PART C3: SCOPE OF WORK

Contractor | Witness 1 | Witness 2 | Employer | Witness 1 | Witness 2

C3.1: DESCRIPTION OF THE WORKS

C3.1.1 Employer's Objectives

The scope of work for this Contract primarily involves the construction of civil engineering services by the NALA LOCAL MUNICIPALITY. The primary objective is to enhance the existing sewer infrastructure in Bothaville's Kgotsong area by rehabilitating, renovating and installing new outfall sewer lines and addressing the current sewer system issues.

C3.1.2 Overview of the works

1. **Bulk Outfall Sewer Replacement:**

- **Pipeline Refurbishment:** The existing outfall sewer pipelines, which are currently blocked due to rocks, clothes, and debris, will undergo refurbishment, replacement, or upgrade to ensure unhindered sewage flow.

- **Manhole Refurbishment:** Damaged manholes and their benching, suspected to have been caused by high-pressure water jetting, will be refurbished to restore their structural stability and integrity.

- **Pipeline Decommissioning:** The mid-block pipeline at Ikemisetseng Primary School will be cut off and decommissioned to improve the sewer system. Provision should be made for working with and decommissioning and replacing midblock sewers.

2. **Internal Sewer Replacement:**

- **Problematic Areas Rectification:** Specific areas in Kgotsong, including Erf 1283, Erven 2851 and 3440, Erven 6890 and 6899, and Erven 6959 and 6960, where the community frequently experiences sewer spillages, overflowing sewers, and blockages will be addressed and rectified.

- **Unblocking and Surveying:** The appointed Contractor will assist in unblocking manholes and pipelines as necessary. Furthermore, the Contractor will aid in surveying the Manhole invert and cover levels where required to ensure accurate and efficient sewer system functionality.

C3.1.3 Extent of The Work

Construction takes place in the general vicinity of Kgotsong. Construction activities are to take place in existing residential areas and as such the Contractor is expected to be sensitive to public health & safety and to manage traffic and access control. The Contractor is also required to take the safety of the residents and their property into account during the planning and execution of the works.

This Contract covers the supply of all materials, plant, equipment and labour for, and the installation of the following civil services as specified:

1. **Establishment and Preparation:**

    - Establishment of the Contractor's camp, plant, and material resources on site.

    - Informal training and employment of local labour.

    - Clearing of the site.

2. **Sewer Pipeline and Manhole Maintenance:**

- Cleaning of blocked sewer pipelines and manholes.
- CCTV camera inspections of existing and newly installed sewer pipelines.
- Refurbishment of sewer pipes of varying diameters and materials by utilizing trenchless methods such as cured-in-place pipe (CIPP) lining, pipe bursting, pipe reaming, and slip lining.
- Removal and disposal of existing sewer pipes of varying diameters and materials, which may include asbestos pipes.

3. **New Outfall Sewer Line Construction:**
   - Construction of new outfall sewer lines.
   - Installation of new sewer precast concrete manholes.
   - Connection house connections to collector and or outfall lines
   - Connections to existing precast manholes.
4. **Pipe Jacking:**
   - Installation of concrete pipes underneath existing roads where required.
5. **Road Construction and Rehabilitation:**
   - Excavation for pipe trenches (up to 6m deep).
   - Construction of 150mm pavement subbase and base layers.
   - Stabilization of pavement base layers with cement.
   - Repairing & laying of slurry seal or block paving on road surfaces.
   - Shaping of ground levels and replacement of kerbs.
6. **Utility and Infrastructure Works:**
   - Groundwater management.
   - Carting and disposal of excavated contaminated material.
   - Refurbishment and replacement of sewer pipesn manhole beanching and manholes.
   - Infrastructure crossings (National, Provincial, and local roads, river/stream).
   - Crossing of existing services (water, sewerage, stormwater, electricity, telecommunications, fences).
   - Reinstatement of existing fences, roads, paving, and channels.
7. **Connection and Commissioning:**
   - Connection to existing sewer infrastructure.
   - Handling of sewer flow during construction.

- Hydraulic testing and commissioning of pipelines.

8. **Traffic and Legal Compliance:**

   - Accommodation of traffic.
   - Obtaining wayleaves for work areas.

The description of the projects as described in this section is merely an outline of the contract works and shall not be regarded as limiting to the amount of work to be done by the Contractor under this contract.

Dealing with existing services including water pipes, electrical and Telkom cables and existing sewer lines form part of the works.

C3.1.4 Location of the Works

The town of Bothaville / Kgotsong area is located in the northwestern Free State and is approximately 50 km south of Klerksdorp, 80 km north of Welkom and 230 km North-West of Bloemfontein and is accessible via the R30 between Bloemfontein and Klerksdorp. The location of the works is in Kgotsong. The following coordinates can be used:

Latitude: 27°22'47.57"Sy

Longitude: 26°39'2.63"E

C3.1.5 General Information

The operation of construction vehicles on existing roads or streets, shall be limited to traffic with an axle load not exceeding that allowed by the Road Traffic Ordinance of the authority concerned, or any amendment thereof.

The Contractor shall be held responsible to clear any spillage caused by his activities on site, by whatever means necessary, within 24 hours after such spillage has occurred. No additional payment will be made for the clearance of spillage and all relevant costs will be deemed to be covered under the relevant items.

No housing is available for the Contractor's employees and the Contractor shall make his own arrangements for housing his employees or transporting them to and from the site. The Contractor is in all respects responsible for the housing and transporting of his employees and for the arrangement thereof, and no extension of time due to any delays resulting from this will be granted.

Facilities such as an office, telephone, name board, survey equipment, and any relevant services required for the Engineer are described under the relevant sections.

The tenderers are to tender for the relevant project by completing the relevant bill of quantities. A valid bid shall be a completed bill of quantities with a total after VAT, corresponding with the amount recorded in the offer of acceptance.

C3.2: ENGINEERING

C3.2.1 DRAWINGS

The following drawings will be required to be prepared by the contractor as a minimum:

- Site layouts for the contractor's camp and office accommodation
- Site layouts for the Engineer Representative's temporary office accommodation

The costs of the designs will be deemed to have been included in the scheduled items in the
Schedule of Quantities. No other additional payments will be certified to cover these activities.

The tender drawings are applicable to the contractor are detailed in Part C5 of these documents.
These drawings have been used for setting up the Bills of Quantities.

The drawings that is issued during the tender stage are preliminary and final drawings will be issued during the award of the project to the successful tenderer.

C3.2.2 MANAGEMENT

Management of the Works

The SANS Standard Specifications for Engineering Construction prepared by the Standards South Africa. These publications are available and tenderers must obtain copies at their own cost from Standards South Africa. Volume 3 is obtainable from SAICE, Private Bag X200, Halfway House, 1685. Tel: (011) 8055947/8, e-mail: civilinfo@saice.org.za or can be purchased from the Employer.

Submitted programme

The Contractor's programme, required in terms of Clause 5.6.1 of GCC 2015, shall be in a bar chart form.
In addition to the requirements of Clause 5.6.1 of GCC 2015, the Contractor's programme shall show:

a) the various activities, related to a time scale, for each element of the Works, including those of Nominated and/or Subcontractors, in sufficient detail to be able to assess construction progress,
b) critical path activities and their dependencies,
c) key dates in respect of work to be carried out by others,
d) key dates in respect of information to be provided by the Engineer and/or others,
e) the anticipated handing over of sections of the site in phases where civil services are completed for the construction of houses by a separate contractor,
f) predicted cash flow programme.

If any change to the critical path occurs, the Contractor shall as soon as practicable notify the Engineer in writing.

The Contractor's programme and method statement will not be accepted as the basis for claims for additional compensation without due reference to all relevant associated factors.

Setting-out Detail

The works should be set out according to the Construction drawings. Contractors should familiarize with the boundaries of region.

It remains the Contractor's responsibility to set out all work from the benchmarks and reference pegs.

Quality Assurance (QA) (Read with SANS 1921 – 1: 2004 clause 4.4)

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

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

C3.2.3 CHANGES TO SCOPE OF WORK

It is a condition of this contract that the employer reserves the right to limit the total expenditure on the Works due to possible budget constraints. Should the tender sum exceed the budgeted amount, the scope of the works may be reduced at any time before or during the contract period to ensure that the final contract amount does not exceed the budgeted amount.

For any particular works' instruction, all work shall be subject to the approval and issuing of a works order by the municipality.

C3.2.4 HEALTH & SAFETY

The Contractor shall take special precautions to ensure the safety of workman on site affected by the works.

The Contractor's tendered rates shall include full compensation for all possible additional costs, which may arise from the above and no claims for extra payment or for an extension of time due to inconvenience as a result of the prescribed process will be considered.

The safety officer shall not be the site agent, contracts manager, foreman or any employee who is involved directly with the construction process. The duties of the safety officer shall be dedicated to safety of work force and site activities.

C3.3: PROCUREMENT: GUIDELINES FOR SUBCONTRACTING AND LABOUR ENHANCEMENT

C3.3.1 DEFINITIONS

"The community" means individual and communal property owners, organised groups of road users, other interest groups and departments or spheres of government that may be affected by the location, construction, operation and maintenance of the road to which this contract applies.

"Conventional contract" means any contract for the execution of civil engineering or building or similar construction works, in which the liabilities and responsibilities of the two parties thereto are assigned essentially in a manner which is consistent with that set out in the General Conditions of Contract for Road and Bridge Works for State Road Authorities, 1998 (as published by the Committee of Land Transport Officials) or other similar documents.

"Conventional subcontract" shall be similarly and appropriately construed.

"Contract Participation Goal" (or CPG), is the value of goods, services and works, excluding VAT, for which the Contractor proposes to engage labour and subcontractors.

"Contractor" means any person or group of persons in association, or firm, or body corporate who is registered with the Construction Industry Development Board (CIDB) and:

a) have a contractor grading designation equal to our higher than a contractor grading designation specified for the Contract, or

b) contractors registered as potentially emerging enterprises with the CIDB who are registered in one contractor grading designation lower than that required in terms of a) above

"Subcontractor" shall be similarly and appropriately construed.

"Emerging contractor" means an EME (exempted micro enterprise), QSE (qualifying small business enterprise), ABE that cannot reasonably be categorized as a conventional contractor defined above.

"Affirmable Business Enterprise (ABE)" means a business which adheres to statutory labour practices, is a legal entity, registered with the South African Revenue Service and a continuing and Independent Enterprise for profit, providing a Commercially Useful Function and:

a) Which is at least two thirds owned by one or more previously disadvantaged individuals or, in the case of a company, at least two thirds of the shares are owned by one or more previously disadvantaged individual; and

b) Whose management and daily business operations are in the control of one or more of the previously disadvantaged individuals who

effectively own it.

"Key Personnel" means all contracts managers, site agents, materials and survey technicians, trainers, supervisors, foremen, skilled plant operators, and all other personnel in the permanent employ of the Contractor or his subcontractor who posses special skills and/or who play key roles in the Contractor's or subcontractor's operations.

"Worker" for the purposes of this specification means any person, not being one of the defined key personnel of the Contractor or his subcontractor, who is engaged by the Contractor or subcontractor to participate in the execution of any part of the contract works and shall include unskilled labour, semi-skilled and skilled labour, artisans, clerical workers and the like.

"Workforce" means the aggregate body comprising all workers and shall, unless the context dictates otherwise, include the workforces of the Contractor and all his subcontractors.

"Subcontractor" means any person or group of persons in association, or firm, or body corporate (whether formally constituted or otherwise) not being the Contractor, to whom specific portions or aspects of the works are sublet or subcontracted or material purchased by the Contractor in accordance with the provisions of the contract.

"Level of subcontractor" means the level of responsibility carried by and the assistance to be provided to the different grades of subcontractor in the execution of subcontracts.

"**Project Committee**" is the committee comprising out of the Employer's representative, The Engineer or his representative, the Contractor or his representative and the CLO.

"**CLO**" is the Community Liaison Officer as appointed by the Contractor and paid under the Contract.

C3.3.2 LABOUR ENHANCED CONSTRUCTION

The Contractor's attention is drawn to the fact that it is an objective of the contract to maximize the labour content of certain operations or portions thereof. In this regard, where the specified work allows for a choice between mechanical or labour-enhanced means, the former shall generally be kept to the practical minimum.

The Contractor shall submit on a monthly basis on the date as determined by the Employer, daily labour returns on the prescribed templates to the Engineer indicating the numbers of labour employed on the works and the activities on which they were engaged.

It is also an objective to utilize EME's , QSE's in the vicinity of the project, the development of these resources in the execution of the project, and by maximizing the amount of project funds retained within the project locality.

C3.3.3 TEMPORARY WORKFORCE

a) **Record of workforce and subcontractors**

The Contractor shall maintain accurate and comprehensive records of all workers engaged on the contract and shall provide to the Engineer at monthly intervals from the commencement of the contract, interim records substantiating the actual numbers of employment opportunities which have been generated to date and the amounts actually paid in respect thereof. Such interim records shall be in a format approved by the Employer. Labour records of emerging contractors, SMME or ABE subcontractors, where applicable, shall also be provided by the Contractor and shall be deemed to form part of the workforce.

The Contractor shall, on completion of the contract, and as a pre-requisite to the release of any retention money, provide the Engineer with independently audited documentary evidence of the total number of employment opportunities actually generated during the contract.

The value of the target amount spent on subcontracting is 30% of the contract value.

b) **Recruitment and selection procedures**

The Contractor shall be responsible for the final selection of workers and subcontractors to constitute the temporary workforce but in doing so, shall adhere to the procedures adopted by the CLO along the following guidelines:

The Contractor shall advise the Engineer in writing, of the numbers of each category of temporary worker which he requires, together with the personal attributes which he considers desirable that each category of worker shall possess (taking due cognizance of the provisions of the contract relating to training).

The CLO shall take the necessary actions to identify potential workers for the temporary workforce from communities in the vicinity of the works. The details of all persons applying for employment shall be recorded, including inter-alia:

- Name, address, age and sex
- Marital status and number of dependants
- Qualifications and previous work experience (whether substantiated or not)
- Period since last economically active
- Preference for type of work or task.

The CLO shall make a selection of workers from amongst the applicants, taking due cognisance of his requirements for the workforce as supplied by the Contractor and the provisions of the contract in regard to the provision of training to selected members of the workforce and in accordance with the following principles:

No potential temporary worker shall be precluded from selection by virtue of a lack of skill in any suitable operation forming part of the works, unless:

- all available vacancies have been or can be filled by temporary workers who already possess suitable skills; or
- the completion period allowed in the contract, or the remaining portion of the contract period (as the case may be) is insufficient to facilitate the creation of the necessary skills;

The Contractor shall make a final selection from the list provided by the CLO using the following criteria:

- preference shall be given to the long term unemployed and single heads of households
- in so far as is reasonably practicable, give priority to accommodating the applicants' expressed preferences regarding the types of work for which they are selected and shall not be prejudicial to youth over the age of fifteen years and women.

The same provisions shall apply as is in respect of the selection of additional or replacement members of the workforce as may be necessary from time to time during the contract.

c) **Terms and Conditions pertaining to the Employment of the Temporary Workforce and subcontractors**

The onus shall be on the Contractor to ensure that all the requirements of all the acts relating to the employment of workers and subcontractors are observed.

d) **Labour Relations and Worker Grievance Procedures**

In accordance with the provisions of the General Conditions of Contract, the Contractor shall, at his own cost, be fully responsible for the establishment and maintenance of satisfactory labour relations on site and the resolution of all grievances of temporary workers and subcontractors as may occur.

The Contractor shall at all times adhere to the accepted norms and standards of labour relations prevailing generally in the civil engineering construction industry and shall conduct himself in a fair and reasonable manner, within the constraints as may be imposed upon him by the terms of the contract.

In the event of any temporary worker engaged by the Contractor in terms of the contract, being aggrieved on any issue, he shall have the right to nominate and be supported in any inquiry or disciplinary hearing or investigation instituted by the Contractor, by one member of the temporary workforce.

In the event of any grievance not being satisfactorily resolved through the application of normal dispute resolution procedures described above, then either the Contractor or the worker concerned may require that the matter be referred to the PC for further consideration, with a view to facilitating resolution thereof.

C3.3.4 TRAINING OF THE TEMPORARY WORKFORCE

Selected members of the workforce are to be provided at least with structured training by a nominated subcontractor, in accordance with the provisions of this section. The Contractor shall make all necessary allowances in his program of work to accommodate and facilitate the delivery of such structured training.

ABE subcontractor's workforces will be entitled to receive accredited training that will improve on task skills necessary for the execution and successful completion of the various subcontracts. The Contractor, in conjunction with the Engineer, shall monitor each ABE's progress closely and shall identify those who will benefit from structured construction skills training.

The technical training shall comprise of items selected from the table in paragraph 7 of this section and which are relevant to this project.

C3.3.5 ACCREDITED TRAINING AND ATTENDANCE

Only qualified trainers employed by training agencies who are accredited by the Civil Engineering Industry Training Scheme (CEITS), or any other institution recognized by the Department of Labour shall deliver all training certificates affirming the successful participation in the various courses and shall be presented to each attendant.

The contractor shall facilitate in the delivery of training, by instructing and motivating the relevant subcontractor regarding his staff's attendance and participation therein.

The contractor shall further make all reasonable efforts to co-ordinate subcontractor's work with that of the delivery of the structured training

The provision of structured training shall not relieve the Contractor of any of his obligations in terms of the Conditions of Contract and the Contractor shall remain fully liable for the provision, at his own cost, of any other training of the workforce, additional to the structured training, as deemed to be necessary by the Contractor to achieve the execution and completion of the works strictly in accordance with the provisions of the contract.

C3.3.6 PENALTIES FOR NON-COMPLIANCE

Any deliberate failure or neglect by the Contractor to comply with the provisions of this specification, or any deliberate omission or neglect by the Contractor in adhering to or applying the principles as are described and inherent in this specification, shall be deemed to constitute a warrant for the Engineer to act in terms of the Conditions of Contract or the

penalties specified for non-attaining the prescribed CPG's will be applied and doubled.

C3.3.7 MEASUREMENT AND PAYMENT

ITEM **UNIT**

C3.3.1 **Community Liaison Officer Salary** .....provisional (Prov) sum

The provisional sum provided shall cover the salary of the duly elected and approved CLO.

C3.3.3 **Handling costs and profits in respect of items C3.3.1 and C3.3.2** .....percentage (%)

The tendered percentage is a percentage of the amounts actually spent under the items, which shall include full compensation for the handling costs of the Contractor, and the profit in connection with the training.

C3.3.6 **Penalties**

b) Targeted Labour..... percentage point

The penalty for item (b) for not attaining at least the tendered number of person-days (refer to Part T2: Returnable Documents) will be calculated as follows:

In the event that the Tenderer fails to substantiate that any failure to achieve the Contract Participation Goal was due to quantitative under runs, the elimination of items, or any other reason beyond the Contractor's control which may be acceptable to the Employer, it shall be liable to pay to the Employer a financial penalty calculated in the following manner:

$$P = \mathbf{1.0} \times \frac{(D - Do)}{(100)} \times N_A$$

Where

D = tendered Contract Participation Goal percentage
Do = the Contract Participation Goal which the Engineer based on the credits passed, certifies as being achieved upon completion of the Contract
N_A = Net Amount (Contract expenditure, excluding VAT)
P = Rand value of penalty payable.

The Minimum set-aside on this contract for Targeted Labour is 7.5%

Contractor | Witness 1 | Witness 2 | Employer | Witness 1 | Witness 2

C3.4: CONSTRUCTION

C3.4.1 Site Establishment

The Contractor shall negotiate with property owners (Nala Local Municipality) and make his own arrangements to obtain sites for the erection of offices, laboratories, yards, etc. Written approval must be obtained from the owners (Phokwane Local Municipality) on whose property the camp is to be situated. The choice of position for the establishment of camps is subject to the approval of the Engineer. The site for the Engineer's offices and laboratories shall not be used for the accommodation or housing of the Contractor's personnel and employees.

The Contractor shall make his own arrangements concerning the supply of electrical power, water, telephone and all other services, both for use at the site establishment area as well as for the use in the construction of the Works. No direct payment shall be made for the provision of any service and the cost thereof shall be deemed to be included in the rates tendered for the various items of work for which these services are required

C3.4.2 Survey Control and Setting Out of the Works

Reference and level beacons will be shown to the Contractor by the Engineer at the commencement of the Contract and the Contractor will be responsible for transferring the data to the Site of Works.

The Contractor shall check the condition and accuracy of all reference and level beacons and satisfy himself that they have not been disturbed and are true with regard to position and level. A beacon that has been disturbed shall not be used until its true position and level have been re-established and the new values have been certified by the Engineer. The Contractor shall thereafter be held entirely responsible for the protection of all reference and level beacons.

The Contractor shall employ a capable surveyor to set out the Works to the required lines and levels. The Engineer shall be informed immediately should any discrepancy be discovered between the levels or dimensions obtained by the Contractor and those shown on the drawings.

Where a beacon is likely to be disturbed during construction operations, the Contractor shall establish suitable reference beacons at locations where they will not be disturbed during construction. No beacons shall be covered over, disturbed or destroyed before accurate reference beacons have been established and details of the positions and levels of such beacons have been submitted to the Engineer. The Contractor's reference beacons shall be of at least the same accuracy and sturdiness of construction as the existing beacons.

The Contractor shall submit the method of setting out he proposes to employ to the Engineer. Accurate control of line and level shall be provided by the Contractor at all stages of construction.

Work set out by the Contractor may be checked by the Engineer and any errors found shall be rectified by the Contractor at his own expense. The Contractor shall supply any instrument, equipment, material and labour required by the Engineer for this survey work. Any assistance, including checking given to the

Contractor by the Engineer or any setting out done by the Engineer for Contractor shall not be held as relieving the Contractor of his responsibility for the accurate construction of the Works.
The Contractor's survey instruments and survey equipment shall be suitable for the accurate setting out of the Works and shall be subject to the approval of the Engineer. They shall furthermore be checked and correctly adjusted by the authorized agents before the commencement of the contract and subsequently when required by the Engineer and when otherwise necessary. When required the Contractor shall, at his own expense, provide two labourers to assist the Engineer. The Engineer shall have the sole right of approving of such a labourer.

Survey work shall not be measured and paid for directly and compensation for the work involved in setting out shall be deemed to be covered by the rates tendered and paid for the various items of work included under the contract.

C3.4.3 Existing Services

The scope of works for this contract shall be affected by existing services. Where necessary the Contractor must familiarize himself with the position and extent of existing services and to carry out the works in such a manner as not to cause damage to existing services.

Any cost of repairs, replacement and/or installation of services and equipment resulting from the Contractor’s negligence or unauthorized action shall be to the Contractor’s account. Where applicable, the employer’s standard specification for repairing and installation of water and sanitation services shall be used.

C3.4.4 Plant and Materials

The Contractor, when using materials that are required to comply with any standard specification, shall, if so ordered, furnish the Engineer with certificates of compliance.

Where so specified, materials shall bear the official mark of the appropriate authority. Samples ordered or specified shall be delivered to the Engineer's office on the site free of charge.

Where proprietary products have been specified, similar products may be used subject to the prior written approval of the Engineer.

Unless otherwise specified, all proprietary materials shall be used and placed in strict accordance with the relevant manufacturer's current published instructions.

Unless anything to the contrary is specified, all manufactured articles or materials supplied by the Contractor for the permanent works shall be unused and fresh, not older than three months or as approved by the engineer.

Existing structures on the site shall remain the property of the employer and except as and to the extent required elsewhere in the contract, shall not be interfered with by the Contractor in any way.

Materials to be included in the works shall not be damaged in any way and, should they be damaged on delivery or by the Contractor during handling, transportation, storage, installation or testing they shall be replaced by the

Contractor at his own expense.

All places where materials are being manufactured or obtained for use in the works, and all the processes in their entirety connected therewith shall be open to inspection by the Engineer (or other persons authorised by the Engineer) at all reasonable times, and the Engineer shall be at liberty to suspend any portion of work which is not being executed in conformity with these specifications.

C3.4.5 Abnormal Rainfall

Add the following new clause:
Extension of time due to Abnormal Rainfall
Extension of time for completion of the Contract shall be allowed in the event of abnormal rainfall in accordance with the following formula:

V = (Nw - Nn) + (Rw - Rn)/20

Where:

V = Extension of time in calendar days for the calendar month under consideration

Nw = Actual number of days during the calendar month under consideration on which a rainfall of 10mm and more is recorded

Rw = Actual total rainfall in mm recorded during the calendar month under consideration

Nn = Average number of days, derived from rainfall records, onwhich a rainfall of 10mm and more was recorded during the relevant calendar month as per the data tabulated hereinafter

Rn = Average total rainfall in mm for the relevant calendar month, derived from rainfall records, as tabulated hereinafter

Where the extension of time due to abnormal rainfall has to be calculated for portion of a calendar month, pro rata values shall be used. Should V be negative for any particular month, and should its absolute value exceed the corresponding value of Nn, then V shall be taken as being equal to minus Nn. The total extension of time to be granted shall be the algebraic sum of all the monthly extensions, provided that if this total is negative then the time for completion shall not be reduced due to subnormal rainfall.

Rainfall records for the period of construction shall be taken on Site. The Contractor shall provide and install all the necessary equipment for accurately measuring the rainfall. The Contractor shall also provide, erect and maintain a security fence plus gate, padlock and keys at each measuring station, all at his own cost. The Employer’s Agent or his Representative shall take and record the daily rainfall readings. The Contractor shall be permitted to attend these readings, in the company of the Employer’s Agent’s Representative. Access to the measuring gauge(s) shall at all times be under the Employer’s Agent's control.

The rainfall records applicable to this Contract are those recorded at Weather Station Bothaville. The following values of Nn and Rn shall apply.

Month	**Rn (mm)**	**Nn (days)**
January	115	12
February	86	11
March	61	9
April	60	8
May	19	3
June	12	1
July	6	1
August	5	1
September	10	2
October	44	7
November	85	11
December	120	14
Total	**508**	**80**

www.worldweatheronline.com. (n.d.). Bothaville Annual Weather Averages - Free State, ZA. [online] Available at: https://www.worldweatheronline.com/bothaville-weather-averages/free-state/za.aspx [Accessed 3 Apr. 2024].

PART C3.5: SPECIFICATIONS

C3.5.1 STANDARD SPECIFICATIONS

The following specifications shall apply to this contract:

C3.5.1.1 Applicable SANS 1200 Standardized Specifications

The SANS 1200 Standardized Specifications that apply to this Contract are listed in Part C3.6.1. All data and variations to these specifications are given in Part C3.6.2, Specification Data.

C3.5.1.2 Particular / Generic specifications

The Particular / Generic specifications that apply to this Contract are listed in Part C3.6.1. All data and variations to these specifications are given in Part C3.6.2, Specification Data.

LIST OF APPLICABLE SPECIFICATIONS

The following specifications shall apply to this contract:

a) The COLTO Standard Specifications for Road and Bridge Works for State Road Authorities (1998).

The contractor may purchase copies from the South African Institution of Civil Engineers at:

SAICE
Waterfall Park / Postnet Suite 81
Howick Gardens / Private Bag X65
Vorna Valley / Halfwayhouse
Becker Street / 1685
Midrand

Tel : (011) 805-5947
Fax : (011) 805-5971

Contact Person: Angeline Aylward

b) SABS or BS Specifications and Codes of Practice

Wherever any reference is made to the South African Bureau of Standards (SABS) and the British Standards Specification (BSS) in either these Bill of Quantities or the Specification of Materials and Methods to be Used (OOG-001E), this reference shall be deemed to read “SABS or equivalent standard” and BS or equivalent standard” respectively.

c) SANS 10409: 2005: Design, Selection and Installation of Geomembranes
d) SANS 1526: 2003: Thermoplastics sheeting for use a geomembrane
e) PS-TE : Spirally Wound Poly Vinyl Chloride (PVC) Liner Pipe
f) SASTT-TS-TT1 : Sliplining of pipelines
g) SASTT-TS-TT2 : Pipe bursting
h) SASTT-TS-TT3 : Horizontal directional drilling
i) SASTT-TS-TT4 : Cured-in-place pipe lining
j) SASTT-TS-TT5 : CCTV Inspections of pipelines
k) Various other specifications specified in the COLTO Standard Specifications or the Project Specification

C3.5.2 PROJECT SPECIFICATIONS RELATING TO STANDARD SPECIFICATIONS

This part of the project specifications deals with matters relating to the standard specifications. Where reference is made in the standard specifications to the project specifications this part shall also contain the relevant information e.g. the requirements where a choice of materials or construction methods are provided for the standard specifications.

In certain clauses the standard specifications allow a choice to be specified in the project specifications between alternative materials or methods of construction and for additional requirements to be specified to suit a particular contract. Details of such alternatives or additional requirements applicable to this contract are contained in this part of the project specifications. It also contains some additional specifications and amendments of the standard specifications required for this particular contract.

The number of each clause and each payment item in this part of the project specifications consists of the prefix B followed by a number corresponding to the number of the relevant clause or payment item in the standard specifications. The number of a new clause or a new payment item, which does not form part of a clause or a payment item in the standard specifications and is included here, is also prefixed by B followed by a new number. The new numbers follow on the last clause or item number used in the relevant section of the standard specifications.

The following Standard and Particular Specifications, as bound in this document, and as amended in the Specification Data, shall apply:

	No. of pages
Specification EMA – Ver 2: Environmental management	11

Construction

Although not bound in nor issued with this document, the following Standardized Specifications for Civil Engineering Construction, as amended in the Specification Data, form part of this document and, notwithstanding Sub-clause 2.2 of SANS 1200 A, the edition specified below shall apply:

PORTION 1: STANDARDISED SPECIFICATIONS

The following SANS 1200 Standardised Specifications for Civil Engineering Construction prepared by the South African Bureau of Standards are applicable:

SANS 1200 A	General
SANS 1200 AB	Engineer's Office
SANS 1200 C	Site Clearance
SANS 1200 D	Earthworks
SANS 1200 DB	Earthworks (Pipe Trenches)
SANS 1200 DM	Earthworks (Roads, Subgrade)
SANS 1200 G	Concrete (Structural Works)

SANS 1200 L	Medium Pressure Pipelines
SANS 1200 LB	Bedding (Pipes)
SANS 1200 LD	Sewers
SANS 1200 M	Roads (General)
SANS 1200 ME.	Subbase
SANS 1200 MF	Base
SANS 1200 MK	Kerbing and Channeling
1700	CLEARING AND GRUBBING.
2100	DRAINS
2200	PREFABRICATED CULVERTS
2300	CONCRETE KERBING, CONCRETE CHANNELLING, CHUTES AND DOWNPIPES, AND CONCRETE LININGS FOR OPEN DRAIN
3300	MASS EARTHWORKS.
3400	PAVEMENT LAYERS OF GRAVEL MATERIAL
3500	STABILIZATION
5100	PITCHING, STONEWORK AND PROTECTION AGAINST EROSION
7300	CONCRETE BLOCK PAVING FOR ROADS
8100	TESTING MATERIALS AND WORKMANSHIP

VARIATIONS AND ADDITIONS TO THE STANDARD SPECIFICATIONS

The Specification Data gives amendments and additions to the specifications that are listed in the List of Applicable Specifications. Clause headings are prefixed by the letters "SD" followed by alphabetic and numeric characters which identify the specification and main clause of the applicable specification. Sub-clauses are numbered sequentially. The clause reference to which a sub-clause refers, either to amend or to add to, is given after the sub-clause heading. Where the Specification Data sub-clause is an addition and there is no appropriate clause in the applicable specification to which to link it, no clause reference is given in the heading.

Should any requirement of the Specification Data conflict with any requirement of the specifications listed, the requirement of the Specification Data shall prevail.

PORTION 2: VARIATIONS AND ADDITIONS TO STANDARDISED SPECIFICATIONS

The variations and additions to the SANS 1200 specifications listed above are as follows:

The term “Project Specification” must be replaced by the term “Scope of Work” wherever it appears in the standardized specifications.

The term “Schedule of Quantities” must be replaced by the term “Bill of Quantities” wherever it appears in the standardized specifications.

The term “Engineer” appearing in any of the SANS 1200 Standardised Specifications must be replaced with the terms “Employer’s Agent”.

The prefix “PSA” denotes an amendment to SANS 1200A. “PSAB” denotes an amendment to SABS 1200AB and so forth. The number following these prefixes refers to the relevant clause numbers of SABS 1200. For example: “PSA 8.1” refers to Clause 8.1 of SANS 1200A.

Further to the above, it should be noted that, where in a specific Standardised Specification reference is made to a subclause in another Standardised Specification, any amendment or addition to the subclause referred to, as provided in the Works Specification, shall apply.

The Contractor shall be deemed to have satisfied himself before tendering as to the correctness and sufficiency of his tender for the Works and of the rates and prices stated in the priced Bill of Quantities and the Schedule of Rates and Prices (if any) or in the specification, which rates and prices shall (except in so far as otherwise provided in the Contract) collectively cover full payment for the discharge of all his obligations under the Contract and all matters and things necessary for the proper completion of the Works."

PSA GENERAL (1986)

PSA 1 SCOPE

Replace subclause 1.1 with the following:

"1.1 This specification covers requirements, principles and responsibilities of a general nature which are normally applicable to all civil engineering contracts as well as the requirements for the Contractor's establishment on site."

PSA 2 INTERPRETATIONS

PSA 2.3Definitions

a) General

Add the following definitions:

"General conditions: The general conditions of contract specified for use with this contract and the specal conditions of contract as applicable

Specified: As specified in the standardized specifications, the drawings or the project specifications. Specifications shall have the corresponding meaning."

c) Measurement and payment

Replace the definitions for fixed charge, time-related charge and value-related charge with the following:

"Fixed charge: A charge that is not subject to adjustment on account of variation in the value of the contract amount or the contract time of completion

Time-related charge: A charge, the amount of which is varied in accordance with the time for completion of the work as adjusted in accordance with the provisions of the contract

Value-related charge: A charge, the amount of which is varied pro rata the final value of the measured work executed and valued in accordance with the provisions of the contract."

PSA 2.4 Abbreviations

a) Abbreviations relating to standard documents

Add the following abbreviation:

"CKS : SABS Co-ordinating Specification

PSA 2.8 Items In Schedule Of Quantities

PSA 2.8.1 Principle

In the fourth line after the word “Specification” add “or in the measurement and payment clause of the standard or particular specification or section or project specification”.

PSA 2.8.2 Preliminary and General Section

Add the following to A 2.8.2:

Should the sum of Section A: Preliminary and General exceeds 15% of the tender sum (excluding VAT), the Tenderer shall state his reasons in writing for tendering in this manner. See also PSA 8.2.1.

PSA 3 MATERIALS

PSA 3.1 Quality

Add the following:

"All manufactured materials supplied shall be new materials unless the contrary is specified. All materials specified in accordance with SABS specifications shall bear the SABS mark, whether so specified or not."

Add the following:

"The Contractor must provide the Engineer with at least 48 hours notice prior to control testing being required. Furthermore, the Contractor must make provision in his programme for the undertaking, and calculation of results, of such testing. Construction of any work that depends on control

testing, for which test results are not available will be undertaken at the Contractors own risk."

Add the following subclause(s):

"PSA 3.3 Ordering Of Materials

The quantities set out in the schedule of quantities have been determined from calculations based on data available at the time and should therefore be considered to be only approximate quantities. The Contractor shall therefore, verify the quantities before ordering materials of any kind. No liability or responsibility whatsoever shall be attached to the employer for materials ordered by the Contractor except if they have been ordered in accordance with written confirmation issued by the Engineer.

PSA 3.4 Materials Supplied By The Employer

Materials designated in the Contract documents to be supplied by the Employer shall not be obtained by the Contractor from any other source than from the Employer. Requisitions for materials to be supplied by the Employer shall be submitted in writing and shall be signed by the Contractor or his authorised representative and the Engineer. The Contractor or his authorised representative shall sign a receipt upon delivery of all such materials that, having been accepted by the Contractor, will be deemed to be in a sound and satisfactory condition and will thenceforth be his sole responsibility.

