shall be kept neat and clean at all times and all surplus or rejected material shall be removed from the site.

The Contractor will not be allowed to provide living accommodation for staff at the Contractor's Site Camp. Overnight accommodation for security staff will be allowed.

PSA 5 CONSTRUCTION

PSA 5.1 Survey

PSA 5.1.1 Setting out of the Works

The Contractor shall establish his/her own pegs and reference lines from which the work can be set out. Bench marks will be established on site by Rand Water.

PSA 5.9 Methods of Construction (Sub-clauses 5.3, 5.4, 5.5 and 5.7)

Except where acceptance of the Contractor's proposed methods of construction is stated in the letter in which the tender is accepted, acceptance of the tender does not signify acceptance of such methods of construction and does not in any way relieve the Contractor of any of his responsibilities for the Works, and it shall not be used as a basis for claiming compensation where the proposed methods of construction do not comply with the requirements of the specifications and are not approved subsequent to the award of the Contract.

PSA 5.10 Accommodation and Temporary Deviation of Traffic *(Read with SANS 1921-2 Part 2)*

The Contractor shall ensure that the excavations are protected at all times and adequately lit at night in terms of the Occupational Health and Safety Act. The Contractor shall provide, erect and maintain temporary road traffic signs that conform to the requirements of the "South

African Road Traffic Signs Manual" as published by the CSIR in positions where open cut road crossings are required.

No Traffic Management Plan shall be needed for this Contract.

An adequate number of warning lights and/or flagmen and appropriate barricades, clearly visible to oncoming traffic, shall be provided at all times. If steel drums are used, they shall be ballasted with soil, sand, or stones and shall be white on the outside with reflective material. Nothing will be allowed to be placed on top of the drums and shall be maintained in a clean and effective condition.

The Contractor shall:

i. Construct and maintain such temporary accesses, roads, walkways, bypasses and/or parking areas as may be required to safely accommodate vehicular and pedestrian traffic from portions of the road affected by construction.
ii. Provide and maintain across-trench access to all stands and properties at all times.
iii. Where half-width construction is approved or appropriate, arrange his work that the traffic will at all times have free one-lane access to at least half the width of the roadway.
iv. Whatever possible, where half width construction is used, ensure that the whole road is open at night and to a good and safe trafficable condition
v. Ensure that the usable width of the road or by-passes is at least 6m for two-way traffic or at least 4m per lane for single-lane traffic.
vi. Provide measures, to the satisfaction of the Engineer, to control dust nuisance for the duration of construction, these measures may include, but is not limited to, spraying of water or placing of asphalt to the appropriate thickness.
vii. Maintain such by-passes for the duration of construction to a condition fit to safely accommodate road traffic.
viii. Demolish such by-passes on completion of construction and reinstate the area to its original condition on completion of construction.

PSA 5.11 Protection of Railway line until Construction in Vicinity is Complete

The Contactor shall ensure that any railway line along the pipeline route shall be protected during construction. The Contractor is to ensure that the owner SPOORNET, Infrastructure Maintenance, P.O Box 30943, Braamfontein, 2001, OR the relevant office in Gauteng, are informed of the work to take place and to hand over the infrastructure in the same condition that they receive it.

PSA 5.12 Discontinue operations and transfer plant, equipment and labour

The construction of the SL1 pipeline will ideally commence at chainage 0m and terminate at chainage 6020m. Should the Contractor regard that more working fronts are required in order to complete the work on time, it should be qualified at tender stage.

When the construction operations are under way the construction train will extend from the forward site clearing and setting out activities followed the excavation of pipe trenches, the trench floor and pipe bed preparation, the pipe laying operation, by final backfilling, construction of the valve chambers and structures and the cleaning up and reinstatement of the working space.

The tendered rates should be based on continuous progress of all necessary operations taking into account plant, equipment, accommodation and labour movements at crossings

of roads, streets, railways, canals, streams, watercourses, various services and a reduced rate of advance in soils which have a low shear strength and in wetland areas.

Should it become necessary to discontinue the excavations and/or pipe laying at a point along the route of the pipeline out of the sequence prescribed above and to recommence at another point the Contractor shall on the instructions of the Engineer transfer his operations, including supervision, accommodation and supply system to the new point and continue in the rearranged sequence. Items are included in the Bill of Quantities to cover transfers not foreseen and allowed for in the sequence set out above.

Note: This excludes moving where rock is encountered along the trench route.

PSA 5.13 Moving of equipment over road crossings and railway lines

Concrete sleeves are to be jacked under specified roads as part of this Contract. The Contractor will have to move his equipment around or over these features in order to make connections to these jacked pipe crossings. No additional payment will be made for these moves.

PSA 5.14 Continue operations in confined and reduced working space width

At the start, along and at the end point of the SL1 Pipeline the pipeline will cross and run parallel to several existing Rand Water pipelines. No construction vehicle traffic or any other traffic will be allowed to travel on or closer than 5m from the centreline of these existing pipelines.

No construction vehicle traffic or any other traffic will be allowed to travel on or closer than 5m from the centreline of these pipelines. No additional loading will be allowed on these existing pipelines due to material storage, stockpiling of materials, etc.

The Contractor will limit or confine construction operations to a reduced working space as per the Engineers instruction up to a minimum of 9m wide. The Contractor shall on the instruction on the Engineer confine all his operations, to a reduced working strip and continue all operations in this manner up to a point indicated by the Engineer.

PSA 8 MEASUREMENT AND PAYMENT

PSA 8.3.5 Health and Safety Plan

The sum shall cover the Contractor's cost to provide a health and safety plan as well as any additional safety measures and/or appointments as may be required in terms of PS 10 and PS 11 or as ordered by the Engineer. Separate payment will be made for the fixed-charge and time-related components of the cost in terms of Clause 8.2 of SANS 1200 A.

---------- Unit: Sum

PSA 8.3.6 Environmental Management Plan

The sum shall cover the Contractor's cost to comply with the requirements of the Environmental Management Plan (See PS12) as well as any additional safety measures and/or appointments as may be required in terms of PS 10 and PS 11 or as ordered by the Engineer. Separate payment will be made for the fixed-charge and time-related components of the cost in terms of Clause 8.2 of SANS 1200 A.

---------- Unit: Sum

PSA 8.3.7 Department of Public Works (If Applicable)

The sum shall cover the Contractor's cost to comply with the specifications of the Department of Public Works, PW34: Appropriate Development of Infrastructure on Dolomite: Manual for consultants, as well as any additional safety measures and/or appointments as may be required in terms of PS 10 and PS 11 or as ordered by the Engineer.

----------Unit: Prov. Sum

PSA-8.7 Dayworks

Day works are covered in a separate Particular Specification and are therefore measured in dedicated section.

PSA 8.8.2 Accommodation and Temporary Deviation of Traffic

The sum shall cover the cost to supply and operate plant and machinery, supply and place materials and other measures and cost of labour for the deviation/accommodation of traffic to comply with all requirements as described in PSA 5.10. Separate payment will be made for the fixed-charge and time-related components of the cost in terms of Clause 8.2 of SANS 1200 A.

---------- Unit: Sum

PSA 8.8.3 Protection of Railway line until Construction in vicinity is complete

The sum shall cover the cost to supply and operate plant and machinery, supply and place materials and other measures and cost of labour for the deviation/accommodation of traffic to comply with all requirements as described in PSA 5.11.

---------- Unit: Sum

PSA 8.8.7 Dealing with Water

The sum shall cover the cost to keep the pipe trench, jacking's and excavations free from water at all times during construction.

---------- Unit: Sum

PSA 8.8.8 Discontinue operations and transfer plant, equipment and labour

The rate to discontinue operations at a point along the route of the pipeline and transfer plant, equipment and labour to a new point, shall include everything necessary to close down in sequence the various operations in the construction train and transfer them in sequence to the new point.

The Bill of Quantities includes items for a transfer over a plant and equipment route distance of up to 2km and a transfer over a route distance exceeding 2km. For purposes of classification the distance shall be measured along the shortest practical route along which the plant and equipment can be transported.

The rate shall cost the cost to comply with all requirements as described in PSA 5.12.

---Unit: No

PSA 8.8.9 Moving of equipment over road crossings and railway lines (If Applicable)

No additional payment will be made for moving equipment around or over these features in order to make connections to these pipe crossings.

PSA 8.8.10 Protection of road surfaces

The rate shall include for selecting, transporting and spreading suitable material in the 300mm thick protective layer and maintaining it while the excavation of the trench, installation of the pipe and backfilling operations are in progress. The rate shall also include the collection into piles, loading the material and the final cleaning of the road surfaces. Separate payment will be made for the fixed-charge and time-related components of the cost in terms of Clause 8.2 of SANS 1200 A.

---Unit: m^2

PSA 8.8.11 Standing time

The rate shall include for overheads, plant charges, wages and all other costs incurred when the Contractor is unable to carry out the work of the contract, for reasons beyond his control.

