

Bill of Quantities						
Item Ref	Payment Refers	Description	Unit	Quantity	Rate	Amount R
1		SECTION 1 : PRELIMINARY AND GENERAL				
1.1	SABS 1200 A 8.3	FIXED-CHARGE ITEMS				
1.1.1	8.3.1	Compilation of health and Safety and Environment file	Sum	1		
1.2	8.4	TIME-RELATED ITEMS				
1.2.1	8.4.1	ALL TIME-RELATED ITEM COSTS ARE DEEMED TO BE INCLUDED IN THE VARIOUS RATES PER CONSTRUCTION RELATED ITEMS				
TOTAL SECTION 1 CARRIED TO SUMMARY OF SCHEDULES						

3		SECTION 3 : EARTHWORKS (PIPE TRENCHES)				
	SABS 1200 DB	EXCAVATION				
3.1	8.3.2(a)	Excavate in all materials for trenches backfill, compact, and dispose of surplus/unsuitable material, for total trench depth: Exceeding but not exceeding				
3.1.1		0,0 m 1,0 m	m ³	3		
3.1.2		1,0 m 2,0 m	m ³	3		
3.1.3		2,0 m 3,0 m	m ³	3		
		Make up deficiency in backfill material (Provisional)				
3.3.1	8.3.3.1(a)	a) from other necessary excavations on site	m ³	1		
3.3.2	8.3.3.1(b)	b) by importation from designated borrow pits	m ³	1		
3.3.3	8.3.3.1(c)	c) by importation from commercial or off-site sources selected by the Contractor	m ³	12		
3.4	8.3.3.3	Compaction in road reserves	m ³	1		
TOTAL SECTION 3 CARRIED TO SUMMARY OF SCHEDULES						
6	SABS 1200L	SECTION 6 : MEDIUM-PRESSURE PIPELINES				
6.1		VALVE CHAMBER AND MANHOLES				
6.1.1	PSL 8.2.13	Cutting of the 900mm HDPE Pipe and the Supplying and Fixing of the Coupling	sum	1		
6.1.1.1		Brickwork	m ²	1		
6.1.2	PSL 8.2.15	Provide valve, water pipe marker in accordance with JHB water's detailed drawing. JW100-DET12-W01				
6.1.2.1		Isolation Valve Marker	No	1		
6.1.2.2		Air Valve Marker	No	1		
6.1.2.3		Scour Valve Marker	No	1		
6.1.2.4		Fire Hydrant Marker	No	1		
6.1.2.5		Plates	No	1		
TOTAL SECTION 6 CARRIED TO SUMMARY OF SCHEDULES						

Extra-over 8.2.1 for the Cutting of the Pipe and the Supplying and Fixing of the Extra Coupling Unit: No.
 Separate items will be scheduled for each size of pipe.
 The rate shall cover the cost of the cutting of the pipe and of the supplying and fitting of the additional coupling and of the delivery of unused off-cuts of pipes to the Engineer's office or store.

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Contract JW OPS 022/23

Avalon 900mm HDPE Repair

Scope of Works

Johannesburg Water SOC Ltd



VOLUME 2

CONTRACT

PART 3: SCOPE OF WORK

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Contract JW OPS 022/23

Avalon 900mm HDPE Repair

Scope of Works

PREAMBLE TO SCOPE OF WORK

General

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

The Standardized Specifications applicable to this Contract are listed in the Project Specification.

These Specifications are not issued with this volume but are available at the Contractor's expense from: SA Bureau of Standards, Private Bag X191, Pretoria, 0001.

Scope

This Project Specification is set out in two portions:

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

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

Status

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

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



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Scope of Works

C3.1 DESCRIPTION OF THE WORKS

C3.1.1 JW OBJECTIVES

The Employer's objective is to ensure that all reinstatements of existing civil services are restored to their original conditions within the City of Johannesburg on an as and when required basis. This will be achieved by engaging established contractor(s) with a CIBD grading of 2 CE or higher.

C3.1.2 OVERVIEW OF THE WORKS

The work to be carried out under this contract includes the supply of equipment, material and labour for the successful completion of the project within the constraints of time, cost and quality. The scope of work for this contract covers the reinstatement of existing civil services that have been damaged during repairs of existing water mains or by others.

The primary activities of the project entail the following:

- Cut the 900mm HDPE pipe
- Supply and install the pipe and coupling
- Test and commission

The Contractor's obligations shall also include strict compliance with any Environmental requirements and/or reports deemed to form part of this Contract as well as any Occupational Health and Safety requirements.