The onus shall be entirely on the Contractor to ensure that he accepts only sound materials from the Employer, and the Engineer is authorised to reject as unsuitable any material on the Site of the Works that, in his opinion, is unsound or defective in any way. The Contractor shall immediately remove such rejected materials from the Site of the Works and shall replace them, at his own expense, with new and sound materials to the satisfaction of the Engineer."

PSA 4 PLANT

PSA 4.2 Contractor's Offices, Stores And Services

Add the following paragraph before the first paragraph:

"The Contractor's construction camp shall be fenced off and shall contain all offices, stores, workshops, testing laboratories, toilet facilities, etc. The camp shall always be kept in a neat and tidy condition.

No personnel will be allowed to reside on the site. Only night-watchmen may be on the site after hours."

The Contractor shall make arrangements as necessary for the removal of night soil."

Add the following to clause 4.2:

Storage of Materials

Rubber articles, including pipe insertion or joint rings, shall be stored in a suitable shed and kept away from sunlight, oil or grease. Living accommodation shall not be used for the storage of materials.

Large items not normally stored in a building shall be neatly stacked or laid out on suitable cleaned areas at the Site. Grass or vegetation shall not be allowed to grow long in the storage areas and the material shall be kept free of dust and mud, and be protected from stormwater. Pipes shall be handled and stacked in accordance with the manufacturer's recommendations, special care being taken to avoid stacking to excessive heights and placing over hard objects. uPVC pipes shall be protected from direct sunlight by suitable covers.

Every precaution shall be taken to keep cement dry and prevent access of moisture to it from the time it leaves the place of manufacture until it is required for use on the Site. Any bags of cement which show any degree of hydration and setting shall be removed from the Site of the Works and replaced at the Contractor's own expense.

PSA 5 CONSTRUCTION

PSA 5.1 Survey

PSA 5.1.1 Setting Out of the Works

Substitute the first sentence in clause 5.1.1 with the following:

Setting out of the works shall be done from survey pegs along the street reserve boundaries and from bench-marks as indicated on the drawings. The Contractor shall, within two (2) weeks after the site has been handed over to him, ascertain the correctness of all pegs and bench-marks. Any discrepancy shall immediately be reported in writing to the Engineer. Any costs or subsequent costs arising from discrepancies which had not been reported to the Engineer within the aforementioned period, shall be the sole responsibility of the Contractor.

PSA 5.1.2 Preservation and replacement of survey beacons and pegs subject to the Land Survey Act

DELETE THE WORDS "in the vicinity of boundaries" IN THE SECOND SENTENCE OF SUB-CLAUSE 5.1.2 AND REPLACE THE WORDS "under the direction of" IN THE SAME SENTENCE WITH "in consultation and liaison with".

ADD THE FOLLOWING AFTER THE SECOND SENTENCE OF SUB-CLAUSE 5.1.2:

"The Contractor and the Engineer shall record on the said list, their concurrence or disagreement (as the case may be) regarding the completeness and accuracy of the details recorded therein."

REPLACE THE THIRD SENTENCE OF SUB-CLAUSE 5.1.2 WITH THE FOLLOWING:

"At the completion of the Contract, the Contractor shall expose all pegs that were listed at the commencement of the construction as being in order and the Contractor shall arrange with a registered Land Surveyor for the checking of the positions of all such pegs and the replacement of those that the Land Surveyor's check reveals have become disturbed or damaged. The Contractor shall, as a precedent to the issue of the Certificate of Completion, provide to the Engineer, a certificate from the registered Land Surveyor, certifying that all the pegs listed at the commencement of construction in accordance with the provisions of this clause, have been checked and that those found to have been disturbed, damaged or destroyed have been replaced in their correct positions, all in accordance with the provisions of the said Act.

The costs of all checking, replacement and certification as aforesaid shall be entirely for the Contractor's account. This, with the provision always that the Contractor shall not be held liable for the cost of replacement of pegs which:

a) cannot reasonably be re-established in their original positions by reason of the finished dimensions of the permanent works, and

b) the Contractor can prove beyond reasonable doubt to the satisfaction of the Engineer, were disturbed, damaged or destroyed by others beyond his control

PSA 5.2 Watching, Barricading, Lighting And Traffic Crossings

Add the following to clause 5.2:

The Contractor shall employ competent watchmen to guard the works both day and night.

From the time work on any portion of the Works commences, until the Completion of the Works and the issue of the Certificate of Completion of the Works, the Contractor shall be responsible for protecting the property of the Municipality and all persons having business on the Site from anything dangerous or likely to cause damage or injury. The Contractor shall take all practical precautions to avoid nuisance or inconvenience to the owners or occupiers of properties near to the Site and to the public generally whilst carrying out the Works and shall at all times keep the Site clean and in safe and satisfactory condition. Dust control shall be exercised by frequently and whenever required spraying cleared surfaces and bypasses with water.

The crossing of any tarred roads to connect to the water and sewer mains must be done in half widths, or as required by the Engineer.

PSA 5.3 Protection Of Existing Structures

REPLACE "Machinery and Occupational Safety Act, 1983 (Act No 6 of 1983)" WITH "Occupational Health and Safety Act, 1993 (Act No 85 of 1993), as amended," AND INSERT THE FOLLOWING AFTER "(Act No. 27 of 1956)": "as amended".

PSA 5.4 Protection Of Overhead And Underground Services

REPLACE THE HEADING AND THE CONTENTS OF SUB-CLAUSE 5.4 WITH THE FOLLOWING:

PSA 5.4 Location And Protection Of Existing Services

PSA 5.4.1 Location of existing services

Before commencing with any work in an area, the Contractor shall ascertain the presence and actual position of all services which can reasonably be expected by an experienced and competent Contractor to be present on, under, over or within the Site.

Without in any way limiting his liability in terms of the Conditions of Contract in relation to damage to property and interference with services, the Contractor shall, in collaboration with the Engineer, obtain the most up-to-date plans as are available, showing the positions of services existing in the area where he intends to work. Neither the Employer nor the Engineer offers any warranty as to the accuracy or completeness of such plans and because services can often not be reliably located from plans, the Contractor shall ascertain the actual location of services depicted on such plans by means of careful inspection of the Site.

Thereafter, the Contractor shall, by the use of appropriate methodologies, carefully expose the services at such positions as are agreed to by the Engineer, for the purposes of verifying the exact location and position of the services. Where the exposure of existing services involves excavation to expose underground services, the further requirements of sub-clauses 4.4 and 5.1.2.2 of SABS 1200 D (as amended) shall apply.

The aforesaid procedure shall also be followed in respect of services not shown on the plans but which may reasonably be anticipated by an experienced Contractor to be present or potentially present on the site.

All services, the positions of which have been determined as aforesaid at the critical points, shall henceforth be designated as 'known services' and their positions shall be indicated by the Contractor on a separate set of drawings, a copy of which shall be furnished to the Engineer without delay.

As soon as any service which has not been identified and located as described above is encountered on, under, over or within the site, it shall henceforth be deemed to be a known service and the aforesaid provisions pertaining to locating, verifying and recording its position on the balance of the site shall apply. The Contractor shall notify the Engineer immediately when any such service is encountered or discovered on the Site.

Whilst he is in possession of the Site, the Contractor shall be liable for all loss of or damage as may occur to

a) known services, anywhere along the entire lengths of their routes, as may reasonably be deduced from the actual locations at which their positions were verified as aforesaid, due cognisance being taken of such deviations in line and level which may reasonably be anticipated, and

b) any other service which ought reasonably to have been a known service in

accordance with the provisions of this clause,

The Contractor shall also be liable for consequential damage in regard to (a) and (b), whether caused directly by the Contractor's operations or by the lack of proper protection.

No separate payment will be made to the Contractor in respect of his costs of providing, holding available on the Site and utilising the said detecting and testing equipment, nor for any costs incurred in preparing and submitting to the Engineer the Drawings as aforesaid. These costs shall be deemed included in the Contractor's other tendered rates and prices included in the Contract.

Payment to the Contractor in respect of exposing services at the positions agreed by the Engineer and as described above will be made under the payment items (if any) as may be provided for in the respective sections of the specifications pertaining to the type of work involved

PSA 5.4.2 Protection during construction

The Contractor shall take all reasonable precautions and arrange its operations in such a manner as to prevent damage occurring to all known services during the period which the Contractor has occupation and/or possession of the Site.

Services left exposed shall be suitably protected from damage and in such a manner as will eliminate any danger arising there from to the public and/or workmen, all in accordance with the requirements of the prevailing legislation and related regulations.

Unless otherwise instructed by the Engineer, no services shall be left exposed after its exact position has been determined and all excavations carried out for the purpose of exposing underground services shall be promptly backfilled and compacted. In roadways, the requirements of Sub clause 5.9 of SABS 1200 DB should be observed. In other areas compaction is to be to 90% modified AASHTO density.

Before any work that involves services to any property is carried out, the Contractor shall serve notice on the resident, occupier and/or owner of every property at least 3 working days in advance of any temporary disconnection, advising the nature, time and duration. The Contractor shall comply with any additional requirements of the Local Authority.

PSA 5.4.3 Alterations and repairs to existing services

Unless the contrary is clearly specified in the Contract or ordered by the Engineer, the Contractor shall not carry out alterations to existing services. When any such alterations become necessary, the Contractor shall promptly inform the Engineer, who will either make arrangements for such work to be executed by the owner of the service, or instruct the Contractor to make such arrangements himself.

Should damage occur to any existing services, the Contractor shall immediately inform the Engineer, or when this is not possible, the relevant

authority, and obtain instructions as to who should carry out repairs. In urgent cases, the Contractor shall take appropriate steps to minimise damage to and interruption of the service. No repairs of telecommunication cables or electric power lines and cables shall be attempted by the Contractor.

The Employer will accept no liability for damages due to delay in having such alterations or repairs effected. The Contractor shall provide all reasonable opportunity, access and assistance to persons carrying out alterations or repairs of existing services.

PSA 5.7 Safety

REPLACE THE CONTENTS OF SUBCLAUSE 5.7 WITH THE FOLLOWING:

"Pursuant to the provisions of the Conditions of Contract, and without in any way limiting the Contractor's obligations there under, the Contractor shall at his own expense (except only where specific provision (if any) is made in the contract for the reimbursement to the Contractor in respect of particular items), provide the following:

a) Provide to its Employees on the site of the works, all safety materials, clothing and equipment necessary to ensure full compliance with the provisions of the Occupational Health and Safety Act, 1993 (Act No 85 of 1993) as amended (hereinafter referred to as the Act) at all times, and shall institute appropriate and effective measures to ensure the proper usage of such safety materials, clothing and equipment at all times;

b) Provide, install and maintain all barricades, safety signage and other measures to ensure the safety of workmen and all persons in, on and around the site, as well as the general public;

c) Implement on the site of the works, such procedures and systems and keep all records as may be required to ensure compliance with the requirements of the Act at all times;

d) Implement all necessary measures so as to ensure compliance with the Act by all subcontractors engaged by the Contractor and their employees engaged on the works;

e) Full compliance with all other requirements pertaining to safety as may be specified in the Contract.

The Employer and the Engineer shall be entitled, although not obliged, to make such

inspections on the site as they shall deem appropriate, for the purpose of verifying the Contractor's compliance with the requirements of the Act. For this purpose, the Contractor shall grant full access to the site of all parts of the site and shall co-operate fully in such inspections and shall make available for inspection all such documents and records as the Employer's and/or Engineer's representative may reasonably require.

Where any such investigations reveal, or where it comes to the Engineer's attention that the Contractor is in any way in breach of the requirements of the Act or is failing to comply with the provisions of this clause, the Engineer shall, in accordance with the provisions of clause 39 of the Conditions of Contract, be entitled to suspend progress on the works or any part thereof until such time as the Contractor has demonstrated to the satisfaction of the Engineer, that such breach has been rectified.

The Contractor shall have no grounds for a claim against the Employer for extension of time and/or additional costs if the progress on the works or any part thereof is suspended by the Engineer in terms of this clause, and the Contractor shall remain fully liable in respect of the payment of penalties for late completion in accordance with the provisions of clause 43 of the Conditions of Contract should the Contractor fail to complete the Works on or before the specified due completion date in consequence of the suspension.

Persistent and repeated breach by the Contractor of the requirements of the Act and/or this clause shall constitute grounds for the Engineer to act in terms of subclause 55 of the Conditions of Contract and for the Employer to cancel the Contract in accordance with the further provisions of the said clause 55."

ADD THE FOLLOWING SUB-CLAUSE TO CLAUSE 5:

"PSA 5.9 Site Meetings

The Contractor or his authorised agent will be required to attend regular site meetings, which shall normally be held once a month on dates and at times determined by the Engineer, but in any case, whenever reasonably required by the Engineer. Unless otherwise indicated in the Contract or instructed by the Engineer, such meetings shall be held at the Contractor's offices on the site. At such monthly meetings, matters such as general progress on the works, quality of work, problems, claims, payments, and safety shall be discussed, but not matters concerning the day-to-day running of the Contract."

PSA 6 TOLERANCES

Add the following sub-clause:

"PSA 6.4 General

No guarantee is given that the full specified tolerances will be available independently of each other, and the Contractor is cautioned in regard to the fact that the liberal or full use of any one or more of the tolerances may deprive him of the full or any use of tolerances relating to other aspects of the work.

Except where the contrary is specified or when clearly not applicable, all quantities shall for purpose of measurement and payment be determined from the 'authorized' dimensions. This shall be taken to mean the dimensions as specified or shown on the drawings or, if changed, as finally instructed by the Engineer, without any allowance for the tolerances

specified. Save as hereinafter specified to the contrary, all measurements for determining quantities for purposes of payment will be based on the "authorized" dimensions.

If the work is therefore constructed in compliance with the "authorized" dimensions plus or minus any tolerances allowed, quantities will be based on the "authorized" dimensions regardless of the actual dimensions to which the work has been constructed.

When the work is not constructed in accordance with the 'authorised' dimensions plus or minus the tolerances allowed, the Engineer may nevertheless, at his sole discretion, accept the work for payment. In such cases no payment shall be made for quantities of work or material in excess of those calculated for the 'authorised' dimensions, and where the actual dimensions are less than the 'authorised' dimensions minus the tolerance allowed, quantities for payment shall be calculated based on the actual dimensions as constructed."

PSA 7 TESTING

PSA 7.1.1 Checking

Replace the last sentence with the following:

"The Contractor shall obtain the services of an independent testing laboratory at his own expense (Refer sub-clause PS 8.6 of portion 1 of the project specifications) to carry out such checks as are prescribed in the various standardized specifications."

PSA 7.1.2 Standard of finished work not to specification

Replace the words "Where the Engineer's checks reveal . . ." with "Where the checks by the approved laboratory reveal . . ."

PSA 7.2 Approved Laboratories

Add the following:

"The independent laboratory used by the Contractor and approved by the Engineer shall also be deemed to be an approved laboratory."

PSA 7.4 Statistical Analysis Of Control Tests

Substitute A 7.4 with the following:

Test results shall not be evaluated by statistical methods. All results shall comply with the specified minimum requirements of the materials concerned.

PSA 8 MEASUREMENT AND PAYMENT

PSA 8.1 Measurement

PSA 8.1.2 Preliminary and general items or section

PSA 8.1.2.1 Contents

Replace the contents of item (c) with the following:

"The 'duration of construction' applicable to a time-related item shall be the tendered contract period."

PSA 8.1.2.2 Tendered sums

Replace the contents of this sub-clause with the following:

"The Contractor's tendered sums under items PSA 8.3 and PSA 8.4 shall collectively cover all charges for:

- Risks, costs and obligations in terms of the General Conditions of Contract, Special Conditions of Contract and of this Standardized Specification, except to the extent that provision is made in these Project Specifications to cover compensation for any of these items of work.
- Head-office and site overheads and supervision.
- Profit and financing costs.
- Expenses of a general nature not specifically related to any item or items of permanent or temporary work.
- Providing facilities on site for the Contractor's personnel, including offices, storage facilities, workshops, ablutions, for providing services such as water, electricity, sewerage, sewage and rubbish disposal, for access roads and all other facilities required as well as for the maintenance and removal on completion of the works of these facilities (Excluding the permanent structures).and the cleaning-up of the camp site on completion of the works.
- Providing facilities for the Engineer and his staff as specified in Portion 1: Site facilities required, SABS 1200 AB and PSAB.
- All costs related to the supply, erection, maintenance and removal of two contract name boards as detailed in the drawings."

PSA 8.2 Payment

PSA 8.2.1 Fixed-charge and value-related items

Replace the contents of this sub-clause with the following:

"Payment of fixed charges in respect of item 8.3.1 will be made as follows:

Eighty per cent (80%) of the sum tendered will be paid once the facilities have been provided and approved. The remaining twenty per cent (20%) will be paid once the works have been completed, the facilities removed and the camp site cleared and cleaned.

Payment for the sum tendered under item 8.3.2 will be made in three separate instalments as follows:

a) The first instalment which is 40% of the sum, will be paid when the Contractor has met all his obligations to date under this specification, the general conditions of contract and the special conditions of contract, and where the value of work certified for payment, excluding materials on site and any payments under preliminary and general items is equal to not less than 5% of the total value of the work listed in the schedule of quantities.

b) The second instalment, which is 40% of the sum, will be made when the amount certified for payment, including retention monies but excluding the second instalment referred to herein, exceeds 50% of the tender sum.

c) The final payment, which is 20% of the sum, will be made when the works have been certified as completed and the Contractor has fulfilled all his obligations to date under this specification, the general conditions of contract and the special conditions of contract.

Should the value of the measured work finally completed be more or less than the tender sum, then the sum tendered under item 8.3.2 will be adjusted pro rata up or down in accordance with clause 53 of the General Conditions of Contract and this adjustment shall be applied to the third instalment. No adjustment will apply to item 8.3.1 in respect of variations in the value of work done or the time for completion finally authorized."

PSA 8.2.2 Time-related items

Replace the contents of this sub-clause with the following:

"Subject to the provisions of 8.2.3 and 8.2.4, payment under item 8.4.1 (time-related item) will be made monthly in equal amounts, calculated by dividing the sum tendered for the item by the tendered contract period in months, provided always that the total of the monthly amounts so paid for the item is not more than in proportion to the progress of the work as a whole.

Should the Engineer grant an extension of the time for completion of the works, the Contractor will be entitled to an increase in the sum tendered for the time-related item, which increase shall be in the same proportion to the original tendered sum as the extension of time is to the original time for completion of the works.

Payment for such increased amounts will be taken to be in full compensation for all additional time-related preliminary and general costs, that result from the circumstances pertaining to the extension of time granted."

PSA 8.3 Scheduled Fixed-Charge And Value-Related Items

PSA 8.3.1 Contractual requirements Unit: Sum

Add new payment item:

PSA 8.3.1 a) Contractors all risk insurance provided by Contractor (if not by Municipality as

Contractor | Witness 1 | Witness 2 | Employer | Witness 1 | Witness 2

The rate shall cover the cost to provide insurance as required in GCC38.1 for the duration of the contract.

PSA 8.3.2 Establishment of Facilities on the Site

PSA 8.3.2.1 Facilities for Engineer

Substitute or add the following subclauses:

Substitute A 8.3.2.1(a) and (b) with:

a) Furnished office for Resident Engineer suitable for site meetings Unit: Sum

b) One cellular phone Unit: Sum

d) One survey assistants and equipment Unit: Sum

Add the following sub-clauses:

e) One carport as specified Unit: Sum

f) Provision of monthly “as-built” records to the Engineer Unit: Sum

g) Ablution and latrine facilities Unit: Sum

The payment remains as specified in Subclause 8.3.2.3.

PSA 8.4 Scheduled Time-Related Items

PSA 8.4.2.1 Facilities for Engineer

Substitute A 8.4.2.1(a) and (b) with:

a) Furnished office for Resident Engineer suitable for site meetings Unit: month

b) One cellular phone Unit: month

d) Two survey assistants and equipment Unit: month

Add the following sub-clauses

e) One carport as specified Unit: month

f) Provision of monthly “as-built” records to the Engineer Unit: month

g) Ablution and latrine facilities Unit: Month

PSA 8.4.2.2 Facilities for Contractor

Add the following:

k) One printer Unit: month

l) Digital camera to take digital photographs of existing structures and obstructions on the pipeline routes and submit to the Engineer Unit: month

The unit of payment for item 8.4.2.1 will be “month”

PSA 8.5 Sums Stated Provisionally By Engineer

Add the following:

a) Relocation of existing services Unit: Sum

b) Accredited Training Unit: Sum

PSA 8.6 Prime Cost Items

Add the following new sub-clauses:

d) Additional quality control tests by approved laboratory instructed by the Engineer. (The cost of tests not conforming to standards shall not be included for payment) Unit: Sum

e) Contractor’s superintendence and administration of item (d) above Unit: %

PSA 8.7 Daywork

Replace A8.7 with the following:

Daywork will be paid according to the tendered rates in the Daywork Schedule attached as an annexure. These tendered rates include all allowances for the Contractor’s and subcontractor’s profits, timekeeping, clerical work, insurance establishment, superintendence and the use of hand tools. The percentage allowances stated in the appendix to the tender form are only applicable to daywork items not listed in the Daywork Schedule. These daywork costs will be valued according to clause 40(4)(b) in the General Conditions of Contract as amended.

PSA 8.8 Temporary Works

PSA 8.8.2 Accommodation of Traffic Unit: Sum

Add the following to A 8.8.2:

The rate shall cover all costs pertaining to the provision, erection, moving, re-erection and maintenance of all temporary barricades, road signs, lights, flagmen, etc. as required, for the guarding and protection of the works, for the construction, gravelling and maintenance of access roads and detours to the site of the works, borrow pits or spoil sites, as well as for the later removal or the cleaning and tidying up thereof, for making the necessary traffic arrangements and arrangements with regard to the moving and/or re-erection of existing traffic signs, as well as all other costs to accommodate the traffic during construction.

PSA 8.8.4 Existing Services

Add the following to A 8.8.4:

Where the Contractor is responsible for the cost of repairs carried out by the Municipality or others, the costs will be recovered by means of a deduction from the Contractor's monthly payment certificate. The Municipality will attend to the payment of monies due to others.

PSA 8.8.5 Cost of Survey in Terms of the Land Survey Act Unit: Sum

Substitute A 8.8.5 with the following:

The sum shall cover the cost of all labour, plant and material required for the searching and compilation of a list, all in accordance with the requirements as set out in clause A 5.1.2. The cost of the Contractor's responsibility for the setting out of the Works in terms of Subclause 5.1.1 and the preservation and replacement of beacons and pegs subject to the Land Survey Act in terms of Subclause A 5.1.2 will be held to be covered by the sums tendered for other obligations under Subclauses 8.3.3 and 8.4.5.

PSA 8.9 Additional Survey

a) As instructed by the EngineerUnit: PC Sum

b) Overheads, changes and profit on item (a) above Unit: percentage (%)

ADD THE FOLLOWING ITEM:

PSAB ENGINEERS OFFICE (1986)

PSAB 3 MATERIALS

PSAB 3.1 Nameboards

Substitute "South African Institution of Civil Engineers" in the first paragraph of AB 3.1 with "South African Association of Consulting Engineers".

PSAB 3.2 Office Building(S)

Add the following to AB 3.2:

The office must have an adjacent carport with minimum dimensions of 6 m x 3 m with a free draining, wearing course floor. The roof must be built in such a way that a vehicle will always be shielded against the sun throughout the day. An approved shade net may be used for the sides to comply with above-mentioned requirement.

Add the following:

"The Contractor shall provide an air conditioner for both cooling and heating. At least 2 single phase plug points shall be provided. A plan hanger for A0 plans shall be provided."

PSAB 4 PLANT

PSAB 4.1 Telephone

Replace AB 4.1 with the following:

The Contractor shall make available a cellular phone for the exclusive use of the Engineer's Representative for official purposes.

PSAB 5 CONSTRUCTION

PSAB 5.1 Nameboards

Add the following to AB 5.1:

The nameboards shall be erected within one month after receipt of the letter of acceptance and shall be placed at the position indicated by the Engineer, and kept in good repair for the duration of the contract and the defects liability period. Any damage to these boards shall be repaired within fourteen days. No payment shall be made in terms of the contract prior to the erection of the nameboards.

The Contractor will be permitted to erect a maximum of two of his own nameboards, in positions approved by the Engineer. The Engineer reserves the right to order the removal of these boards if they are not kept in good condition.

PSAB 5.5 Survey Assistants

Substitute "two or more" in the first sentence of AB 5.5 with "two".

PSAB 5.6 Survey Equipment

New clause

The Contractor shall provide the following tested and approved survey equipment on site for the duration of the contract and for the use of the Engineer whenever needed:

a) one tachimeter capable of reading to minimum 20 seconds and maximum 6 seconds of arc, plus tripod;

b) one automatic level plus tripod;

c) two tachimeter staffs and one level staff, all graduated metrically; and

d) one 5 m and one 100 m tape measure.

The above-mentioned equipment may by arrangement be shared between the Contractor and the Engineer's representative.

The Contractor shall keep the equipment continuously insured against any loss, damage or breakage, and he shall indemnify the Engineer and the Municipality against any claims in this regard. The Contractor shall maintain the equipment in good working order and

keep it clean throughout the contract period.

PSA 3 MATERIALS

PSA 3.1 QUALITY

Where there is a standardisation mark programme for any material, all such material supplied shall bear the official standardisation 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 OFFICES, STORES AND SERVICES

The Contractor's site establishment shall also comply with the requirements of the Environmental Management Plan herein (Section C3.8)

PSA 5 CONSTRUCTION

PSA 5.1 SURVEY

PSA 5.1.1 Setting Out of the Works

The Contractor shall engage an engineering surveyor to establish sufficient control points for the subsequent setting out and checking of the new pipeline alignments

Any control point disturbed by the Contractor in the course of construction shall be reinstated at the Contractor's own expense.

The setting out of the Works shall be carried out by the Contractor, according to the setting out coordinates given on the drawings and the control points referred to above. All dimensions, levels and data necessary for the complete setting out of the Works will be provided on the Drawings. The Contractor shall not scale dimensions from the Drawings but shall request from the Engineer any information which is not clearly stated on the Drawings.

PSA 5.4 PROTECTION OF OVERHEAD AND UNDERGROUND SERVICES

Add the following to Sub-Clause 5.4: -

Location and Protection

All available information relating to known existing services and structures has been included on the Drawings. Although this information is reflected as accurately as possible, all positions and levels must be taken as approximate only. At the commencement of

the contract the Contractor shall verify the information on the plans.

The Contractor shall liaise with the landowners to determine the location of any privately-owned services.

At locations where there is a reasonable possibility of unknown underground services being present, the Contractor shall open trenches across such locations before commencing with excavations and, if services are found, these shall be plotted and thereafter be considered as 'known services'. Such work is to be carried out only on the instruction of and under the direct control of the Employers Agent.

All known services shall be adequately protected from damage during construction operations. The requirements of the relevant service departments relating to limits of heavy plant usage, departmental supervision etc., shall be ascertained and adhered to.

Any damage to known services shall be made good at the Contractor's expense.

No pegs or stakes are to be driven into the ground in the vicinity of the underground services, particularly Electricity or telecommunication services.

Any services or structures damaged during construction shall immediately be reported to the Employers Agent, and as soon as possible after such damage a written report stating the exact circumstances of the occurrence shall be submitted to the Employers Agent.

All practical measures shall be taken to effect immediate repairs, either by contacting the relevant authority, or where instructed by the Employers Agent, the Contractor shall perform temporary repairs himself.

Wayleaves

As soon as the Contract has been awarded, the Contractor shall apply for the applicable wayleaves or permits from Eskom, and the Nala Local Municipality for working in the vicinity of electrical cables.

The Contractor shall also apply to Telkom, Neotel all fibre optic and any other services authorities in respect of any other services which may be present on site.

Copies of these wayleaves or permits shall be submitted to the Employer’s Agent prior to any excavations being carried out.

The Contractor shall provide any sureties or bank guarantees (over and above any other contractual monies) required by Eskom, the Municipality or any other Service Authority, which will be fully refundable provided that the funds are not required to repair cables

damaged by the Contractor. The Contractor shall make provision for excavating by hand when working within 3 m of existing electrical cables (underground or overhead). The Contractor shall liaise closely with Eskom in this regard.

PSA 5.6 POLLUTION

Add the following to Sub-Clause 5.6:

The Contractor is required to take all necessary precautions, watering where appropriate, to prevent dust blowing from construction material and spoil heaps and/or ground stripped of vegetation cover. Unless a specific item is included in the Bill of Quantities, the costs shall be deemed to be included in the tendered rates.

This item shall receive special attention due to the presence of vineyards in the vicinity of the site.

PSA 5.7 SAFETY

The Contractor shall comply with all further provisions pertaining to safety, contained in the Section C3.7: Health and Safety Specifications.

PSA 5.8 GROUND AND ACCESS TO THE WORKS

PSA 5.8.1 Construction Width

The Works are to be executed within privately owned residential properties and land, public roads and land owned by the Municipality, Transnet, Eskom or other parastatal enterprises. Narrower construction widths shall apply in many instances where physical constraints such as existing infrastructure, embankments, structures, boundary walls, trees etc. exist.

The Contractor shall restrict his activities, including the pipe trench, top soil and excavated material heaps, temporary stringing out of pipes and stacking of materials, access and operation of plant and all other work, to within this Construction Width, or such narrower width as may be indicated in certain areas.

PSA 5.8.5 Access Roads

Where there are no existing roads or tracks, the Contractor shall provide suitable access roads, for the purposes of construction and delivery of materials and for access by the Employers Agent to carry out inspections of the work.

These shall be maintained in a satisfactory condition until they are no longer required, after which the areas affected shall be reinstated to their original condition.

Temporary gates shall be provided at points where access roads cross existing fences.

All existing access roads on the site, used by the Contractor for the works or affected by the works shall be maintained for the duration of the Contract and reinstated to their original condition after completion of the works.

The Contractor shall ensure that all existing access roads required by the general public, the Employer or the Landowners are kept open or that acceptable alternative routes are provided.

PSA 5.8.6 FENCES

Before commencing work, the Contractor shall consult the affected landowners to determine which fences, if any, can be temporarily removed.

Fences that cross the Construction Width shall be suitably propped, protected and maintained during construction.

Fences which run parallel to and within the Construction Width, shall be replaced with a temporary fence erected along the edge of the Construction Width, and restored to their original lines after completion of the WorksWhere so agreed to by the landowners, the fences may be dismantled, the materials set aside until completion of the work, after which they shall be reinstated. All fences affected by the Works shall be reinstated to their original condition.

PSA 5.10 PROVIDING ACCESS TO ADJACENT ERVEN AND PROPERTIES

(New Clause) Access to adjacent erven and properties where affected must be provided by the Contractor at all times. To this end suitable road and trench crossings shall be constructed where required. Temporary trench crossings shall be in the form of portable bridges, temporary backfill or other approved means and shall be capable to permitting the safe passage of vehicles of mass not exceeding 2 tonnes. The Contractor shall also be responsible for maintaining crossings and for removing same when they are no longer required.

The Contractor may, with the approval of the Employer’s Agent, arrange with the occupiers of the affected erven and properties to temporarily close off a portion of a street, road, footpath or entrance, provided that the Contractor shall give due notice of the intended closure and its probable duration to the occupiers and shall as punctually as possible re-open the route at the prescribed time. Where possible the access route shall be made safe and re-opened to pedestrian/vehicular traffic overnight. Any such closure shall be an arrangement between the Contractor and the occupiers and shall not absolve the Contractor from his obligations under the contract to provide access at all times. Barricades, traffic signs and drums shall be provided by the Contractor to suit the specific conditions".

PSA 5.11 MAINTAINING WATER SUPPLY

(New Clause) The Contractor shall take note that he shall not cut off

the existing water supply without the prior approval of the Municipality and of the Employer's Agent and the knowledge of the affected residents.

No water pipeline shall remain cut off for more than 5 hours or overnight.

Failure on the part of the Contractor to comply with any of the above provisions will constitute sufficient reason for the Employer's Agent to stop the works until the situation has been remedied, or should he deem it necessary, arrange for the situation to be remedied at the Contractor's cost.

No direct payment will be made for the cost of maintaining the existing water supply. Payment will be deemed to be covered by the rates and sums tendered and paid for the various items of work included under the contract.

PSA 8 MEASUREMENT AND PAYMENT

PSA 8.2 PAYMENT

PSA 8.3.5 Contractor's Obligations with Respect to Health and Safety

(New Clause) The Contractor shall tender a lump sum in the Bill of Quantities to cover his fixed costs for the proper compliance with the requirements of the Occupational Health and Safety Act, the Construction Regulations 2014 issued in terms of Section 43 of the Occupational Health and Safety Act, 1993 (Act 85 of 1993) and the Site Specific Health and Safety Specifications in Section C3.7 herein. The amount tendered and paid shall be full compensation for:

The drawing up of a detailed Health and Safety Plan in respect of the Works for submission to the Engineer and Employer prior to the handing over of the Site to the Contractor.

The execution of all training, precautions, monitoring, liaison, consultation and review as detailed in the Health and Safety Plan.

Ensuring that all Sub-Contractors comply with the requirements of the Act and the Health and Safety Plan.

The preparation and maintenance of a Health and Safety File, which is to be submitted to the Employer upon completion of the Works.

Compliance in all other respects with the relevant health and safety legislations

Payment shall only be affected once the Employers OHS Agent has approved the OHS File, inclusive of all Risk Assessments and Method Statement.

PSA 8.3.6 Compliance with Construction Environmental Management Programme

(New Clause) The Contractor shall tender a lump sum to cover all fixed costs (over and above the costs of site establishment and compliance with health and safety requirements) for complying with the Environmental Management Plan contained in Section C3.8 herein. The amount tendered shall be deemed to be full compensation for all administration, labour, plant, materials, services and risks associated with complying with the Environmental Management Plan in every respect.

A separate item will be scheduled for the Environmental Awareness Training. The amount tendered shall cover all costs associated with provision of the venue, arranging attendance by personnel and shall be deemed to be full compensation for wages of personnel and loss of production during the period that they are engaged in Environmental Training. Payment under this item will be made in the first certificate after completion of the training, provided that the Contractor has submitted a copy of the attendance register to the Engineer.

Item	Unit
Compliance with Environmental Management Plan	Sum

PSA 8.3.9 Removal and re-establishment of Contractor's site establishment

(New Clause) Only if so instructed, the Contractor shall delay the execution of the Works and remove the site establishment and re-establish at a later date to be determined by the Employer. This item shall cover all fixed costs associated with the complete removal from site of the Contractor's establishment and the cost re-establishment. 50% of this item shall be paid upon removal of the site establishment and the balance shall be payable upon re-establishment.

The costs for removal and reinstatement of the Employer's Agent's office, vehicle and equipment as specified in Section AB shall also be included in the rate for this item, which shall be deemed to have been allowed for in his rates.

PSA 8.4.5 Items Requiring Special Attention

The following items shall cover time-related costs associated with complying with specific items requiring special attention, as identified in the Scope of Work.

The sum tendered shall cover all costs not included in the rates for earthworks or other billed items for complying with Clause 5.5 of SANS 1200 A in dealing with water on the works. This amount shall only be paid if proof of any water conditions on site, either caused by storm water or spillage form a broken pipe, has be experienced, which were to be dealt with the by Contractor.

Fixed costs (if any) shall be deemed to be included in PSA 8.3.2.

PSA 8.5.4 Employment of CLO

A sum has been allowed for the employment of a Community Liaison Officer (CLO). The Contractor shall pay the CLO all fees and costs due to him, which shall be recoverable under this item.

The Contractor's tendered mark- up shall allow for all necessary administrative costs in complying with the above.

Item Unit

Employment of CLO& PSC PC Sum

Overheads, charges and profit on a) above %

PSC SANS 1200 C: SITE CLEARANCE

PSC 3 MATERIALS

PSC 3.1 DISPOSAL OF MATERIAL

Natural material comprising stones, gravel, soil and topsoil shall be stockpiled along the edge of the Construction Width and spread over the Construction width after completion of the backfill.

All rubble and waste arising from the demolition of structures shall be removed from site.