---Unit: Days

PSA 8.8.12 Continue operations in confined and reduced working space width

The work will be measured by length over the distance that the work has to be carried out within a confined and reduced working space width.

The rate shall cover the cost of confining or limiting operations at a point along the route of the pipeline to a reduced working space width as instructed by the Engineer to a minimum of 10 m wide, including transfer of plant, equipment and labour and shall include everything necessary to confine the various operations in the construction train and continue the operations as required.

The Bill of Quantities includes for confined operations to be carried out over a route distance of up to 5 km in length. For purposes of classification the distance shall be measured along the shortest practical route along which the plant and equipment can travel.

The rate shall comply with all requirements as described in PSA 5.14

---Unit: m

PSA 8.9 Freehaul and Overhaul

Notwithstanding any clauses in any Standardized Specification or any Particular Specification or Standard Specification Section dealing with the definition, measurement and/or payment for transport, freehaul and/or overhaul, no measurement or payment for overhaul will be made. All haulage will be considered to be freehaul and the cost thereof will be deemed to be covered by the rates for the provision or disposal of the applicable material.

PSA 8.10 Specified Work Activity

The specific work activity identified in the Bill of Quantities, will be measured in the unit scheduled in the Bill of Quantities.

The sum or rate for such work activity:

- Shall cover the cost of all materials, labour and plant required to execute and complete the work activity as specified or described in the Bill of Quantities or as shown on the drawing(s), and/or, where appropriate, shall
- Cover the cost of all requirements and obligations with respect to the work activity as specified or described in the Bill of Quantities.

PSA 8.11 Cost of Health and Safety

The payment items for Occupational Health & Safety are contained in the Commercial Part of the Tender Document i.e. Bill of Quantities. A pro-forma BOQ is given below as a guide to the items the Contractor should allow for in his pricing.

Item	Description	Unit
Preparation of Contractor's Site Specific Health and Safety Plan	The rate for this item must cover all expenses incurred in preparing the Contractor's project specific Health and Safety Plan as required by the Client's Site specific Health and Safety Specification in this document	Lump Sum
Principal Contractor's initial obligations in respect of the Occupational Health and Safety Act and Construction Regulations	The full amount will be paid in one instalment only when the Client's Agent has verified and approved the following (a) The Principal Contractor has notified the Provincial Director of the Department of Labour in writing of the project, Annexure A to the Regulations. (b) The Principal Contractor has made the required initial Appointments of Employees and Contractors. (c) The Client has approved the Principal Contractor's project Health and Safety Plan. (d) The Principal Contractor has set up his Health and Safety File.	Lump Sum
Principal Contractor's time related obligations in respect of the Occupational Health and Safety Act	The amount shall represent full compensation for that part of the Principal Contractor's general obligations in terms of the Occupational Health and Safety Act and Regulations which are mainly a function of time. Payment will be made when the Client's Agent has verified the Principle Contractor's compliance as part of	Month

Item	Description	Unit
and Construction Regulations	the audit. This will include the updating and administration of the Health and Safety file	
Provision of Personal Protective Equipment (PPE)	The rates for these items shall include for the procurement, delivery, storage, distribution and all other actions required for the supply of PPE to the employees of the Principle Contractor, full or part time, requiring them. Contractors are responsible for their own costs in this regard. Any items of PPE not included on the list will be paid for only after the Engineer has agreed to their acquisition. Items listed will include, among others which may be noted, are: hard hats, reflective vests, reflective bibs, high visibility overalls, protective foot wear, fall arrestor harness and tethers, gloves, ear muffs, earplugs and dust masks of appropriate type. Normal items such as standard overalls, waterproof clothing, gum boots and standard workshop safety equipment such as welding masks and goggles will not be paid for. Payment will be based on the issues register for PPE as kept by the Construction Health and Safety Officer, backed up by paid invoices if requested.	Lump Sum
Provision of full time Construction Health and Safety Officer	The Tender sum shall include for the cost of a Construction Health and Safety Officer on a full time basis, his overheads, transport and all others items necessary for the proper carrying out of his duties, which include the induction and training of all persons on site. If a part time safety officer is appointed, by agreement with the Employer, then the amount Tendered will be prorated according to the amount of time spent on the project.	Lump Sum
Costs of Medical Surveillance	This item shall covers all costs in involved in the obtaining of baseline, periodic (at least annually) and exit medical certification and conducting medical surveillance for all workers and especially operators of Construction vehicles and mobile plant as contemplated in CR 21(d) (ii); Workers at Heights, Regulation 8 (2) (b) of the Construction Regulations and Workers exposed to hazardous chemicals including bituminous fumes under Regulation 7 of the HCSR; for temporary workers and workers exposed to noises at or above the limits given in the Noise-induced Hearing Loss regulations, as stipulated above. Workers in the permanent employ of the Contractor will only be paid for if their certificates require updating. Chest x-rays will be required in the case of workers who may be exposed to high concentrations of dust (silica). **C.06 a)** Initial (baseline) medical examinations, including audiometric and lung function testing. **C.06 b)** Periodic examinations	Lump Sum

Item	Description	Unit
	C.06 c) Exit examinations	
Induction Training	This item shall cover all costs incurred for the health and safety inductions as set out on Regulation 7 of the Construction regulations and the proof of induction required. Payment will be made on the figures contained in the induction section of the Health and Safety File.	Unit
Provision of First Aid Boxes including emergency safety equipment such as fire extinguishers	The rate for this item shall cover all costs incurred in the provision and maintaining of first aid boxes as well as other emergency safety equipment which includes, but will not be limited to the provision of fire extinguishers.	Unit
Transportation of Workers	The Lump sum tendered under this Item shall cover all costs involved in the safe transportation of workers as outlined above. Payment will be made in equal amounts for the duration of the contract.	Lump Sum
Welfare Facilities	Adequate toilets and hand washing facilities, clean, safe drinking water, sheltered eating facilities, showering and changing facilities for each sex	Lump Sum
Occupational Hygiene Surveys	The lump sum tendered for this item shall cover the costs of the anticipation, recognition, evaluation, control and prevention of hazards from work that may result in injury, illness, or affect the wellbeing of workers. These hazards or stressors are typically divided into the categories biological, chemical, physical, ergonomic and psychosocial.	*Lump Sum*
Training	The Lump sum tendered under this Item shall cover all costs involved in Occupational Health and Safety Training Requirements: (as required by the Construction Regulations and as indicated by the SHE Specification Document & the Risk Assessment/s and recommendations by the Health and Safety Committee.	Lump Sum
Security requirements	The Lump sum tendered under this Item shall cover all costs involved in providing a Security Guardhouse for security guards on-site with ablution facilities where appropriate, a Visitor's register and Occurrence. Two way radio or cell phone to report emergencies to the relevant authorities, site safeguarding and full security uniform worn at all times.	Lump Sum
Employee Wellness Programs	This item shall cover costs of programs implemented improve the health of the labour force, mentally, physically and socially.	Lump Sum
Submission of the Health and Safety File (hard and soft copies)	Expenditure under this item shall be made in accordance with the general conditions of contract. This amount will be paid only once the Principal Contractor has met all his obligations in respect of the Occupational Health and Safety Act and the Construction Regulations and has submitted his Health and Safety File complete as envisaged on this specification to the Client's satisfaction.	Lump Sum

PSA 8.12 Cost of Environment

The payment items for Environmental issues are contained in the Commercial Part of the Tender Document i.e. Bill of Quantities. A pro-forma BOQ is attached to this SHE Specification as a guide to the items the Contractor should allow for in their pricing.

Item	Description	Unit
Signage	The rate for this item must cover all expenses incurred in preparing signage at the entrance of the site offices indicating the following information • The contractor's contact numbers • Authorisations details • ECO details • Emergency numbers and provision for: – snake removal, bee removal, fire, large hydrocarbon spillages, sewerage spillages Signage measuring 30mmx30mm must also be made available for no go areas.	Lump Sum
Pollution prevention	The rate for this item shall include costs for Identification and reduction or elimination of activities, areas, or processes which create excessive waste products or pollutants. It shall include but not be limited to the provision of adequately serviced ablution facilities, Screening for unsightly works and water cart/s for adequately watering down the site.	Lump Sum
Erosion control and silt management	The amount shall represent the costs associated with the practice of preventing or controlling wind or water erosion during construction. The erosion control measures must effectively prevent water pollution, soil loss, wildlife habitat loss and human property loss. The rate shall also include the costs of silt control where devices shall be designed to keep eroded soil on a construction site, so that it does not wash off and cause water pollution to a nearby stream, river, lake, or dam.	Lump Sum
Work in sensitive areas	The Tender sum shall include for the cost associated with the protection of areas where the natural environment can easily be harmed. Control measures will be as indicated in the EMPr.	Lump Sum
Waste disposal provision	The Tender sum shall include for the cost for proper disposition of discarded or discharged material where it be hazardous or non-hazardous waste, in accordance with local environmental guidelines or laws.	Lump Sum
Administration and documentation	The rate for this item must cover all expenses incurred in the preparing and maintenance of an environmental file which includes but will not be limited to permits and licenses, EMPr, Environmental audit reports, Complaints register, Agreements with landowners, Noncompliance notifications, Waste disposal documentation, Safety data sheets for all chemicals	Lump Sum

PSA 8.13 Skills Development Program

The sum shall cover the Contractor's cost to provide a skills development program that addresses the skills capacity of the workforce and also other members of the community who may

not necessarily form part of the project workforce but will benefit from training program that may aid their marketability in general or as ordered by the Engineer. Accredited training program are targeted which will provide the beneficiaries with significant and recognized credit value in accordance with the National Qualification Framework (NQF). Non-accredited training program are not encouraged as the aim is to have significant, measurable and sustainable impact.