Tree trunks, branches and any other cleared vegetation constituting a fire hazard shall be removed from site.

All cleared material removed from site shall be disposed of at an approved landfill site selected by the Contractor.

Burning of material on site will not be permitted.

PSC 5 CONSTRUCTION

PSC 5.1 AREAS TO BE CLEARED

The Contractor shall clear the Construction Width, to the extent necessary to allow access and the execution of the Works as specified.

No established trees or wild olives shall be removed without the Employers Agents prior approval. Prior to commencing clearing, the Contractor shall give adequate notice to the Employers Agent and the area to be cleared shall be inspected jointly by the Contractor's representative and a botanical specialist designated by the Employers Agent. Any vegetation to be protected shall be identified and marked and where necessary, minor adjustments to the pipeline alignment will be made to avoid damage to significant vegetation.

No vines shall be removed without prior approval from the Employers Agent. Prior to removal of any vines, the Contractor shall give adequate notice to the owner and give him the opportunity to recover any plants and or materials.

PSC 8 MEASUREMENT AND PAYMENT

PSC 8.1 PRINCIPLES

PSC 8.1.1 Demolition

Payment for demolition work, should it arise, shall only be made after all waste generated from the demolition work concerned has been cleared from site to the satisfaction of the Employers Agent.

Where indicated that materials recovered from demolition or dismantling of existing structures or plant are to be handed over to the Employer, the rate shall include all costs of removing, transporting and stacking the material at the designated location. No additional payment will be made for transport of material from any location along the pipe route to any location within 500 m of the Construction Width.

Where indicated that materials are to be reused in the Works, the rate shall cover all costs associated with dismantling, setting aside and storing the materials and protecting them from damage, until they are reused.

PSC 8.2.5 Take down existing fences and re-erect after completion of the works to original state Unit: m

The unit of measurement will be metre and the rate will include re-erection thereof as soon as possible after construction work is completed.

Add the following:

PSC 5.8.1 Removal and Re-Erection of Structures

Where the Contractor is directed to dismantle structures to facilitate construction and thereafter to re-erect the same structures, the structure shall be erected at the same location, or such other location as may be required by the owner within the same property, using the same or similar materials as those set aside when removing the structure. The acceptance of the work by the Engineer and certification for payment shall be subject to the Contractor submitting to the Engineer documentary evidence of the owner‘s satisfaction with the re-erected structure, the over-riding consideration being that it shall be in a condition no worse than that pertaining prior to its removal.

The tendered rates shall include for the provision of a detailed photographic and written record of all of the affected structures before dismantling commences and

following re-erection.

PSC 5.8.2 Demolition of Buildings or Structures

Where the Contractor is directed to demolish structures, the Contractor shall provide a Method Statement for the approval of the Engineer. Entering upon the premises for the purpose of the demolition shall not commence before the Contractor has received a release form, duly authorised by representatives of the Employer and the Engineer, in which any special conditions applicable to the demolition are documented."

PSC 8.2.14 Demolition of buildings or structures Unit: m^3

Separate payment will be made for demolishing structures in the manner specified in PSC 5.8.2 above as scheduled, including the cost of removal of rubble to an approved spoil site, backfilling any excavations and compacting to 90% modified AASHTO density and shaping the ground level in line with the natural terrain.

PS C 8.2.8 Demolish and remove structures/buildings and cart away unwanted material to spoil at dump site

a) Informal structures and buildings smaller than 2,5 m^2 irrespective of type of material . Unit: No

b) Buildings larger than 2,5m^2 irrespective of type of material . Unit: m^2

PSC 8.2 SCHEDULED ITEMS

PSC 8.2.1 Clear and Grub

Clearing and grubbing will not be measured where the pipeline is laid within existing gravel roads.

PSC 8.2.5 Fences

Protection/Reinstatement of Fences

Where existing fences cross the pipeline route, the item shall cover the costs of adequately supporting them, protecting them from damage and reinstating them, as well as providing temporary gates as required by the Contractor.

Where existing fences run along and within the Construction Width, the item shall cover the costs of protecting the fence from damage or temporarily relocating it outside of the Construction Width and reinstating it after completion of the works.

The fences may be reinstated using the original materials recovered from the existing fences provided that the Contractor shall, at his own cost, replace any materials that have been lost or damaged during the construction period.

The quantity measured shall be the number of fences affected, or in the case of fences running longitudinally the length of the portion of fence lying within the Construction Width.

Item Unit

Take down existing fences and re-erect after completion of the works to original state m

PSD SANS 1200 D: EARTHWORKS

PSD 1 SCOPE

Items of work covered by this specification shall include, bulk and restricted earthworks for the pump stations as well as all other incidental excavations required to complete the Works.

PSD 3 MATERIALS

PSD 3.1 Classification For Excavation Purposes

PSD 3.1.1 Method of classifying

Add the following:

"Classification of material other than 'soft excavation' shall be agreed upon before excavation may be commenced. The Contractor shall immediately inform the Engineer if and when the nature of the material being excavated changes to the extent that a new classification for further excavation is warranted. Failure on the part of the Contractor to advise the Engineer thereof in good time shall entitle the Engineer to classify, at his discretion, such excavation as may have been executed in material of a different nature."

PSD 3.2 CLASSIFICATION FOR PLACING PURPOSES

PSD 3.2.1 Material suitable for embankments and terraces

Replace the contents of this subclause with the following:

"PSD 3.2.1.1 General

Save as provided below or instructed by the Engineer, all material resulting from excavations shall be used for purposes of constructing fills and shall only be removed to spoil when surplus to requirements and on the written instructions of the Engineer. Other material that may be approved and ordered for use includes dump rock, ash (mixed with soft fill) and mine-dump material.

In the application of this classification, no differentiation shall be made between "bulk" or "restricted" excavations.

PSD 3.1.2 Classes of Excavation

All material encountered in any excavations for any purpose including restricted excavation will be classified as follows:

Hard rock excavation

Hard rock excavation shall be excavation in material (including un-decomposed boulders exceeding 0,17 cubic metres in individual volume) that cannot be efficiently removed without blasting or without wedging and splitting.

Soft excavation

Soft excavation shall be all material not falling into the categories of hard rock

PSD 3.2 CLASSIFICATION FOR PLACING PURPOSES

PSD 3.2.1 Material suitable for Embankments and Terraces

(d) The material arising from excavations for structures, foundations, footings and the like shall be used for the embankments, berms and terraces or as directed by the Employer's Agent and shall be compacted to a minimum of 90% modified AASHTO density (100% for sand).

PSD 3.2.2 Material suitable for Replacing Overbreak in Excavations for Foundations Add the following Subclause to 3.2.2:

"Any overbreak, in locations where concrete work is to be cast against excavated undisturbed surfaces (e.g. below bulk excavation) is to be refilled with Grade 10 concrete".

PSD 3.2.4 Backfilling and Embankments

Sufficient material arising from excavations for structures, foundations, footings and the like and which is suitable for forming and shaping including compaction of embankments, berms and backfilling against finished structures shall be temporarily stockpiled in the vicinity of the construction. All other material from the excavations shall be disposed of at the designated area.

PSD 5 CONSTRUCTION

PSD 5.1 PRECAUTIONS

PSD 5.1.1 Safety

PSD 5.1.1.2 Safeguarding of Excavations

The Contractor shall be responsible for all lateral support and the safe-guarding of all excavations, and all costs involved with the proper safeguarding of the excavations shall be included in the tendered rates.

PSD 5.1.1.4 Excavation of Rock by Blasting

In addition to complying with the provisions of Sub-clause 5.1.1.3, the Contractor shall record for the information of the Employer's Agent the spacing and loading of the charge in each blast and compliance with this requirement will not relieve the Contractor of any responsibility in terms of the said Sub-clause.

PSD 5.2 METHODS AND PROCEDURES

PSD 5.2.1 Site Preparation

PSD 5.2.1.2 Conservation of Topsoil

Add the following to Subclause 5.2.1.2:

"Topsoil shall not be stockpiled higher than 2,0m. Care shall be exercised to prevent the contamination and compaction of topsoil in any way especially by vehicles travelling over such material."

Topsoil shall consist of fertile, friable soil of loamy character obtained from areas having a good coverage of natural vegetation, preferably grasses. It shall be free from deleterious matter such as large roots, stones, refuse, stiff or heavy clays and the seeds of noxious weeds.

Topsoil shall be obtained from wherever suitable material occurs on the site or borrow areas. The Employer's Agent shall indicate the areas from where topsoil is to be removed, and unless otherwise permitted by the Employer's Agent, topsoil shall be taken from within 400mm of the surface. If the Contractor fails to stockpile the topsoil indicated, he shall obtain suitable topsoil from other sources at no extra cost to the Employer.

PSD 5.2.2 Excavation

PSD 5.2.2.3 Disposal

Where excavated material is disposed of on site or at location designated by the Engineer, the topsoil shall be stripped to a depth of 150 mm or as directed, stockpiled and reinstated to its original depth over the spoil. The spoil site shall be graded to smooth, free-draining contours.

PSD 5.2.4 Finishing

PSD 5.2.4.2 Top soiling

Delete the contents of Subclause 5.2.4.2 and replace with the following:

“Before top soiling, the area must be shaped to line and level and then loosened to a depth of 150mm. All rubble, large rocks, stones, etc shall be raked up and removed from the site prior to the topsoil being evenly distributed over the area to be grassed at a thickness of not less than 100mm. The topsoil shall be levelled with rakes. Following top soiling, the contractor shall apply 2:3:2 fertilizers at a rate of 40gm/m2 prior to planting of vegetation cover”.

PSD 5.2.5 Transport for Earthworks

All haulage for materials obtained from commercial sources selected by the Contractor or disposed of off-site by the Contractor shall be regarded as free-haul.

PSD 8 MEASUREMENT AND PAYMENT

PSD 8.3 SCHEDULED ITEMS

PSD 8.3.2 Bulk Excavation

Unless an item has been specifically scheduled for dewatering, the cost of dewatering of excavations will be held to have been included in the tendered rates for excavation. Provision is made under item PSA 8.4.5 (a) which shall cover all the Contractor's costs involved with the control of surface and subsurface water, not included in the rates for excavation and trench excavations.

The Contractor shall provide adequate temporary drains in and around the excavations to control surface water. Such drains may be self-draining or lead to sumps equipped with pumps.

Should the Contractor allow saturated conditions to develop he shall take such steps to rectify the conditions as the Employers Agent may order, entirely at his own cost, including dewatering.

The tendered price for excavation shall also include for trimming, levelling and compacting the floor of the excavation ready for the application of the blinding layer.

Where embankments are to be constructed with boulder material, embankments are to be laid and compacted in layers (specified by the Employers Agent in writing) and boulders of diameter greater than the layer thickness are to be removed before compaction. The cost for this exercise is deemed to be included in the tendered rates.

PSD 8.3.2 a) Excavate in all materials and use in embankment or backfill or dispose of as ordered

Where the sequence of operations requires temporary stockpiling of excavated material, the rates for excavation shall cover temporarily stockpiling the excavated material on site and maintaining stockpiles until the material is used.

Removal of Excess Material

Where material is surplus or unsuitable for use in embankments or spreading on site, the Employers Agent may order such material to be carted away and disposed of off-site at a location determined by the Contractor. The rate shall cover loading and transport and all disposal charges. The volume shall be computed on the basis of the volume of hauling vehicles in accordance with 8.2.2.

PSD 8.3.3 Restricted Excavation

The provisions of PSD 8.3.2 shall apply. Rates tendered shall include for restricted backfilling around the structure.

PSDB SANS 1200 DB: EARTHWORKS (PIPE TRENCHES) PSDB 3

MATERIALS

PSDB 3.1 CLASSES OF EXCAVATION

The excavation of material will be classified as specified in Clause

PSD 3.1.

PSDB 3.2 BACKFILL MATERIAL

Delete the contents of Clause 3.5(b) and replace with the following:

“Materials used in the reinstatement of trenches beneath or within a new roadway, up to underside of the road layers, shall be 37,5mm basecourse quality material conforming to SANS 1200 MF compacted in 150mm layers to 98% Modified AASHTO density. The area subject to loads from road traffic shall be held to apply for a width of 150mm beyond the back of kerb.”

PSDB 5 CONSTRUCTION

PSDB 5.1 PRECAUTIONS

PSDB 5.1.5 Shoring of Pipe Trenches

The Contractor shall be responsible for ensuring that pipe trenches are safe by either cutting back the walls to safe slopes or shoring. The rates for trench excavation shall be deemed to include for this.

When excavating the Contractor shall exercise due caution to ensure that the excavations does not undermine any existing structures or services, including existing thrust blocks.

PSDB 5.4 EXCAVATION

Trench Depths

All trenches are to be excavated to a depth sufficient to accommodate the pipes at the levels and cover as shown on the drawings. Unless otherwise stated, a minimum cover of 1000 mm will generally be required. Allowance must also be made for the required depth of pipe bedding.

PSDB 5.6.3 Disposal of Surplus Material

Surplus material shall be disposed of off- site or spoiled on site, as directed, in accordance with the provision of PSD 5.2.2.3.

PSDB 5.6.6 Completion of Backfilling

Add the following to Subclause 5.6.6:

“If in the opinion of the Employer’s Agent’s Representative, the Contractor is lagging in the backfilling of trenches, he will be entitled to order that no further excavation takes place until the backfilling operation has caught up.”

PSDB 5.7 COMPACTION OF TRENCH BACKFILL

Compaction of trench backfill above the bedding (fill blanket) shall be 90% Modified AASHTO density (100% for non-cohesive materials).

PSDB 8 MEASUREMENT AND PAYMENT

PSDB 8.3 SCHEDULED ITEMS

PSDB 8.3.1 Site Clearance and Removal of Topsoil

The rate tendered shall include all costs of complying with the relevant requirements of the Environmental Management Plan.

Strip and Conserve Gravel in Roadways

Where pipes are laid within gravel roads, the contractor shall strip and conserve separately the existing gravel to a depth of 150 mm (or such other depth ordered) for use in reinstating the road surface. Any shortfall in gravel due to loss of material or contamination shall be made up at the Contractor’s cost by importing laterite gravel from an approved source.

The quantity shall be calculated from the trench width determined in accordance with 8.2.3, and the length of pipe along the centreline between road edges. The quantity shall be adjusted for depths other than 150 mm where so ordered.

The rate tendered shall include all costs in stripping, stockpiling and conserving the material and replacing shortfall as specified.

Item Unit

Strip and conserve gravel in roadways m2

PSDB 8.3.2 Excavation

PSDB 8.3.2 (a) Excavation in all materials for Trenches

The Contractor is to note that Trench Excavation will be measured and paid as per SANS Drawing DB-2, in lengths for depth increments. The depth for each increment will be the total depth measured as per the Longitudinal Sectional drawings issued for Construction purposes, and will be measured from the bottom of the designed Bedding level to the top natural ground level after Clear and Grub, measured along the centre line of the pipeline.

PSDB 8.3.2 (b) Extra-over item (a) above for:

Delete (1) and (2) of Sub-Clause 8.3.2 (a) and replace with the following:

Hard rock excavation

Hard rock excavation will only be paid when written permission is obtained from the Employers Agent prior to the excavation operation actually commencing.

PSD 8.3.4 Particular Items

Add the following to Sub-Clause 8.3.4:

PSDB 8.3.4 (c) Excavate by hand in all materials to verify existing services, or as directed by the Employers Agent and backfill

This item shall apply where the excavation is only required to confirm the position of an existing service and the removal of the service is not intended.

Measurement shall be the cubic metres actually excavated by hand to expose the services or hand excavations as directed by the Employers Agent.

The rate shall cover the additional cost of care in excavation necessitated by the presence of the service.

Excavations by hand will only be paid upon written order by the Employers Agent to perform excavations by hand.

Item Unit

Excavation by hand in all materials to verify existing services and backfill m^3

PSG SANS 1200 G: CONCRETE (STRUCTURAL)

PSG 3 MATERIALS

PSGA 3.8 CURING COMPOUND

Curing compound shall be white pigmented natural resin based liquid curing compound complying with ASTM C 309-74."

PSG 4 PLANT

PSG 4.4 FORMWORK

PSG 4.4.2 Finish

The finish to all exposed concrete shall be smooth and that to buried or backfilled surfaces, rough.

PSG 5 CONSTRUCTION

PSG 5.1 REINFORCEMENT

PSG 5.1.2 Fixing

Delete the words "or, if permitted by the Employer's Agent, by welding" in the second paragraph of this subclause. Welding will not be permitted.

PSG 5.4 CONCRETE

PSG 5.4.1 Quality

PSG 5.4.1.5 Strength Concrete

Add the following to subclause 5.4.1.5:

"The Contractor shall when requesting approval of a mix design, submit the constituent proportions of the proposed mix together with the results of compressive strength tests carried out."

PSG 5.4.1.6 Ready-mixed concrete

Notwithstanding the provisions of this subclause, the results of tests carried out by the manufacturer as part of his quality control system will not be used as a basis for evaluating the acceptability of delivered concrete in terms of subclause 7.3.

PSG 5.4.2 Batching

Notwithstanding the requirements of this subclause, the method of batching shall be subject to approval. If volume batching is allowed, only full standard 50kg bags of cement may be used to make up a batch.

PSG 5.4.6 Compaction

Replace "or (if approved) forking" in the first sentence of subclause 5.4.6.3 with "using approved vibrators".

PSG 5.4.7 Curing and Protection

Notwithstanding the provisions of this subclause, all cast in situ concrete shall, except where otherwise authorised, be cured in accordance with the requirements of subclause (c) using curing compound of the type specified in PSGA 3.8.

PSG 5.4.8 Concrete surfaces

All unformed concrete surfaces shall be given a wood float finish.

PSG 7 TESTS

PSG 7.1 FACILITIES AND FREQUENCY OF SAMPLING

PSG 7.1.2 Frequency and Sampling

Notwithstanding the requirements of this subclause, the Contractor shall take note that he is responsible for taking an adequate number of tests to ensure that the concrete being used complies with the specification. The Employer's Agent will only carry out such check testing as he require

PSG 8 MEASUREMENT AND PAYMENT

PSG 8.1 MEASUREMENT AND RATES

PSG 8.1.3 Concrete

Add after "testing" in the second line of subclause 8.1.3.3(a) "including transport to an approved laboratory".

PSG 8.4 SCHEDULED CONCRETE ITEMS

PSG 8.4.4 Unformed Surface Finishes

Add the following to Subclause 8.4.4:

"The rate shall further include the cost for complying with Clause PSGA 5.4.8".

PSGA 5.4.1.6 Ready-mixed concrete

DELETE THE CONTENTS OF THE SUBCLAUSE AND REPLACE WITH THE FOLLOWING:

"Concrete produced at a central facility, other than at the site of the Works, shall be accepted for use in the Works except. When such approval has been given the Engineer will then decide whether or not to accept the test results obtained by the facility concerned. The use of concrete from a ready-mixed concrete facility shall be permitted subject to the following provisos:

The facility shall be accredited as being compliant with the requirements of the ISO 9001 standard.

The concrete batching plant shall be inspected by the Engineer for compliance with sans specifications and his approval must be obtained in writing before commencement of the concrete works.

Before any ready-mixed concrete is used on the works, the contractor shall furnish the Engineer with a copy of his letter to the supplier in which was specified:

(i) the type of cement(s);

(ii) the nominal maximum sizes of aggregates;

(iii) the cement / water ratios;

(iv) the required compressive strengths;

(v) the required slump at the time and place of delivery; and

(vi) the type of additive - documentary evidence proving the suitability of the additive for use in the concrete, particularly in the grade 35/19 water retaining concrete, shall be given to the Engineer for his prior approval.

The following shall be specified in the contractor's contract/order with the ready mixed concrete supplier and a copy of the relevant documentation shall be given to the Engineer's Representative: a maximum delivery period of 90 minutes from the time water is added to the concrete mix to the actual completion of the discharge of concrete on site shall be permitted. 120 minutes is a max. the discharge period (including placing the concrete) shall not exceed 30 minutes.

the concrete slump of every truckload shall be measured on delivery to site as soon as discharge commences and it shall comply with clause sabs 1200 G 5.4.1.2 prior to any concrete from that truck being placed. no additional water may be added to the mix after it has left the batching plant without the written approval of the Engineer‘s Representative. under no circumstances shall the cement/water ratio for concrete in water retaining structures be less than 2,0.

A detailed computer printout of the constituents of the concrete mix from the batching plant is to be handed over to and retained by the Engineer‘s Representative on site on arrival (i.e. truck registration, mix proportions and the time water was added to the mix). the masses of the concrete constituents of each truck shall be checked against that of those submitted with the trial mix, subject to the batching accuracy as specified in sans 0100-2: 1992. the arrival time of each truck on site and the time that the concrete discharge is completed shall also be recorded by the Engineer‘s Representative. Dedicated truck drivers shall be used, where possible, for the delivery of the concrete to site. When required the contractor shall satisfy the Engineer that acceptable alternative means of supplying concrete have been arranged and can be brought into operation in the event of disruption in the supply of concrete. in this regard, the Engineer may require that the alternative means of supply shall commence if the disruption in the supply of ready-mixed concrete has lasted for a period of 1½ hours. The use of ready-mixed concrete

will in no way relieve the contractor of any of his obligations for providing concrete that complies with the specifications.

PSGA 5.4.5 Placing ADD TO SUBCLAUSE 5.4.5.4: "

In the case of continuous walls these are to be cast in lifts of such height that each lift can be poured uninterruptedly in one continuous operation over the entire length of the wall. No vertical or inclined construction joints of any kind will be permitted in continuous walls unless they have been specifically ordered or authorised by the Engineer. The placing of concrete shall commence at convenient points on the length of the wall and shall proceed both ways simultaneously so that fresh concrete meets fresh concrete. Any rest pauses, such as for meals, shall be avoided as far as possible, and the Contractor may be required by the Engineer to make the operation continuous by working in shifts. A workable arrangement must be made before each concreting operation commences

PSGA 5.4.5.5 Adverse weather conditions (See PSGA 2.3(d))

Under adverse cold weather conditions, effective measures shall be taken to ensure that the temperature of the concrete, from the time of placing until it has hardened (i.e. about 24 h), is maintained at not less than 5 °C. If the atmospheric temperature in the vicinity of the concrete is below 2 °C or is expected to fall below 2 °C during the curing period (see Subclause 5.4.7), water shall not be used for curing. All surfaces shall be protected from ice or frost damage. When the ambient temperature is above 32 °C, the temperature of the concrete when deposited shall not be allowed to exceed 32 °C. Under adverse hot weather conditions, the Contractor shall take all reasonable steps to reduce to a minimum the placing temperature of the concrete. Stockpiles of aggregates and all metal surfaces in contact with aggregates and concrete shall be shielded from the direct rays of the sun or cooled by being sprayed with water, and windbreaks shall be erected, if necessary, to prevent the initial rapid drying-out of concrete which would otherwise occur before normal curing procedures can be undertaken. Concrete shall not be placed during periods of heavy or prolonged rainfall.

PSGA 5.4.9 Watertight Concrete ADD TO THE END OF THE FIRST SENTENCE: and shutter-tie positions ADD TO THE SUBCLAUSE:

The following structures shall be subject to water-tightness tests: All concrete chambers/structures below ground shall exclude water and shall be subject to a visual test for watertightness. No horizontal or inclined construction joints of any kind will be permitted in the external walls of the inlet control chamber unless these have been specially ordered or authorised by the Engineer

PSGA 6 TOLERANCES PSGA 6.1 BASIS OF MEASUREMENT PSGA 6.1.1

General REPLACE "Degree of Accuracy III" IN THE THIRD LINE WITH "Degree of Accuracy II". ADD TO THE SUBCLAUSE: “The Permissible Deviations for the following elements of the Works shall be to Degree of Accuracy III:

PSGA 8.4 SCHEDULED CONCRETE ITEMS PSGA 8.4.1 Prescribed Mix Concrete DELETE FROM THE SUBCLAUSE ALL BUT THE FIRST SENTENCE. ADD THE FOLLOWING NEW ITEMS: “PSGA 8.7 GROUTING This clause is amended to delete the last sentence and to include the following: "Grouting under structural steel column bases or members or under pumps, motors or other machinery will be measured on site as executed provided the concrete is within the specified tolerances. Should the concrete not be within the specified minus tolerance, site measurements will be adjusted accordingly.

Rates for grouting are to allow for all necessary preparatory work (hacking, slurry etc.) and for all necessary formwork". PSGA 8.9 MISCELLANEOUS PSGA 8.9.1

Concrete coring……..Unit: No

The rate shall cover the products, tools and equipment for the coring of openings, in existing concrete structures, complete, as described on drawings or in the Bill of quantities. Any exposed existing reinforcement after coring and the prevention of concrete over-break are to be treated with approved products.‖

PSH STRUCTURAL STEELWORK

PSH 3 MATERIALS PSH 3.1 STRUCTURAL STEEL

All steel used in the construction of these works shall comply with SABS 1431 Grade 300WA.

PSH 3.6 BOLTS, NUTS AND WASHERS

All bolts, nuts and washers shall be Precision Bolts Grade 8.8, unless otherwise specified on the drawings.

PSH 5 CONSTRUCTION

PSH 5.1 DRAWINGS AND SHOP DETAILS

It shall be the structural steel fabricator’s responsibility to prepare full shop details for approval by the Engineer.

The structural steel fabrication will be executed as a Subcontract to the Civil Works contract. The Main Contractor will be responsible for providing the Subcontractor with copies of all the relevant drawings and specification clauses to enable him to prepare the required shop details.

PSH 5.1.2 Contractor Provides Shop Details

The shop drawings shall be submitted to the Engineer at least three (3) weeks before fabrication is due to commence. The Engineer will provide his approval and/or comments within two (2) weeks of receipt of ALL the shop details.

PSH 5.2 FABRICATION

PSH 5.2.2 Identification

The Contractor shall maintain adequate records to ensure that all steel can be positively identified in respect of its grade.

PSH 5.2.3 Cutting

If flame cutting is utilised all edges of plates shall be dressed by grinding to remove all burrs and notches.

PSH 5.2.4 Holes for Fasteners

No holes may be formed by flame cutting and punching.

PSH 5.6 GROUTING OF SUPPORTS

PSH 5.6.1 Responsibility

Grouting of base plates may be carried out either by the Civil Contractor or the Structural Steelwork Subcontractor as agreed between them. In either event the following shall apply.

It is important that the base plates of the portal columns in particular are grouted to ensure full and intimate contact between the underside of the base plate and the foundation.

No grouting shall commence until the Engineer’s approval is given for grouting to commence.

All base plates shall be grouted using Durabed NF grout as supplied by Messrs ABE Industrial Products or equal approved.

All grout shall be mixed and used in strict compliance with the manufacture’s instructions. The grout shall be placed in a “Flowable” state and shall be poured into a mould formed around the base plate. The mould shall be constructed in such a manner that an effective head of grout equal to 50mm

above the bottom of the base plate can be achieved and maintained until after the final setting time of the material.

The grout shall be poured in a manner agreed with the Engineer in advance of the commencement of grouting operations to ensure that no air is trapped beneath the base plate.

PSH 7 TESTING

PSH 7.1 TEST CERTIFICATES

The structural steel fabricator shall obtain and submit to the Engineer certificates from all suppliers from whom steel is purchased stating that the material supplied conforms in all respects with SABS 1431 Grade 300WA.

PSH 8 MEASUREMENT AND PAYMENT PSH 8.3 SCHEDULED ITEMS (Subclauses 8.3.1 to 8.3.5)

The unit of measurement shall be the metric tonne with weights being calculated as defined in Clause 8.2, or for single items combining the requirements of Subclauses 8.3.1 to 8.3.5, as scheduled.

The rates tendered shall include for all aspects contemplated in these subclauses including but not confined to the preparation of shop drawings, supply, fabrication, delivery to site and erection complete of the structure including the provision of all bolts, nuts and washers required for the full and proper erection of the structure as detailed.

The rate tendered shall include for provision of formwork as required and specified above, the supply and deliver to site of the proprietary grout, mixing of grout and placing the grout in position as specified. It shall include all labour, materials and plant of whatever nature required for the operation.

PSL SANS 1200 L: MEDIUM PRESSURE

Valves.

Valves shall be stored under cover and shall be stacked off the ground in a manner which will prevent the ingress of dirt and ensure that the valve faces, spindles and coatings are not damaged.

PSL 3.3 C.I. PIPES, FITTINGS AND SPECIALS (SUB-CLAUSE 3.3)

Add the following to Subclause 3.3 :

Cast iron fittings shall comply with SANS 546 class D. PSL 3.4 STEEL PIPES, FITTINGS, AND SPECIALS

PSL 3.4.1 General

The Contractor shall submit to the Engineer or his representative, the certificates covering the chemical analysis and physical properties of the iron used in the manufacture of pipes and specials.

Written confirmation that welding has been carried out by coded welders shall also be provided if required.

Each pipe or fitting shall have its relevant item number painted onto the exterior surface prior to despatch from the factory.

PSL 3.4.3 Pipes of Nominal Bore over 150mm

Add to the Subclause 3.4.3:

All steel pipes, fittings and specials shall be manufactured from 4,5mm thick Grade B steel plate and shall comply with the requirements of SABS 719.

PSL 3.4.4 Fittings and Specials

Add to the Subclause 3.4.4:

All fittings and specials shall be manufactured from straight pipe materials specified under the previous Clauses; the pipe so used shall have satisfactorily passed the stipulated hydraulic pressure test.

PSL 3.4.5 Welds

Pipes shall be manufactured from steel strips or plates continuously welded along the seams and the height of the inner weld reinforcement shall not exceed 1mm. In the case of pipes to be used with couplings, the external weld reinforcement shall be ground flush with the outer wall of the pipe over a suitable distance from the end. Pipes shall preferably have a continuous helical seam but nevertheless, longitudinal and circumferential seams would be acceptable for this Contract.

PSL 3.4.6 Puddle Pipes

Puddle pipes shall be manufactured from 4,0mm grade B carbon steel pipes and shall comply with the requirements of SABS 719 for electric welded low carbon steel pipes for aqueous fluids.

PSL 3.7 OTHER TYPES OF PIPES

PSL 3.7.1 uPVC Pipes

The uPVC pipes shall be Class 34 spigot and socket complying with SANS 966.

PSL 3.8 JOINTING MATERIALS

PSL 3.8.2 Flexible Couplings

Flexible couplings for steel pipes shall be of the "Viking Johnson" type. All nuts and bolts shall be Stainless steel (heavy duty).

The plain end of the steel pipe shall be properly prepared, before corrosion protection, so as to accept the flexible coupling

PSL 3.8.3 Flanges and Accessories

Where new pipework is to be joined onto existing pipework, the Contractor shall measure the existing flanges and report the dimensions to the Engineer. The drilling of new flanges shall match the existing flanges.

In new installations, where pipes are not coupled onto existing pipework, the flanges shall be in accordance with SANS 1123. The dimension and drilling of flanges shall be in accordance with the requirements of SABS 1123, table 1600, unless scheduled otherwise. All flanges shall be truly at right angles to the axis of the pipe or fitting.

Puddle flanges used as pipe anchorage shall be of the same dimensions as corresponding flanges but are to be undrilled. The flange shall be welded to the pipe with sufficient strength to be capable of transmitting a longitudinal force 50% greater than the force to be applied under test conditions.

Flanges shall be machined flat and without a raised joint face.

Flanges for low-pressure applications (less than 10 bar) shall be of the slip-on type. Flanges for high-pressure applications (greater than 10 bar) shall be of the socket weld type, unless otherwise agreed with the Engineer.

Flanges shall be manufactured from materials equal to or better than the pipes to which they are connected.

PSL 3.8.6 Spigot and socket Pipes

Add the following:

The shortest length of pipe which may be used in the pipeline is 0,5m, thus the shortening of an adjacent pipe may be necessary so as to ensure compliance with the position of specials. When pipes of 1m or less in length are used or where specials are laid within 1m of each other, they shall be jointed by means of C.I. repair couplings.

PSL 3.8.8 Jointing Gaskets

Jointing gaskets for flanged joints shall comply with the requirements of BS 4865 and be cut to the full width of the flange. The materials shall be suitable for and compatible with the required pressure and temperature duties, and characteristics of the material conveyed.

PSL 3.8.9 Fasteners

Bolts and nuts shall be hexagon head type complying with SANS 1700 with threads of the coarse pitch series.

Washers of similar material to the bolts shall be provided under each nut and bolt head. Multiple washers or shims shall not be used. Spring washers or other approved locking arrangement shall be used, together with flat washers on all fasteners subject to vibration.

All fasteners shall be manufactured of grade 316 stainless steel.

PSL 3.8.10 Anti-seize Compound

Before assembly, threads shall be treated with a nickel based, anti-seize/corrosion protection compound such as Chesterton 725: Nickel Anti Seize Compound, or equivalent and approved.

Copper based compounds are not acceptable and, if used, shall be cleaned off before the correct compound is applied.

If it is found during inspection that compound has not been applied, the Contractor shall disassemble all fasteners and comply with this requirement.

A small amount of compound shall be applied along the full length of the thread before the nut is applied. Excessive compound visible on the thread after the nut has been applied shall be cleaned off.

PSL 3.9.5 Joints, Bolts, Nuts and Washers

Add the following to Sub-clause 3.9.5:

Bolts, nuts and washers shall conform to SANS 135. All bolts, nuts and washers shall be hot dipped galvanized (heavy duty) Gr8.8.

PSL 3.9.6 Corrosive Soil

Saddles, cast iron detachable and flanged joints together with their bolts, and a minimum of 100mm of pipe on each side of the joint shall be protected by means of either an approved

protective petrolatum paste, then wrapped with three layers of an approved petrolatum impregnated tape, or other means of inhibiting corrosion approved by the Engineer. All overlaps shall be 30mm minimum. This protection shall also be applied to the bolts and flanges used by the manufacturer in the construction of valves and hydrants.

The rates shall cover the cost of corrosion protection for the complete joint.

PSL 3.10 VALVES

Valves shall comply with the requirements of SANS 1200 LK, and the following requirements:

PSL 3.10.1 Gate Valves

All valves shall be AVK or similar approved by the Engineer. Resilient seal valves shall be used for general applications and shall:

bear the SABS mark of approval, shall comply with SABS 664;

be double socketed for PVC pipes or flanged for steel pipes, or as scheduled by the manufacturer;

The direction of rotation shall be anti-clockwise for closing when viewed from above. The direction of opening or closing of each valve, and the appropriate words and have the direction of opening clearly embossed on the valve body and spindle cap;

be heavy duty Class 16, unless a different class is specified;

have non-rising spindles along pipelines, but have rising spindles within the Pump Stations;

Bodies, gates and glands shall be cast iron or cast steel, spindles bronze, and sealing rings on gate and body gunmetal or stainless steel;

be fitted with cast iron square cap tops or handwheels (as specified) secured with retaining bolts, top permanently marked with the direction of closing;

Dimensions and drilling of flanges shall be in accordance with the requirements of SANS 1123 Table 1600/3 unless scheduled otherwise;

Before or after completion of the factory tests, whichever is applicable, all valves shall be thoroughly cleaned and painted at the factory prior to despatch to Site;

be protected against corrosion by:

Electrostatically applied epoxy resin to DIN 30677 with a minimum coating thickness of 250 micron; or

coating with a minimum thickness of 250micron copon KSIR 88 epoxy paint applied to all internal and external surfaces after it has been thoroughly cleaned by grit blasting to SA 2 ½ finish in compliance with the requirements of SIS 05 09 00, or similar approved coatings.

Rates shall include for testing and providing the test certificates and the specifications from the manufacturer before installation of the valves commence. The batch serial numbers for cross reference shall be clearly marked on the body. No payment will be made unless the test certificates and specifications have been submitted.

PSL 3.10.2 Sluice Valves

Sluice valves shall be double flanged and shall comply with the requirements of SABS 664, Class

Valves shall be drop tight under test and working conditions and shall have non-rising spindle, wedge closure, and flanged suitable for repacking under pressure. Bodies, gates and glands shall be cast iron or cast steel, spindles bronze, and sealing rings on gate and body gunmetal or stainless steel. Dimensions and drilling of flanges shall be in accordance with the requirements of SABS 1123 Table 1600 unless scheduled otherwise.

All sluice valves shall be fitted with square caps. The direction of rotation shall be anti-clockwise for closing when viewed from above. The direction of opening or closing of each valve, and the appropriate words shall be embossed on the cap and gland.

Before or after completion of the factory tests, whichever is applicable, all valves shall be thoroughly cleaned and painted at the factory prior to despatch to Site.

All cast iron surfaces of every valve shall be prepared for painting to a thoroughly clean condition free of all grease and deleterious matter.

Valves shall be protected against corrosion by:

Electrostatically applied epoxy resin to DIN 30677 with a minimum coating thickness of 250 micron; or

coating with a minimum thickness of 250micron copon KSIR 88 epoxy paint applied to all internal and external surfaces after it has been thoroughly cleaned by grit blasting to SA 2 ½ finish in compliance with the requirements of SIS 05 09 00, or similar approved coatings.

Rates shall include for testing and providing the test certificates and the specifications from the manufacturer before installation of the valves commence. The batch serial numbers for cross reference shall be clearly marked on the body. No payment will be made unless the test certificates and specifications have been submitted.

PSL 3.11 MANHOLES, VALVE CHAMBERS AND SURFACE BOXES

PSL 3.11.1 Precast concrete sections

PSL 3.11.4 Step Irons

Step irons shall be copolymer polypropylene with a 12mm diameter high tensile steel core

(“Calcamite” or equal approved) installed according to the manufactures specification.

PSL 3.11.5 Manhole Cover and Frames

Substitute LD 3.5.8 with the following:

All manhole covers and frames must be lockable precast concrete as manufactured by Rocla, or equivalent.

Covers inside the site boundary as well as covers in street reserves will be heavy dut

"PSLD 5.11 Backfilling Around Manholes

"Material used to backfill around manholes that fall within the road reserve must comply with SABS 1200 LB subclause 3.1. Material used to backfill around other manholes must comply with SABS 1200 DB subclause 3.5.

Material adjacent to the walls of the manholes must be watered and mixed to its optimum moisture content, and compacted in layers not exceeding 150 mm in the compacted state. Compaction must be minimum 100% MOD AASHTO for non-cohesive material, and minimum 93% of MOD AASHTO density for cohesive materials.

Backfilling around the structure must be carried out in even layers to avoid uneven side forces."

PSLD 7 TESTING

PSLD 7.1 General

Add the following to LD 7.1.5:

All tests shall be repeated after the completion of backfilling of pipe trenches.

PSLD 7.2 Tests And Acceptance/Rejection Criteria

PSLD 7.2.6 Watertightness of Manholes

Add the following:

"Manholes shall be filled with water up to the underside of the frame of the lid. The manhole shall then be left for a hour to ensure that initial absorption takes place and thereafter be topped up. The level of the water shall not drop by more than 20mm in the following hour. The Contractor shall remove the water after the test has been completed. Under no circumstances shall the water be permitted to drain down the network.

Should any manhole fail to pass the inspection to the satisfaction of the Engineer, the fault or faults shall be made good by the Contractor at his own expense according to methods approved by the Engineer and the work shall be inspected again. The cost of all extra work and inspection shall be borne by the Contractor."

PSL 5 CONSTRUCTION

PSL 5.1 LAYING

PSL 5.1.3 Keeping Pipelines Clean

All pipes and specials strung out above ground along the line of the trench shall have both ends closed by means of an adequately fixed plastic cap or other approved material, supplied by the Contractor, in order to prevent the ingress of foreign material.

PSL 5.1.4 Depths and Cover

PSL 5.1.4.1 Add the following to Sub-Clause 5.1.4.1

Watermains and rising mains shall be laid so that the cover to the top of the pipe barrel from finished surface level is generally, but not less than, 800 mm in the case of watermains less than 250 mm diameter, and 1.0 m in the case of the 300 mm and larger diameter pipelines.

The value of 800 mm above shall be increase to 1 m within road reserves.

During construction there shall be not less than 0,5 metre of cover over the pipes, where construction traffic is liable to cross them, hence road crossings, shall be constructed after the construction of the road layers has reached the stage where 0,5 metre cover is available.

PSL 5.1.4.3 Add the following to Sub-Clause 5.1.4.3

Where the minimum clearance between pipe crossings would be less than that specified in Sub- Clause 5.1.4.3, the watermain shall be laid beneath the service crossed at an invert level which allows for the clear space as specified. The watermain shall be laid horizontally at this level for a distance of at least 1,0 m on either side of the centreline of the service crossed and then revert to the specified cover.

No decrease in cover or clear space between the pipe barrels as specified will be permitted unless otherwise instructed by the Engineer in writing.

PSL 5.1.6 Changes in Direction

Vertical and horizontal direction changes less than 11¼º shall be achieved by deflecting the pipes at the joints. The deflection at each joint shall not exceed the value recommended by the pipe manufacturer and if necessary, the specified change in direction shall be achieved over a number of pipe lengths.

PSL 5.2 JOINTING METHODS

PSL 5.2.1 Detachable Couplings (AC and uPVC Pipelines Add the following to Sub-Clause 5.2.1 :

Unless otherwise specifically detailed on the drawings, uPVC water pipes, specials and fittings shall be coupled with spigot and socket joints fitted with rubber sealing rings. In the following cases, ductile iron repair couplings shall be used:

on one end of each valve and hydrant;

where pipes have to be cut to fit specials in designated positions, refer to PSL 3.8.6.

PSL 5.3 SETTING OF VALVES, SPECIALS AND FITTINGS

Add the following :

Valves and hydrants shall be so sited that the valve spindle or hydrant outlet is directly opposite an erf side boundary or splay corner peg, to within 150 mm, or as otherwise dimensioned on the drawing.

Where specials are required in close proximity of one another the minimum pipe length between specials shall not be less than one metre unless adequate precautions are taken to prevent excessive movement of the numerous flexible couplings.

The shortening of the adjacent pipes may be necessary to achieve the above and ensure compliance with the position of specials" (see sub-clause PSL 3.8.6).

PSL 5.5 THRUST BLOCKS

All thrust blocks shall be cast against undisturbed material. In the event of the Contractor over-excavating, he shall carry the cost of any additional concrete required to comply with this provision.

Prior to casting any thrust blocks, the Contractor shall notify the Engineer who shall inspect the nature of the ground against which the thrust block is to be cast and either confirm that the specific conditions do not differ from those on the basis of which the thrust blocks shown on the drawings were designed, or instruct the Contractor to alter the dimensions of the thrust block to suit the actual ground conditions.

Any pipe laid on a gradient exceeding 25% shall be anchored as directed by the Engineer.

PSL 5.12 CONNECT TO EXISTING MAINS

Where connections have to be made to the existing water mains, the following procedure has to be followed:

Liaise with the Local Authority to arrange a suitable time period for the proposed connection.

Ensure all tools and fittings of the correct size and type are on site prior to requesting the shut down of the mains.

Advise the Local Authority at least 3 days in advance of the intention to commence work, in order for them to shut down the mains.

Arrange with the Local Authority to have an official present on site when the work commences.

Advise the Local Authority when work is complete and thrust block in place and sufficiently cured, for the system to be recharged. Work to be completed to minimise the disruption to the supply to a maximum of 12 hours.

All arrangements and planning must be made in close collaboration and with the approval of the Engineer’s Representative on site. Names and contact personnel at the Local Authority will be advised at the required time.

PSL 5.13 AS BUILT SURVEYS

The Contractor shall survey the final position of all buried pipework installed, prior to backfilling.

The pipework shall be surveyed and the information submitted to the Engineer as the work progresses. No joint shall be backfilled before the survey information has been approved by the Engineer.

The pipelines shall be coordinated at centrelines of all bends, specials and fittings and intermediate points at intervals of not more than 50 m.

The survey data shall be presented in tabular format giving Y-Coordinate, X-Coordinate, chainage and level. All coordinates and levels shall be referenced to the WGS 84 system and Mean Sea Level (MSL).

for the temporary termination of supply, as specified in Clause PSL 5.1. Fittings required for the connections shall be measured elsewhere.

PSLB SANS 1200 LB: BEDDING (PIPES)

PSLB 3 MATERIALS

PSLB 3.1 SELECTED GRANULAR MATERIAL (BEDDING CRADLE)

Selected granular material shall comply with the provisions of Clause 3.1 of SANS 1200 LB and in addition, the PI shall not exceed 2.

PSLB 3.2 SELECTED FILL MATERIAL (FILL BLANKET)

Selected fill material shall comply with the provisions of clause 3.2 of SANS 1200 LB. Add the following to Clause 3.2:

“Where expansive clay is encountered in the trench bottom, the material in the selected fill blanket shall be selected granular material”.

PSLB 3.3 BEDDING

The bedding of the rising main shall be in accordance with the drawings.

There are no designated borrow pits, and the Contractor will be expected to make his own arrangements regarding importing bedding and blanket material.

PSLB 5 CONSTRUCTION

PSLB 5.1 GENERAL

PSLB 5.1.4 Compaction

The degree of compaction required will be 93% Mod. AASHTO density (or 100% for sand).

PSLB 5.2 PLACING AND COMPACTING OF RIGID PIPES

PSLB 5.2.1 Class A bedding

Add the following to sentence to Subclause 5.2.1 (d):

“…or a period of 5 days has elapsed after the placing of the concrete in that section, whichever occurs first”.

PSLB 5.2.2 Class B bedding

The dimension “x” for all rigid and flexible pipes (except for HDPE erf connections) as referred to in drawing LB-1 and LB-2, shall be 100mm.

PSLB 8 MEASUREMENT AND PAYMENT

PSLB 8.2 SCHEDULED ITEMS

PSLB 8.2.6 Bedding in Waterlogged Conditions (new item refer to PSDB 5.1.2)

In the event of waterlogged conditions occurring in the bottom of the trench, the Employers Agent may order the Contractor to place a crushed stone bedding layer (minimum thickness 150 mm) on the trench bottom.

Should the trench bottom conditions remain unstable due to the nature of the soil and the degree of saturation, the Employers Agent may order the Contractor to install a geotextile on the trench bottom prior to the provision of the stone layer. After placing the stone bedding, the geotextile shall be folded over the stone with a minimum overlap of 300 mm to form an enclosed drain. The specified bedding material shall then be used to bed the pipe.

The Contractor shall only provide and lay the stone bedding layer and geotextile after receipt of the written order to do so from the Employers Agent.

The tendered rate shall cover the cost of all additional excavation and preparation of the trench bottom to accommodate the layer of stone, the removal of unsuitable material, the supply and placing of a 150 mm thick layer of stone over at least the specified width, the cost of supply of the

geotextile, placing and losses as a result of overlaps and over excavated trench widths and all related activities in order to produce a stable platform.

Where the use of a layer of crushed stone in the trench bottom has been authorised by the Employers Agent, it will be measured by volume calculated according to the length multiplied by the minimum base width and specified thickness.

The cost of dealing with water as specified in SANS 1200 DB, Sub-Clause 5.1.2.1 will be held to have been included in the tendered sums for excavation.

Item Unit

Single size 19mm stone m^3

Geotextile m2

PSLD SANS 1200 LD: SEWERS

PSLD 3 MATERIALS

PSLD 3.1 PIPES, FITTINGS, AND PIPE JOINTS

Unless otherwise scheduled or shown on the drawings the pipes shall be of unplasticised polyvinyl chloride (uPVC) Class 34 heavy duty complying with SANS 791.

PSLD 3.5 MANHOLES, CHAMBERS, ETC.

PSLD 3.5.2 Precast Concrete Sections

Add the following to Sub-Clause 3.5.2:

All sand and aggregate used in concrete for sewer manholes and chambers shall be dolomitic.

PSLD 3.5.7 Step Irons

Plastic encapsulated step irons or similar approved by the Employers Agent in manholes will be required.

PSLD 3.5.8 Manhole Covers and Frames

Notwithstanding the requirements of Sub-Clause 3.4.3 all covers and frames shall be

constructed of ductile iron, and shall conform to the requirements of EN 124, Class C250, or D400, as indicated on the Drawings. Concrete cover manholes both medium to heavy duty as maybe deemed appropriate.

Where grid inlets are required these shall be manufactured from ductile iron conforming to the requirements of EN 124, Class C250 or shall be constructed in concrete. A sample of the grid shall be provided to the Engineer for approval.

Once constructed, all covers must be securely seated in the frame and may not wobble, rock or exhibit any instability. Unstable covers will not be accepted and shall be replaced at the Contractor’s own cost. Any associated costs, such as the removal, replacement and making good of frames, layer works, kerbing and surfacing, shall also be borne by the Contractor.

PSLD 5 CONSTRUCTION

PSLD 5.6 MANHOLES

Refer to PSLD 3.5.2 above for the type of material.

Notwithstanding the requirements of Sub-Clause 5.6 manholes constructed of precast concrete rings shall have watertight joints.

Manholes shall be provided with copolymer polypropylene step irons with a 12 mm diameter high tensile steel core ("Calcamite" or equivalent) installed according to the manufacturer's specifications.

PSLD 5.6.7 Cast in-situ concrete manholes

Refer to Municipal Standard Detail Drawings for details.

20 MPa strength concrete shall be used. Aggregate size may be 19 mm or 13 mm to suite Contractor. Dolomitic aggregates are not required.

When the concrete is mixed on site, an approved rotary mixer, suitable in size for a batch containing cement in increments of one sack of 50 kg, shall be used. The Contractor's method of batching of the ingredients shall be to the approval of the Employer's Agent’s Representative. Samples of the materials to be used shall be submitted for approval. The proportions of cement, coarse and fine aggregate and water necessary to produce the 20 MPa concrete shall be determined and submitted to the Employer's Agent’s Representative together with the results of compressive strength tests, before the Contractor will be allowed to use site mixed concrete in the construction of manholes.

The Contractor shall bear the costs of determining the proportions of the mix and making and testing cubes for this purpose. If the Contractor submits reliable test records of concrete made from the same materials and mix proportions which he proposes to use, then the Employer’s Agent may

waive all or part of the strength tests required above to verify that the concrete mix design which the Contractor proposes to use is satisfactory.

The Contractor shall carry out his own testing during the construction of the Works to ensure that the concrete being used complies with the Specification. The Employer's Agent’s Representative shall carry out such test check testing as he/she requires, and the Contractor shall render any assistance necessary in taking of samples and the carrying out of tests.

All concrete being placed shall be vibrated by means of approved vibrators. Curing shall be by means of the application of a natural resin based liquid curing compound complying with ASTM C309-74. When the surface to be cured is to receive further concrete it shall be cured with water only, by sprinkling, spraying or ponding such as to maintain it in a continuously wet condition.

If the concrete is found to be cracked, honeycombed, soft or defective in any way, or if cube test strength results do not comply with the requirements, then the concrete shall be rejected. Rectification shall be by removal of the defective portion and replacement with sound concrete.

If the manhole is constructed in more than one lift the construction joint formed shall in addition to being prepared as specified in sub- clause 5.4.5.4 of SABS 1200 GA, be reinforced with 8 No 12 mm diam. x 300 mm long mild steel dowel bars, cast in to a depth of 150 mm, placed centrally in the joint face and equally spaced about the circumference.

PSLD 5.11 PIPE LAYING WITH HIGH WATER TABLE (NEW CLAUSE)

Where a high- water table is encountered and a probability exists of water entering the trench after the pipeline has been laid, the Contractor will be permitted to bed and lay the pipes and backfill sufficiently to prevent flotation, prior to testing.

PSLD 6 TOLERANCES

PSLD 6.6 AS-BUILT INFORMATION

The Contractor shall submit "As-Built" levels, distances between manholes and the grades of pipelines for which he requires payment at the time he submits his monthly payment claim. A sample form is obtainable from the Employer’s Agent.

PSLD 7 TESTING

PSLD 7.2.7 Acceptance Criteria

The acceptance of the pipe length or manhole shall depend upon whether it satisfies the criteria set out in SABS 1200 LD clauses 6, 7 and the PS clauses above.

Where pipes other than vitro clay pipes are laid, only tests carried out on the pipelines after completion of the backfilling to ground level (excluding surface restoration) and completion of the construction of manholes to roof height, including benching, will be considered for acceptance purposes.

In the case where vitro clay pipes are being laid, no pipelines are to be covered prior to inspection and approval by the Employer’s Agent. Once the pipeline has been laid and bedded in the compacted bedding cradle (to half pipe) between control points, the Employer’s Agent must be called out to inspect the installation. The Contractor is to provide the necessary equipment in order for the Employer’s Agent to adequately assess that the pipeline has been laid to the specified tolerances. Further, an air test, in accordance with the specifications, is to be conducted and witnessed by the Employer’s Agent prior to the placing of the Fill Blanket.

PSLD 8 MEASUREMENT AND PAYMENT

PSLD 8.2 SCHEDULED ITEMS

PSLD 8.2.1 Supply, lay, Joint, Bed and Test Pipeline (Sub-Clause 8.2.1) add the following:

No deductions will be made for the internal length of manholes and the cost of all invert channels irrespective of diameter shall be included in the rate tendered for this payment item.

The measured quantity of completed pipe length will only be included in the payment certificate when the pipeline has satisfied the test after the completion of the backfill to ground level

PSLD 8.2.2 Extra-over Item 8.2.1 for specials add the following:

Rodding Eyes

Rodding eyes shall be measured by number complete as shown on the drawing, for each different diameter and type of material.

The tendered rate shall cover the cost of all excavation, disposal of material, supply of fittings and labour to construct the rodding eyes as detailed on the drawings.

PSLD 8.2.3 Manholes

Manholes will be measured and paid in accordance with Sub-Clause 8.2.3.

The tendered rates for the different types of manholes shall cover the cost of the supply and installation of the complete precast concrete or brick manhole, including flexible joints, step irons, concrete landing slabs where applicable, concrete cover slabs, masonry between concrete cover slab and covers and covers and frames, as shown on the drawings. The rate shall also cover the cost of waterproofing the joints between manhole rings in the case of precast manholes.

For the purposes of measurement and payment, the depth of a manhole is defined as the depth from the top of the cover to the lowest invert level of the manhole.

PSLD 8.2.4 Extra-over Item PSLD 8.2.3 for construction of manholes on existing pipelines

The rate tendered shall include full compensation for breaking into the pipeline, cutting pipes, dealing with the existing flow, preventing unacceptable debris entering the drain line and making good.

PSLD 8.2.7 Encasing of Pipes in concrete

Add the following to Sub-Clause 8.2.7

The volume of concrete material will be measured net, excluding the volume occupied by the pipe ducts and 30/19MPa concrete shall be used.

Item Unit

Encasing of pipes in concretem3.

PSLD 8.2.14 Connections into Existing Manhole (New Item)

The unit of measurement for connecting into existing manholes shall be by the number of connections.

The rate tendered shall include full compensation for breaking into the manhole, connecting the pipe, modifying or enhancing the benching, cutting pipes, dealing with the existing flow, preventing unacceptable debris entering the drain line and making good any benching, finish

walls, covers and frames.

The item shall distinguish between type of structure, diameter of connecting pipe or size of culvert.

Item Unit

Connections into existing manhole for pipe (diam) No.

PSLD 8.2.15 Internal Backdrop into Manhole (New Clause)

Measurement will be by number for each diameter of backdrop in 0,5 m depth ranges.

The rate shall include breaking into the existing manhole and making good on completion including ensuring that the manhole is watertight, the supply and installation of all pipes and fittings, and the alterations to the benching to suit.

Item Unit

Internal backdrop into manhole No.

PLX TRENCHLESS PIPE UPGRADING BY MEANS OF "HORISONTAL DRILLING" METHOD PARTICULAR SPECIFICATION

PLX 1 SCOPE

This particular specification covers the trenchless installation of pipes to be installed using “HORISONTAL DRILLING ”, for the purpose of increasing the diameter of the existing sewage rising main, without disturbing the road surface via conventional trenching.

The Primary Contractor will have to engage the specialist services of a Sub-Contractor at Tender Stage if they do not have the expertise in-house to perform this work scope completely, who will have to price the applicable work scope in detail.

The Primary Contractor will however still remain fully liable for the programming, performance, quality control and completion of this work component, and shall price the applicable items sufficiently to deal with and manage their Sub-Contractor accordingly.

No upfront payments will be authorised for this work scope, and measurement and payment for this work will only be made on completion of the specific work scope activities.

The “” Specialist Sub-Contractor must familiarize them with the designed levels of the sewer line invert levels upstream and downstream of each section to be exposed and cut, prior to commencement of the process.

The interaction and work programme between the Primary Contractor and the Specialist “” Sub-Contractor must be managed by the Primary Contractor to ensure the correct position and levels and timeously excavation of the launching pits and reception / exit pits. All cost related to this activity shall be fully priced for in the applicable line items of the Pricing Schedules.

PLX 2 INTERPRETATIONS

PLX 3 MATERIALS

PLX 3.1 PIPES

Unless otherwise specified, pipes to be installed by means of “HORISONTAL DRILLING” shall be HDPe material, in accordance with the relevant specifications of SANS 1200 L as amended by section PSL of the Works Specifications.

A sleeve pipe will required, and the installed pipe pulled through the new HDPE sleave pipe section, shall serve as the duty conduit, and shall therefor have to be tested to proof to be watertight, as part of the final quality control process.

PLX 4 PLANT

The drilling plant shall be suitable for guided / controlled ““Horizontal Directional Drilling”” to the specified depths and gradients, without disruption of the overlying ground or road surface.

The Contractor and the identified Sub-Contractor, shall determine the plant required to suit the specified installation. The plant shall be adequately sized for the specified diameter and length of the installation.

PLX 5 CONSTRUCTION

PLX 5.1 EXCAVATION OF LAUNCH AND RECEPTION PITS

Excavation shall conform to the relevant requirements of SANS 1200 D, DA and DB as applicable. Deep excavations shall be shored.

The Contractor shall be responsible for determining the requirements of the excavations to suit his / his Sub-Contractor’s plant and method of operation.

PLX 5.2 REMOVAL OF DISPLACED MATERIAL

The method of installation shall be such that material displaced by the ducts shall be removed from the bore to prevent lifting of the overlying road surface. This shall be done mechanically, manually, by washing out with drilling fluids or by other approved means.

However, any voids shall be filled with an approved grout or bentonite slurry to eliminate the possibility of settlement of the road surface.

PLX 5.3 PIPE JOINTS

The pipe joints shall be welded by means of extrusion welding or fusion bonding, in accordance with the relevant specifications of SANS 1200 L as amended by section PSL of the Works Specifications. All bunds shall be cut and completely removed after welding, before the HDPe pipe shall be used for the drilling process.

PLX 6 TOLERANCES

The acceptable deviations shall be agreed between the Contractor and the Engineer, taking cognisance of the ground conditions.

PLX 7 TESTING

The installed pipe shall be pressure tested in accordance with the relevant specifications in SANS 1200 L, to proof that the installed conduit s water tight, and installed at correct levels and single gradient as per Construction Drawings issued.

PLX 8 MEASUREMENT AND PAYMENT

PLX 8.1 SITE ESTABLISHMENT OF DRILLING CONTRACTOR

The item shall cover the “Once off” costs of the complete Site establishing and disestablishing of the drilling Sub-contractor and all necessary equipment on site. This shall include all transport to site with Plant, equipment and containers, as well as to transport all material to site as may be required.

All additional Health & Safety requirements, e.g. to provide an additional portable chemical toilet to each site / each area where “horizontal drilling ” will be performed, and to provide shelters for workers, and to provide washing and drinking water and to provide all required PPE and Covid-19 protection, shall be fully covered under this item, or under other applicable OHS items. No additional payment shall be authorized for the above requirements. No excavation of launch pits or reception / exit pits may commence, before all of the above OHS / requirements are not in place at the specific “HDD” site.

A detailed “Method Statement” which shall cover the technical and Health & Safety aspects in full, shall be prepared and presented to the Employer’s Agent for approval, before any Site Establishment of the Plant may take place.

PLX 8.2 TRAFFIC ACCOMMODATION AT “HDD” ROAD SECTIONS

The Contractor’s attention is drawn to the fact that the alignment is adjacent to a surfaced road in a residential build-up area, which may accommodate high traffic volumes, including a percentage of heavy vehicles and pedestrians and the railway that needs to be crossed.

The Contractor shall ensure that all Traffic Accommodation principles as required by the Northern Cape Provincial Roads Department/Spoornet shall be in place, prior to the commencement of the drilling process. This shall amongst others, but not be limited to these activities, include the following requirements :

Inform the Local Municipality before commencement;

Supply and erect temporary applicable Road Traffic, “Construction Ahead”, and “Deep Excavations” signage at least 100m before the launching and receiving pits on both sides of the road (in the direction of approach traffic), and at the positions of the excavation pits.

Barricade the excavations with orange netting, and firmly secure anchor poles to span at least 1m away from and all around the excavation pits;

Deploy a flagman on each side of the road, at the position of the excavation pits, to warn traffic and pedestrians;

If the excavation pits will be left open after hours / overnight, flicker lights / cat eyes will be erected around the excavation pits.

PLX 8.3 SETTING UP AT EACH DRILLING LOCATION

PLX 8.3.1 Move Directional Drilling Plant and Setup

The item shall cover all costs of moving plant, equipment etc., drilling fluid tanks, etc. to each location where directional drilling is required, and setting up. All conditions ito OHS and as applicable to PLX 8.1, shall also apply to this clause.

Item Unit

Move “Drilling Plant” plant and setup for each new position Rate only

PLX 8.3.2 Excavation and Preparation of Launch and Reception Pits

The item shall cover the costs of machine or hand excavation as deemed suitable for the site, topography, surrounding infrastructure and soil conditions, as well as for the preparing and levelling off the bottom of these pits for the drill rig platform at both the launch and reception pits at either end of the bore section.

The size of excavation shall be determined by the Contractor to suit his method of operation and the quantity shall be a lump sum, irrespective of the actual volume of excavation.

The rate shall include shoring and dewatering of the excavation.

Items Unit

Excavation, preparation and levelling of launch and reception Sum/No

PLX 8.4 SUPPLY OF NEW SEWAGE BULK OUTFALL SEWERLINE

The rate shall cover the supply, transport, off-load and handling of all specialist pipes required for the as specified, per type and diameter.

PULLING THROUGH OF PIPE

The item shall cover the complete cost of supply all specialist plant and equipment, hydraulic drilling in soft material, pulling through of the pipe, and complete the jointing of pipe sections.

The rate shall include the handling, welding (extrusion of fusion bond), trimming of the bund, pulling through and water pressure testing after installation of the pipe.

The quantity shall be the final length of pipe supplied and installed. No payment will be made for waste and off-cuts.

An item will be scheduled for each type and diameter of pipe.

Item Unit

HDPe Pipe per linear meter installed ,

pulling through of (diameter and type as stated) pipe and jointing m

PLX 8.6 DEALING WITH LIVE RAW SEWAGE IN EXISTING SEWER MAIN

The item shall cover the complete dealing with the raw sewage in the existing rising main.

Once the existing sewage pipe is cut, the contractor shall fully deal with the sewage spillage to avoid any contamination of ground water and the surrounding. A “honey-sucker” truck or submersible sewage pump and generator shall be available at the position where the pipe cutting takes place, to immediately clean all spilled sewage.

The Contractor shall further fully comply with the specific Environmental requirements for this

work activity, and shall liaise with the ECO on this matter.

Item Unit

Dealing with Raw Sewage.....Sum

COLTO SERIES 1000: GENERAL

SECTION B1700: CLEARING AND GRUBBING

B1701 SCOPE

ADD THE FOLLOWING AFTER "grubbing" IN THE FIRST PARAGRAPH:

"including the demolishing and disposal of structures, shelters, dwellings and out-buildings within the new road reserve".

ADD THE FOLLOWING:

"This section also covers the removal of boulders adjacent to the top of cuts."

B1702 DESCRIPTION OF WORK

(a) Clearing

ADD THE FOLLOWING TO THE THIRD PARAGRAPH:

"Boulders exceeding 0,15 m³ in volume adjacent to the tops of cuts within the road reserve that are considered by the engineer to be unstable, shall be removed by the contractor and disposed of at approved dumping sites provided by the contractor."

ADD THE FOLLOWING SUBCLAUSE:

"(e) Clearing household refuse from the road reserve

Where household refuse has been deposited within the road reserve, it shall be removed to approved dumping sites provided by the contractor."

B1703 EXECUTION OF WORK

(e) Cleaning out of hydraulic structures

ADD THE FOLLOWING:

"The cleaning of hydraulic structures shall involve the removal of all undesirable materials such as earth, sand, gravel, stones and mud until the structures are completely clean, and the debris is disposed of at approved dumping sites

B1704 MEASUREMENT AND PAYMENT

Item

B17.01 Clearing and grubbing

REPLACE THE LAST PARAGRAPH WITH THE FOLLOWING:

"The tendered rates shall include full compensation for all work necessary for the clearing and grubbing of the surface, the demolishing and disposal of structures, shelters, dwellings and out-buildings, the removal of all vegetation, shrubs, trees and tree stumps (except large trees and stumps as defined in item 17.02), cutting of branches, backfilling of cavities, the removal, transporting (including all haul) and disposal of material at approved dumping sites provided by the contractor, and all additional costs incurred to clear and grub the surfaces to the engineer's satisfaction.

Clearing and grubbing of borrow areas will only be measured and paid for in the cases specified in clause 3104(b)."

ADD THE FOLLOWING ITEMS:

Item Unit

B17.09 Demolition and disposal of structures

(description of structure and km distance

to be given) ..... lump sum

The tendered lump sum for each structure shall include full compensation for the complete demolition of the structure (including foundations to 0,5 m below natural ground level) and the transportation (including all haul) and disposal of all debris at approved dumping sites provided by the contractor.

Item
Unit

B17.11 Removal of household refuse from the

road reserve ..... cubic metre (m^3)

The unit of measurement shall be the cubic metre of household refuse removed from the road reserve as instructed by the engineer. The volume of refuse removed shall be taken to be the equivalent of 70% of the loose volume of the haul vehicles.

The tendered rate shall include full compensation for loading, transporting (including all haul), unloading and disposing of the material at approved dumping sites provided by the contractor.

Item Unit

B17.12 Cleaning existing drainage systems and

structures .....

The tendered lump sum shall include full compensation for all work required for removing all undesirable materials from the drainage systems and structures, and transporting (including all haul) and disposing of these materials at approved dumping sites provided by the contractor, as well as all additional costs (e.g. for flushing, if necessary) incurred to clean the drainage systems and structures to the engineer's satisfaction."

COLTO SERIES 2000: DRAINAGE

SECTION B2200: PREFABRICATED CULVERTS

B2203 MATERIALS

ADD THE FOLLOWING:

"Numbered precast culverts to be constructed in accordance with this section of the specifications are measured and paid for under Schedule B: Structures of the bill/ schedule of quantities or pricing schedule."

ADD THE FOLLOWING NEW SUB ITEM:

(j) All bricks shall be of type NFX with a minimum compressive strength of 14MPa. Theses bricks shall be used with class 2 mortar.

B2204 CONSTRUCTION METHODS

ADD THE FOLLOWING:

"Culverts shall be installed by the 'trench method'.

When instructed by the engineer, measures shall be taken to reduce the effect of unsuitable material at the positions of prefabricated culverts. This will entail the additional excavation of a minimum of 1 m of in-situ material to a minimum width of 4 m, the even chamfering of the sides of the excavation to a grade of 1:4 and backfilling the excavation with imported fill material with at least G10 quality compacted to 90% of modified AASHTO density. Additional excavation as described above will be paid for under item 33.07. Backfilling of the excavation will be measured and paid for under item 33.01."

B2205 EXCAVATION FOR CONSTRUCTION BY TRENCH METHOD

(a) Depth of excavation

ADD THE FOLLOWING AFTER THE FIRST SENTENCE OF THE FIRST PARAGRAPH:

"The maximum overall depth of the trench shall, however, not exceed 2,0 m."

B2210 LAYING AND BEDDING OF PREFABRICATED CULVERTS

(a) Concrete pipe culverts

ADD THE FOLLOWING AFTER THE FIRST PARAGRAPH:

"When instructed by the engineer or when measures are required to reduce the effect of unsuitable material below culverts, the pipe joints shall be sealed with a 500 mm wide strip of Bituthene 3000 or an approved equivalent material glued symmetrically around the joint, using an adhesive recommended by the manufacturer of Bituthene. A 150 mm wide strip of

adhesive shall be applied to the edges of the Bituthene. An overlap of 150 mm shall be provided and the two layers of Bituthene at the overlap shall be glued together over the full area of 150 mm x 500 mm."

(i) Class A bedding

ADD THE FOLLOWING:

"12 mm thick Flexcell or an approved equivalent material shall be placed in the concrete bedding below all pipe joints."

(b) Portal and rectangular culverts

(iii) Placing the portal portions of culverts

ADD THE FOLLOWING:

"When instructed by the engineer or when measures are required to reduce the effect of unsuitable material below culverts, the culvert joints shall be sealed with a 500 mm wide strip of Bituthene 3000 or an approved equivalent material glued symmetrically around the joint, using an adhesive recommended by the manufacturer of Bituthene. A 150 mm wide strip of adhesive shall be applied to the edges of the Bituthene."

(f) General

ADD THE FOLLOWING:

"Where the grade of the culvert is such that it would require a trench deeper than 2,0 m, the culvert shall be constructed in stages as the fill progresses. The construction shall normally begin at the outlet or downstream end of the culvert and backfilling shall be done in horizontal layers starting at the lower end.

No additional payment will be made under section 3300 or under this section for constructing the fill or culverts in stages as described above."

B2212 INLET AND OUTLET STRUCTURES, CATCHPITS AND MANHOLES

REPLACE THE HEADING AND FIRST PARAGRAPH WITH THE FOLLOWING:

"B2212INLET AND OUTLET STRUCTURES, CATCHPITS, MANHOLES AND SKEW-END PIECES FOR PORTAL AND RECTANGULAR CULVERTS

Inlet and outlet structures for prefabricated culverts, catchpits, manholes, and skew-end pieces for portal and rectangular culverts shall be constructed in accordance with the details on the drawings."

(i) Prefabricated energy dissipators in outlet structures

REPLACE THE PARAGRAPH WITH THE FOLLOWING:

"When shown on the drawings or instructed by the engineer, the contractor shall supply and install prefabricated reinforced-concrete blocks in outlet structures. The blocks shall be Class 20/19 concrete manufactured to the dimensions shown on the drawings or listed in the bill/schedule of quantities/pricing schedule. All concrete work shall comply with the requirements of Series 6000."

ADD THE FOLLOWING SUBCLAUSES:

"(j) Prefabricated concrete cover slabs for kerb inlets

Prefabricated reinforced-concrete cover slabs for kerb inlets, complete with steel supporting structures, shall be manufactured and installed in accordance with the details on the drawings. All concrete work shall comply with the requirements of Series 6000.

(k) Building in pipework

Pipework shall be built into concrete as shown on the drawings. The pipework shall be set into exact position in the shutters before the concrete is placed and the concrete thoroughly compacted and worked around the pipework. Alternatively, at the discretion of the engineer and at no extra cost, unless specifically provided for in the bill/schedule of quantities/pricing schedule, holes may be left or formed in the concrete into which the pipework shall be set, whereupon the space around the pipework shall be caulked with concrete having just sufficient water to ensure water tightness and thereafter the caulking shall be properly cured.

The joint between the old and fresh concrete shall be made in accordance with clause 6408: Construction joints.

Where pipes enter brickwork they shall be caulked into the wall and rendered with mortar.

(l) Manholes for Telkom

Manholes required for Telkom shall be for jointing, pulling or for change of direction and shall be constructed in accordance with the details shown on the drawings. As these manholes generally finish somewhere in the layer works of the pavement, these layer works shall first be constructed to the level of the top of the manhole roof slab. Excavation for the manhole shall then be carried out as neatly as possible, the manhole constructed and the minimal backfill space filled with either soil cement for brick walls or combined with the concrete if the walls are concrete. Finally, once all structural concrete has attained its design strength, the overlying layer works shall be constructed, then the manhole shaft/opening constructed so that the cover is completely flush with the adjacent asphalt surfacing.