---------- Unit: Prov Sum

PSA 8.14 Corporate Social Responsibility Program

The sum shall cover the Contractor's cost to addresses a specific community need such as educational, health, economic and other social needs. It is important to carefully structure a social responsibility program that will ensure effective delivery to address the identified community needs in a significant and sustainable manner or as ordered by the Engineer.

---------- Unit: Prov Sum

PSA 8.15 Community Liaison Officer

The sum shall cover the Contractor's cost to provide a community liaison officer for the duration of the program. A key component in aiding the realization of the SED objectives is effective community liaison with all the relevant role-players, structures, civic organizations and the community at large.

---------- Unit: Prov Sum

PSA 8.16 As built

The sum shall cover the Contractor's cost of all materials, labour and plant required to execute and complete the work activity as specified under PS 13, in the technical specifications or described in the Bill of Quantities or as shown on the drawing(s), and/or, where appropriate, shall cover the cost of all requirements and obligations with respect to the work activity

Add the following for Sludge lines:
"The contractor shall provide additional drawings, csv/txt files for the precise location of flanges along the run of the pipeline. Accuracy should be as close to 0.1 metres (X, Y, Z)"

---------- Unit: Sum

PSAB ENGINEERS OFFICE (SABS1200AB-1986)

PSAB 3 MATERIALS

PSAB 3.2 Office Building(s)

Delete the first sentence and substitute the following:

The Contractor shall supply and furnish two air-conditioned “Kwikjack” or similar (6m x 3m) removable offices for the use of the Engineer and his/her staff, and one air-conditioned “Kwikjack” (9m x 3.4m) conference facility for conducting meetings.

Add to the Sub-clause:

In addition to the furnishings listed under sub-items (a) to (i), the following shall be provided and properly maintained:

(j) electrical installation (per office) to include sufficient fluorescent lighting and three 15A plug points, plus two adequately sized air conditioning units (for heating and cooling) for each unit;
(k) covered parking for five vehicles
(l) un-covered parking space for two vehicles
(m) two “Barhold” or similar wall mounted racks each with 6 clamps suitable for hanging A0 sized drawings
(n) one large conference table (not plastic)
(o) ten additional chairs
(p) additional two desks having a top of size at least 1,5m x 0,9m and at least one lockable drawer per unit;
(q) acceptable venetian blinds for all windows;
(r) microwave oven;
(s) white boards (3m x 2m) with four colour markers per Office / Conference Facility;
(t) two pin boards (2m x 1m) per Office / Conference Facility;
(u) one refrigerator of at least 315 litre capacity;
(v) one kettle of at least 2 litre capacity, one tea / coffee set comprising six cups and saucers, six mugs, six teaspoons, one teapot, one sugar bowl and one milk jug
(w) Fire extinguisher 9,0kg all purpose (per office and conference facility)

PSAB 4 PLANT

PSAB 4.1 Telephone

Delete sub-clause and substitute the following:

A cellular phone, Samsung Galaxy S8 or similar approved, shall be provided by the Contractor for the sole use of the Engineer’s Representative. The Contractor will be required to pay the connection charges, service fees, rent, insurance’s, operation and maintenance costs, including all consumption and call charges with regard to the above, with the provision that the total cellular phone call charges do not exceed R1000.00 per month.

PSAB 4.2 Survey Equipment (New Clause)

Add new Sub-Clause:

The Contractor shall provide the following survey equipment on the Site for use by the Engineer from the commencement to the completion of the Works:

- One automatic reading Engineer's level plus tripod;
- One levelling staff (5m long, 1 cm graduations);
- One staff angle bubble;
- One metal change-point for levelling;
- One separate plumb-bob;
- One spirit level (one metre long);
- One hammer (2kg) with steel or wooden pegs as necessary;
- One 50 m steel tape;
- One 5,0 m (or longer) retractable steel tape.

The Contractor shall keep the equipment continuously insured against any loss, damage, or breakage and he/she shall indemnify the Engineer and the Employer against any claims in this regard. Upon completion of the Works the survey equipment as listed above shall revert to the Contractor.

The Contractor shall maintain the equipment in good working order and keep it clean until the completion of the Works. The Engineer's level is to be calibrated at an accredited facility on a quarterly basis.

PSAB 5 CONSTRUCTION

PSAB 5.2 Engineer's Office

Add to the Sub-Clause:

The toilet facilities provided for the sole use of the Engineer or his/her representative(s) shall be of the chemical type, maintained in a hygienic and sanitary condition and shall be removed on completion of the Works. The facilities provided shall conform to the local health authority's requirements as applicable and the Contractor shall pay all sanitary fees and charges.

PSAB 5.4 Telephone

Delete the sub-clause.

PSAB 5.5 Survey Assistants

Delete the first sentence and substitute the following:

The Contractor shall make available to the Engineer two suitably qualified assistants (S2/S3) for full-time use on and about the site, on survey and other work associated with the project directed by the Engineer at all reasonable times.

PSC SITE CLEARANCE (SABS 1200C-1980)

PSC 5 CONSTRUCTION

PSC 5.1 Areas to be Cleared and Grubbed

Only the approved minimum area required for the execution of the Works, including areas on which material shall be stockpiled for later reuse or on which material shall be dumped and spread, shall be cleared and grubbed.

Where excavations are required under existing concrete or bricked paved areas, the existing concrete surfacing shall be neatly cut with a suitable blade and the concrete or brick surfacing shall be carefully removed, stacked and cleaned for reuse. Where excavations take place under road surfaces, the bitumen surfaces shall be neatly cut with a suitable blade and the surfacing material removed within the limits of the excavation and discarded at the disposal site.

For pipe trenches, generally a sufficiently wide strip equal to the trench width plus the estimated allowance for trench side slopes plus the width of the stockpiled backfill, bedding and topsoil materials (Where relevant) and a 600 mm width (Which shall be maintained alongside the trench) plus the width of access to the trench, shall be cleared. The area to be cleared shall also allow for working space for a pipe laying platform, an access road, pipe storage strip and pipe storage mounds alongside the trench for pipe laying operations.

PSC 5.6 Conservation of Topsoil

Topsoil to a depth of 150mm, if available, shall be removed from the areas to be cleared and grubbed and stockpiled on approved sites for later use. Until required for later use, the stockpiles of topsoil material shall be stabilized by watering or other approved means

PSC 5.9 Clear and grub site for trench construction

See PSC 5.1.

PSC 5.10 Remove and grub large trees and tree stumps of girth over 1m

As far as practical, trees are to remain in position. The Contractor may remove trees that prevent access or construction with the prior approval of the Engineer. Large trees within the road reserve must be carefully removed and planted at a temporary site for later replanting by others on completion of the installation of the pipeline (See PS2.6)

PSC 8 MEASUREMENT AND PAYMENT

PSC 8.2.10 Remove topsoil to nominal depth of 150mm and stockpile

The rate tendered for the removal of insitu topsoil shall, in addition to the items listed in Subclause 8.10.2, also cover the cost of stabilizing and protecting the stockpiles of topsoil.

PSC 8.2.11 Dealing with Fences and Walls

The rate shall cover the cost of all activities, plant, material, and labour time to comply with the requirements as set out in section PS 9.5 (Section C3 – Portion 1). This shall cover the protection and re-erection of fences and walls as specified in the Bill of Quantities.

---------- Unit: m

PSC 8.2.12 Crossing Fences or Walls

When it is necessary to cross a fence/wall a 5m wide double gate is to be installed in the existing fence and 20m of fence is to be refurbished as shown on Drawing **A4085**. The rate shall cover the cost of all activities, plant, material, and labour time to comply with the drawing requirement.

----------Unit: No

PSC 8.2.13 Fire breaks

Measurement will be in square metres over the area instructed by the Engineer.