The contractor shall allow in his programme for a suitable delay in the layer works while the various Telkom manholes are being constructed."

B2215 SERVICE DUCTS

REPLACE THE LAST PARAGRAPH WITH THE FOLLOWING:

"The end of each duct shall be marked with a 300 mm x 300 mm x 100 mm Class 20/19 concrete marker block. A 200 mm x 100 mm galvanized steel or aluminium plate with the size, number and depth of pipes stamped on the surface shall be affixed to the top of the marker block. Each duct marker shall be at least 50 mm proud of the finished surface level."

ADD THE FOLLOWING TO THE SEVENTH PARAGRAPH:

"The Telkom uPVC ducts for the optical fibre cable are required to be placed in special bedding, padding and backfilling as specified in clause B2219."

ADD THE FOLLOWING NEW CLAUSES:

B2219 TELKOM DUCTS FOR OPTICAL CABLES

(a) This clause specifies the characteristics, testing and installation of bedding, padding and backfilling material for Telkom uPVC ducts.

The following conditions apply:

Bedding: The material constituting the even floor of an excavated trench onto which a pipe or a bank of pipes are laid being either undisturbed in-situ material or an imported layer of suitable material as specified hereinafter.

Padding: The material installed around and/or between pipes up to a level of at least 150 mm above the pipe or bank of pipes: The padding material must be 150 mm below and to the sides of ducts.

Backfilling: The material installed above the padding material layer to complete the refilling of an excavated trench.

(b) Bedding, padding and backfill material shall be installed with a moisture content as near to optimum as possible to ensure that optimum compaction is achieved. The engineer may, if he considers it necessary, direct the contractor to carry out tests, which the engineer shall specify, to determine the optimum and actual moisture content of any material being used. Should the results of such tests require it, the engineer may direct the contractor to add water to material which is too dry or to dispose of material which is too moist or import suitable material.

(c) Under no circumstances shall material, which is saturated with water, be used for bedding, padding and backfill.

(d) The contractor shall pay particular attention to the proper compaction of bedding, padding and backfilling material.

A higher standard of compaction effort will be insisted upon in all cases where fine materials are approved as bedding and padding.

(e) The bedding shall cover the full width of the trench in a uniform layer of the required thickness and shall be compacted by means of one pass by a vibratory plate compactor.

(f) Care must be taken to ensure that the ducts are completely surrounded by the padding material.

On completion of the placement of the padding material, the top surface shall be compacted by means of one pass by a vibratory plate compactor.

(g) The compaction of backfill shall be by means of a vibratory plate compactor.

(h) During the compaction of padding and backfill material, the contractor shall exercise due care to ensure that pipes and pipe joints are not disturbed or damaged in any way.

The material to be used for the bedding and padding shall be coarse-grade crushed stone as specified in clause 2104(a) of the standard specifications.

i.e. The crushed stone shall be graded crushed stone conforming to the following grading requirements:

Sieve size	% Passing
26,5 mm sieve	100%
13,2 mm	60 - 85%
6,7 mm	Minimum 15%
2,36 mm	Maximum 15%

Note: The following items will be supplied by Telkom and delivered to site:

(i) uPVC pipes

(ii) copper earth conductor wires

(iii) danger tape conductor

The contractor must inform Telkom at least three weeks before the pipes are required for installation.

(i) Where directed by the engineer, copper earth conductors shall be installed. Joints in conductors shall be by means of approved clamps.

(ii) Where indicated on the drawings, ducts shall be protected with precast concrete slabs.

B2218 MEASUREMENT AND PAYMENT

Item Unit

B22.02 Backfilling:

REPLACE THE DESCRIPTION OF SUBITEM 22.02(c) WITH THE FOLLOWING:

(c) Extra over subitems B22.02(a) and (b) for soil cement (soilcrete) backfilling (percentage of cement indicated)

ADD THE FOLLOWING SUBITEMS:

(d) Special backfilling for Telkom optical fibre,

uPVC ducts all as specified ..... cubic metre (m^3)

(e) Special bedding and padding for Telkom

optical fibre uPVC pipes as specified ..... cubic metre (m^3)

(f) Installation of earth wire in backfilling (including

jointing) and danger tape as supplied by Telkom ..... metre (m)

ADD THE FOLLOWING PARAGRAPHS:

"The payment shall also apply to backfill adjacent to and over corrugated metal arch culverts. The quantity shall be calculated in accordance with the details of backfilling as indicated on the

drawings.

The tendered rate shall include full compensation for all additional work necessitated by working in the confined area, special equipment required to achieve the specified compaction and the material as described in clause B2211."

Item

B22.03 Concrete pipe culverts

ADD THE FOLLOWING TO THE SECOND PARAGRAPH:

"The tendered rates shall also include full compensation for supplying and installing Flexcell or an approved equivalent material in the concrete bedding below pipe joints."

REPLACE ITEM 22.26 WITH THE FOLLOWING:

Item Unit

B22.26 Hand excavation:

(a) To determine the positions of existing services:

(i) In roads ..... cubic metre (m^3)

(ii) In all other areas ..... cubic metre (m^3)

(b) To expose existing services to 0,6 m on either

side of the service ..... cubic metre (m^3)

The unit of measurement shall be the cubic metre of material excavated within the lengths and widths authorised by the engineer and the depth required to expose the service. Excavation in excess of the authorised dimensions will not be measured for payment.

The tendered rates shall include full compensation for all excavation, backfilling, compacting to 90% of modified AASHTO density, disposing of surplus excavated material, demarcating excavations with approved safety tape, keeping the excavations safe, dealing with surface or subsurface water, taking special care to ensure that services are not damaged in any way, and all other operations required to complete the work. The tendered rates shall also include for transporting surplus excavated material for a free-haul distance of 1,0 km.

No distinction will be made between hard and soft materials, nor will distinctions be made between the various types of service to be exposed or the depths to which excavations are taken.

When instructed by the engineer, the reinstatement of the pavement layers, surfacing and kerbing will be measured for payment under item 22.27.

*NB - The contractor shall supply adequate supervision of labourers excavating to expose services. Damage to a service caused by the contractor shall be repaired at his expense, to the satisfaction of the owner of the service and the engineer."

ADD THE FOLLOWING ITEMS:

Item Unit

B22.29 Waterproofing of prefabricated culvert joints

with a 500 mm wide strip of Bituthene 3000

or an approved equivalent material ..... metre (m)

The unit of measurement shall be the metre of 500 mm wide strips of Bituthene 3000 or an approved equivalent material glued over the joints. The specified 150 mm overlap will also be measured for payment.

The tendered rate shall include full compensation for procuring, furnishing, installing and gluing the Bituthene strip, including the adhesive, as specified.

Item Unit

B22.30 Breaking into existing drainage structures

and building in pipes of the following diameter

(pipe diameter to be stated) ..... number (No)

The unit of measurement shall be the number of each size of pipe built into existing drainage structures in accordance with the details on the drawings or as instructed by the engineer.

The tendered rates shall include full compensation for supplying all labour, constructional plant and materials required, for all excavation, breaking into existing drainage structures, building pipes into the newly formed accesses, sealing around the pipes and making the joints watertight, breaking out existing benching and channelling where required and reconstructing them complete with granolithic rendering to suit the new pipe arrangement, backfilling and compacting to 90% of modified AASHTO density, transporting (including all haul) and disposing of all surplus excavated material and debris to approved dumping sites provided by the contractor, and dealing with the flows in the existing structures.

No distinction will be made between different types of structure.

SECTION B2300: CONCRETE KERBING, CONCRETE CHANNELLING, CHUTES AND DOWNPIPES, AND CONCRETE LINING FOR OPEN DRAINS

B2301 SCOPE

ADD THE FOLLOWING TO THIS CLAUSE:

“This section also covers the replacement of damaged concrete kerbing, channelling and lining.”

B2304 CONSTRUCTION

(b) Prefabricated concrete kerbing and channelling

ADD THE FOLLOWING:

"A 10 mm wide joint formed in inert filler shall be provided every 20 metres through the kerbing and channelling. The colour of the filler shall match the colour of the kerbing.

Contractor | Witness 1 | Witness 2 | Employer | Witness 1 | Witness 2

Curved kerbing of radius less than one metre shall be cast in situ. Units for curved kerbing of radius greater than 1 m up to 4 m shall be of nominal length 0,3 m. Units for curved kerbing of radius greater than 4 m up to 20 m shall be of nominal length 0,5 m. Units for radius exceeding 20 m shall be of nominal length 1 m. Any associated channelling shall also comply with the above requirements."

The cast insitu concrete support behind the kerbs must be continues and can be interrupted every 2m with a 10mm wide construction joint.

(e) Cast in situ kerbs and channels

ADD THE FOLLOWING:

"Cast in situ kerbs, channels and edge beams shall be provided with a contraction joint every 2 m and an expansion joint every 20 m. The contact area of the contraction joint shall be painted with two coats of bitumen. Alternatively, joints may be cut and finished to a depth of 50 mm. The expansion joint shall consist of 12 mm thick Flexcell or an approved equivalent placed between adjoining concrete sections. The top part of the joint shall be sealed with a 12 mm x 12 mm silicone sealant. All joints shall be provided for the full depth of the concrete."

(g) Concrete-lined open drains

ADD THE FOLLOWING:

"When instructed by the engineer, the surfaces on which concrete lining is to be cast shall be sprayed with invert bituminous emulsion as soon as possible after the excavations have been trimmed. The sprayed surfaces shall be maintained until the concrete lining is cast. The nominal rate of application of the emulsion shall be 0,5 litre/m2 unless otherwise instructed by the engineer. The tolerance in the rate of application shall be ± 5% of the specified rate."

(k) Cutting existing bituminous surfacing and pavement layers

REPLACE THE PARAGRAPH WITH THE FOLLOWING:

"Where the engineer instructs kerbing, edge beams, channelling or concrete-lined drains to be constructed against existing bituminous surfacing and pavement layers, the full depth of the bituminous surfacing and pavement layers shall be accurately cut with a mechanical saw to the required line and level before the kerbing, edge beams, channelling or concrete-lined drain is constructed. The cut edge shall be vertical for kerbing, edge beams, concrete-lined drains and channelling. The concrete shall be placed directly against the cut edge without formwork. All material outside the cut edge shall be removed to the required depth before the concrete is placed, and the debris shall be disposed of at approved dumping sites provided by the contractor. The bituminous surfacing shall be protected and kept clean to the engineer's satisfaction."

ADD THE FOLLOWING SUBCLAUSE:

“(l) Removal of existing kerb and channel

Where shown on the drawings and/or indicated by the engineer, the existing kerb and channel shall be removed and transported to spoil as directed.”

B2307 MEASUREMENT AND PAYMENT

REPLACE THE DESCRIPTION OF ITEM 23.01 WITH THE FOLLOWING:

Item Unit

B23.01 Concrete kerbing, straight and curved including joints

(class of concrete indicated for in situ concrete) ..... metre (m)

ADD THE FOLLOWING TO THE PAYMENT PARAGRAPH:

"The tendered rates shall also include full compensation for the construction of expansion and construction joints as specified. The rate shall also include continues backing and bedding."

REPLACE THE DESCRIPTION OF ITEM 23.02 WITH THE FOLLOWING:

Item Unit

B23.02 Concrete kerbing-channelling combination,

straight and curved, including joints

(class of concrete indicated for cast in situ concrete):

(a) (Description of type with reference to drawing) ..... metre (m)

(b) (Etc for other types) ..... metre (m)

REPLACE THE DESCRIPTION OF ITEM 23.06 WITH THE FOLLOWING:

Item Unit

B23.06 Inlet, outlet, ramps and similar

Structures (measured by components):

Item Unit

B23.14 Cutting bituminous surfacing and pavement

layers for concrete kerbing, edge beams,

channelling or concrete-lined drains:

(a) Depth up to 50 mm ..... metre (m)

(b) Depth exceeding 50 mm but not exceeding 100 mm ..... metre (m)

(c) Depth exceeding 100 mm but not exceeding 150 mm ..... metre (m)

(d) Depth exceeding 150 mm but not exceeding 200 mm ..... metre (m)

The unit of measurement shall be the metre of bituminous surfacing and pavement layers in each overall depth category cut as instructed by the engineer. The various layers will not be measured separately for payment.

The tendered rates shall include full compensation for all labour, constructional plant and materials required for cutting the surfacing and pavement layers to the required depth, removing, transporting (including all haul) and disposing of the debris at approved dumping sites provided by the contractor, and protecting and keeping the surfacing clean, all as specified."

COLTO SERIES 3000: EARTHWORKS AND PAVEMENT LAYERS OF GRAVEL OR CRUSHED STONE

SECTION B3200: SELECTION, STOCKPILING AND BREAKING-DOWN THE MATERIALS FROM BORROW PITS, CUTTINGS AND EXISTING PAVEMENT LAYERS, AND PLACING AND COMPACTING THE GRAVEL LAYERS

B3203 STOCKPILING THE MATERIAL

IN THE THIRD PARAGRAPH, REPLACE THE SECOND AND THIRD SENTENCES WITH:

“Before any stockpiling may be done the area shall be cleared of topsoil to a sufficient depth that will subsequently allow for the complete rehabilitation of the site with a cover of topsoil that does not exceed 100 mm in depth and is not less than 75 mm in depth. If there is insufficient topsoil; the contractor shall acquire whatever balance is needed to rehabilitate the area at his own cost. No make-up topsoil shall be taken from the road reserve. The topsoil shall be stored in an area that shall not be affected by construction activities nor impede the natural flow of water. The topsoil so windrowed or stockpiled and its surrounds shall be kept free of all undesirable vegetation (refer to subclause 5807(e)). The contractor shall not commence his stockpiling activities without prior written approval from the Engineer that the site has been adequately prepared.

After the stockpiled material has been removed, the site shall be reinstated as closely as possible to its original condition by ripping of the affected areas, re-landscaping if necessary, re-instatement of the topsoil and re-vegetation.”

B3205 CRUSHING AND SCREENING

ADD TO THE FIRST PARAGRAPH THE FOLLOWING:

"The crushing of material shall only take place on the written instructions of the engineer."

B3206 CONTROLLING THE MOISTURE CONTENT OF MATERIALS

ADD THE FOLLOWING AFTER THE FIRST PARAGRAPH:

With respect to the last paragraph, the onus is placed on the contractor to show that he has taken all reasonable precautions to keep the material dry and to dry it out and this includes the scheduling of the work in the correct season."

B3208 PLACING AND COMPACTING THE MATERIAL IN LAYER THICKNESSES OF 200 mm AND LESS AFTER COMPACTION

(a) Spraying and mixing

(i) General requirements

ADD THE FOLLOWING TO THE SECOND PARAGRAPH:

"When pavement material is to be stabilized, the moisture content of this material to be compacted shall be 1% below the optimum moisture content, unless otherwise approved by the engineer."

B3302 MATERIALS

(b) Fill

ADD THE FOLLOWING TO SUBITEM (iv):

"The maximum swell at 100% modified AASHTO compaction shall not be more than 2%."

B3305 TREATING THE ROADBED

(a) Removing unsuitable material

REPLACE "or" IN THE EIGHTH LINE OF THE THIRD PARAGRAPH WITH "and" AND ADD THE FOLLOWING:

"for the purpose of this contract, excavation and removal of in situ clayey material over areas where the road is in a fill condition shall be classified as removal of unsuitable material, irrespective of the stability or moisture condition of the in-situ material".

(c) Preparing and compacting the roadbed

DELETE THE LAST SENTENCE OF THE FIRST PARAGRAPH “If necessary, roadbed …. depth of compaction.” AND REPLACE AS FOLLOWS:

“Where demarcated by the engineer, prior to the roadbed being scarified, the excess in situ material forming part of the present roadway, and within the limits of the roadbed, and in close proximity of the layer works, but falling within the limits of the layer works, shall be bladed to controlled level in order to achieve the required level and necessary depth of compaction.”

(d) In situ treatment of roadbed

ADD THE FOLLOWING AFTER THE SECOND PARAGRAPH:

"Shales and mudstone shall under no circumstances be subject to the above treatment."

B3306 CUT AND BORROW

(a) Dimensions of cuts

REPLACE THE SECOND SENTENCE OF THE THIRD PARAGRAPH WITH THE FOLLOWING:

"No additional or extra over payment will be made for widening existing or partly completed cuttings along the road. The widening of such cuttings shall be measured and paid for as 'cut and borrow to fill' (item 33.01) or 'cut to spoil' (item 33.04) as instructed by the engineer."

(e) The temporary stockpiling of materials

REPLACE THE CONTENTS OF THIS SUBCLAUSE WITH THE FOLLOWING:

"The contractor shall plan his activities in such a manner so that materials excavated from

borrow areas and cuttings can be directly transported to and placed at the designated points.

The temporary stockpiling of material will not be paid for separately unless instructed by the engineer, and full compensation will be deemed to have been included in the rates tendered for the various payment items for work for which the stockpiled material is to be used."

(f) The disposal of surplus material

ADD THE FOLLOWING AFTER THE FIRST PARAGRAPH:

"Material shall be disposed of by side spoiling only on the written instructions of the engineer."

(g) General

ADD THE FOLLOWING AFTER THE FIRST SENTENCE OF THE SECOND PARAGRAPH:

"The final cut surface in hard excavation shall not be more than 0,5 m below the specified slope face, measured at right angles to the strike and dip directions of the slope face."

B3307 FILLS

(a) General

ADD THE FOLLOWING:

"Where existing embankments are to be widened, or where new embankments are to be constructed adjacent to existing embankments, the existing side slopes shall be benched as specified in subclause 3307(d) and in accordance with the details on the drawings.

In addition the material in the fill widening shall, unless otherwise instructed by the engineer, be compacted as follows:

(i) where the thickness exceeds 1,2 m, it shall be compacted to a minimum of 93% modified AASHTO density to a depth of at least 1,2 m below the final road level;"

(c) Constructing a pioneer layer

ADD THE FOLLOWING AT THE END OF THE FIRST PARAGRAPH:

"Where instructed by the engineer or shown on the drawings, the pioneer layer shall be wrapped in a Grade 5 geotextile."

(d) Benching

REPLACE THE FIRST SENTENCE OF THE SECOND PARAGRAPH WITH THE FOLLOWING:

"The dimensions of benches as well as the extent to which existing fills have to be cut back to form benches shall be subject to the engineer's approval."

ADD THE FOLLOWING:

"In order to obtain sufficient working width for road-building equipment when the existing road fill is widened, it may be necessary to form benches that extend beyond the normal road prism or to cut back into the existing road fill or both. The contractor shall submit his proposals in

this regard to the engineer for approval before proceeding with such work. The contractor will be paid in accordance with the relevant payment items for work required to obtain a working width of up to 4 m. Additional work required to provide a working width in excess of 4 m shall be at the contractor's expense."

(i) Widening of fills

REPLACE THE FIRST SENTENCE OF THE EIGHTH PARAGRAPH WITH THE FOLLOWING:

"No additional or extra over payment will be made for widening of existing fills along the road. The widening of fills shall be measured and paid for under items B33.01 and B33.20 as instructed by the engineer."

ADD THE FOLLOWING SUBCLAUSES:

"(k) Constructing a coarse fill layer

Coarse fill (so-called pioneer/rock fill layer as indicated on the drawings) shall consist of material which conforms with G10 specifications as per TRH 14: table 13 and shall be compacted to 90% of modified AASHTO density. The coarse fill shall be constructed to a specified thickness as indicated on the drawings.

B3308 FINISHING THE SLOPES

(d) General

ADD THE FOLLOWING:

“Where existing cut and fill slopes are excessively eroded or where slippages occurred in slopes, the slopes are to be reinstated by means of backfilling with suitable gravel material. All loose material and vegetation shall first be removed from the eroded cut and fill slopes before backfilling may commence from the bottom of the cut or fill. The backfill material shall be benched into the existing slopes and compacted to 90% of modified AASHTO density, using suitable small compaction equipment e.g. Bomag walk-behind rollers or hand-held compaction tools. Benching shall be executed to the dimensions shown on the drawings. Upon completion of the backfilling operation the cut and fill slopes shall be neatly finished as specified.”

B3310 CONSTRUCTION TOLERANCES

ADD THE FOLLOWING SUBCLAUSE:

"(c) Layer thicknesses

The thickness tolerances referred to in clauses 8205 and 8305 for the 150 mm natural gravel fill layer compacted to 93% of modified AASHTO density, shall be as follows:

D90	Dmax	Daverage	
Fill layer	30 mm	40 mm	10 mm"

B3312 MEASUREMENT AND PAYMENT

General directions

(3) Work in restricted areas

DELETE THE CONTENTS OF THIS SUBCLAUSE AND REPLACE IT WITH THE FOLLOWING:

"No additional or extra over payment will be made for work in restricted or confined areas."

Item Unit

B33.01 Cut and borrow to fill, including all haul"

ADD THE FOLLOWING SUBITEM:

(g) Coarse fill (so-called pioneer/rock fill as

specified in subclause B3307(k)) compacted to

90% of modified AASHTO density ..... cubic metre (m^3)

REPLACE THE FIFTH MEASUREMENT AND PAYMENT PARAGRAPH WITH THE FOLLOWING:

"The tendered rates shall include full compensation for procuring, furnishing and placing the material, including excavating as if in soft excavation, the cutting of benches, the transporting of material over the haul distance, for preparing, processing, shaping, watering, mixing, and compacting the materials to the densities or in the manner specified herein and for removing and disposing of up to 5% oversize material from the road after processing, including all haul."

Item

B33.04 Cut to spoil, including all haul.

Material obtained from:

ADD THE FOLLOWING TO THE FOURTH PARAGRAPH:

"It shall also, where applicable, allow for spoiling at sites where borrowing is taking place at the same time. No additional payment for temporary stockpiling or double handling will be made."

REPLACE THE FOURTH MEASUREMENT AND PAYMENT PARAGRAPH WITH THE FOLLOWING:

"The tendered rates for cut to spoil shall include full compensation for excavating from the road prism and roadbed in the various classes of excavation, for loading, transporting the material over the haul distance, off-loading and disposing of the material as specified, including shaping and levelling-off any piles of spoil material."

AMEND THE DESCRIPTION OF ITEM 33.07 AS FOLLOWS:

Item

B33.07 Removal of unsuitable material,

including all haul:

REPLACE THE LAST SENTENCE OF THE LAST MEASUREMENT AND PAYMENT PARAGRAPH WITH THE FOLLOWING:

"It shall also include compensation for hauling material over the haul distance."

REPLACE THE HEADING OF ITEM 33.09 WITH THE FOLLOWING:

Item Unit

B33.09 Material temporarily removed and placed

in a windrow ..... cubic metre (m^3)

REPLACE "bladed to" IN THE SECOND LINE OF THE FIRST PARAGRAPH WITH "removed and placed in a".

REPLACE "bladed off" IN THE FOURTH LINE OF THE FIRST PARAGRAPH WITH "removed and placed in a windrow".

REPLACE "bladed to" IN THE FIRST LINE OF THE THIRD PARAGRAPH WITH "removed and placed in a".

SECTION B3400: PAVEMENT LAYERS OF GRAVEL MATERIAL

B3402 MATERIALS

(a) General

REPLACE THE FIRST PARAGRAPH WITH THE FOLLOWING:

"Gravel material shall be obtained from approved commercial sources or approved sources provided by the contractor."

REPLACE "and 3402/4" IN THE THIRD LINE OF THE SECOND PARAGRAPH WITH "3402/4 and 3402/5".

ADD THE FOLLOWING AFTER THE SECOND PARAGRAPH:

"The wet-dry durability (table 3402/5) limits for subbase if tested according to TMH1 method A19, but using samples as prepared for the modified AASHTO method, shall be as follows:

C3: 20% maximum (modified AASHTO density briquettes)

C4: 30% maximum (modified AASHTO density briquettes)"

“Distinction shall be made between crushed and natural G4, G5 and G6 materials. Where the crushing and/or screening of these materials has been specified, the combined grading shall conform to the grading limits specified for G4 class material in Table 3402/1.”

ADD THE FOLLOWING TO THE SECOND PARAGRAPH:

"Natural gravel shoulder material shall comply with the requirements of a Type 1 material according to table 3402/4."

"For chemically stabilised layers the material shall conform to the requirements in table

B3402/5."

REPLACE TABLE 3402/5 WITH:

TABLE B3402/5: REQUIREMENTS FOR CHEMICALLY STABILIZED LAYERS

Classification	C1	C2	C3	C4
Material before treatment	At least G2 quality	At least G4 quality	At least G5 quality	At least G6 quality
PI after treatment	Non-plastic	Non-plastic	6 max. *(1)	6 max. *(1)
UCS (MPa) *(2)	6 min	4 min	1,5 min	0,75 min
ITS (kPa) *(3)	-	-	250 min	200 min
WDD (% loss)	5 max	10 max	20 max	30 max

Notes:

* (1) For materials derived from the basic crystalline rock group, the Plasticity Index after stabilisation shall be non-plastic.

* (2) Unconfined Compressive Strength @ 100% Mod. AASHTO density

* (3) Indirect tensile Strength @ 100% Mod. AASHTO density

* (4) Wet/Dry Durability according to Method B8110"

ADD THE FOLLOWING SUBCLAUSE:

"(d) Material requirements

When the values listed in tables 3402/1, 3402/2, 3402/3 and 3402/4 cannot be attained with the type and quantity of stabilizing agent specified in section 3500 in the project specifications and on the borrow pit plans, the engineer will authorise the contractor to vary and/or amend the quantity and possibly the type of stabilizing agent as well in order to obtain the required values."

ADD TABLE B3402/6 AFTER TABLE 3402/5:

TABLE B3402/6: REQUIREMENTS FOR EMULSION TREATED MATERIALS

Criteria	E1	E2
Material before treatment	G1 to G3	G4 to G5
After treatment: - Minimum CBR @ 100% modified AASTHO density - Minimum UCS @ 100% modified AASHTO density	 150% 1 200 kPa	 100% 700 kPa

B3403 CONSTRUCTION

ADD THE FOLLOWING SUBCLAUSES:

"(f) Treatment of in situ material or existing pavement layers as new pavement layers

Where the in situ material or existing pavement layers are classified as suitable for new pavement layers and have to be reconstructed as prescribed by the engineer, the material or layers shall be scarified, watered and compacted to a percentage of modified AASHTO density. The density and compaction depth will be prescribed by the engineer.

When additional material has to be imported to obtain the required level and layer thickness, and when the thickness of the layer of imported material would be less than the specified layer thickness after compaction, the in situ material or existing pavement layers shall be scarified, the necessary imported material placed, and this combined material mixed and compacted to the full specified depth of the layer.

The imported material will be measured and paid for under item 34.01 and the in situ material will be measured and paid for under item B34.04.

(g) Temporary stockpiling of material

The contractor shall plan his activities so that materials excavated from borrow areas and cuttings or imported from commercial sources can be directly transported to and placed at the designated points.

The temporary stockpiling of material will not be paid for separately unless instructed by the engineer, and full compensation will be deemed to have been included in the rates tendered for the various payment items for work for which the material is to be used.

This subclause does not apply to the excavation and temporary stockpiling of existing pavement layers as instructed by the engineer, in terms of subclause B3403(h), as these will be measured and paid for separately under item 32.06.

(h) Existing asphalt base or surfacing

Existing asphalt base or surfacing which cannot be broken down effectively to be used as part of the recovered pavement material, shall be separately excavated from the existing pavement layers and disposed of at approved dumping sites

(i) Storing recovered pavement material

Excavated pavement material intended for reprocessing but which cannot be reprocessed in place or cannot, in the opinion of the engineer, be placed in a windrow next to the excavation, nor directly placed in position anywhere else, shall be transported to approved stockpile or dumping sites with written permission from the engineer.

Stockpile sites for material to be recycled or reprocessed shall be located as approved by the engineer.

The stockpile site shall be cleaned, and all stones, vegetation and other materials which may cause contamination shall be removed. The site shall be graded smooth with an adequate slope to ensure proper drainage of water. If instructed by the engineer, the surface shall be watered and compacted to a depth of at least 150 mm and to a density of 90% of modified AASHTO density. The compacted surface shall be firm. Upon completion, the surface shall be swept clean.

Stockpile sites shall be large enough to allow the different types of material to be stockpiled without overlapping or exceeding the limits of the prepared site. Enlargement of the stockpile sites after the stockpiles have been placed will not be permitted without the engineer's approval.

Upon completion of the work, the stockpile sites shall be rehabilitated in accordance with the engineer's instructions."

B3405 CONSTRUCTION TOLERANCES

(a) Level

ADD THE FOLLOWING:

H90 Hmax

Subbases and shoulders below precast concrete

interlocking paving blocks ..... 15 mm 20 mm

Level control for the various pavement layers shall be done at the following intervals in the longitudinal direction:

Layer	Interval
Selected layer, subbase, shoulders and wearing course	20 m
Base	10 m

Contractor | Witness 1 | Witness 2 | Employer | Witness 1 | Witness 2

ADD THE FOLLOWING AT THE END OF THE CLAUSE:

"If a selected subcontractor lays the precast concrete interlocking block paving, the contractor shall nevertheless be responsible for ensuring that the top levels of the subbases comply with the specifications. This could entail removing high spots and filling in depressions as specified in clause B7304."

(b) Layer thicknesses

ADD THE FOLLOWING:

"The construction tolerances of clause 3405 shall apply to layers constructed from reprocessed material, but when a gravel layer is placed on top of an existing layer without the existing layer being trimmed to prescribed levels, the thickness tolerances of subclause (b) do not apply."

(e) Cross-section

DELETE THE SECOND PARAGRAPH AND REPLACE WITH THE FOLLOWING:

"The normal cross-fall of the road wearing course where the road is in a straight horizontal alignment, is specified as shown on the drawings.

At any cross-section the measured cross-fall between any two points shall be at least 2,8% and not more than 3,5%. At any cross-section the actual level at any point shall not be higher than 10 mm above the computed level from the cross-section as specified and the actual level, if lower than the computed level, shall not be lower by more than that derived from the specifications for longitudinal grade and cross-fall deviations."

(f) Surface regularity

ADD THE FOLLOWING:

"Where transverse construction joints in base layers are made between newly and previously constructed sections, the contractor shall exercise level control at such joints by installing level poles at 5 m intervals on either side of the joint of the layer covering at least a 30 m length into the newly constructed section."

B3406 QUALITY OF MATERIALS AND WORKMANSHIP

REPLACE THE SECOND PARAGRAPH WITH THE FOLLOWING:

"Test results and measurements will be assessed in accordance with the provisions of Section 8200/8300."

B3407 MEASUREMENT AND PAYMENT

DELETE THE FIRST PARAGRAPH AND REPLACE IT WITH THE FOLLOWING:

"No additional or extra over payment will be made for work in restricted or confined areas."

B3415 GRAVEL FROM COMMERCIAL SOURCES

The unit of measurement shall be the cubic metre of compacted pavement layer constructed with material obtained from commercial sources provided by the contractor. The quantity of which shall be calculated in accordance with the authorised dimensions of each separate

completed layer by the method of average end areas from levelled cross-sections prepared from the ground line prior to the construction of new pavement layers, and the final specified or authorised layer cross-section superimposed at 20 m intervals along the centre line of the road.

The tendered rates shall include full compensation for the costs of negotiations and payments of royalties, for procuring, furnishing, placing, spreading, mixing imported material if required, breaking down, shaping, watering, preparing and compacting the material, for hauling the material over an unlimited free-haul distance from the source to the point of use, for protecting and maintaining the layer and for conducting control tests, all as specified. The tendered rates shall include full compensation for blading all oversize material off the road into windrows, for loading and transporting the material for an unlimited free-haul distance to approved dumping sites provided by the contractor, and for off-loading and spreading the material, all as specified.

SECTION B3500: STABILIZATION

B3502 MATERIALS

(a) Chemical stabilizing agents

ADD THE FOLLOWING:

"The stabilizing agent shall be class CEM II B-L, class 32.5N cement conforming to SANS 50191 (EN 197-1), or as directed by the engineer. The nominal rate of application for tender purposes as a percentage of the mass of the material to be stabilized and compacted to the required modified AASHTO density shall be as follows:

Base : 4,0%

The engineer may instruct the contractor to amend the percentage and possibly the type of stabilizing agent if necessary after tests on the site during construction.

Enough stabilizer should be added, over and above the design value, to allow for wastage during too high preshaping levels and inaccuracies during the spreading operation."

(i) Road lime

ADD THE FOLLOWING:

"Road lime shall be calcium type lime."

B3503 CHEMICAL STABILIZATION

(a) Preparing the layer

ADD THE FOLLOWING:

"The material to be stabilized shall be spread and pre-shaped, so that a true cross-fall is obtained. The upper level of the spread material shall be such that any indentations and depressions caused by construction equipment shall be above or at final cutting level. Enough extra material must be allowed for, so that no filling whatsoever is carried out. The final operation on the base prior to final compaction will be cutting and never making up of levels."

(d) Mixing in the stabilizing agent

ADD THE FOLLOWING:

"The contractor shall prepare a trial section for each type of material without any extra payment to demonstrate his proposed mixing process before extensive mixing commences.

After approval has been obtained, the mixing process and equipment shall remain unaltered unless otherwise instructed by the engineer.

The fact that the engineer has approved the mixing process shall not relieve the contractor of his obligations in respect of the mixing specified elsewhere in the specifications. It will serve only as a guideline to ensure that the specified mixing requirements can actually be met."

(f) Compaction

ADD THE FOLLOWING:

"Where the gravel base is chemically modified with road lime to modify certain physical properties of the gravel material and not for purposes of cementation, the base shall be compacted by means of two roller passes with a heavy pneumatic roller after the stabilizing agent has been mixed in and the material watered as specified in subclauses 3503(d) and (e) respectively. After twenty-four (24) hours the base shall be loosened by ploughing to its full depth, and be shaped, compacted and finished in accordance with the specifications.

When cutting final levels, the top of the layer shall be lightly watered to reduce the risk of dragging the material and cause shear cracks. The blade of the grader shall be tilted forward to reduce the dragging effect. Under no circumstances shall material be imported from the windrow to make up for low spots or depressions caused by any construction equipment."

(h) Curing the stabilized work

ADD THE FOLLOWING TO PARAGRAPH (ii):

"The covering material shall be placed by end-tipping, and compaction of this covering layer shall be delayed until the underlaying layer has cured for 7 days."

(i) Construction limitations

ADD THE FOLLOWING:

"No stabilization shall be carried out during falling temperatures when the ambient air temperature falls below 7 °C or during rising temperatures when the ambient air temperature is below 3 °C.

Moisture content tests shall not be undertaken more than one day in advance of in situ stabilization operations. Care shall be taken to ensure that samples are representative of the in situ material. When wet weather occurs, checks shall be conducted between initial testing and work commencing on any section.

The surface temperature of a compacted stabilized layer shall not be allowed to fall below 1 °C during the first three (3) days after stabilization. The contractor shall be responsible for taking the necessary measures in this connection, and especially to refrain from stabilizing when such temperatures become probable.

When a sudden unforeseen temperature drop to a level below this limit occurs, the stabilized layer shall be covered with the material required for the next layer to be constructed.

All stabilized layers damaged by frost or by the formation of ice in the layer shall be removed and replaced by the contractor at his own expense.

The contractor shall make allowance for these requirements in his construction programme, and no claims in this connection will be considered."

IN TABLE 3503/1, DELETE “8 hours” FOR ORDINARY PORTLAND CEMENTS AND CEMENT BLENDS AND REPLACE WITH "6 hours".

ADD THE FOLLOWING SUBCLAUSE:

(j) General

The contractor shall at all times supply all workers exposed to chemical stabilizing or modifying agents with approved protective apparel, eyewear and masks, and no person without such apparel, eyewear and masks may be permitted to work with or be exposed to the chemical agents. Precautionary measures shall also be taken to ensure that any livestock and the public will not be exposed to the chemical agents, for instance when they are carried by the wind.

Any biscuit layers or bowls, identified by the hollow sound caused when a chain is dragged over the stabilized layer, shall be removed and repaired prior to surfacing. The repairs shall be for the account of the contractor. Before surfacing is allowed, ball penetration tests shall be carried out."

B3510 MEASUREMENT AND PAYMENT

REPLACE THE FIRST PARAGRAPH WITH THE FOLLOWING:

"No additional or extra over payment shall be made for stabilization work in restricted or confined areas."

Item

B35.01 Chemical stabilization extra over unstabilized compacted layers

REPLACE THE FIRST PARAGRAPH WITH THE FOLLOWING:

"The unit of measurement shall be the cubic metre of stabilized material, the quantity of which shall be determined in accordance with the final in-situ authorised dimensions of the layers treated as instructed by the engineer. Additional material preshaped to allow for finishing by cutting only will not be included in the measurement."

ADD THE FOLLOWING TO THE PAYMENT PARAGRAPH:

"The tendered rate shall also include full compensation for working in restricted areas on top of and alongside culverts where necessary."

B35.02 Chemical stabilizing agent

REPLACE THE THIRD PARAGRAPH WITH THE FOLLOWING:

"Subject to the provisions of clause 1220, the quantity of stabilizer will be determined in accordance with the authorised rate of application and layer dimensions. Extra stabilizer added for wastage and higher pre-shaping levels will not be included in the quantity.

COLTO SERIES 8000: SUNDRIES

SECTION B8200: QUALITY CONTROL

B8201 SCOPE

ADD THE FOLLOWING:

"Quality control Scheme 1 shall apply to this contract."

SECTION B8300: QUALITY CONTROL

B8301 SCOPE

ADD THE FOLLOWING PARAGRAPH:

"Section 8300 shall be used for quality control on this contract."

B8308 PROCESS CONTROL BY THE CONTRACTOR

ADD THE FOLLOWING:

"For the purpose of this contract process or quality control by the contractor comprises at least the following:

(a) Soil tests

Field densities, maximum dry density and optimum moisture content determinations, CBR, UCS, indicator tests (grading and PI), moisture contents, solid densities and chemical tests relating to stabilizing agent contents.

(b) Aggregate tests

Grading, flakiness index, average least dimension (ALD).

(c) Concrete tests

Slump and cube crushing strengths.

C3.5.3 STANDARD SPECIFICATIONS BOUND IN

The following Standard Specifications are bound into the document in this section:

Specification EMA – Ver 2 : Environmental management (basic)

SPECIFICATION EMA: ENVIRONMENTAL MANAGEMENT (BASIC)

CONTENTS

SPECIFICATION EMA: ENVIRONMENTAL MANAGEMENT (BASIC)

1. SCOPE

This Specification covers the requirements for controlling the impact of construction activities on the environment. It contains clauses that are generally applicable to the undertaking of civil engineering works in areas where it is necessary to impose pro-active controls on the extent to which the construction activities impact on the environment.

Interpretations and variations of this Specification are set out in the Specification Data.

2. NORMATIVE REFERENCES

2.1 Supporting Specifications

Where this Specification is required for a project the following specifications shall, inter alia, form part of the Contract Document.

a) Specification Data;
b) SANS 1200 Series of Standardized Specifications;
i) SANS 1200 A or SANS 1200 AA, as applicable;
c) Specification AO
d) Construction Regulations, 2014, and e) 1Standards listed in Appendix A.

3. DEFINITIONS

For the purposes of this Specification the definitions and abbreviations given in the applicable specifications listed in 2.1 and the following definitions shall apply:

Environment : The surroundings within which humans exist and that are made up of:
i) the land, water and atmosphere of the earth;
ii) micro-organisms, plant and animal life;
iii) any part or combination of i) and ii) and the interrelationships among and between them; and
iv) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

Potentially hazardous
Substance : A substance that, in the reasonable opinion of the Engineer, can have a deleterious effect on the environment.

Method Statement : A written submission by the Contractor to the Engineer in response to the Specification or a request by the Engineer, setting out the plant, materials, labour and method the Contractor proposes using to carry out an activity, identified by the relevant specification or the Engineer when requesting the Method Statement, in such detail that the Engineer is enabled to assess whether the Contractor's proposal is in accordance with the Specifications and/or will produce
results in accordance with the Specifications.

The Method Statement shall cover applicable details with regard to:
construction procedures,
materials and equipment to be used,
transportation of equipment/materials to and from site, movement of equipment/materials on

site,
storage of materials on site,
containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur,
timing and location of activities,
areas of non-compliance with the Specifications and
any other information deemed necessary by the Engineer.

Reasonable : Unless the context indicates otherwise, reasonable in the opinion of the Engineer after he has consulted with a person, not an employee of the Employer, suitably experienced in "environmental implementation plans" and "environmental management plans" (both as defined in Act No 107,1998).

Solid waste : All solid waste, including construction debris, chemical waste, excess cement/ concrete, wrapping materials, timber, tins and cans, drums, wire, nails, food and domestic waste (e.g. plastic packets and wrappers).

Contaminated water : Water contaminated by the Contractor's activities, e.g. concrete water and runoff from plant/ personnel wash areas.

4. REQUIREMENTS

4.1. Materials

4.1.1 Materials handling, use and storage

The Contractor shall ensure that any delivery drivers are informed of all procedures and restrictions (including "no go" areas) required to comply with the Specifications. The Contractor shall ensure that these delivery drivers are supervised during off loading, by someone with an adequate understanding of the requirements of the Specifications.

Materials shall be appropriately secured and covered to ensure safe passage between destinations. The Contractor shall be responsible for any clean-up resulting from the failure by his employees or suppliers to properly secure transported materials.

4.1.2 Hazardous substances

Procedures detailed in the Materials Safety Data Sheets (MSDS) shall be followed in the event of an emergency situation.

Potentially hazardous substances shall be stored, handled and disposed of as prescribed by the Engineer.

4.2 Plant

4.2.1 Ablution facilities

The Contractor shall ensure that no spillage occurs when the toilets are cleaned or emptied and that the contents are properly stored and removed from Site. Discharge of waste from toilets into the environment and burial of waste is strictly prohibited.

Washing, whether of the person or of personal effects and acts of excretion and urination are strictly prohibited other than at the facilities provided.

4.2.2 Solid waste management

The Contractor shall provide sufficient bins with lids on Site and no on-site burying, dumping or burning of any waste materials, vegetation, litter or refuse shall occur. Bins shall be emptied a minimum of once daily. The waste may be temporarily stored on Site in a central waste area that is weatherproof and scavenger-proof, as approved by the Engineer.

All solid waste shall be disposed of off-site at an approved landfill site. The Contractor shall supply the Engineer with a certificate of disposal.

4.2.3 Contaminated water

Contractor shall set up a contaminated water management system, which shall include collection facilities, as well as suitable methods of disposal of contaminated water. The Contractor shall prevent the discharge of water contaminated with any pollutants, into the environment.

The Contractor shall notify the Engineer immediately of any pollution incidents on Site. The Engineer’s approval is required prior to the discharge of contaminated water to the Municipal sewer system.

4.2.4 Noise

The Contractor shall limit noise levels (e.g. install and maintain silencers on machinery). The provisions of SANS 1200 A Sub clause 4.1 regarding "built-up areas" shall apply to all areas within audible distance of residents whether in urban, peri-urban or rural areas.

Appropriate directional and intensity settings are to be maintained on all hooters and sirens and no amplified music shall be allowed on Site other than in emergency situations.

The Contractor shall restrict any of his operations that may result in undue noise disturbance to the hours of 08:00 to 17:00 on weekdays and Saturdays. Unless otherwise agreed to with the Engineer.

4.2.5 Fuel (petrol and diesel) and oil

Fuel may be stored on site in an area approved by the Engineer. The Contractor shall ensure that all liquid fuels (petrol and diesel) are stored in tanks with lids, which are kept firmly shut or in bowsers. The tanks/ bowsers shall be situated on a smooth impermeable surface (concrete or 250 µm plastic) with an earth bund (plastic must have a 5 cm layer of sand on top to prevent damage and perishing). The impermeable lining shall extend to the crest of the bund and the volume inside the bund shall be 130% of the total capacity of all the storage tanks/ bowsers. Provision shall be made for refueling at the fuel storage area, by protecting the soil with 250 µm plastic covered with a minimum of a 5 cm layer of sand.

The Contractor shall prevent unauthorized access into the fuel storage area. No smoking shall be allowed within the vicinity of the fuel storage area. The Contractor shall ensure that there is adequate fire-fighting equipment at the fuel stores.

4.2.6 Equipment maintenance and storage

Leaking equipment shall be repaired immediately or removed from the Site. Where practical, maintenance of plant shall not occur on site. Where emergency maintenance is necessary, the Contractor shall ensure that this does not result in contamination of the soil or vegetation. Drip

trays shall be provided in construction areas for stationary and "parked" plant as well as during emergency servicing of vehicles. Drip trays shall be inspected and emptied daily. The contents of drip trays shall be disposed off at an authorized facility. Drip trays shall be closely monitored during rain events to ensure that they do not overflow.

The washing of equipment shall be restricted to urgent or preventative maintenance requirements only. The use of detergents for washing shall be restricted to low phosphate and nitrate containing, low sudsing-type detergents.

4.3 Methods and procedures

4.3.1 Method Statements

Any Method Statement required by this Specification, the Engineer or the Specification Data shall be produced within such reasonable time as is required by this Specification, the Engineer or the Specification Data. The Contractor shall not commence the activity until the Method Statement has been approved. Except in the case of emergency activities, the Contractor shall allow a period of two weeks for approval of the Method Statement by the Engineer. Such approval shall not unreasonably be withheld.

Method Statements in respect of environmental management that shall be provided by the Contractor within 14 days of receipt of the letter of acceptance and prior to the activity covered by the Method Statement being undertaken, include:

1) Location and structure of the fuel storage site, including the type and volume of storage container and the design and capacity of the bund.

2) Solid waste (refuse) control and removal of waste from the Site, including the number, type and location of rubbish bins, the manner and frequency with which the waste will be removed from site and the disposal site.

3) Contaminated water management system, including an indication of the source and volume of contaminated water and how this would be disposed of.

4) Emergency procedures for fire, and accidental leaks and spillages of hazardous materials.

4.3.2 Environmental awareness training

Within seven days of the Commencement Date, the Contractor's site staff including foremen and site management staff shall attend an environmental awareness training course, of approximately one-hour duration. The Contractor shall liase with the Engineer prior to the Commencement Date to fix a date and venue for the course. The Contractor shall provide a suitable venue with facilities as required by the Specification, Data and ensure that the specified employees attend the course.

Any new employees coming on to site after the initial training course and the Contractor’s suppliers and subcontractors shall also attend this course. The Contractor shall ensure that all attendees sign an attendance register, and shall provide the Engineer with a copy of the attendance register the day after each course.

4.3.3 Construction personnel information posters

As required by the Specification Data, the Contractor shall erect and maintain information

posters for the information of his employees depicting actions to be taken to ensure compliance with aspects of the Specifications. Such posters will be supplied by the Engineer and shall be erected at a location specified by the Engineer.

4.3.4 Site clearance

The Contractor shall ensure that the clearance of vegetation is restricted to that required to facilitate the execution of the Works. Site clearance shall occur in a planned manner, and cleared areas shall be stabilized as soon as possible. The detail of vegetation clearing shall be subject to the Engineer's approval.

Should fauna be encountered during site clearance, earthworks shall cease until such fauna have been safely relocated.

4.3.5 Site division and Site demarcation

The Contractor shall restrict all his activities, materials, equipment and personnel to within the area specified. As required by the Specification Data, the Contractor shall erect and maintain permanent and/ or temporary fences of the type and in the locations directed by the Engineer. Such fences shall, if so specified, be erected before undertaking designated activities.

4.3.6 Access routes/ haul roads

On the Site, and, if so required by the Specification Data, within such distance of the Site as may be stated, the Contractor shall control the movement of all vehicles and plant including that of his suppliers so that they remain on designated routes, are distributed so as not to cause an undue concentration of traffic and that all relevant laws are complied with. In addition such vehicles and plant shall be so routed and operated as to minimize disruption to regular users of the routes not on the Site. On gravel or earth roads on Site and within 500m of the Site, the vehicles of the Contractor and his suppliers shall not exceed a speed of 20km/h.

Mud and sand deposited onto public roads by construction activities shall be cleared on a daily basis.

4.3.7 Cement and concrete batching

Where applicable, the location of the batching plant (including the location of cement stores, sand and aggregate stockpiles) shall be as approved by the Engineer. The concrete/cement batching plant shall be kept neat and clean at all times.

The batching plant shall be located on a smooth impermeable surface (plastic) and shall be bunded and sloped towards a sump to contain spillages of substances.

All wastewater resulting from batching of concrete shall be disposed of via the contaminated water management system and shall not be discharged into the environment.

Empty cement bags shall be stored in temporary weatherproof containers and shall be disposed of on a regular basis via the solid waste management system.

The Contractor shall take all reasonable measures to prevent the spillage of cement/ concrete during batching and construction operations. During pouring, the soil surface shall be protected using plastic and all visible remains of concrete shall be physically removed on completion of

the cement/ concrete pour and appropriately disposed of. All spoiled and excess aggregate/ cement/ concrete shall be removed and disposed of via the solid waste management system.

Where “readymix” concrete is used, the Contractor shall ensure that the delivery vehicles do not wash their chutes directly onto the ground. Any spillage resulting from the “readymix” delivery shall be immediately cleared and disposed of via the solid waste management system.

4.3.8 Fire control

No fires may be lit on site. Any fires that occur shall be reported to the Engineer immediately. Smoking shall not be permitted in those areas where it is a fire hazard. In terms of the Atmospheric Pollution Prevention Act (No. 45 of 1965), burning is not permitted as a disposal method.
The Contractor shall ensure that there is basic fire-fighting equipment available on Site at all times. This shall include at least rubber beaters when working in urban open spaces and fynbos areas, and at least one fire extinguisher of the appropriate type when welding or other “hot” activities are undertaken.

4.3.9 Emergency procedures

The Contractor shall ensure that his employees are aware of the procedure to be followed for dealing with spills and leaks, which shall include notifying the Engineer and the relevant authorities. The Contractor shall ensure that the necessary materials and equipment for dealing with spills and leaks is available on Site at all times. Treatment and remediation of the spill areas shall be undertaken to the reasonable satisfaction of the Engineer.

In the event of a hydrocarbon spill, the source of the spillage shall be isolated, and the spillage contained. The area shall be cordoned off and secured. The Contractor shall ensure that there is always a supply of absorbent material readily available to absorb/ breakdown
and where possible be designed to encapsulate minor hydrocarbon spillage. The quantity of such materials shall be able to handle a minimum of 200 ℓ of hydrocarbon liquid spill.

4.3.10 Community relations

The Contractor shall record any complaints or queries from the public, as well as the action taken in response, in the site request book. Complaints and associated responses shall be communicated to the Engineer on a weekly basis. The Contractor’s contact details shall be posted on the site board to enable the public to telephone should they have any queries or complaints.

4.3.11 Protection of natural features

The Contractor shall not deface, paint, damage or mark any natural features (e.g. rock formations) situated in or around the Site for survey or other purposes unless agreed beforehand with the Engineer. Any features affected by the Contractor in contravention of this clause shall be restored/ rehabilitated to the satisfaction of the Engineer.

The Contractor shall not permit his employees to make use of any natural water sources (e.g. springs, streams, open water bodies) for the purposes of swimming, personal washing and the washing of machinery or clothes.

4.3.12 Protection of flora and fauna

Except to the extent necessary for the carrying out of the Works, flora shall not be removed,

damaged or disturbed nor shall any vegetation be planted without authorization. Trapping, poisoning and/or shooting of animals is strictly forbidden. No domestic pets or livestock are permitted on Site.

4.3.13 Protection of archaeological and paleontological remains

The Contractor shall take reasonable precautions to prevent any person from removing or damaging any fossils, coins, articles of value or antiquity and structures and other remains of archaeological interest discovered on the Site, immediately upon discovery thereof and before removal. The Contractor shall inform the Engineer immediately of such a discovery and carry out the Engineers instructions for dealing therewith. All works within the vicinity of the discovery must cease immediately and the area shall be cordoned off until such time as the Engineer authorizes resumption of the works in writing.

4.3.14 Stockpiling

The Engineer will identify suitable sites for stockpiling. Stockpiles shall be convex in shape, shall be no higher than 2 m and shall be located so as to cause minimal disturbance. Where required, appropriate precautions shall be taken to prevent the erosion and limit the compaction of the stockpiles. The Contractor shall ensure that all stockpiles do not cause the damming of water or run off, or is itself washed away.

4.3.15 Dust

The Contractor shall take all reasonable measures to minimize the generation of dust as a result of construction activities to the satisfaction of the Engineer. Appropriate dust suppression measures, e.g. dampening with water, shall be used when dust generation is unavoidable, particularly during prolonged periods of dry weather in summer. Dust suppression measures shall be agreed upon in consultation with the Engineer.

5. COMPLIANCE WITH REQUIREMENTS AND PENALTIES

5.1 Compliance

Environmental management is concerned not only with the final results of the Contractor's operations to carry out the Works but also with the control of how those operations are carried out. Tolerance with respect to environmental matters applies not only to the finished product but also to the standard of the day-to-day operations required to complete the Works.

It is thus required that the Contractor shall comply with the environmental requirements on an ongoing basis and any failure on his part to do so will entitle the Engineer to certify the imposition of a penalty as detailed below.

5.2 Penalties

Penalties will be issued for certain transgressions. Penalties may be issued per incident at the discretion of the Engineer. Such penalties will be issued in addition to any remedial costs incurred as a result of non-compliance with this Specification. The Engineer will inform the Contractor of the contravention and the amount of the penalty, and shall be entitled to deduct the amount from monies due under the Contract.

Penalties will be as set out in the Specification Data.

6. MEASUREMENT AND PAYMENT

6.1 Basic principles

6.1.1 General

Except as specified below or in the Specification Data or as billed, no separate measurement and payment will be made to cover the costs of complying with the provisions of this Specification and such costs shall be deemed to be covered by the rates tendered for the items in the Bill of Quantities completed by the Contractor when submitting his tender.

6.1.2 All requirements of the environmental management specification

All work not measured elsewhere, associated with complying with any requirement of the environmental management specification shall be measured as a sum. The tendered rate shall cover any cost associated with complying with the environmental management specification and shall include for all materials, labour and plant required to execute and complete the work as specified, described in the Bill of Quantities or shown on the drawing(s).

6.1.3 Work "required by the Specification Data"

Where a clause in this Specification includes a requirement as "required by the Specification Data", measurement and payment for compliance with that requirement shall be in accordance with the relevant measurement and payment clause of the Specification Data.

6.2 Billed items

6.2.1 Method Statements: Additional work

No separate measurement and payment will be made for the provision of Method Statements but, where the Engineer requires a change on the basis of his opinion that the proposal may result in, or carries a greater than warranted risk of damage to the environment in excess of that warranted by the Specifications, then any additional work required, provided it could not reasonably have been foreseen by an experienced contractor, shall be valued in accordance with the Clause in the General Conditions of Contract dealing with Provisional Sums.

A stated sum is provided in the Bill of Quantities to cover payment for such additional work.

6.2.2 All requirements of the environmental management specification
Unit: ..... Sum

All other work not measured elsewhere, associated with complying with any requirement of the environmental management specification shall be measured as a sum. The tendered rate shall cover any cost associated with complying with the environmental management specification and shall include for all materials, labour and plant required to execute and complete the work as specified, described in the Bill of Quantities or shown on the drawing(s).

APPENDIX A: APPLICABLE STANDARDS

Reference is made to the latest issues of the following standards:

Specification Occupational health and safety Construction Regulations, 2014

APPENDIX TO THE ENVIRONMENTAL SPECIFICATION

ENVIRONMENTAL REQUIREMENTS FROM THE ENVIRONMENTAL IMPACT ASSESSMENT

1. CONSTRUCTION PHASE

(a). Possible disturbance and/or destruction of archaeological / paleontological sites.

Mitigation:
Training construction staff beforehand in identifying archaeological / paleontological material. Ceasing all excavation activities at a locality immediately if it appears that a subsurface concentration of archaeological / paleontological material had been encountered and reporting it to the South African Heritage Resources Agency (Sahra) for investigation and advice on further mitigation measures to be taken.

(b). Disturbance of vegetation and destruction of the protected “Kraal aalwyn” (Aloe Claviflora), as well as small Shepherd’s Tree / “Witgatboom” (Boscia Albitrunca) specimens.

Mitigation:
Training construction staff beforehand in identifying the protected plant species and avoiding disturbing / destructing them.

Training construction staff beforehand in removing and translocating the protected plant species where applicable.

(c). Fuel and oil spills from construction vehicles and equipment.

Mitigation:
Drawing up a procedure beforehand for cleaning up of fuel and oil spills and strictly enforcing it during the construction phase.

Ensuring that vehicles are in good working order, drivers properly trained and good housekeeping rules are applied.

(d). Disturbance and destabilization of the site’s minor drainage line / watercourse and its headwater section.

Mitigation:
Once identified / mapped, the, at least, 50m horizontal distance between the center of the site’s drainage line / watercourse and its headwaters and the first row of graves must be properly demarcated, preferably by a proper cemetery fence section, and no construction workers or vehicles allowed to move beyond the demarcated zone towards the drainage line / watercourse or its headwater

C3.6 COMMUNITY LIAISON OFFICERS & LOCAL LABOUR

COMMUNITY LIAISON OFFICERS

The tenderer shall allow in his tender for the appointment of full time Community Liaison Officer for the duration of the contract. The Liaison Officer will be introduced to the successful tenderer.

Because of the fact the local labour will have to be utilized on this project, the Contractor will have to liaise with the appointed person for the necessary recruitment of labourers as well as for all other negotiations with local labourers.

UTILIZING OF LOCAL LABOUR

SKILLS REQUIRED
CLO - Community Liaison Officer
Security Officers
Labourers for house connections
Labourers for excavations

DUTIES, TASKS AND RESPONSIBILITIES

CLO- Community Liaison Officer:

a) Act as Liaison Officer between Community, Contractor and Employer.
b) Identify and recruit manpower.
c) Ensure labourers obey Contractors instructions.
d) Terminate, retrench and discipline workers when:
   - Not obeying Contractors instructions
   - Refuse to work
   - Not reporting for work without excuse
   - Misbehave, steel, drink, intimidating, etc. during working hours
e) Settlement of disputes.
f) Obtain way leaves.
g) Any other reasonable instruction required by the Contractor, Project Manager or Employer.

SECURITY OFFICER:

a) Keep close watch over all material, site yard and equipment of Contractor.
b) Protect material and equipment. Report all incidents to the Contractor.
c) Work 8 hours shifts as follows:
   - Shift 1: 06:00 to 14:00
   - Shift 2: 14:00 to 22:00
   - Shift 3: 22:00 to 06:00
d) Any other reasonable instructions required by the Contractor, Project Manager or Employer.

LOCAL LABOUR:

a) Perform and execute tasks such as:
   - Digging holes
   - Digging trenches
   - Planting poles
   - Planting stays
b) Installation and fitting of keypads and ready boards.
c) Installation and connecting of Airdac cables.
d) Installation and fitting of kicking pipes.
e) Any other reasonable instructions required by the Contractor, Project Manager or Employer.

CONTRACTOR:

a) Employ the CLO, security officers and local labour.
b) Provide and supply all clothing, tools and materials to perform the tasks required.
c) Manage the workforce with the assistance of the CLO to ensure that the programme to carry out the work is met.
d) Utilize a maximum of 15 people of own employee to conduct all skilled tasks and to work as team leaders amongst the workforce, to provide training, set the standard and quality of work required and to ensure the required production rate is met.
e) Conduct and convene meetings on a daily basis to dish out work and tasks and tor record progress.
f) To ensure all safety requirements are met.
g) Pay and remunerate the workforce on a monthly basis and record all payments with relevant signatures.

CONDITIONS OF EMPLOYMENT

a) Obey Contractors instructions.
b) Sign time sheets and report for work from Monday to Friday.
c) Work overtime if required by Contractor.
d) Working hours are 45 hours per week from 07:00 to 16:00 with 30 minutes lunch break from 12:00 to 12:30.
e) Payment will be affected according to the attendance register, with no work no pay policy.
f) Payment will be done on the last Friday of each month at 12:00. No unemployment insurance funds will be deducted or applicable.
g) Tax will be deducted if applicable.
h) Payment categories:

- CLO – R6 500.00 per month;
- Labourers - Compensation to be in line with Department of Labour rates;
- PSC Members – R250.00 per sitting (only if not already receiving a stipend); or

  according to the attached schedule for the various activities stipulating piece work

NOTE: Preference is given to piece work.

i) Overtime will be paid according to time plus a third.
j) If the required progress is not met, the Contractor will have the right to strengthen his own workforce with the approval of the Project Manager.

LABOUR FORCE

The following number of people should be employed on site:

CONTRACTOR:

1 x Site agent
1 x Foreman
1 x Store man
6 x Drivers
2 x Linesmen

Contractor | Witness 1 | Witness 2 | Employer | Witness 1 | Witness 2

RESPONSIBILITY OF CONTRACTOR

It will be the responsibility of the Contractor to manage all material on-site, to ensure that the installation complies with the requirements of the specification and to coordinate and supervise the manpower required for the project.

Irrespective of the manpower or subcontractors used, the Contractor will be responsible for the complete installation, all in accordance with the conditions of contract and Technical Specifications and shall provide all the plant, hand tools, etc. for the execution of the works.

USING OF OWN MANPOWER

The Contractor will only be allowed to use a skeleton staff of his own. Should it prove to be impossible to identify people from the community to perform the tasks, written approval shall be obtained by the Contractor from the Engineer (after approval by the community) prior to utilizing his own manpower to complete the project. The Contractor's own personnel will be responsible for cable terminations, joints, stringing, the connection of pole top boxes, testing of prepayment meters and ready boards, etc. The Contractor shall therefore use only skilled labour of his own workforce. All other labour shall be local labour.

C3.7 OCCUPATIONAL HEALTH AND SAFETY SPECIFICATION

1. GENERAL

1.1 Preamble

In terms of Construction Regulation 5(1)(a)(b) of the Occupational Health and Safety Act, 1993 (Act 85 of 1993), the Client or its Agent on its behalf, shall be responsible to prepare Occupational Health and Safety Baseline Risk Assessment as well as Site specific Health and Safety Specifications (OHSS) for any intended construction project and provide any Principal Contractor who is making a bid or appointed to perform construction work for the Client and/or its Agent on its behalf with the same. This Principal Contractor (PC) must provide and demonstrate to the client a suitable and sufficiently documented health and safety plan (OHSSP), based on the client's documented health and safety specifications contemplated in regulation 5(1)(b), which shall be applied from the date of commencement of and for the duration of the construction work.

The Client's further duties are as described in The Act and the Regulations made there-under. The Principal Contractor shall be responsible for the Health and Safety Policy for the site in terms of Section 7 of the Act and in line with Construction Regulation 7 as well as the Health and Safety Plan for the project.

The client and/or its Agent on its behalf 'Health and Safety Specifications' document is governed by the "Occupational Health and Safety Act, 1993 (Act No. 85 of 1993), hereinafter referred to as 'The Act'.

1.2 Scope of the Health and Safety Specification Document

The Health and Safety Specification pertain to the project at **Kgotsong: Upgrading of sewer outfall remaining phases** cover the subjects contained in the index and are intended to outline the normal as well as any special requirements of the Client and/or its Agent pertaining to health and safety matters.
This Specification should be read in conjunction with the Act, the Construction Regulations, all other Regulations and Safety Standards which were or will be promulgated under the Act or incorporated into the Act and be in force or come into force during the effective duration of the project.

Contractors employed by the Client or its Agent are to ensure that the provisions of the OHSS (Occupational Health and Safety Specification) and OHSP (Occupational Health and Safety Plans) are applied both on the site and in respect of all off site activities relating to the project.

The Principal Contractor is to enforce the provisions of the OHSS and his/her OHSP amongst all co-contractors and suppliers for the project.

1.3 Purpose

The purpose of this Occupational Health and Safety Specification is to establish a site specific specification for the implementation of a safety program during the construction of the **Kgotsong: Upgrading of sewer outfall remaining phases**. This is intended to minimize loss, injuries, meet regulatory compliance requirements and implement site safety method statements established by the PC.

The Client is obligated to implement measures to ensure the health and safety of all people and properties affected under its custodianship or contractual commitments, and is further obligated

to monitor that these measures are structured and applied according to the requirements of the Health and Safety Specifications.

The purpose of the OHSS and OHSP document is to provide the relevant Principal Contractor and his/her contractors with any information other than the standard conditions pertaining to the construction site which might affect the health and safety of persons at work, the health and safety of persons in connection with the use of plant and machinery and to protect persons other than persons at work against hazards to health and safety arising out of or in connection with the activities of persons at work during the project. The Principal Contractor and his /her contractors is to be briefed on the significant health and safety aspects of the project and to be provided with information and requirements on inter alia prior to the commencement of work:

a) Health, Safety and Environmental considerations affecting the site of the project and its environment (Baseline Risk Assessment);
b) Health and safety aspects of the Plant, Machinery, Tools, Structures and Equipment (OHSS);
c) Submissions and Documentation on Health and Safety matters required from the Principal Contractor and his /her contractors; and
d) Principal Contractor and his/her contractors Health and Safety Plans.
e) Principal Contractor and his/her contractor site accommodation of Traffic Management Plan.

To ensure that the Principal Contractor and his /her contractors is fully aware of what is expected from them with regard to the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993) and the Regulations made there-under including the applicable safety standards, and in particular in terms of Section 8 of the Act.

To ensure that the Principal Contractor and his /her contractors is fully aware of what is expected from them with regard to the South African Road Safety Signs Manual.

To inform the Principal Contractor that the Occupational Health and Safety Act, 1993 (Act 85 of 1993) in its entirety shall apply to the contract at **Bothaville during the construction of 315 mm Outfall Sewer Line**. The Construction Regulations promulgated 2014 and incorporated into the above Act shall apply to any person involved in construction work pertaining to this project.

That these Occupational Health and Safety Specifications (OHSS) will be implemented during all the project within the construction activity/scope the Client has control over. It will also assist in ensuring that all the costs related to the compliance with the Occupational Health and Safety Act (Act 85 of 1993) as well as the OHSS is taken into consideration at tender stage.

The OHSS is a performance specification to ensure that the Client and any bodies that enter into formal agreements with the Client viz. Consultants, Contractors achieve an acceptable level of Occupational Health and Safety performance.

1.4 Definitions

The most important definitions in the Act and Regulations pertaining to this OHSS (Occupational Health and Safety Specification) document are hereby extracted.

"**Purpose of the Act"** –

To provide for the health and safety of persons at work and the health and safety of persons in

connection with the use of plant and machinery; the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with the activities of persons at work; to establish an advisory council for occupational health and safety; and to provide for matters connected therewith.

"Agent" –

means a competent person who acts as a representative for a client;

"Client" –

means any person for whom construction work is performed;

''Construction Work'' is defined as any work in connection with –

(a) the erection, maintenance, alteration, renovation, repair, demolition or dismantling of or addition to a building or any similar structure;
(b) the installation, erection, dismantling or maintenance of a fixed plant where such work includes the risk of a person falling;
(c) the construction, maintenance, demolition or dismantling of any bridge, dam, canal, road, railway, runway, sewer or water reticulation system or any similar civil engineering structure; or
(d) the moving of earth, clearing of land, the making of an excavation, or any similar type of work;

"Contractor" –

means an employer, as defined in Section 1 of the Act, who performs construction work and includes Principal Contractor;

"Health and Safety File" –

means a file, or other record in permanent form, containing the information required a contemplated in the regulations;

"Health and Safety Plan" –

means a site, activity or project specific documented plan in accordance with the client health and safety specifications;

"Health and Safety Specification" –

means a site, activity or project specific document prepared by the client pertaining to the health and safety requirements related to construction work ;

"Method Statement" –

means a document detailing the key activities to be performed in order to reduce as reasonably as practicable the hazards identified in any risk assessment;

"Principal Contractor " –

means an employer appointed by the client to perform construction work;

"Risk Assessment" –

means a program to determine any risk associated with any hazard at a construction site, in order to identify the steps needed to be taken to remove, reduce or control such hazard.

"Excavation Work" –

means the making of any man made cavity, trench, pit or depression formed by cutting, digging or scooping.

"Fall Risk" –

means any potential exposure to falling either from, off or into

"Shoring" –

means a system to support the sides of an excavation and which is intended to prevent the cave-in or the collapse of the sides of the excavation.

1.5 Site Occupational Health and Safety Management

Structure and Organization of OHS Responsibilities

Overall Supervision and Responsibility for OHS:

- The Client and/or its Agent on its behalf to ensure that the Principal Contractor, appointed in terms of Construction Regulation 5(1)(k), implements and maintains the agreed and approved OHSP.
- The Chief Executive Officer of the Principal Contractor in terms of Section 16 (1) of the Act to ensure that the Employer (as defined in the Act) complies with the Act.
- All OHS Act (85 /1993), CR (8)(1), CR 8(2), CR 8(7) and Section 16(2) appointee/s as detailed in his/her/their respective appointment forms to regularly, in writing, report to their principals on matters of health and safety per routine and ad hoc inspections and on any deviations as soon as observed to ensure reports are made available to the Principal Contractor to become part of site records (Health and Safety File).
- All Health and Safety Representatives (SHE-Reps) shall act and report as per Section 18 of the Act.

Further (Specific) Supervision Responsibilities for OHS

Several appointments or designations of responsible and /or competent people in specific areas of construction work are required by the Act and Regulations. The following competent appointments, are applicable **Bothaville during the construction of 315 mm Outfall Sewer Line** in terms of the Occupational Health and Safety Act and Regulations to ensure compliance to the Act, Regulations and Safety Standards.

Required appointments:

Reg.	Appointment	Appointee	Appointed by	Represented by
CR 5 (k)	Principal Contractor	16(2) for the company	Client	Project Manager
CR 5 (C)(V)	Contractor	Competent person	Principal Contractor	16(2)/CR 8(1)
CR 8 (1)	Construction Manager	Competent person	Principal Contractor	16(2)
CR 8 (2)	Assistant Construction Manager	Competent person	Principal Contractor	16(2)
CR 8 (5)	Construction Safety Officer	Competent person	Principal Contractor	16(2)/CR 8(1)
CR 8 (7)	Construction Supervisor	Competent person	Principal Contractor	16(2)/CR 8(1)
CR 8 (8)	Assistant Construction Supervisor	Competent person	Principal Contractor	16(2)/CR 8(1)
CR 9 (1)	Risk Assessor	Competent person	Principal Contractor	16(2)/CR 8(1)
CR 10 (1)	Competent Person to prepare fall protection plans	Competent Person	Principal Contractor	16(2)/CR 8(1)
CR 13 (1)	Excavation Work Supervisor	Competent person	Principal Contractor	16(2)/CR 8(1)
COVID 19 Compliance Officer	COVID 19 Compliance Officer	Competent person	Principal Contractor	16(2)/CR 8(1)
CR 23 (1j)	Construction Vehicle Inspector	Competent person	Principal Contractor	16(2)/CR 8(1)
CR 27 (h)	Fire Equipment Inspector	Competent person	Principal Contractor	16(2)/CR 8(1)
CR 28 (a)	Stacking and Storage Supervisor	Competent person	Principal Contractor	16(2)/CR 8(1)
OHSA 16 (2)	16 (2)	Competent Person	16(1)	CEO
OHSA 17 (1)	Health & Safety Rep	Nominated and Elected, Trained employee	16(1)	16(2)/CR 8(1)
GAR 9 (2)	Incident Investigator	Competent person	Principal Contractor	16(2)/CR 8(1)

GSR 3 (4)	First Aider	Competent person	Principal Contractor	16(2)/CR 8(1)

This list may be used as a reference or tool to determine which components of the Act and Regulations would be applicable to a particular site. This list must not be assumed to be exclusive or comprehensive.

1.6 Communication and Liaison

- OHS Liaison between the Client and or its Agent, the Principal Contractor, other Contractors, the Designer and other concerned parties shall be through the HS Committee and Site Progress Meetings.

- In addition to the above, communication may be directly to the Client or his appointed Agent, in writing, as and when the need arises.