----------Unit: Sq. m

PSC 8.2.14 Supply and erect fences and gates for working strip

It is necessary to protect the working area from public and animals. Hence, prior commencing works, 1.8m high cattle proof temporary fence shall be erected on both sides of the temporary working strip or servitude with gates. The rate shall cover the cost of all activities, plant, material, and labour to erect and dismantle the fence and gates for reuse.

----------Unit m

PSDA EARTHWORKS (SMALL WORKS) (SABS1200DA-1989)

PSDA 5 CONSTRUCTION

PSDA 5.2.6 Freehaul and Overhaul

See PS18 and PSA 8.9

PSDA 8 MEASUREMENT AND PAYMENT

PSDA 8.3.3 Overhaul

See PS18 and PSA 8.9

PSDA 8.3.9 Survey of Surrounding Structures before Blasting/Demolishing (New Sub-Clause)

The rate shall cover the cost to examine and measure up any buildings, houses or structures in the vicinity of the proposed blasting/demolishing and establish and record together with the owners thereof the extent of cracking or damage that may exist before commencement of blasting operations.

---------- Unit: Sum

PSDA 8.3.10 Photographic Record (New Sub-Clause)

The rate shall cover the cost of providing a photographic record of neighbouring structures before blasting/demolishing commences.

---------- Unit: Sum

PSDB EARTHWORKS (PIPE TRENCHES) (SABS1200DB-1989)

PSDB 5 CONSTRUCTION

PSDB 5.6.8 Transport for Earthworks for Trenches

See PS 18 and PSA 8.9

PSDB 5.11 Shoring

The Contractor shall have shoring materials on site at all times for additional shoring as being ordered by the Engineer. Shoring shall be installed and maintained in the positions and for the duration as approved by the Engineer and in accordance to the relevant rule of law and latest version of the Construction Regulations and Occupational Health and Safety Acts. The responsibility lies with the Contractor to ensure excavation works are deemed safe for human occupation during construction activities

PSDB 5.12 Soft Materials and Rock

The material is classified in the price schedules under 2 headings, i.e. soft material and rock and the following shall be determining factors in the classification of the material:

Soft Material: shall mean all material not classified below, and shall include all material that is pickable and can be excavated by machinery or appropriate capacity and power for the rate of excavation required, including hard clay, ouklip, calcareous material and sort rock that has not been consolidated into a hard un-pickable mass, and closely to medium jointed andesites. No intermediate material will be classified.

Rock: shall mean all rock that is partially jointed or un-weathered and shall include oxidised hard shale, hard fireclay, hard coal conglomerate, hard homogenous ouklip, granite, quarts, dolomite, etc or materials of similar hardness which in the opinion of the Engineer can only be removed by drilling and blasting. Solid boulders in excess of 0,5 m^3 shall be classified as rock.

PSDB 8 MEASUREMENT AND PAYMENT

PSDB 8.3.2. (b)(1) Extra-over item (a) above for 1) Intermediate excavation

No intermediate excavation will be classified.

PSDB 8.3.2. (b)(2) Extra-over item (a) above for 2) Hard rock excavation

Hard rock excavation shall be classified as per SABS 1200 D 3.1.2(c).

The decision of the Engineer as to the classification of the material shall be final and binding and any objection to the classification shall be made before the trench is backfilled. The quantities listed in the Bill of Quantities are purely provisional and payment will be made on the actual volume of each class of material as determined after the trench has been opened.

---------- Unit: m^3

PSDB 8.3.3.1(d) Make up deficiency in backfill material – sieve from excavated material

The Engineer may instruct the Contractor to sieve excavated material to make it suitable for backfill or bedding.

---------- Unit: m^3

PSDB 8.3.3 Excavation ancillaries

PSDB 8.3.3.3 Compaction in Road Reserves

Delete the heading and substitute:

Compaction in areas subject to road traffic

(a) Under roadways to 93% MOD AASTHO---------- Unit: m^3

(b) Elsewhere to 93% MOD AASTHO---------- Unit: m^3

PSDB 8.3.3.4 Overhaul

See PS 18 and PSA 8.9

PSDB 8.3.6.2 Top soiling

Add the following clause. The rate shall cover the cost of excavating from stockpiles (See clause 8.3.1(c) of SANS 1200 DB), hauling and spreading in terms of SABS 1200DA 5.2 to a compacted depth of 300mm.

---------- Unit: m^2

PSDB 8.3.5(b) Services that adjoin a trench: Overhead Power Cables

The rate shall cover the cost of all measures to be taken in order to comply with all requirements of the relevant authorities to protect the service from damages, to ensure the stability of the poles and cables and to ensure the safety of the labourers, the public or any other person for the duration of construction.

---------- Unit: m

PSDB 8.3.5(b) Services that adjoin a trench: Overhead Telephone Cables

The rate shall cover the cost of all measures to be taken in order to comply with all requirements of the relevant authorities to protect the service from damages, to ensure the stability of the poles and cables and to ensure the safety of the labourers, the public or any other person for the duration of construction.

---------- Unit: m

PSDB 8.3.5(b) Services that adjoin a trench: Underground Telephone Cables

The rate shall cover the cost of all measures to be taken in order to comply with all requirements of the relevant authorities to protect the service from damages, and to ensure the safety of the labourers, the public or any other person for the duration of construction.

---------- Unit: m

PSDB 8.3.8 Excavate by hand

The rate shall cover the cost of labour for hand excavation to expose all services in soft material. Measurement will be in cubic metres to the length and levels as instructed by the Engineer.

---------- Unit: m^3

PSDB 8.3.9 Backfill with soil cement fill

The rate shall be for the supply of cement, mixing, placing and compaction of the material. The soil shall be selected from the trench excavation. Measurement will be in cubic metres to the length and levels instructed by the Engineer or as detailed on relevant Drawings.
---------- Unit: m^3

PSDB 8.3.10 Backfill the trench and other excavations with crusher run material

The rate shall include for the supply and placing of the material as specified in the Bill of Quantities or indicated on the Drawings. Measurement will be in cubic metres to the length and levels instructed by the Engineer or as detailed on relevant Drawings.
---------- Unit: m^3

PSDB 8.3.11 Placing of geotextile filter blanket

The rate shall include for the supply and placing of the geotextile as specified in the Bill of Quantities or indicated on the Drawings. The rate shall include for losses as a result of overlaps (200 mm minimum) and over-excavated trench widths. Measurement will be in square metres.
---------- Unit: m^2

PSDB 8.3.12 Excavate to expose existing steel pipes, backfill and compact

(a) Excavation in all material to completely expose existing steel pipe in preparation for cross connection installation and inline valve installation:

(i) For total excavation depth not exceeding 1,0m
---------- Unit: m

(ii) For total excavation depth exceeding 1,0m but not exceeding 2,0m
---------- Unit: m

The rate shall be for excavation in all materials to expose the existing pipe for cross connection installation and inline valve installation. The excavation shall be excavated by a combination of mechanical and manual means that will avoid damage to the pipe

PSDB 8.3.13 Testing

Provisional sum for additional geotechnical investigations (including analysis of bedding, compatibility tests, etc) by nominated specialists, where ordered by the Engineer.
----------Prov. Sum:

PSDB 8.3.12 Kerbing

Provisional sum for reinstatement of kerbing as ordered by Engineer
----------Prov. Sum:

PSDB 8.3.12 Reinstatement of surfaces

Provisional sum for reinstatement of surfaces as ordered by Engineer
----------Prov. Sum:

PSGA CONCRETE – SMALL WORKS (SABS1200GA-1982)

SEE CIVIL TECHNICAL SPECIFICATIONS

PSHA STRUCTURAL STEELWORK (SUNDRY ITEMS) (SABS1200HA-1990)

SEE CIVIL TECHNICAL SPECIFICATIONS

PSLB BEDDING – (PIPES) (SABS1200LB-1983)

PSLB 8 MEASUREMENT AND PAYMENT

PSLB 8.1.3 Volume of Bedding Materials

Add the following to LB 8.1.3
a) The volume calculated for bedding material shall exclude the volume pipe.

PSLB 8.1.6 Freehaul

See PS 18 and PSA 8.9

PSLB 8.2.1 Provision of Bedding from Trench Excavation

Delete the two paragraphs “The rate shall cover...” and “... around the pipeline.”” and replace with the following:
The rate shall cover the cost of acquiring, from the pipeline excavation, bedding material that complies with the relevant requirements of the specification and of delivering it to points alongside the trench spaced to suit the Contractors methods of working. The rate shall also cover the cost of handling bedding material from alongside the trench and placing it under and around the pipe.

---------- Unit: m^3

PSLB 8.2.2.2 From borrow pits

Amend Sub-Clause LB 8.2.2.2 to read as follows:
The rate shall cover the cost of acquiring the required bedding material, that complies with the relevant requirements of the specification, from borrow pits selected by the Contractor (subject to approval by the Engineer) and of delivering it to points alongside the trench spaced to suit the Contractors methods of working. The rate shall also cover the cost of handling the bedding material from alongside the trench and placing it under and around the pipeline.