- Consultation with the workforce on OHS matters will be through their Supervisors and HS Representatives ('SHE – Reps')

- The Principal Contractor will be responsible for the dissemination of all relevant OHS and road safety information to the other Contractors e.g. The PC will also disseminate all design changes agreed with the Client and/or its Agent on its behalf and the Designer. The PC will also disseminate instructions by the Client and/or his/her Agent, exchange information between Contractors, the reporting of hazardous/dangerous conditions/situations etc.

1.7 Project Health and Safety Plan Requirements

The Standard OHSS document is the specifications which must be used by the Principal Contractor and Sub Contractors appointed by the Principal Contractor to develop site specific Health and Safety Plans OHSP for this project. The specifications will form part of the tender documentation to ensure compliance of all OHSP.s

All OHSP must be approved by the Client or his Agent prior to commencement of work on site.

The OHSS must be taken into account and due allowance made within the pricing of appropriate items contained within the specification. Where the tenderer is of the opinion that a requirement is missing or is not adequately specified then this shall be drawn to the Client / Client's Agent's attention during the tender period. In the absence of any direction to the contrary, the tenderer shall as part of the tender submission, set out the details of such discrepancy together with the costs associated therewith, separately identified and included within the tender figure.

1.8 Responsibilities

1.8.1 **Client**

1.8.1.1 The Client or his appointed Agent on his behalf will appoint each Principal Contractor for this project or phase/section of the project in writing for assuming the role of Principal Contractor as intended by the Construction Regulations and determined by the Bills of Quantities.

1.8.1.2 The Client or his appointed Agent on his behalf shall discuss and negotiate with the Principal

Contractor the contents of the OHSS and OHSP of the both Principal Contractor and Contractor for approval.

1.8.1.3 The Client or his appointed Agent on his behalf will take reasonable steps to ensure that the OHSP of both the Principal Contractor and Contractor is implemented and maintained. The steps taken will include periodic audits at intervals of at least once every month.

1.8.1.4 The Client or his appointed Agent on his behalf will prevent the Principal Contractor and/or the Contractor from commencing or continuing with construction work should the Principal Contractor and/or the Contractor at any stage in the execution of the works be found to:

- have failed to have complied with any of the administrative measures required by the Construction Regulations in preparation for the construction project or any physical preparations necessary in terms of the Act;
- have failed to implement or maintain their health and safety plan;
- have failed to implement or maintain their accommodation of Traffic Management Plan in accordance to the South African Road Safety Manual;
- have executed construction work which is not in accordance with their health and safety plan; or
- act in any way which may pose a threat to the health and safety of any person(s) present on the site of the works or in its vicinity, irrespective of him/them being employed or legitimately on the site of the works or in its vicinity.

1.8.2 **Principal Contractor**

1.8.2.1 The Principal Contractor shall accept the appointment under the terms and Conditions of Contract. The Principal Contractor shall sign and agree to those terms and conditions and shall, before commencing work.

1.8.2.2 The Principal Contractor shall ensure that he is fully conversant with the requirements of the OHSS and all relevant health and safety legislation. The Specification is not intended to supersede the Act nor the Construction Regulations or any part of either. Those sections of the Act and the Construction Regulations which apply to the scope of work to be performed by the Principal Contractor in terms of this contract (entirely or in part) will continue to be legally required of the Principal Contractor to comply with. The Principal Contractor will in no manner or means be absolved from the responsibility to comply with all applicable sections of the Act, the Construction Regulations or any Regulations proclaimed under the Act or which may perceivable be applicable to this contract.

1.8.2.3 The Principal Contractor shall provide and demonstrate to the Client a suitable and sufficiently documented health and safety plan based on the Specification, the Act and the Construction Regulations, which shall be applied from the date of commencement of and for the duration of execution of the works. This plan shall, as appendices, include the health and safety plans of all Sub-contractors for which he has to take responsibility in terms of this contract.

1.8.2.4 The Principal Contractor shall provide proof of his registration and good standing with the Compensation Fund or with a licensed compensation insurer prior to commencement with the works.

1.8.2.5 The Potential Principal Contractor shall demonstrate that he has made provision for the cost of compliance with the specified health and safety requirements, the Act and Construction Regulations. (Note: This shall have to be contained in the conditions of tender upon which a tenderer's offer is based.)

1.8.2.6 The Principal Contractor shall consistently demonstrate his competence and the adequacy of his resources to perform the duties imposed on the Principal Contractor in terms of this Specification, the Act and the Construction Regulations.

1.8.2.7 The Principal Contractor shall ensure that a copy of his health and safety plan is available on site and is presented upon request to the Client, an Inspector, Employee or Sub-contractor.

1.8.2.8 The Principal Contractor shall ensure that a health and safety file, which shall include all documentation required in terms of the provisions of the Specification, the Act and the Construction Regulations, is opened and kept on site and made available to the Client or Inspector upon request. Upon completion of the works, the Principal Contractor shall hand over a consolidated health and safety file to the Client.

1.8.2.9 The Principal Contractor shall, throughout execution of the contract, ensure that all conditions imposed on his Sub-contractors in terms of the Act and the Construction Regulations are complied with as if they were the Principal Contractor.

1.8.2.10 The Principal Contractor shall from time to time evaluate the relevance of the Health and Safety Plan and revise the same as required, following which revised plan shall be submitted to the Client and/or his/her Agent for approval.

1.8.3 Contractor responsibilities of in terms of this contract and health and safety specification is as

per 1.8.2 above, as and where applicable or as indicated in the letter of appointment.

1.9 Start of Construction Phase

The construction phase shall not commence until the Principal Contractor Health and Safety Plan was considered and approved by the Client / Client's Agent. The Client / Client's Agent shall discuss and negotiate with the Principal Contractor the contents of the Health and Safety Plan and accommodation of Traffic Management Plan submitted by the Principal Contractor before finally approving it for implementation.

The construction phase shall not commence until written permission is received from the Client / Client's Agent. In this respect the Client / Client's Agent may rely on the advice of the Design Team as to the adequacy and comprehensiveness of the Plan offered by the Principal Contractor.

The Health and Safety Plan based on the Health and Safety Specifications supplied to them by the Client, Client's Agent , contractors will allow for the adoption of safe working procedures, method statements specific to health and safety and co-ordinate and rationalize activities to avoid uncontrollable hazards arising due to clashes of activities.

The construction phase shall not commence until the Principal Contractor submitted a written site accommodation of Traffic Management Plan to the Client / Client's Agent to be approved by

the Professional Engineer.

1.10 Sub-Contractors, Suppliers and Designers

The Principal Contractor shall ensure that all direct appointments in connection with this project include provisions for the compliance of his sub-contractors, suppliers and designers, etc, with the relevant provision of the Occupational Health and Safety Act (Act 85 of 1993) and Regulations, in particular the Construction Regulations 2014.

1.11 General Health and Safety Provisions

1.13.1 Construction Work Permit and Notification of Intention to Commence Construction Work

To be implemented as per section 3 and 4 of the Construction Regulations.

1.13.2 Competency of Contractor's Responsible Persons

The Contractor's responsible persons shall be competent in Health and Safety Management and shall undergo Health and Safety Induction Training.

The Contractor shall submit CV's with all relevant substantiating documentation to prove role player competence for approval by the Client Agent at tender stage.

1.13.3 Compensation for Occupational Injuries and Diseases Act (Act 130 of 1993)

The Contractor shall submit a letter of good standing with the Compensation Insurer to the Client/ Client Agent, within 7 working days from receipt of the Letter of Acceptance from the Client/Client Agent prior to commencement of construction.

1.12 Undertaking by Principal Contractor and Sub-Contractors appointed by the Principal Contractor (Sec 37(2) Agreement)

The Principal Contractor as well as Sub-Contractors appointed by him/her shall undertake in writing to ensure that the provisions of the Occupational Health and Safety Act (Act 85 of 1993) and Regulations, in particular the Construction Regulation of 2014 and any amendments or re-enactments thereto are complied with. The undertaking form shall be signed by the Managing Director of the company/firm awarded the tender.

2. PROJECT DESCRIPTION

2.1 Client

See tender document

2.2 Site Address

See tender document

2.3 Description of Work

See tender document

This OHSS applies to the specific scope of work pertaining to the above-mentioned project as detailed in the tender documents for the **Kgotsong: Upgrading of sewer outfall remaining phases.**

2.4 Estimated Duration of Construction Phase

See tender document

2.5 Client's Agent

BVI Consulting Engineers Central

3 SITE CONDITIONS

3.1 Site Location

See tender document

3.2 Site Use

See tender document

3.3 Condition of the Premises

Will be confirmed during tender clarification meeting.

3.4 Existing Services

See tender document

3.5 Fire Precautions and Means of Escape

This will be confirmed during the tender clarification meeting.

3.6 Occupation

This will be confirmed during the tender clarification meeting.

3.7 Existing Ground Conditions

Refer to C4.2

4. EXISTING DRAWINGS

See tender document

5. INFORMATION REQUIREMENTS

The PC must provide the following information to the Client/Client Agent together with his tender documentation for pre-evaluation. Please note that if none of the mentioned information is submitted the particular tender will not be considered!!!

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

5.1 General

- The Principal Contractor / Sub-Contractor shall have an OHS Policy in accordance with the Occupational Health and Safety Act, Act 85 of 1993 and include a copy of the Policy in the Health and Safety Plan to be submitted by the Principal Contractor / Sub-Contractor.

  NB: This needs to be submitted with your tender!

- The Principal Contractor / Sub-Contractor shall promptly display a copy of the Company's OHS Policy on the OHS Notice Board for the duration of the contract and include it into information provided to persons at Project OHS induction.

- The Principal Contractor Managing Director shall sign the Commitment Statement and prominently display a copy on the OHS Notice Board for the duration of the project. A copy of the Commitment Statement shall be included in information provided to persons at the Project OHS induction and a copy shall also be supplied to each sub-contractor.

- The Principal Contractor is required to maintain an acceptable disabling incident frequency rate (DIFR) and report on this to the Client and/or its Agent on its behalf on a monthly basis.

5.2. Management

- The Principal Contractor and all Co-contractors to be appointed by him / her attention is draw to the following pre-tender requirements. Please provide details of the personnel and management systems to be put in place to prepare, manage, implement, conduct and monitor the Health and Safety Plan for the project. Broadly speaking your:

  - Organization's internal structure that establishes SHE (Safety, Health and Environmental) ROLES, RESPONSIBILITIES, ACCOUNTABILITIES, and REPORTING RELATIONSHIPS,

  - SHE (Safety, Health and Environmental) PLANS, POLICIES, PROCEDURES, DIRECTIVES and STANDARDS that provide instructions as to how activities and functions are to be carried out,

  - SHE (Safety, Health and Environmental) CONTROLS, INSPECTIONS, REVIEWS, etc. built into construction operations to ensure that performance is consistent with SHE (Safety, Health and Environmental) objectives and requirements,

  - SHE (Safety, Health and Environmental) COMMUNICATION MECHANISMS for collecting, handling and reporting information. In other words Management Systems that specifies WHO is going to do WHAT, WHERE, WHEN, Why and HOW.

- Details of relevant Health and Safety Knowledge, Training, Experience and Qualifications held by the persons nominated above, including recent health and safety education and training undertaken. Please ensure that substantiating proof needs to accompany these details!

- Procedures for determining the competence of contractors engaged on the project, whether employed by the Principal Contractor directly or by others, to fulfil their duties under the Construction Regulations 2014.

5.3. Hazard Identification, Risk Assessment and Control

5.3.1 Hazard Identification, Risk Assessment and Control (Base Line)

- The Principal Contractor / Sub-Contractor shall detail and implement procedures that will identify hazards, assess risks and determine suitable control measures as they arise throughout term of the contract. These procedures shall both comply with and be implemented and managed in accordance with the specification.
- The Principal Contractor / Sub-Contractor shall detail and implement procedures that ensure control measures are evaluated for effectiveness and modified as necessary. The evaluation procedure shall detail the responsibilities, timelines and records that will be kept as part of the process.

- Where Risk is controlled through administrative control measures, the Principal Contractor / Sub-Contractor shall ensure that the administrative measures are:

  - Clearly documented and those personnel responsible for implementation and management are explicitly defined;
  - Understood by all relevant personnel through training and assessment;
  - Implemented as documented and promptly reviewed for effectiveness following initial implementation;
  - Amended and authorized as required;
  - Adequately supervised, managed and audited to ensure continuing compliance;
  - Available at all times wherever the measures are being implemented.

- Any piece of plant or equipment not complying with the specification shall cease operation until the Principal Contractor / Sub-Contractor can demonstrate to the satisfaction of the Client / Client's Agent that the piece of non-conforming plant or equipment conforms to these requirements.

- Important to note:

  - All Hazard Identification Risk Assessments (HIRA) are to be conducted by a person with specific Knowledge, Training, Qualifications and Experience in determining potential threats to the health and safety of persons at work, persons other than persons at work as well as potential threats to health and safety in connection with the use and maintenance of plant, equipment and machinery;
  - All HIRA's needs to be comprehensive and may well lead to further, separate, more in depth risk assessment studies;
  - All HIRA's shall form part of the Contractor's Health and Safety Plan;
  - All HIRA's shall be periodically reviewed;
  - The HIRA must be submitted 14 calendar days prior to the planned commencement date;
  - Should the Contractor commence construction activities without the approval of their HIRA, or should the HIRA not reflect the activities being undertaken, the Client/ Client Agent may instruct that all construction activities to be halted immediately, and the Contractor will have **NO** claim against the Client/Client Agent in such a

case for lost time or costs, irrespective of whether it can be demonstrated that the work was safely undertaken.

- The HIRA should include the following:

  - The identification of hazards to the health and safety to which persons may be exposed;
  - An analysis and evaluation of the hazards identified;
  - A documented method statement and written safe work procedures to mitigate reduce or control the risks assessed;
  - A monitoring and review plan that will ensure the effective functioning of risk mitigating, reducing and controlling measures;
  - The relevant PPE (personal protective equipment) and or clothing;
  - The relevant Ergonomic Risks;
  - The relevant Traffic Management Risks

- The Principal Contractor shall ensure that all Contractors are informed, instructed and trained by a person with specific Knowledge, Training, Qualifications and Experience in determining potential threats to the health and safety of persons at work, persons other than persons at work as well as potential threats to health and safety in connection with the use and maintenance of plant, equipment and machinery regarding any hazard and related safe work/activity procedures before any work commences and thereafter at daily safety or toolbox talks.

5.4 Issue Based Risk Assessment and Control

As circumstances and needs arise, separate risk assessment studies will need to be conducted. These will be associated with a system for the management of change. An additional risk assessment will need to be conducted and submitted to the Client Agent for approval when for example:

a) A new machine is introduced onto site;
b) A system of work is changed or operations altered;
c) After an accident or “near miss incident” has occurred;
d) New knowledge comes to light and information is received which may influence the level of risk to employees on site.

5.4.1 Continuous Risk Assessment and control

This is the most important form of risk assessment which should take place continually, as an integral part of the day-to-day management.

This activity must be conducted by frontline supervisors on site and it is essential that formal training be provided to enable this process to be efficient. Examples of continuous risk assessment include:

- Audits;
- General hazard awareness linked to a suggestion scheme;
- Pre-activity assessments using checklists.

- In general, the Contractor must ensure that the risk assessment involves identifying the hazards present in a work activity on site. This is followed by an evaluation of the extent the risk involved taking into consideration those precautions already being taken.

The PC/Contractors shall be responsible for making sure that all employees under his / her control are conversant with the content of the risk assessment and what appropriate measures have been put in place to either eliminate or reduce the identified risks. The PC/Contractor shall outline to employees what role they are expected to fulfil in the risk assessment and control measure process.

The following general principles should be followed when conducting a risk assessment:

- All relevant risks and / or hazards should be systematically addressed;
- The risk assessment should address what actually happens in the workplace during the work activity;
- All employees and those who may be affected must be considered, including maintenance staff, security guards, visitors and co-contractors;
- The risk assessment should highlight those groups and individuals who may be particularly at risk, such as the young and inexperienced, and those who are required to work alone or who have disabilities;
- The risk assessment process should take into account the existing safety measures and controls;
- The level of detail on a risk assessment should be appropriate to the level of risk.

5.5 Health and Safety Plan

The Principal Contractor as well as Contractors appointed by him / her shall develop a Health and Safety Plan to reflect the requirements of the Client / Client's Agent OHSS.

The Principal Contractor shall develop this Health and Safety Plan so that it:

- Incorporates the contractor's approach to managing the construction work to ensure the health and safety of all persons carrying out the construction work and all persons who may be affected by their work.
- Includes the risk assessments prepared by all Contractors under their duties set out in the Construction Regulations 2014 and any other relevant legislation (i.e. the OHS Act and Regulations, etc.).
- Includes the arrangements for ensuring that, where appropriate or specifically requested, all Contractors / Sub-Contractors prepare suitable and sufficient method statements for their construction works which incorporate adequate measures for ensuring the health and safety of all persons who may be affected by these works.
- Incorporates the common arrangements for site safety, statutory notices and registers etc.
- Includes the site rules to be adopted for controlling the risks to health and safety during the construction phase(s) or the project.
- Includes reasonable arrangements for monitoring compliance with health and safety legislation and site rules.
- Includes reasonable measures to ensure co-operation between all Contractors and Sub-Contractors in respect of health and safety provisions and prohibitions.
- Includes the steps to be taken to ensure that only authorized persons are allowed into any premises or parts of the site / premises where construction work is being carried out.
- Includes arrangements for emergency procedures.

- Includes arrangements for ensuring that, so far as is reasonably practicable, every Contractor and Sub-Contractor is provided with comprehensible information about the risks to health and safety of that Contractor / Sub-Contractor, or of any employees or other persons under their control, arising out of the construction works, including the emergency procedures.
- Includes details of the arrangements for ensuring, so far as is reasonably practicable, that the employees or other persons under the control of any Contractor / Sub-Contractor, and any visitors to the site, receive adequate information about the risks to their health and safety arising out of the construction works and, where necessary, adequate training to carry out their work in a safe and healthy manner.
- Includes arrangements for providing all persons at work on the site and visitors to the site with the opportunity and means of discussing and offering advice on health and safety issues relating to the construction works.
- Includes arrangements for the reporting of any accidents, injuries or dangerous occurrences, including conforming to the statutory requirements.
- Includes a plan for the accommodation of traffic in accordance to the South African Road Safety Signs Manual.
- Can be modified as the work proceeds to take account of any information received from Contactors / Sub-Contractors, any experience gained during the course of the project or any changes necessary as a result of unforeseen circumstances or alterations to the design.
-

5.6 Cost

The Contractor is required to provide before work commence on site together with his / her tender documentation:

- A detailed breakdown of costs allowed in the contractor's tender for preparing, managing, implementing and monitoring the Health and Safety Plan, and for complying with the requirements imposed on the Principal Contractor under the Construction Regulations of 2014.
- All safety personnel and competent persons are to be personnel employed by the Principal Contractor and no additional payment will be made for the appointment of such personnel;

6. GENERAL SITE SAFETY

6.1 Safety training and education

The Principal Contractor shall detail and make available substantiating proof of the OHS competencies and training received by its contract management personnel as well as key Health and Safety role players and makes a copy available to the Client/Client Agent for assessment. This information is to be available with tender documentation.

The Principal Contractor/Contractor Health and Safety Plan shall have a detailed register of the skills and competencies for all personnel for activities which personnel will undertake under the contract. (E.g. Mobile Plant Operators, Drivers etc.)

The Principal Contractor shall demonstrate and maintain documentary evidence of competencies on site for the duration of the contract.

The Principal Contractor shall at quarterly intervals conduct a training needs analysis to ascertain what health and safety training is required. A plan of action should be derived and forwarded to the Client/Client Agent for record purposes. Once the identified people have attended the training, the PC will copy the Client/Client Agent with certificates of training.

6.1.1 Induction Training

The Principal Contractor / Contractor shall develop and detail a Site Induction Training Programme as part of the Occupational Health and Safety Plan to be submitted to the Client / Client's Agent prior to commencement of construction that includes as a minimum:

- Training related to hazards likely to be encountered on site and control measures that have been developed in response to these hazards;
- Health and Safety Roles and Responsibilities;
- The requirements of the Health and Safety Plan submitted and approved including the accommodation of Traffic Management Plan.
- Address the identified issues in the Fire Safety, Emergency, Evacuation and Rescue Plan to ensure that all site personnel are aware of procedures in the event of an incident or emergency occurring;

The Principal Contractor / Sub-Contractor shall evaluate all persons undertaking the site Induction Training through a written test to ensure that inductees have an understanding of the OHS (Occupational Health and Safety) requirements for the contract. The written tests shall be signed and dated by the person undertaking the induction training to attest to their understanding and be retained by the Principal Contractor / Sub-Contractor as a record that the training has been completed.

The Principal Contractor / Sub-Contractor shall conduct Site Specific Occupational Health and Safety Induction Training for all personnel, the Client / Client's Agent and all visitors not escorted on Site by inducted persons

6.2 Recording and Reporting of Injuries

The PC shall make arrangements for all his / her employees and Contractors appointed by him/her to report accidents, ill health and dangerous occurrences notifiable to the Department of Labour under Section 24 of the OHS Act (Occupational Health and Safety Act, Act 85 of 1993) (Reporting to DOL (Department of Labour) Inspector regarding certain incidents).

All lost time incidents associated with the contract works or reportable as defined by Section 24 of the OHS Act shall be immediately reported to the Client / Client's Agent.

The Principal Contractor / Sub-Contractor shall provide a detailed report of all accidents/incidents, including events that could have become lost time incidents were it not for fortuitous circumstances to the Client / Client's Agent within 5 days of the incident occurring. The Principal Contractor / Sub-Contractor shall provide copies of all reports and information associated with the incidents to the Client / Client's Agent. Copies of reports must be placed on the Health and Safety File.

Where the Principal Contractor / Sub-Contractor has been:

- Served with a prohibition, contravention or improvement notice under the OHS Act; or

- Required to comply with any order issued by an inspector for the Department of Labour;

The Principal Contractor / Sub-Contractor shall immediately supply a copy of that notice, order or notification to the Client / Client's Agent.

Where the Principal Contractor / Sub-Contractor have been served with a summons or are convicted of any offence in relation to occupational health and safety, the Principal Contractor / Sub-Contractor shall immediately supply a copy of that summons to the Client / Client's Agent.

The Principal Contractor / Sub-Contractor shall detail the reporting and investigation procedures for incident investigation. The procedures shall include the investigating officer responsible and the time limits imposed for reporting and investigating the incident and to implement corrective action in a timely manner so as to prevent a recurrence.

The Client / Client's Agent may participate in or undertake an investigation into the incident, injury or illness at its discretion and the Principal Contractor / Sub-Contractor shall cooperate with and provide assistance to the investigation organized and undertaken by the Client / Client's Agent.

6.3 First Aid

The PC/Contractor shall establish and implement a first-aid programme to provide emergency treatment to victims of accidents, chemical substances or excessive exposure to toxic substances or the Coronavirus.

The programme shall include:

- first-aid box for each site with 6 or more persons,
- training and re-training of first-aiders for each site with 10 or more persons,
- first-aid treatment procedures,
- standard procedures in case of an emergency,
- special procedures, e.g. for poisoning, Engulfment, COVID 19
- maintenance of first-aid facilities

All first-aid provisions shall comply with the OHS Act (Act 85 of 1993)

6.4 Fire Protection and Prevention

- Appropriate measures shall be taken by the PC/Contractor to avoid the risk of fire.
- The PC/Contractor shall provide sufficient and suitable storage for flammable liquids, solids and gases.
- The PC/Contractor shall ensure that smoking is prohibited and notices in this regard must be prominently displayed in all places containing readily combustible or flammable materials;
- The PC/Contractor shall ensure that combustible materials do not accumulate on the construction site.
- The PC/Contractor shall ensure that welding, flame cutting and other hot work are only conducted after the appropriate precautions have been taken to reduce the risk of fire.
- The PC/Contractor shall ensure that suitable and sufficient fire-extinguishing equipment is placed at strategic locations and such equipment is maintained in good working order;

- The PC/Contractor shall ensure that a sufficient number of workers are trained in the use of fire-extinguishing equipment.

6.5 Site Emergency Procedures

The Principal Contractor / Sub-Contractor shall establish an Emergency Evacuation and Rescue Plan. (EPP)

The plan shall include the following detail:

- The role and responsibility of every individual in the work area on fire safety emergency evacuation and rescue;
- General work area precautions, fire prevention, detection, protection and warning alarm systems;
- Fire fighting and rescue equipment including types of fire extinguishers;
- Fire safety measures for Site accommodation;
- Escape and communication;
- Fire brigade access, facilities and coordination;
- Fire drills and training including the use of fire fighting equipment;
- Material storage including flammable liquids, gasses and waste;
- Procedures to deal with engulfment,
- Procedures to deal with Coronavirus

The Principal Contractor / Sub-Contractor shall ensure that all procedures, precautionary measures and safety standards stipulated in the Plan are communicated, implemented and complied with by all workers including other interfacing contractors on site.

The Principal Contractor / Sub-Contractor shall practice their emergency preparedness within six (6) weeks of the commencement of work and at least two (2) monthly intervals thereafter. Reports detailing the state of effectiveness of emergency preparedness shall be compiled by the PC and a copy placed on the Project Health and Safety File.

The Principal Contractor / Sub-Contractor shall review and ensure the adequacy of the Plan as the work progress.

The Principal Contractor / Sub-Contractor shall conduct monthly checks on fire fighting equipment and test alarms and detection devices installed on Site and document findings in a register which shall be placed on the Project Health and Safety File.

The Principal Contractor / Sub-Contractor shall conduct monthly inspections of escape routes, fire brigade access, fire fighting facilities and working areas to ensure that the requirements stipulated in the Fire Safety, Emergency, Evacuation and Rescue Plan are complied with. All inspection records shall be documented in registers and kept in the Health and Safety file for inspection at any time.

6.6 Housekeeping

The PC shall ensure that suitable housekeeping is continuously implemented on the construction site, including:

- proper storage of materials and equipment

- removal of scrap, waste and debris at appropriate intervals;

Loose materials shall not be placed or allowed to accumulate on the site so as to obstruct access and egress from workplaces and passageways.

Good housekeeping will be maintained at all times as per Construction Regulation No. 27 and 28. Poor housekeeping contributes to three major problems, namely, costly or increased accidents, fire or fire hazards and reduction in production. Good housekeeping will enhance production time.

Particular emphasis is to be placed on the following crucial elements of a construction site:

- Phase priorities and production/plant layout
- Enclosures
- Pits, openings and shoring
- Storage facilities
- Effective, sufficient and maintained lighting or illumination
- Principal sources of injuries e.g. stairways, runways, ramps, loose building material, excavations
- Oil, grease, water, waste, rubble, glass, storm water
- Colour coding
- Demarcations
- Pollution
- Waste disposal
- Ablution and hygiene facilities

This list must not be taken to be exclusive or exhaustive!

In promotion of environmental control all waste, rubble, scrap etc, will be disposed of at a registered dump site and records will be maintained. Where it is found to be impractical to use a registered dump site or it is not available, the Principal Contractor will ensure that the matter is brought to record with the client or client's Agent, after which suitable, acceptable alternatives will be sought and applied.

6.7 Stacking and storage

- The PC shall ensure that adequate storage areas are provided.
- The PC shall ensure that storage areas are kept neat and under control.

6.8 Sanitation /Hygiene

The PC shall ensure that site hygiene facilities are provided as follows:

- One sanitary facility for each sex for every 30 workers.
- Adequate hand washing facilities.
- One shower facility for every 15 workers.
- Sheltered Eating Areas
- Drying sheds, huts, rooms or other accommodation for sheltering during bad weather, storing clothes and taking meals. Facilities should include tables and chairs, suitable and a supply of wholesome drinking water

The PC/Contractor shall provide reasonable and suitable living accommodation for the workers at construction sites which are remote from their homes and where adequate transportation between the site and their homes, or other suitable living accommodation, is not available.

6.9 Personal Protective Equipment

The Principal Contractor / Sub-Contractor shall provide and maintain suitable PPE (Personal Protective Equipment) for all employees employed on the Site.

The Principal Contractor / Sub-Contractor shall ensure that such PPE comply with the requirements of the OHS Act (Occupational Health and Safety Act, Act 85 of 1993).

The Principal Contractor / Sub-Contractor shall also ensure that all equipment is properly used by his / her employees during the course of their work.

The Principal Contractor / Sub-Contractor shall record all issues of all equipment to his / her employees in documented registers and such registers shall be kept in the Health and Safety File on site and made available for inspection at all times.

PPE shall be provided, used, and maintained in a sanitary and reliable condition wherever it is necessary by reason of hazards

All personal protective equipment shall be of safe design and construction for the work to be performed.

The Principal Contractor / Sub-Contractor shall provide all employees with washable face masks, hand and Surface Sanitizer to protect employees against the spread of the Coronavirus.

6.10 Permit to work requirements

The PC shall ensure that a written work permit (Site handing over) is obtained from the client or engineer before commencing with any work to be undertaken. Thereafter a permit shall be issued for all hazardous or dangerous activities to be carried out during construction. The client or engineer shall be made aware of and ensure that he / she has signed the permit before the PC commences on site.

The following is a list of hazardous activities which need a permit:

- executing excavation work,
- Work inside deep excavations;

6.11 Lock-out

The PC shall institute a "Lock-out" procedure in respect of controlling energy so as to prevent unexpected operation or activation of machinery, equipment or source of energy. This procedure must include a written policy, specific procedures, rules and supervisory follow-up, covering the positive locking of switches and valves to ensure that alterations, maintenance, set-up and or

other work can be performed safely.

Physical/mechanical lock-out systems shall be part of the safety system and included in training. Lockouts shall be tagged and the system tested before commencing with any work or repairs.

6.12 Monthly Health and Safety Audits

The Principal Contractor shall carry out monthly Health and Safety Audits on the measures contained within his / her Health and Safety Plan submitted to the Client / Client's Agent as well as Health and Safety Plans submitted by Sub-Contractors appointed by the Principal Contractor to demonstrate that the required level of health and safety are being achieved and maintained and compile a full report to the Client / Client's Agent on such audit.

The Client / Client's Agent will audit the Principal Contractor as well as his / her Sub-Contractor's Health and Safety Plans on a monthly basis and will advise the Principal Contractor of any matter with which he / she is not satisfied and the Principal Contractor shall take such steps as are necessary to satisfy the Client / Client's Agent.

The Client / Client's Agent will carry out such audits as he/she considers necessary by not less than monthly.

The Principal Contractor shall make available, specialist personnel as the Client / Client's Agent may consider necessary for the performance of such audits.

The Principal Contractor shall develop and maintain an Audit Schedule that details the audits planned to be undertaken by the Principal Contractor of the work under the contract, including sub-contractors, for the duration of the contract. The Audit Schedule shall form part of the Health and Safety Plan that needs to be submitted by the Principal Contractor.

Audit reports shall detail the scope of the audit, the audit questions and the audit findings.

The Client / Client's Agent shall be promptly provided with copies of all audit reports together with other documentation to show that all matters raised have been appropriately addressed.

Unless otherwise directed by the Client/Client's Agent the Principal Contractor/Sub-Contractor shall undertake its initial OHS Audit within 4 weeks of commencement of work. The Principal Contractor / Sub-Contractor shall undertake subsequent OHS Audits at a frequency not less than once a month.

All Principal Contractor OHS Audits shall include an assessment of Sub-Contractor compliance with the approved OHS Plan. The following are in particular requirements and will form a basis for compliance audits:

- Administrative, Legal Requirements, Compliance to Health and Safety Plan & Specifications
- Education, Training and Promotion
- Public Safety and Emergency Preparedness
- Personal Protective Equipment
- Housekeeping
- Safety Signage
- Electrical Safeguarding

- Emergency/Fire Prevention and Protection
- Excavations
- Inspections and Tools
- Transport and Materials Handling
- Site Plant and Machinery
- Plant and Storage Yards/Site Workshops Specifics
- Health and Hygiene
- Hazard Identification and Risk Assessments
- Medical Surveillance
- Health and Safety meetings and Minutes
- Incident Recording and Reporting
- Notifications
- Contractors on site
- COVID 19 Compliance

OUTLINED DATA, REFERENCES AND INFORMATION ON CERTAIN AND/OR SPECIFIC OBLIGATORY REQUIREMENTS TO ENSURE COMPLIANCE

Administrative and Legal Requirements

OHS Act Section/Regulation	Subject	Requirements
Construction Regulation 3	Application for Construction Work Permit	Department of Labour Application 30 Days Prior Copy of Permit available on Site
Construction Regulation 4	Notice of carrying out Construction work	Department of Labour notified 7 Days Prior Copy of Notice available on Site
General Admin Regulation 4	*Copy of OHS Act (Act 85 of 1993)	Updated copy of Act and Regulations on site Readily available for perusal by employees
COID Act Section 80	*Registration with Compensation. Insurer	Written proof of registration / Letter of good standing available on Site
Construction Regulation 5(1)(b)	HS Specification and Programme	HS Spec received from Client and/or its Agent on its behalf OHS programme developed and Updated regularly
Section 9(1) Construction. Regulation 9	*Hazard Identification and Risk Assessment	Hazard Identification carried out/Recorded Risk Assessment and – Plan drawn up / Updated RA Plan available on Site Employees/Sub-Contractors informed/trained
Section 16(2)	*Assigned duties (Managers)	Responsibility of complying with the OHS Act assigned to another person/s by CEO.
Construction Regulation 8(1)	Designation of Person Responsible on Site	Competent person appointed in writing as Construction Manager with job description.
Construction Regulation 8(2)	Designation of Assistant for above	Competent person appointed in writing as Assistant Construction Manager with job description.
Construction Regulation 8(7)	Designation of Person Responsible on Site	Competent person appointed in writing as Construction Supervisor with job description.
Construction Regulation 8(8)	Designation of Assistant for above	Competent person appointed in writing as Assistant Construction Supervisor with job description.
Section 17 and18 General Administrative Regulations 6 and7	*Designation of Health and Safety Representatives	More than 20 employees -one HS Representative one additional HS Rep. for each 50 employees or part thereof. Designation in writing period and area of responsibility specified in terms of GAR 6 and 7. Meaningful HS Rep. reports. Reports actioned by Management.
Section 19 and 20 General	*Health and Safety	HS Committee/s established.