---------- Unit: m^3

PSLB 8.2.2.3 From commercial sources

The rate shall cover the cost of acquiring the required bedding material, that complies with the relevant requirements of the specification, from commercial sources and of delivering it to points alongside the trench spaced to suit the Contractors methods of working. The rate shall also cover the cost of handling the bedding material from alongside the trench and placing it under and around the pipeline.

---------- Unit: m^3

PSLB 8.2.2.4 From commercial sources (In dolomitic zones where the trench floor is inadequate)

The rate shall cover the cost of acquiring the required bedding material, that complies with the relevant requirements of the specification, from commercial sources and of delivering it to points alongside the trench spaced to suit the Contractors methods of working and of disposing of displaced material. The rate shall also cover the cost of handling bedding material from alongside the trench and placing it under and around the pipeline.

---------- Unit: m^3

PSLB 8.2.5 Overhaul

See PS 18 and PSA 8.9

PSLG PIPE JACKING (SABS 1200 LG – 1983)

PSLG 2 INTERPRETATIONS

PSLG 2.3 Definitions

Add the Sub-Clause:

The Works. All the components making up the entire jacking operation including construction of both thrust and reception pits as well as the excavation, placing and jacking of the pipes together with all support activities.

PSLG 3 MATERIALS AND WORKMANSHIP

PSLG 3.1 PIPES FOR JACKING

Delete the Sub-Clause and substitute with the following:

Pipes for jacking shall be SC Type reinforced concrete manufactured in accordance with SABS 677: Concrete Non Pressure Pipes as published in General Notice 463 of 9 July 1982 to the D load specified on the drawings. All pipe joints shall be sealed. The actual diameters of the pipes shall not be less than the nominal diameters given on the drawings or stated in the schedule.

In addition to withstanding the specified two (or three), edge bearing test-load, the pipes shall be capable of withstanding, without damage during jacking, the maximum longitudinal force to be transmitted by the Contractor's jacks and method of operation.

The design of the pipes shall be determined by the Contractor to suit the proposed method of construction but shall not be less than the class of pipe or type of pipe stated on the drawings or determined by the Engineer. The pipes shall incorporate extended modified Ogee type joints which shall be seated by means of a rubber ring. On longer pipe jacks it may be necessary to use a rebated butt joint to withstand the higher jack forces. However, the decision of type of joint to use is that of the Contractor. Irrespective of joint type used the Contractor must adhere to the joint sealing details given in PSLG 3.1.2 below.

At least one hole shall be formed in the crown of each pipe to allow for the injection of both a lubricant, if required, and a final grout. The final layout of grout holes is the Contractor's responsibility.

The Contractor must ensure that the pipes shown on the drawings and mentioned in the documents can be jacked the full distance mentioned in the Scope of Work.

PSLG 3.1.1 Intermediate Jacking Pipes (New Sub-Clause)

In circumstances where it is desirable to use jacking pipes intermediate between manholes or junctions the number and type of such intermediate jacking pipes is to be determined by the Contractor. The joint between pairs of intermediate jacking pipes shall be protected externally by a cylindrical mild steel sleeve of wall thickness at least 8mm, which shall overlap the pipes on either side of the joint for a distance of at least 150mm. The joint is to allow a substantial and permanent caulked seal within the joint.

PSLG 3.1.2 Joints and Seals (New Sub-Clause)

It is the Contractor's choice as to type of joint used in the pipes to be jacked. However, applied forces used to jack the pipes must be uniformly distributed around the joint to avoid damaging the joint. Pipes that are delivered to site with damaged joints must be rejected by the Contractor.

A seal is required at each joint to minimise ingress of water. Ingress of water into the jacked pipes stemming from the joints should not exceed 5 litres per minute in total. The chipboard packing used to distribute stresses on the joints should be raked out to a depth of 25mm on the inside all round and sealed with a durable flexible sealing agent such as bituseal, thioflex or similar.

PSLG 5 CONSTRUCTION

PSLG 5.1.1 Authority to Jack Pipelines under Roads and Railway Lines

The Employer will obtain permission from the relevant authorities for jacking under roads and railway lines. However, the Contractor is to confirm that such permission has been granted before commencing work.

PSLG 5.1.2 Competence

Jacking and excavation shall be supervised and undertaken by persons fully conversant with this work.

PSLG 5.1.4 Contractor Solely Responsible

Add to the Sub-Clause:

No approval of any material or plant and its operation, or of any construction procedure to be used will imply any relaxation of the requirements governing the quality of the materials or of the finished work or relieve the Contractor of his/her responsibilities under the Contract.

PSLG 5.2.3 Recording of Movements

PSLG 5.2.3.1 General

Delete the Sub-Clause and substitute with the following:

The Contractor shall take movement measurements correct to 1,0mm and shall record any change in the line and level of road and railway line before the start of the Contract and at such intervals as directed by the Engineer for a period up to 12 months after the issue of the Completion Certificate. However, no more than 15 sets of reading will be required in this period. A copy of these measurement records shall be made available to the Engineer.

PSLG 5.2.3.2 Working under roadways

Add to the Sub-Clause:

The Contractor shall bear full responsibility for any consequential damage to persons and property resulting from subsidence.

PSLG 5.2.3.3 Working under railway lines (New Sub Clause)

Before jacking under railway lines the Contractor shall take elevation readings at the top (Crest) of the fill embankment and at the toe of the ballast as well as on top of each railway line along the centre line of the pipe jack and at intervals of 1 500 mm apart up to a distance of 9m from the pipe centre line. The profile of the railway embankment must be measured and recorded from toe to toe (of the embankment) before pipe jacking starts.

The intervals at which movement readings are to be taken over a period of 12 months is the same as mentioned above for roads (PSLG 5.2.3.1).

PSLG 5.2.3.4 Remedial Measures (New Sub-Clause)

All remedial measures will be carried out and completed to the standards set by the various controlling authorities.

Roads – Remedial measures plus time related professional costs needed to reinstate roads and fill embankments will be the Contractor's liability. Remedial measures are those relating to the need to put right settlement and movement of road surfaces, formation layers or fill embankments including providing all road safety markers, traffic control, or signs and al associated needs of the road authority to allow remedial work to proceed without danger to workers or traffic. The Contractor must arrange all matters regarding remedial work with the road authority. In most instances these measures will comprise jacking up concrete roads using grout and regrading to original elevation formation layers and premix surfacing as well as mending drainage fixtures where these have been damaged. All the remedial work will be directed by the Engineer to his/her satisfaction and approval.

Railways – Remedial measures plus time related professional costs needed to reinstate railway lines and fill embankments will be the Contractor's liability. Remedial measures are those relating to the cost of realigning railway lines, regrading of ballast, and stabilising fill embankments. All the remedial work will be directed by the Engineer to his/her satisfaction and approval. A provisional sum is given in the Bill of Quantities to cover the cost of strapping railway lines and provided for a signalman to activate speed deregulation.

PSLG 5.4 EXCAVATION

PSLG 5.4.1 General

Except as required in terms of 5.2.5 SABS 1200 LG 1983 the provisions of SABS 1200 DA shall apply.

PSLG 5.4.2 Thrust Pits

In the second paragraph, delete the words "Factories, Machinery and Building Work Act, 1941 (Act 22 of 1941)" and replace with the words "Occupational Health and Safety Act 1995"

Add to the Sub-Clause:

Claims arising out of any accidents or incidents in or adjacent to these access pits will not be considered by the Employer.

Stormwater control measures around these pits are also necessary to prevent water ingress into the pits. Provision must be made by the Contractor to keep both thrust and reception pits free of seepage and stormwater.

Thrust pits will in general only be permitted at positions indicated on the drawings or where manholes or junctions are required. Jacking pits shall be of sufficient size to accommodate

the jacking operation and any manhole structure to be constructed upon completion of the jacking. The approximate dimensions of the pits shall be agreed with the Engineer before work commences. The Contractor will be required to design and construct all thrust blocks, bases and other temporary Works required to maintain the stability of the pits and shall demolish and remove these upon completion of the jacking operation and the Contractor shall take into account all such limiting factors when preparing his/her tender.

PSLG 5.4.2.1 Intermediate Jacking Pits (New Sub-Clause)

In circumstances where it is desirable to use jacking pits intermediate between manholes or junctions indicated on the drawings, the number and type of such intermediate jacking pits is to be determined by the Contractor. Such intermediate jacking pits will only be permitted where conditions of access and working space permit.

Full details of the intermediate jacking pits and the junction box constructed as a closure between the ends of the jacked pipes are to be submitted with the tender.

PSLG 5.4.3 Jacking of Pipeline

PSLG 5.4.3.1 General

Add to the Sub-Clause:

A lead pipe with a rebated front end over which the trailing end of the shield is fitted should be the first concrete pipe used. This should minimise overbreak. The extent of the payment line for grouting between the outer face of the sleeve and the excavation face will be limited to 10% of the outside diameter of the sleeve. Therefore, the excavation payment line will be outside diameter for the different sections of sleeves.

No material may be removed in advance of the leading edge of the shield in unstable or loose materials.

As the pipe is advanced, excavation is to take place within the lead pipe under the full time supervision of a responsible foreman to ensure that the end of the shield is always fully plugged with earth at a safe angle of repose within the pipe. The Contractor shall ensure that there is not uncontrolled flow of sand, mud or earth into the pipe which could result in imperilling excavation personnel or the formation of cavities above or around the sleeve pipe. If at any stage during the jacking operation such conditions arise the Contractor shall immediately plug the pipe and stabilise the material before proceeding with further work.

Should it be necessary, the Contractor shall allow for stabilising the soil by dewatering, chemical grouting, or any other approved means. The design of the shield shall be such as to permit the face to be completely or partially closed by boarding or similar to control material flow from the face.

During weekend or holiday stoppages the Contractor must make sure that a plug of soil is left in the shield.

PSLG 5.4.3.6 Continuous Jacking (New Sub-Clause)

In order to minimize problems due to the build-up of skin friction on a static pipe, the pipes are to be jacked continuously unless agreed to otherwise with the Engineer, allowing for overnight stoppage.

PSLG 5.5 JACKING PROCEDURE

PSLG 5.5.1 Procedure

Add to the Sub-Clause:

Each jack shall be fitted with a pressure gauge suitable calibrated such that the actual jacking forces can be read at any time.

Suitable packing of hard materials shall be inserted between the abutting vertical ends of the pipes in order to transfer the jacking force. The packing shall constitute a complete circle and be sufficiently wide to transfer the applied load.

A suitable adjustable shield is to be fitted to the front of the lead pipe. The shield is to incorporate cutting edges which can be varied by control jacks to maintain the pipe on line and level.

Pipe jacking may generally be carried out either up-grade or down-grade to suit the Contractors requirements subject to the approval of the Engineer, and provided that provision is made by the Contractor for the necessary drainage required.

PSLG 5.5.2 Lubrication of Structure during Jacking

Add to the Sub-Clause:

To ease pipe friction, the Contractor shall make provision for the injection of bentonite or other approved lubricant.

PSLG 5.6.1 Backfilling (New Sub-Clause)

Both thrust and reception pits must be backfilled as per the Geotechnical report recommendation. Backfill compaction rates must not be less than 90 percent Modified AASHTO with the top 1,5m of backfill being compacted to a minimum 92% Modified AASHTO. The backfill must be built up to at least 500mm above the natural ground level to prevent stormwater pounding around the excavation pits.

PSLG 5.7 Grouting and Plugging

Add to the Sub-Clause:

The grout shall consist of cement/sand grout with mix ratio of 1:2 with plasticiser or as per the instruction.

PSLG 5.9 Markers (New Sub-Clause)

On completion of the pipe jacking activities the Contractor shall place standard Rand Water marker concrete posts at the start and end of each pipe jacking section. The marker posts shall be collected at the Rand Water Central Depot (located 10km south of the head office of Rand Water opposite the Zwartkoppies pump station), transported to site, offloaded, stored, and installed.

PSLG 5.10 Recording Jacking Parameters (New sub-clause)

Throughout the jacking operation the Contractor is requested to take and record the following measurements.

a) A plot of pressure (kN/m²) and total force (kN) originating from the combined force of all hydraulic jacks used to move pipes versus accumulative length of jacked pipe. As soon as a lubricant is used it must be recorded on the plot. If heavy ground water seepage is noted this must also be recorded on the plot. A time scale in days should also be used in conjunction with jacked length of pipe. It is also important to record start up force required to move pipes after a delay, i.e. after weekend.

b) The dimensions of the thrust block used must be recorded as well as the accumulative thrust force on the block (kN) together with lateral movement of the thrust block (mm).

A copy of these measurement records shall be made available to the Engineer.

PSLG 6 TOLERANCES AND MEASUREMENT

PSLG 6.2 Permissible Deviations

In the first line delete “100mm” and substitute with “50mm”.

PSLG 8 MEASUREMENT AND PAYMENT

PSLG 8.2.1 Jacking Establishment

In the second paragraph add the words “and any intermediate jacking pits” after the words “thrust and reception pits”.

PSLG 8.2.6 Supply and Install Pipes by Pipe Jacking Method, Complete with Excavations

Add to the Sub-Clause:

The rate shall include for grouting any voids around the pipe annulus which are a result of the pipe jacking operation.

PSLG 8.2.10 Standing Time for Pipe Jacking Gang and the Jacking Equipment

In the first paragraph, delete the words “Wage Act, 1957 (Act 5 of 1957)” and replace with the words “Basic Conditions of Employment Act No. 75 of 1997”.

PSLG 8.2.12 Permanent Sealing

The unit of measurement will be cubic meter of pipe from open end to open end.

The rate will include all labour, equipment and materials to rake out and place a flexible seal in the pipe joints.

PSLG 8.2.13 Brick Wall Closure

The unit of measurement will be the number per pipe diameter.

The rate shall cover all labour, materials and equipment used to construct the brick ends at the opening of all pipes.

PSLG 8.2.14 Geotechnical Investigation

a) Allow provisional sum for additional geotechnical investigation for pipe jacking purposes where ordered by the engineer (Prov.)
---Unit: Prov. Sum

b) Contractors mark-up on Item
---Unit: %

SOCIO ECONOMIC DEVELOPMENT SPECIFICATION

PSA 8 MEASUREMENT AND PAYMENT

PS SED1 Skills Development Program

The sum shall cover the Contractor's cost to provide a skills development program that addresses the skills capacity of the workforce and also other members of the community who may not necessarily form part of the project workforce but will benefit from training program that may aid their marketability in general or as ordered by the Engineer. Accredited training program are targeted which will provide the beneficiaries with significant and recognized credit value in accordance with the National Qualification Framework (NQF). Non-accredited training program are not encouraged as the aim is to have significant, measurable and sustainable impact.

---Unit: Sum

PS SED 2 Corporate Social Responsibility Program

The sum shall cover the Contractor's cost to addresses a specific community need such as educational, health, economic and other social needs. It is important to carefully structure a social responsibility program that will ensure effective delivery to address the identified community needs in a significant and sustainable manner or as ordered by the Engineer.
---Unit: Sum

PS SED 3 Community Liaison Officer

The sum shall cover the Contractor's cost to provide a community liaison officer for the duration of the program. The wages must be as stipulated in the relevant legislation or comparable with industry norms. A key component in aiding the realization of the SED objectives is effective community liaison with all the relevant role-players, structures, civic organizations and the community at large.
---Unit: Months

PART 3 - TECHNICAL SPECIFICATIONS

(REFER TO ATTACHED CD)

The following Technical Specifications are provided in the attached CD and form part of this tender and shall form part of the contract.

Technical Specifications
Work package 3A:
Technical Specification For Pipeline Excavation, Backfilling And Pipe Trenches And Pipe Laying, Special And Testing And Investigations And Returnable Schedules (TS)
RW-0310-AS-460- Specification for Sluice-, Air-, Reflux-, Butterfly-, Resilient Seal Gate- and Ball Valves and Powered Actuators.
Rand Water Civil Technical Specifications - (VG Sludge Pipeline Chamber Specification - Civil Technical Specification)
Rand Water Cathodic Protection System Technical Specification – Revision 7.5 (RW ELS 00001 TS)
Work package 3B:
As Above including the following discipline specific specifications:
Electrical System Specification And Returnable Schedules Rev 2 – RW10397155/21
Electrical Engineering Standard For Earthing And Suppression
Engineering Standard For The Control Of Plant And Equipment
Standard Specification For Factory Built Assemblies Of Low Voltage Switchgear And Control Gear
General Electrical Specification For The Installation Of Electrical Plant And Equipment
General Electrical Specification For Building Lighting And Small Power Installations
General Electrical Specification For The Design And Selection Of Electrical Plant And Equipment
Specification For Plant Codification Labels
Electrical Engineering Standard Rwb-Ees-002
Automation System Specification For RW10397155/21
Mechanical Scope RW10397155/21-Mech-Spec
Technical Specification For Electrically Operated Valves At Rand Water (RC01108)
Submersible Sump Pump Specification (RC 01100- Rev 2)
P.03743 VG to Panfontein Sludge Pipeline Connection At Central Sludge 2- Civil Project Specification
Civil Chamber Construction Specification

PART 4 – SHERQ SPECIFICATION

(REFER TO ATTACHED CD)

PART 5 - ENVIRONMENTAL MANAGEMENT PLAN ("EMP") & ENVIRONMENTAL AUTHORISATION ("EA") (WHERE APPLICABLE)

(REFER TO ATTACHED CD)

PART 6 - SITE INFORMATION

a) SITE LOCATION

Refer to the Locality Plan attached at the end of this document.

b) SITE BOUNDARIES

The Contractor shall confine his activities to the area in the vicinity of designated sites, and the actual boundaries of the site will be pointed out by the Engineer. The Contractor shall not extend his activities outside the boundaries unless the Engineer has specifically authorised the extension in writing

c) SITE ACCESS

A Site Access Certificate will be required before the Contractor is granted access to site. Please see Additional Particular Conditions of Contract for details of this certificate and where to obtain it.

d) POSSESSION OF SITE

The written order to commence the work will be deemed to give the Contractor possession of the site. In the event of any portion of the work or completion of the contract being delayed due to the Employer delaying the Contractor in taking possession of the site, an extension of time may be allowed by the Engineer. The Employer shall not be liable for any payment in respect of such delays.

e) ACCOMMODATION ON SITE

No housing is available. The Contractor's employees will not be allowed to be accommodated on the site.