Administrative Regulations 5	Committee/s	All HS Reps shall be members of HS Committees Additional members are appointed in writing. Meetings held monthly; Minutes kept. Actioned by Management.
Section 37(1) and (2)	*Agreement with Mandataries / (Sub-)Contractors (Example of such and agreement include)	Written agreement with (Sub-)Contractors List of (Sub-) Contractors displayed. Proof of Registration with Compensation Insurer/Letter of Good Standing Construction Supervisor designated Written arrangements re. HS Reps and HS Committee Written arrangements re. First Aid
Section 24 and General Admin. Regulation 8 COID Act Sect.38, 39 and 41	*Reporting of Incidents (Dept. of Labour)	Incident Reporting Procedure displayed. All incidents in terms of Sect. 24 reported to the Provincial Director. Department of Labour within 3 days. (Annexure 1?) (WCL 1 or 2) and to the Client and/or its Agent on its behalf Cases of Occupational Disease Reported Copies of Reports available on Site Record of First Aid injuries kept
General Admin. Regulation 9	*Investigation and Recording of Incidents	All injuries which resulted in the person receiving medical treatment other than first aid recorded and investigated by investigator designated in writing. Copies of Reports (Annexure 1) available on Site Tabled at HS Committee meeting Action taken by Site Management.
Construction. Regulation 13	Excavations	Competent person/s appointed in writing to supervise and inspect excavation work Written Proof of Competence of above appointee/s available on Site Risk Assessment carried out Inspected: -before every shift -after any blasting -after an unexpected fall of ground -after any substantial damage to the shoring -after rain. Inspections register kept Method statement developed where explosives will be/ are used
Construction. Regulation 24/Electrical Machinery Regulations 9 and10/ Electrical Installation Regulations	Inspection and Maintenance of Electrical Installation and Equipment (including portable electrical tools)	Inspections: -Electrical Installation and equipment inspected after installation after alterations and quarterly. Inspection Registers kept -Portable electric tools electric lights and extension leads must be uniquely identified/numbered. -Weekly visual inspection by User/Issuer/Store man. Register kept.
Construction. Regulation 26/ General Safety Regulation 8(1)(a)	*Designation of Stacking and Storage Supervisor.	Competent Person/s with specific knowledge and experience designated to supervise all Stacking and Storage Written Proof of Competence of above appointee available on Site
Environmental Regulation 9	*Designation of a Person to Co-ordinate Emergency Planning And Fire Protection	Person/s with specific knowledge and experience designated to co-ordinate emergency contingency planning and execution and fire prevention measures Emergency Evacuation Plan developed: -Drilled/Practiced

		-Plan and Records of Drills/Practices available on Site Fire Risk Assessment carried out All Fire Extinguishing Equipment identified and on register. Inspected weekly. Inspection Register kept Serviced annually
General Safety Regulation 3	*First Aid	Every workplace provided with sufficient number of First Aid boxes. (Required where 5 persons or more are employed) First Aid freely available Equipment as per the list in the OHS Act. One qualified First Aider appointed for every 50 employees. (Required where more than 10 persons are employed) List of First Aid Officials and Certificates Name of person/s in charge of First Aid box/es displayed. Location of First Aid box/es clearly indicated. Signs instructing employees to report all Injuries/illness including first aid injuries
General Safety Regulation 2	Personal Safety Equipment (PSE)	PSE Risk Assessment carried out Items of PSE prescribed/use enforced Records of Issue kept Undertaking by Employee to use/wear PSE PSE remain property of Employer not to be removed from premises GSR 2(4)
Hazardous Chemical Substances (HCS) Regulations Construction Regulation 25	*Control of Storage and Usage of HCS and Flammables	Competent Person/s with specific knowledge and experience designated to Control the Storage and Usage of HCS (including Flammables) Written Proof of Competence of above appointee available on Site Risk Assessment carried out Register of HCS kept/used on Site Separate purpose made storage available for full and empty containers
Construction. Regulation 23	Construction Vehicles and Earth Moving Equipment	Operators/Drivers appointed to: -Carry out a daily inspection prior to use -Drive the vehicle/plant that he/she is competent to operate/drive Written Proof of Competence of above appointee available on Site. Record of Daily inspections kept
General Safety Regulation 13A	*Inspection of Ladders	Competent person appointed in writing to inspect Ladders Ladders inspected at arrival on site and weekly there after. Inspections register kept Application of the types of ladders (wooden weekly there after. Inspections register kept Aluminium etc.) regulated by training and inspections and noted in register

Education and Training

Subject	Requirement
*Company OHS Policy Section 7(1)	Policy signed by CEO and published/Circulated to Employees Policy displayed on Employee Notice Boards Management and employees committed.
*Company/ Site OHS Rules (Section 13(a)	Rules published Rules displayed on Employee Notice Boards Rules issued and employees effectively informed or trained: written proof Follow-up to ensure employees understand/adhere to the policy and rules.
*Induction and Task Safety	All new employees receive OHS Induction Training.

Contractor | Witness 1 | Witness 2 | Employer | Witness 1 | Witness 2

Training (Section 13(a)	Training includes Task Safety Instructions. Employees acknowledge receipt of training. Follow-up to ensure employees understand/adhere to instructions.
*General OHS Training (Section 13(a)	All current employees receive specified OHS training: written proof Operators of Plant and Equipment receive specified training Follow-up to ensure employees understand/adhere to instructions.

Public Safety, Security Measures and Emergency Preparedness

Subject	Requirement
*Notices and Signs	Notices and Signs at entrances / along perimeters indicating "No Unauthorized Entry". Notices and Signs at entrance instructing visitors and non -employees what to do where to go and where to report on entering the site/yard with directional signs. e.g. "Visitors to report to Office". Notice & Signs posted to warn of overhead work and other hazardous activities. e.g. Notice & Signs posted to warn public and community of moving plant and machinery other hazardous activities. e.g. Notice & Signs posted to warn of excavation work and other hazardous activities. e.g **General Warning Signs.** Road Safety Signs as per South African Road Safety Signage Manual.
Site Safeguarding	Nets, barriers, Canopies, Platforms, Fans etc. to protect members of the public passing / entering the site. Persons placed with flag to warn oncoming traffic against any dangers of construction vehicles. Especially where construction vehicles have to cross public roads when entering or exiting the construction area or borrow pit.
*Security Measures	Access control measures/register in operation Security patrols after hours during weekends and holidays Sufficient lighting after dark Guard has access to telephone/ mobile/other means of emergency communication
*Emergency Preparedness	Emergency contact numbers displayed and made available to Security and Guard Emergency Evacuation instructions posted up on all notice boards (including employees' notice boards) Emergency contingency plan available on site/in yard Doors open outwards/unobstructed Emergency alarm audible all over (including in toilets)
*Emergency Drill and Evacuation	Adequate No. of employees trained to use Fire Fighting Equipment. Emergency Evacuation Plan available displayed and practiced. (See Section 1 for Designation and Register)

Personal Protective Equipment

Subject	Requirement
*PPE needs analysis	Need for PPE identified and prescribed in writing PPE remain property of Employer, not to be removed from premises GSR 2(4)
*Head Protection	All persons on site wearing Safety Helmets including Sub-contractors and Visitors (where prescribed)
*Foot Protection	All employees on site wearing Safety Footwear including Gumboots for concrete / wet work and non-slip shoes for roof work Visitors to wear same upon request or where prescribed
*Eye and Face Protection	Eye and Face (also Hand and Body) Protection (Goggles Face Shields Welding Helmets etc.) used when operating the following:

Contractor | Witness 1 | Witness 2 | Employer | Witness 1 | Witness 2

	*Jack Hammers *Angle / Bench Grinders *Electric Drills (Overhead work into concrete / cement / bricks *Explosive Powered tools *Cutting Tools and Equipment
*Hearing Protection	Hearing Protectors (Muffs Plugs etc.) used when operating the following: *Jack Hammers *Explosive Powered Tools
*Hand Protection	Protective Gloves worn by employees handling / using: *Cement / Bricks / Steel / Chemicals *Jack Hammers etc.
*Protective Clothing	All jobs requiring protective clothing (Overalls Rain Wear Welding Aprons etc.) Identified and clothing worn. COVID 19 PPE to be included.
*PPE Issue and Control	Identified Equipment issued free of charge. All PPE maintained in good condition. (Regular checks). Workers instructed in the proper use and maintenance of PPE. Commitment obtained from wearer accepting conditions and to wear the PPE. Record of PPE issued kept on HS File. PPE remain property of Employer not to be removed from premises GSR 2(4).

Housekeeping

Subject	Requirement
Stacking and Storage (See Section 1 for Designation and Register)	Stacking: *Stable on firm level surface/base. *Prevent leaning/collapsing *Irregular shapes bonded *Not exceeding 3x the base *Stacks accessible *Removal from top only. Storage: *Adequate storage areas provided. *Functional – e.g. demarcated storage areas/racks/bins etc. *Special areas identified and demarcated e.g. flammable gas cement etc. *Neat safe stable and square. *Store/storage areas clear of superfluous material. *Storage behind sheds etc. neat/under control. *Storage areas free from weeds litter etc.
Sub-contractors (Housekeeping)	Sub-contractors required to comply with Housekeeping requirements.

Ladders

Subject	Requirement
*Physical Condition / Use and Storage – To access deep excavation.	Stepladders -hinges/stays/braces/stiles in order. Extension ladders -ropes/rungs/stiles/safety latch/hook in order. Extension / Straight ladders secured or tied at the bottom / top. No joined ladders used Wooden ladders are never painted except with varnish Aluminium ladders NOT to be used with electrical work All ladders stored on hooks / racks and not on ground Ladders protrude 900 mm above landings / platforms / roof Fixed ladders higher than 5 m have cages/Fall arrest system

Electricity

Subject	Requirement
*Electrical Distribution Boards and Earth Leakage – Site Office	Colour coded / numbered / symbolic sign displayed. Area in front kept clear and unobstructed. Fitted with inside cover plate / openings blanked off / no exposed "live" conductors / terminals/Door kept close Switches / circuit breakers identified. Earth leakage protection unit fitted and operating. Tested with instrument: Test results within 15 – 30 milliamps Aperture/Opening/s provided for the plugging in and removal of extension leads without the need to open the door Apertures and openings used for extension leads to be protected against the elements and especially rain
*Electrical Installations and Wiring	Temporary wiring / extension leads in good condition / no bare or exposed wires. Earthing continuity / polarity correct: Looking at the open connectors to connect the wiring, the word "Brown" has the letter 'R' in it, so the b'R'own wire connects to the 'R'ight hand connector. "Blue" has the letter 'L' in it, so the b'L'ue wire connects to the 'L'eft hand connector. Cables protected from mechanical damage and moisture. Correct loading observed e.g. no heating appliance used from lighting circuit etc. Light fittings/lamps protected from mechanical damage/moisture. Cable arrestors in place and used inside plugs
*Physical condition of Electrical Appliances and Tools	Electrical Equipment and Tools: (includes all items plugging in to a 16 Amp supply socket) Insulation / casing in good condition. Earth wire connected/intact where not of double insulated design Double insulation mark indicates that no earth wire is to be connected. Cord in good condition/no bare wires/secured to machine and plug. Plug in good condition, connected correctly and correct polarity.

Emergency and Fire Prevention and Protection

Subject	Requirement
*Fire Extinguishing Equipment	Fire Risks Identified and on record The correct and adequate Fire Extinguishing Equipment available for: *Offices *General Stores *Flammable Store *Fuel Storage Tank/s and catchment well *Gas Welding / Cutting operations *Where flammable substances are being used / applied. *Equipment Easily Accessible
*Maintenance	Fire equipment checked minimum monthly, serviced yearly
*Location and Signs	Fire Extinguishing Equipment: *Clearly visible *Unobstructed *Signs posted including "No Smoking"/ "No Naked Lights" where required. (Flammable store, Gas store, Fuel tanks etc.)
*Storage Issue and Control of Flammables (incl. Gas cylinders)	Storage Area provided for flammables with suitable doors, ventilation, bund etc. Flammable store neat / tidy and no Class A combustibles. Decanting of flammable substances carried out in ignition free and adequately ventilated area. Container bonding principles applied Only sufficient quantities issued for one task or one day's usage Separate, special gas cylinder store/storage area. Gas Cylinders stored / used / transported upright and secured in trolley/cradle/structure and ventilated.

	Types of Gas Cylinders clearly identified as well as the storage area and stored separately. Full cylinders stored separately from empty cylinders. All valves, gauges, connections, threads of all vessels to be checked regularly for leaks. Leaking acetylene vessels to be returned to the supplier IMMEDIATELY.
*Storage, Issue and Control of Hazardous Chemical Substances (HCS)	HCS storage principles applied: products segregated Only approved, non-expired HCS to be used Only the prescribed PPE shall be used as the minimum protection Provision made for leakage/spillage containment and ventilation Emergency showers/eye wash facilities provided HCS under lock and key controlled by designated person Decanted/issued in containers as prescribed with information/warning labels Disposal of unwanted HCS by accredited disposal Agent No dumping or disposal of any HCS on or inside the storage area or anywhere else on the project site All vessels or containers to be regularly checked for leaks

Excavations

Subject	Requirement
Excavations	Shored / Braced to prevent caving / falling in. Provided with an access ladder. Excavations guarded/barricaded/lighted after dark in public areas Soil dumped at least 1 m away from edge of excavation On sloping ground soil dumped on lower side of excavation All excavations are subject to daily inspections

Tools

Subject	Requirement
*Hand Tools	Shovels / Spades / Picks: *Handles free from cracks and splinters *Handles fit securely *Working end sharp and true
*Explosive Powered Tools.	Only used by trained / authorized personnel. Prescribed warning signs placed / displayed where tool is in use. Work area must be properly isolated/demarcated during use of tool. Inspected at least monthly by competent person and results recorded. Issue and return recorded including cartridges / nails and unused cartridges / nails / empty shells recorded. Cleaned daily after use.

Transport and Materials Handling Equipment

Subject	Requirement
*Site Vehicles	All Site Vehicles, Dumpers, Bobcats, Loaders etc; checked daily before use by driver / operator. Inventory of vehicles used/operated on-site Inspection by means of a checklist/result recorded. No persons riding on equipment not designed or designated for passengers. Site speed limit posted, enforced and not exceeded. Drivers / Operators trained / licensed and carrying proof. No unauthorized persons are allowed to drive/operate equipment.

Site Plant and Machinery

Subject	Requirement
Pipe Cutting Machine	Operator Trained. Only authorized persons use the machine. Emergency stop switch clearly marked and accessible. Area around the machine dry and slip/trip free/clear of off-cuts All moving drive parts guarded/electrical supply cable protected Operator using correct PPE -eye/face/hearing/foot/hands/body.
Concrete Mixer	Top platform provided with guardrails. Dust abatement methods in use. Operators using correct PPE -eye / hands / respirators. All moving drive parts guarded. Emergency stops identified / indicated and accessible. Area kept clean/dry/and free from tripping and slipping hazards. Operator's overseer identified and crane signals displayed and used.

Plant and Storage Yards/Site Workshops Specifics

Subject	Requirements
Section 8(2)(1) General Machinery Regulation 2(1): Supervision of the Use and Maintenance of Machinery	Person/s with specific knowledge and experience designated in writing to Supervise the Use and Maintenance of Machinery Critical items of Machinery identified / numbered / placed on register / inventory Inspection/maintenance schedules for abovementioned Inspections/maintenance carried out to above schedules Results recorded
Lock-out Procedure	Lock-out procedure in operation
Ergonomics	Ergonomics survey conducted – results on record Survey results applied
Demarcation and Colour Coding	Demarcation principles applied All services, pipes, electrical installation, stop-start controls, emergency controls etc. colour coded to own published or SABS standard Employees trained to identify colour coding

Workplace Environment, Health and Hygiene

Subject	Requirement
*Noise	Tasks identified where noise levels exceeds 85 dB at any one time. All reasonable steps taken to reduce noise levels at the source. Hearing protection used where noise levels could not be reduced to below 85 dB.
*Heat Stress	Measures in place to prevent heat exhaustion in heat stress problem areas e.g. steel decks, when the WBGT index reaches 30. (See Environmental Regulation 4) Cold drinking water readily available at all times.
*Ablutions	Sufficient hygiene facilities provided -1 toilet per 30 employees (National Building Regulations prescribe chemical toilets for Construction sites) Toilet paper available. Sufficient showers provided. Facilities for washing hands provided Soap/cleaning Agent available for washing hands Means of drying hands available Lock-up changing facilities / area provided. Ablution facilities kept hygienic and clean.
*Eating / Cooking Facilities	Adequate storage facilities provided. Weather protected eating area provided, separate from changing area Refuse bins with lids provided.

	Facilities kept clean and hygienic.
*Pollution of Environment	Measures in place to minimize dust generation. Accumulation or littering of empty cement pockets, plastic wrapping / bags, packing materials etc. prevented. Spillage / discarding of oil, chemicals and dieseline into storm water and other drains or into existing or newly dug holes/cavities on site expressly prohibited.
*Hazardous Chemical Substances	All substances identified and list available e.g. acids, flammables, poisons etc. Material Safety Data Sheets (MSDS) indicating hazardous properties and emergency procedures in case of incident on file and readily available. Substances stored safely. Expiry dates meticulously checked where applicable

6.13 Stop the execution of Construction Work

The Client or Client's Appointed Health and Safety Agent are authorized by Construction Regulation 5(1)(q) to Stop any construction / construction related work conducted by any person on the construction site, which is **not** in accordance with the PC/Contractor health and safety plans, accommodation of Traffic Management Plan or which poses a threat to the health and or safety of persons.

The PC shall ensure that where construction work or related activities conducted not in accordance with the PC/Contractor approved health and safety plans and accommodation of Traffic Management Plan, such activities or work are immediately stopped until such time that health and safety prescriptions are implemented and functioning effectively.

6.14 Handing Over of Project Health and Safety File

The PC shall hand over a consolidated health and safety file to the Client / Client's Agent upon completion of construction work, including all drawings, designs, materials used and other similar information concerning the completed structure.

In addition to the Health and Safety File compile and hand over a comprehensive and updated list of all contractors on site accountable to the Principal Contractor as well as the agreements between the parties and the type of work done by them.

6.15 Emergency Procedures

Refer to 6.5 above

6.16 Hazards and Potential Situations

The PC shall immediately notify other contractors after the Client / Client's Agent / Engineer has been notified of any hazardous or potentially hazardous situations, which may arise during the performance of construction activities.

6.17 Health and Safety Signage

The PC shall, ascertain and provide adequate on site HS signage. Signage shall include, but shall not be limited to, hard hat / helmet areas; safety shoe areas; traffic protection zones; ear protection zones; hand protection zones; eye protection zones; fall protection zones and road safety signage or persons placed at crossing or other dangerous areas on public roads. The PC shall be responsible to maintain the quality and replacement of signage.

The PC shall also ensure that road safety signage is provided and placed as per the South

African Road Safety Signage Manual. (Pipe jacking, Sidewalks and Kerbs)

6.18 Excavations, Shoring, Dewatering and Drainage

The PC shall make provision for barrier adjacent, shoring within and de-watering or drainage of any excavation that requires it unless otherwise stipulated elsewhere. A safe work method statement shall be submitted with the Health and safety Plan to the Client Agent for approval. A permit will then be issued to the PC to proceed with the excavation work. The PC shall make sure that:

The PC/Contractor shall ensure that all excavation work is carried out under the supervision of a competent person who has been appointed in writing.

The PC/Contractor shall evaluate, as far as is reasonably practicable, the stability of the ground before excavation work begins.

The PC/Contractor shall-

Take suitable and sufficient steps in order to prevent, as far as is reasonably practicable, any person from being buried or trapped by a fall or dislodgement of material in an excavation;

Not require or permit any person to work in an excavation which has not been adequately shored or braced: Provided that shoring and bracing may not be necessary where-

- The sides of the excavation are sloped to at least the maximum angle of repose measured relative to the horizontal plane; or
- Such an excavation is in stable material: Provided that-

Permission being given in writing by the appointed competent person upon evaluation by him or her of the site conditions; and where any uncertainty pertaining to the stability of the soil still exists, the decision from a professional engineer or a professional technologist competent in excavations shall be decisive and such a decision shall be noted in writing and signed by both the competent person and the professional engineer or technologist, as the case may be;

take steps to ensure that the shoring or bracing is designed and constructed in such a manner rendering it strong enough to support the sides of the excavation in question;

Ensure that no load, material, plant or equipment is placed or moved near the edge of any excavation where it is likely to cause its collapse and thereby endangering the safety of, any person, unless precautions such as the provision of sufficient and suitable shoring or bracing are taken to prevent the sides from collapsing;

Ensure that where the stability of an adjoining building, structure or road is likely to be affected by the making of an excavation, the steps are taken that may be necessary to ensure the stability of such building, structure or road and the safety of persons;

Cause convenient and safe means of access to be provided to every excavation in which persons are required to work and such access shall not be further than 6m from the point where any worker within the excavation is working;

Ascertain as far as is reasonably practicable the location and nature of electricity, water, gas or other similar services which may in any way be affected by the work to be performed, and shall before the commencement of excavation work that may affect any such service, take the steps that may be necessary to render the circumstances safe for all persons involved;

Cause every excavation, including all bracing and shoring, to be inspected-

- daily, prior to each shift;
- after every blasting operation;
- after an unexpected fall of ground;
- after substantial damage to supports; and
- after rain, by the competent person, in order to pronounce the safety of the excavation to ensure the safety of persons, and those results are to be recorded in a register kept on site and made available to an inspector, client, client's agent, contractor or employee upon request;

Cause every excavation which is accessible to the public or which is adjacent to public roads or thoroughfares, or whereby the safety of persons may be endangered, to be-

Adequately protected by a barrier or fence of at least one metre in height and as close to the excavation as is practicable; and

Provided with warning illuminants or any other clearly visible boundary indicators at night or when visibility is poor;

Ensure that all precautionary measures as stipulated for confined spaces as determined in the General Safety Regulations, are complied with when entering any excavation;

Ensure that, where the excavation work involves the use of explosives, a method statement is developed in accordance with the applicable explosives' legislation, by an appointed person who is competent in the use of explosives for excavation work and that the procedures therein are followed; and

Cause warning signs to be positioned next to an excavation within which persons are working or carrying out inspections or tests.

6.19 Speed Restrictions

The PC shall ensure that all persons in his / her employ and all those that are visiting the site are aware and comply with the site speed restrictions. On site gravel or earth roads within 500 meters of the site, the vehicles of the PC as well as his / her suppliers shall be regulated to a maximum of 20 km/h or as directed by notices and or signs. The PC shall also ensure that prior to commencement of work a accommodation of Traffic Management Plan is submitted to the Client/Client Agent for approval by the Professional Engineer.

6.20 Hazardous Chemical Substances

In addition to the requirements of the HCS Regulations, the PC/Contractor must provide proof in the HS File that:

- Material Safety Data Sheets (MSDS's) of all the relevant materials / substances are available prior to use the PC/Contractor. Mention will be made how the PC is going to act according to special / unique requirements made in the relevant MSDS's. All MSDS's shall be available for inspection by the Client Agent at all times.
- Risk assessments are conducted at least once every 2 months;
- Exposure monitoring is done according to OEL (Occupational Exposure Limits) by an Approved Inspection Authority (AIA) and that the medical surveillance programme is based on the outcomes of the exposure monitoring;
- How the relevant HCS's are being / going to be controlled by referring to:

    - Limiting the amount of HCS;
    - Limiting the number of employees exposed;
    - Limiting the period of exposure;
    - Substituting the HCS;
    - Using engineering controls;
    - Using appropriate written safe work procedures.

- The correct PPE is being used;
- HCS are stored and transported according to SABS 072 and 0228;
- Training with regards to these regulations was given;
- The HS Plan provides reference to the disposal of hazardous waste on classified sites and the location thereof (where applicable);
- The first-aid officials must be made aware of the MSDS's and how to treat HCS incidents appropriately.

6.21 Noise Induced Hearing Loss

Where noise is identified as a hazard the requirements of the NIHL (Noise Induced Hearing Loss) Regulations must be complied with and the following must be included / referred to in the HS Plan:

- Proof of training with regards to these regulations;
- Risk assessment done within 1 month of commencement of work;
- Monitoring carried out by an AIA and done according to SANS 083;
- Medical surveillance programme established and maintained for the necessary employees;
- Control of noise by referring to:
    - Engineering methods considered
    - Admin control (number of employees exposed) considered;
    - Personal Protective Equipment considered / decided on;
- Describe how records are going to é kept for a period of 40 years.

6.22 Construction Plant and Equipment

"Construction Plant and Equipment" encompasses all types of plant including but not limited to:

- Cement Mixing Machines
- Excavators;
- TLB's
- De-watering equipment
- Road vehicles with or without lifting equipment.

The PC/Contractor shall ensure that all such plant and equipment complies with the requirements of the OHS Act. The PC/Contractor shall also inspect and keep records of inspections of plant, equipment and tools used on site. Only authorized persons are to use plant, equipment and tools under proper supervision. Appropriate PPE and clothing as prescribed by the HIRA, shall be provided and maintained in good condition at all times.

6.23 Fire Fighting Equipment

The PC/Contractor shall provide and maintain regularly serviced fire extinguishers located at strategic points on site. The PC/Contractor shall also keep spare serviced portable fire extinguishers. Safety signage shall be posted up in all areas where fire extinguishers are located. The PC/Contractor shall have adequate persons trained or competent to use extinguishers.

6.24 Ladders and Ladder Work (Access Excavations)

The PC/Contractor shall ensure that all ladders are numbered and inspected regularly keeping record of inspections. It should be noted that Aluminium ladders are preferred to wooden ones.

6.25 General Machinery

The PC/Contractor shall comply with the Driven Machinery Regulations, which include inspecting machinery regularly, appointing a competent person to inspect and ensure maintenance, issue PPE and or clothing, train those people that use machinery and enforce compliance.

6.26 Portable Electrical Equipment / Explosive Power Tools

The PC/Contractor shall ensure that use and storage of all explosive powered tools and portable electrical equipment / tools are in compliance with OHS Act requirements. The PC shall ensure that:

- A competent person undertakes routine inspections;
- Only authorized persons use the tools and equipment;
- There are safe working method statements applied;
- Awareness training is carried out and compliance is enforced at all times;
- PPE and clothing is provided and maintained.

6.27 High Voltage Electrical Equipment

The PC shall ensure that, where construction work is under, on or near high voltage electrical equipment or in close proximity of it, which is not maintained and or operated by the , the Electrical Regulations, instructions by the representatives and safety instructions (Regulations and or the owner) are complied with.

Such equipment includes:

- Eskom;
- The PC own supply;
- Electrical equipment being installed but not yet taken over from the contractor by the .

6.28 Public Health and Safety

The PC/Contractor shall ensure that each person working on or visiting a site, and the surrounding community, shall be made aware of the dangers likely to arise from on-site activities and the precautions to be observed to avoid or minimize those dangers. Appropriate safety signage that includes road safety signage shall be posted at all times.

Both the client and the PC have a duty in terms of the OHS Act to do all that is reasonably practicable to prevent members of the public and others being affected by the construction processes to be aware and put preventative measures in place. The visitors that enter the construction site shall go through a brief health and safety induction detailing hazards and risks they may be exposed to and what measures are in place to control these hazards and risks. The accommodation of traffic plan must also address the safety of motorists and the public.

6.29 Night Work

The PC shall not undertake night work without prior arrangement and a written permit from the Project Engineer. The C shall ensure that adequate lighting is provided for all night work and failure to do so shall result in work being stopped.

6.30 Transportation of Workers / Humans

The PC/Contractor shall refer and comply with the requirements of the Labour Agreement. Over and above these requirements the PC/Contractor is required to comply with the National Road Transport Regulations 2000. The PC/Contractor shall, and not be limited to:

- Not transport persons together with goods, tools, equipment, materials etc. unless there is an appropriate area or section to store them;
- Not transport persons in a non-enclosed (top less) vehicle, e.g. truck, there must be a proper canopy (properly covering the back and top) with suitable sitting area. Workers shall not be permitted to stand or sit at the edge of the transporting vehicle;
- Not transport workers on the back of any open bakkie;
- Provide a serviced portable fire extinguisher in transporting vehicles at all times.

6.31 Records and Records Management

The PC shall ensure that the control of records is in accordance with the Principal Contractor / Sub-Contractor's approved Health and Safety Plan for the contract.

Records shall be registered, ordered and retained on Site in the Health and Safety File for the duration of the contract.

7 OCCUPATIONAL HEALTH

Exposure of workers to occupational health hazards and risks are very common in any work environment, especially in construction. Occupational health hazard and risk exposure is a major problem and all contractors are to ensure that proper health and hygiene measures are put in place to prevent exposure to these hazards and risks. The occupational hazards and risks may enter the body in 3 ways:

- Inhalation through breathing e.g. cement / lime dust;
- Ingestion through swallowing e.g. food / water intake;
- Absorption through the skin e.g. use of chemicals
- Contact with sewerage

All contractors are to ensure that where workers are exposed to airborne contaminants, pre-employment medicals are conducted to ensure the fitness to work under such conditions. Tests conducted must indicate full lung function

All contractors will be responsible for the full cost of medical treatment that persons in his / her employ may require. The contractor is therefore obligated to ensure that all employees are medically fit prior to being allowed onto the construction site.

All driver operators involved in a construction project are to undergo a pre-medical and exist-medical examination. Sufficient time needs to be allocated for these medicals to be done prior to construction activities commencing. The cost of all medical examinations (pre, routine and post) is to be allowed for by the contractor in his / her price irrespective of whether the specific item is scheduled.

All contractors must ensure that Occupational Hygiene Surveys are conducted as per the Occupational Health and Safety Act to ensure employees aren't exposed to hazards. HIRA's should identify areas where surveys are to be conducted.

All contractors must implement **COVID-19 Protocols** and measures to ensure compliance to DPSA, DOH and DOL guidelines and requirements. All employees must be screened daily and be provided with face masks and sanitizers.

All Contractors must implement a cleaning program for tools, and common areas to prevent the disinfection of the coronavirus.

7.1 Provision of Medical Service

The PC/Contractor shall be required to:

- Conduct pre-medical examinations for all his / her employees based on a person-job specification that will be determined by the type of work the person would be required to do or what medical surveillance the person must undergo;
- Compile and implement the HIV / AIDS/COVID-19 Programme including STIs / STD's and TB. The programme shall contain, but not be limited to the following topics:

  - Education and awareness;
  - Voluntary counselling;
  - Treatment or Preventative measures.
  - Daily Screening
  - Isolation of positive COVID-19 employees

8 HEALTH AND SAFETY HAZARDS INHERENT IN THE DESIGN

The following is a list of specific activities and considerations that have been identified for the **KGOTSONG/BOTHAVILLE: UPGRADING OF SEWER OUTFALL REMAINING PHASES** and for which Risk Assessments, Standard Working Procedures (SWP), management and control measures and Method Statements (where necessary) have to be developed by the Principal Contractor :

- Clearing and Grubbing of the Area/Site
- Site Establishment including:
  - Office/s
  - Secure/Safe Storage and storage are as for materials, plant and equipment
  - Ablution facilities
  - Sheltered dining area
  - Vehicle access to the site
- Dealing with existing Structures.
- Location of existing Services
- Installation and Maintenance of Temporary Construction Electrical Supply, Lighting and Equipment
- Adjacent Land uses/Surrounding property exposures
- Boundary and Access control/Public Liability Exposures
- Health risks arising from the plant as well as own activities and from the environment e.g. threats by bees, snakes, lightning, allergies etc.
- Exposure to Noise
- Protection against dehydration and heat exhaustion
- Protection from wet and cold conditions
- Dealing with HIV/Aids/COVID 19 and other diseases
- Exposure to sewerage
- Use of Portable Electrical Equipment including:
  - Angle grinder, Drills, Generators etc

- Excavations including:
  - Ground/soil conditions
  - Trenching
  - Shoring
  - Drainage
  - Daily inspections
  - Engulfment
- Loading and Offloading of Trucks

- Aggregate/Sand and other Materials Delivery
- Manual and Mechanical Handling
- Driving and Operation of Construction Vehicles and Mobile Plant including:
  - Trenching machine
  - Excavator
  - Bomag Roller
  - Plate Compactor
  - Front End Loader
  - Parking of Vehicles and Mobile Plant

- Use and Storage of Flammable Liquids and other Hazardous Substances
- Layering and Bedding of trench floor
- Installation of Pipes in trenches
- Backfilling of Trenches
- Entering Confined Spaces - Manholes
- Protection from Overhead Power Lines
- As discovered by the Principal Contractor hazard identification exercise
- As discovered from any inspections and audits conducted by the Client and/or its Agent on its behalf or by the Principal Contractor or any other Contractor on site
- As discovered from any accident/incident investigation.
- Working in elevated positions on ladders to enter excavations
- Handling chemical substances potentially hazardous to human health and safety;
- Manual handling due to labour-intensive work methods;
- Nature aspects: weather conditions, veldt fires, hot temperatures, ultraviolet sun rays;
- Manual handling of heavy /awkward equipment and materials;
- Moving Traffic;
- Ergonomic aspects;

8.1 Chemical Hazards

The following construction materials and substances to be used in the works have been identified as potentially posing special health and/or safety hazards during the project:

8.1.1 Substances

- Cleaning Agent
- Hydraulic Oil – Plant and Machinery (Pipe Jacking)
- Diesel
- Petrol
- Cement

- Cement – can cause ill health by:
  a) Skin contact, cement burns and dermatitis.
  b) Eye contact, irritation and inflammation.
  c) Inhalation of dust, irritation to nose and throat and causes difficulty with breathing.

- Chemical cleaners can cause ill health mainly by:
  a. Skin contact, acids and alkalis are highly corrosive and destructive to body tissue causing burns.
  b. Inhaling fumes or mist, concentrated solutions of acids and alkalis emit toxic and corrosive fumes.

This is not a definitive list of all potentially harmful products. Other materials and substances commonly used during construction may also present health or safety hazards, however, it is deemed that these should be familiar to the average competent Contractor as part of the routine risk and OHSH (Occupational Health, Safety and Hygiene) assessments and are therefore not included here.

Adopt all precautionary measures provided by manufacturers for the storage, use and application of specified materials.

Data sheets for these, and any other materials that will be used for the works, are to be obtained by the contractor from the manufacturers.

9. SITE-WIDE ELEMENTS

9.1 Site Access and Egress

The PC shall:

- Store materials and plant away from means of access for the general public and occupants.
- Remove rubbish and demolition materials regularly. Do not allow to accumulate.
- Maintain free access through designated means of escape at all times.
- Agree with the Client / Client's Agent delivery points for materials before commencing works.
- Site access will be via the road agreed to by the Client's Agent.

9.2 Visitors to the site

The PC/Contractor shall ensure that:

- All visitors are to report to the Principal Contractor reception area for OHS Induction training.
- All visitors are to sign the visitor's registration document.
- All visitors are to be provided with a Visitors Permit to enable them to access the construction site.
- All un-inducted visitors must be accompanied on the construction site by an inducted person.
- No visitors shall be allowed to access the construction site without wearing the necessary PPE.
- All employees and visitors are screened for COVID-19 and always wear their masks.

9.3 Emergencies

Ensure that there are adequate escape routes and that they are kept clear at all times, including escape routes from trenches.

9.4 Location of Temporary Site Accommodation

See Site Layout Plan.

9.5 Location of Materials Unloading and Storage

Materials are to be unloaded and stored in locations which will not in any way affect access or egress to the site or the works.

9.6 Traffic and Pedestrian Routes

The road, public footpaths and access way are to be kept open at all times. All necessary signage and barriers are to be put in place to protect pedestrians and motorists at the site entrance and access and egress points. An accommodation of Traffic Management Plan will also be submitted to the Client/Client agent for approval by the Professional Engineer. Road traffic warning signs shall be placed well ahead of the work area.

9.7 Environment

See Environmental Management Plan

10 Continuing Liaison

10.1 Health and Safety File on Site

The Principal Contractor and Contractor will have the Site Health and Safety File updated and available on-site at all times. The file should include:

- Client/Client Agent Health and Safety Specifications
- Introduction & Safety Plan
- Appointments
- Contractors Equipment, including specialized equipment
- Personal Protective Equipment Inspection Lists and Register
- Inspection Reports
- Health and Safety Training records
- Medical Surveillance records or proof thereof
- Hazard Identification & Risk Assessments
- Written Safe Working Procedures
- Emergency Response Plans and Procedures
- Incident Recording and Reporting & Investigations
- Health and Safety Committees & Minutes
- Certificates of compliance for electrical Installations
- Section 37(2) agreements
- Policies, site safety rules and health & safety specifications
- Test Records/certificates of equipment
- Construction Permit & Notifications
- Registration with CC or other approved incident insurer
- Site Information
- Disciplinary Action
- Drawings & sketches
- Permits
- Audit Reports
- Completion Certificates issued by designers
- Costs
- Notices previously served by inspectors
- Rehabilitation of construction site
- Disposal of Hazardous waste

- Accommodation of Traffic Management Plan

10.2 LEGAL COMPLIANCE

It is required that all Contractors on site comply with the following legislation and standards:

- The Constitution of the Republic of South Africa (particularly Section 24 of the Bill of Rights).
- National Environmental Management Act 1998 (Act 107 of 1998).
- Environment Conservation Act 1989 (Act 73 of 1989).
- National Water Act 1998 (Act 36 of 1998).
- Conservation of Agricultural Resources Act 1983 (Act 43 of 1983).
- Civil and Building Work Act.
- Mine Health and Safety Act 29 of 1996 and its Regulations. (Must work under this Act on site)
- COID Act.
- Any other applicable South African legislation.
- Applicable South African National Standards (SANS).
- Applicable international standards.
- All COVID 19 Guidelines & Regulations
- Local Municipal By-Laws