The Contractor shall erect, maintain and remove on completion of the work, ample temporary offices and sheds to the Engineer's approval, for proper storage of perishable and other materials and for the use of the workmen.

f) LATRINES

The Contractor shall provide for the duration of the contract, latrine accommodation on the site in the form of chemical closets for the use of persons employed on the works. All latrine accommodation provided by the Contractor shall be efficient, sanitary and non-offensive and all sanitary fees payable to any local authority shall be paid by the Contractor.

g) ACCESS ROADS

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The Contractor shall be liable for all unnecessary and unreasonable damage caused by his equipment and/or transport to the access roads and fences. The cost of repair and reinstatement of unnecessary and unreasonable damage to these roads and fences will be deducted from moneys due to the Contractor.

h) SERVICES ON SITE

The Contractor shall provide for a sufficient supply of water which is available at a convenient point at the sites from which the Contractor shall be responsible for the distribution of water.

The Contractor shall be entitled to use, for the purpose of carrying out the installation, such supplies of electricity and water as may be available on the sites, but shall provide, at his own expense, any apparatus necessary for such uses; no charge will be made for these facilities. The supply of electric power is limited to the use of small tools only (3 kVA); welding machines and similar equipment shall be engine driven. The actual supply of these services is not guaranteed.

There is no compressed air available on the site.

i) SITE SECURITY

The sites are subject to strict security control and the Contractor and his work staff shall comply fully with any requirements imposed by the Employer's security personnel. Permits, issued by the Manager of the site, are required for admission to the sites and, before starting work on the sites, the Contractor shall make arrangements with the Engineer for the issue of the necessary permits for himself and his employees. For purposes of identification, all personnel will be required to carry their identity documents and shall show these, on request, either at entry to the Designated Pumping Station or within the Pumping Station site. The Contractor and his employees will be confined to the site, and the access roads listed above and action will be taken against anyone outside the prescribed areas.

j) CLEANING UP OF WORKS AND SITE

The Contractor shall maintain the whole of the site in a clean and orderly condition, to the satisfaction of the Engineer. On completion of the work the Contractor shall tidy up the site to the satisfaction of the Engineer; all temporary buildings shall be dismantled and removed; all surplus material, debris etc. shall be carted away and the whole site shall be left in a neat and orderly condition.

k) GEOTECHNICAL INFORMATION

WORK PACKAGE 3A

Geotechnical investigation reports for the pipe route are available, the investigations were variously conducted in 2016 and the reports are referenced in this document under Part 6: Site information and attached to the Bid documents.

WORK PACKAGE 3B

No geotechnical report is available.

Refer to PS1.9 and PS4.4 for further details. The geotechnical reports shall be attached to the Bid documents.

PART 7 – DRAWINGS

See PS 19 for drawing register and Bid document attachments for Tender Drawings

T2.2.1 PROJECT RISK MANAGEMENT (REFERENCED IN BID DOCUMENT)

Project Risk Management Register for Contract RW10397155/22
Please fill in the blank columns labelled Response Strategy and Response Action for each Risk Event listed in the table below:

Risk Identification								Qualitative Risk Assessment		Risk Response Plan	
#	RMP No.	Risk Category	Risk Event	Cause	Effect	Threat or Opportunity	Primary Objective	Probability	Impact	Response Strategy	Response Actions

Project Risk Management Register for Contract RW10397155/22 Please fill in the blank columns labelled Response Strategy and Response Action for each Risk Event listed in the table below:											
Risk Identification								Qualitative Risk Assessment		Risk Response Plan	
1		Environmental	Damage to the Works	Flooding of the pipe trenches due to major rainfall storm events	Damage to the bedding, floating of pipes, damage to backfilling, collapsing of trench walls.	Threat	Protection of the Works	Medium	Medium		
			Damage to the Works	Flooding of the pipe trenches due to major rainfall storm events	Negative time impact due to re-work	Threat	Protection of the Works	Medium	Medium		
2		Human Resources	Strike action by labour force	Union strike, site working conditions	Negative time impact	Threat	Protection of schedule and budget	Medium	Medium		
		Human Resources	Key staff resign	Working conditions, work pressure, remuneration	Negative time impact	Threat	Protection of schedule	Low	Low		
3		Quality	Breakdown of critical equipment	Poor maintenance, quality of equipment,	Negative time impact	Threat	Protection of schedule and budget	Low	Low		

Project Risk Management Register for Contract RW10397155/22
Please fill in the blank columns labelled Response Strategy and Response Action for each Risk Event listed in the table below:

Risk Identification								Qualitative Risk Assessment		Risk Response Plan	
			Poor workmanship	suitability of equipment Use of unskilled labour for skilled work	Negative impact on the lifespan of asset		Protection of asset	Medium	Medium		
4		Safety	Life threatening injury or other injury to a team member	Not adhering to Safety Plan and/or OH & S Act or Construction Regulations	Loss of life, site closed	Threat	SAFETY	MEDIUM	HIGH		
			Safety of public during construction, since the pipe may traverse public spaces	Not adhering to Safety Plan and/or OH & S Act or Construction Regulations	Loss of life, site closed	Threat	SAFETY	HIGH	HIGH		

Project Risk Management Register for Contract RW10397155/22
Please fill in the blank columns labelled Response Strategy and Response Action for each Risk Event listed in the table below:

Risk Identification								Qualitative Risk Assessment		Risk Response Plan	
			Safety and security measure at the Magistrate's Court	Not adhering to Safety Plan and/or OH & S Act or Construction Regulations	Public safety	Threat	SAFETY	HIGH	HIGH		
			Jacking collapse	Not adhering to Safety Plan and/or OH & S Act or Construction Regulations	Public safety	Threat	SAFETY	MEDIUM	HIGH		
		Safety	COVID - 19	Not adhering to Safety Plan and/or OH & S Act or Construction Regulations	Public safety, Negative time impact site closed	Threat	SAFETY	HIGH	HIGH		
			Blasting (where applicable)	Not adhering to Safety Plan and/or OH & S Act or Construction Regulations	Public safety, Damage to property	Threat	SAFETY	HIGH	HIGH		
5		Construction	Access to and within private property	Not getting access safety and movement of pipes within the	Negative time impact	Threat	Protection of schedule	Medium	Low		

Project Risk Management Register for Contract RW10397155/22
Please fill in the blank columns labelled Response Strategy and Response Action for each Risk Event listed in the table below:

Risk Identification								Qualitative Risk Assessment		Risk Response Plan	
			Lay down area	Limited storage space on site	Negative time impact	Threat	Protection of schedule	Medium	Low		
			Confine spaces & Restricted working strip	Restricted workspace that can delay work progress	Negative time impact	Threat	Protection of schedule	Medium	Low		
			Traffic management Working within Road reserve Managing access on all roads	High volume of traffic in the area limiting working hours	Negative time impact	Threat	Protection of schedule	Medium	Low		
			Dealing and protection of existing services	Services may require relocation	Negative time impact	Threat	Protection of schedule	Medium	Low		

Project Risk Management Register for Contract RW10397155/22
Please fill in the blank columns labelled Response Strategy and Response Action for each Risk Event listed in the table below:

Risk Identification								Qualitative Risk Assessment		Risk Response Plan	
			Blasting (where applicable)	Blasting within close proximately of existing pipes and other properties	Negative time impact	Threat	Protection of schedule	High	High		
			Geological site Conditions	Unexpected geological issues	Change of works methodology	Threat	Cost	Med	High		
			OTHERS (list and attach separately):								

Name of Bidder: _____

Signed by or on behalf of Bidder: _____ Official Capacity: _____

Date: _____

BLASTING INDEMNITY (where applicable)
BID NO: RW10397155/22 - 3A & 3B

Given by _____

*Company Registration No.: _____

Address: _____

A *Company incorporated with limited liability according to the company laws of the Republic of South Africa, *Partnership, *Close Corporation, *Public Company (hereinafter called the Contractor), represented herein by _____ in his capacity as the Contractor ___ _____ duly authorized.

Hereto by a resolution of the Contractor dated _____ a certified copy of which resolution is attached to this indemnity.

WHEREAS the Contractor has entered into a Contract with Rand Water (hereinafter called the Company) for, _____ and the Company required this Indemnity from the Contractor.

NOW TEHREFORE THIS DEED WITNESSETH that the Contractor does hereby indemnify and hold harmless the Company in respect of all loss or damage that may be incurred or sustained by the Company by reason of or in any way arising out of or caused by blasting operations that may be carried out by the Contractor in connection with the aforementioned Contract and also in respect of all claims that may be made against the Company in consequence of such blasting operations, by reason of or in any way arising out of any accidents or damage to persons, life or property or any other cause whatsoever, and also in respect of all legal or other expenses that may be incurred by the Company in examining, resisting or settling any such claims; for the due performance of which the Contractor binds itself according to law.

THUS DONE AND SIGNED for and on behalf of the Contractor at _____on the _____ day of _____ 20___ in the presence of the subscribing witnesses.

AS WITNESSES

1. _____ _____
SIGNATURE DESIGNATION OF SIGNATORY

2. _____ _____
SIGNATURE DESIGNATION OF SIGNATORY

OHS ACT AGREEMENT

WHEREAS RAND WATER UNDER **BID NO: RW10397155/22 - 3A & 3B** CALLED FOR CONSTRUCTION OF THE VG AND ZB SLUDGE PIPELINES

AND WHEREAS THE CONTRACTOR _____
AND RAND WATER
HAVE AGREED TO REGULATE AS BETWEEN THEM AND AS PROVIDED FOR IN TERMS OF SECTION 37(2) OF THE OCCUPATIONAL HEALTH AND SAFETY ACT, 85 OF 1993, ("THE ACT") PROCEDURES AND ARRANGEMENTS AS REQUIRED BY THE ACT FOR THE EXECUTION OF THE WORK:

NOW THEREFORE THE PARTIES AGREE AS FOLLOWS:

1 The Contractor warrants that all his and his Sub-contractors' workmen are covered in terms of the provisions of the Compensation for Occupational Injuries and Diseases Act, 130 of 1993, which cover shall remain in force whilst any such workmen are present on Rand Water's premises.

2 The Contractor undertakes to ensure that he and/or his Sub-contractors and/or their respective employees will at all times comply with all the requirements of the Act and without derogating from this general undertaking, also comply with the following conditions:

2.1 All work performed on Rand Water's premises must be performed under the close supervision of the Contractor's employees who are trained to understand the hazards associated with any work that the Contractor performs on the stated premises.

2.2 The Contractor shall assume the responsibility in terms of Section 16(1) of the Act. If the Contractor delegates any duty in terms of Section 16(2), a copy of such written delegation shall immediately be forwarded to Rand Water.

2.3 The Contractor shall ensure that he familiarizes himself with all the requirements of the Act, and that he, his employees and any Sub-contractor comply with them.

2.4 The Contractor shall appoint competent employees who shall be trained on any Occupational Health and Safety aspect pertinent to them or to the work that is to be performed.

2.5 Discipline regarding Occupational Health and Safety shall be strictly enforced.

2.6 Personal Protective Equipment shall be issued as required and worn at all material times.

2.7 Safe work practices shall be enforced and all employees shall be made conversant with the contents of these practices.

2.8 No unsafe equipment/machinery and/or articles shall be used on the site.

2.9 All incidents referred to in Section 24 of the Act shall be reported by the Contractor to the Department of Labour as well as to Rand Water. Rand Water shall further be provided with copies of any written documentation relating to any incident.

2.10 Rand Water hereby obtains an interest in the issue of any formal inquiry conducted in terms of Section 32 of the Act into any incident involving a Contractor and/or his employees and/or his Sub-contractor.

2.11 No use shall be made of any Rand Water machinery/article/substance/personal protective equipment without written approval.

2.12 Work for which the issuing of a permit is required shall not be performed prior to the obtaining of a duly completed and approved permit.

2.13 No alcohol or other intoxicating substance shall be allowed on the site. Anyone suspected to be under the influence of alcohol or any other intoxicating substance shall not be allowed on the site.

2.14 Full participation shall be given if and when Rand Water employees inquire into Occupational Health and Safety issues.

2.15 The Contractor expressly agrees to comply with the procedures and arrangements as required by the Act in the execution of the work.

3 The Contractor confirms that he will report to the Engineer anything that he deems to be unhealthy and/or unsafe, and that he has versed his employees and/or Sub-contractor in this regard.

4 The Contractor warrants that he shall not endanger the health and safety of Rand Water employees in any way whilst performing any work on the site.

5 The Contractor confirms that he will acknowledge and adhere to Rand Water's Environmental Management System requirements, as well as co-operate in the following areas:

5.1 Full compliance with existing approved standards for performing work, for example, SABS (SANS) and Rand Water/Site written safe working procedures.

5.2 The Contractor agrees to comply with emergency response procedures.

DATE: _____

SIGNED BY RAND WATER

REPRESENTATIVE _____

(Section 16(2) assignee)

DATE: _____

SIGNED BY CONTRACTOR OR
HIS/HER AUTHORISED _____
REPRESENTATIVE

QUALITY REQUIREMENT AGREEMENT

WHEREAS RAND WATER UNDER **BID NO: RW10397155/22 - 3A & 3B** CALLED FOR ALL THE APPURTENANT EARTHWORKS AND CIVIL WORKS ASSOCIATED WITH THE CONSTRUCTION VG AND ZB SLUDGE PIPELINES. ("THE WORK")

AND WHEREAS THE CONTRACTOR _____

AND RAND WATER HAVE AGREED TO REGULATE AS BETWEEN THEM AND AS PROVIDED FOR IN TERMS OF SABS ISO 9000 SERIES PROCEDURES AND ARRANGEMENTS AS REQUIRED BY THE ACT FOR THE EXECUTION OF THE WORK:

NOW THEREFORE THE PARTIES AGREE AS FOLLOWS:

1. **The Contractor complies in full with the Employer quality requirements.**

2. The Contractor submits 3 (three) copies of his QCP to the Contract Manager for review and acceptance within 2 (two) weeks after tender award.

3. During execution of the Tender no actions to provide the Works are implemented at any part of the site before the relevant quality control documentation is submitted and the Contract Manager accepts the procedures.

4. The Contractor is responsible for the complete quality assurance requirements imposed on his Sub-contractors and suppliers, in terms of SABS ISO 9000 Series.

5. The Contractor is responsible to inspect, expedite, administer and monitor in a pro-active manner Sub-contractors and supplier's work and the enforcing of the terms and conditions of their Tenders, except where extraordinary circumstances warrant the inclusion of Employer's participation.

6. A Quality Control Plan (QCP), which includes hold points and an inspection plan are provided by the Contractor to the Contract Manager for all fabrication, supply (transport) and installation of components for approval prior to start of manufacturing. The Employer uses or modifies the Contractor's QCP's and this includes inspection hold points, dimensional checks, material quality checks, tagging procedure for items, etc.

7. **Contractor's QA/QC responsibilities:**

   7.1 All machinery, material and workmanship comply with the appropriate specifications and codes, and bear the official mark of such specifications and codes.

   7.2 All machinery and material is new and of the most suitable grade, and suitable to withstand and to operate satisfactorily under all possible climate and weather conditions which are reasonably expected at the Site. Such machinery and material is subject to inspection and/or test by the Supervisor, who is granted access by the Contractor and Sub-Contractor.

   7.3 The Contractor conducts a continuous programme of construction quality control for all work performed on the Site. All relevant inspections and tests are adequately documented and signed off by the Supervisor.

   7.4 The Contractor complies with any quality assurance procedures required by the Employer.

   7.5 The Supervisor monitors the Contractor's adherence to quality requirements independently. Any rejections by the Supervisor based on design, specifications, codes and the like is binding.

8. Quality audits:

   8.1 The Employer reserves the right to perform quality audits at any time during the execution of the Works.

8.2 The Contractor gives 48 (forty-eight) hours' notice (in writing) to the Supervisor, prior to testing. The Supervisor exercises the option to witness or not, such tests.

9. Inspection authority:

9.1 If an authorised inspection authority (AIA) is appointed and he is paid for by the Employer, in terms of the OHS act, the Contract Manager will compile and submits the scope of work for the AIA.

DATE: _____

SIGNED BY RAND WATER
REPRESENTATIVE _____

DATE: _____

SIGNED BY CONTRACTOR OR
HIS AUTHORISED REPRESENTATIVE _____