This description of the works is not necessarily complete and shall not limit the work to be carried out by the Contractor under the Contract. No Quantities have been given due to the nature of this contract. The Contractor shall be bound to supply whatever quantities JW actually requires during the period of the contract.

C3.1.3 LOCATION OF THE WORKS

The location of the works will be towards the north of Protea Glen Ext 11.
The map is attached

C3.1.4 TEMPORARY WORKS

The Contractors facilities and the barricading of the works shall be located in an approved position and subject to the approval of all local authorities. Safety and Security of the Contractors temporary works shall be at his own discretion.

The Contractor shall, as relevant, provide temporary drainage works, temporary pumps and other equipment as might be necessary for the protection, draining and dewatering of the works. The tendered rates shall include full compensation for all temporary works.

C3.1.5 CHAMBERS/ VALVE BOXES

The brickwork will be measured per m² and the concrete work will be measured per m³ (precast or cast in-situ). The actual quantity of brickwork and concrete work will be measured and the contractor will be paid in line with these measured quantities. The rates shall be comprehensive as stipulated on the BoQ.

These chambers and valve boxes shall be done in line with the JW standards and specifications.

C3.1.6 ROAD LAYER WORKS, KERBS, WALKWAYS AND OTHER ROAD RELATED STRUCTURES

The road layer works, kerbs, kerb inlets, walkways, and other road related structures, shall be done in line with the JRA standards and specifications.

C3.2 ENGINEERING

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



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Scope of Works

C3.2.1 DESIGN

Due to the nature of the project no design should be required. However the contractor shall comply with all relevant specifications and drawings as mentioned and revised by the JW Representative.

C3.2.2 DRAWINGS

All drawings associated with the works are bound at the back of this volume. The Employer reserves the right to issue amended and/or additional drawings during the Contract.

C3.2.3 DESIGN PROCEDURES

All design and modifications thereto shall be communicated in writing and the contractor and engineer shall maintain lists to record and track all transactions.

C3.3 PROCUREMENT

C3.3.1 PREFERENTIAL PROCUREMENT

C3.3.1.1 Requirements

The Contractor shall comply with the requirements as specified in the documentation.

C3.3.2 SUBCONTRACTING

C3.3.2.1 Scope of mandatory subcontract works

The Contractor is:

- a) Not obliged to utilise any sub-contractors specifically nominated by the Employer. However, where in the opinion of the Engineer the Contractor cannot provide a sub-contractor that is deemed sufficiently experienced to perform the specific works or at a reasonable market related price, the Contractor shall use such sub-contractor as nominated by the Employer.
- b) Required to utilise local sub-contractors for the completion of unskilled labour-based sections of the works, where practical.
- c) Responsible for all work executed on his behalf or under his supervision and/or management by all sub-contractors, including nominated sub-contractors.

NOTA BENE: The Employer shall not negotiate directly with sub-contractors and all problems relating to payments, programming, workmanship, etc., are matters between the Contractor and his sub-contractors.

C3.4 CONSTRUCTION

C3.4.1 WORKS SPECIFICATIONS

C3.4.1.1 Applicable SABS 1200 Standardized Specifications

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

For "Workmen's Compensation Act" read "Compensation for Occupational Injuries and Diseases Act, 1993 (Act No.130 of 1993)" wherever it appears. For "Machinery and Occupational Safety Act" and "Mines and Works Act" read "Occupational Health and Safety Act, 1993 (Act 85 of 1993)" wherever they appear. For "maintenance period" read "Defects Liability Period" in terms of Clause 5.16.3 of the General Conditions of Contract for Construction Works 2010, wherever it appears.

The Construction Sections of the Works shall be executed in accordance with the Specifications listed below and other such pertinent Specifications and / or instructions as may be issued from time to time.

The following SABS 1200 Standardized Specifications for civil engineering construction are applicable:

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Part	T1	T2	C1	C2	C3	C4



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Avalon 900mm HDPE Repair

Scope of Works

SABS 1200 A : Preliminary and General
SABS 1200 D : Earthworks
SABS 1200 L : Medium-pressure pipelines

C3.4.1.2 Particular Specifications

C3.4.1.3.1 Minimum health and safety requirements

This section of the specifications is to be read in conjunction with the Contract Health and Safety specifications, included as Volume 2. The following requirements shall be deemed a Minimum compliance requirements to ensure the health and safety to the public and workers during the execution of the Contract.

C3.4.1.3.2 Road safety equipment

Work units or teams shall be provided with:

An amber-flashing beacon, which shall comply with and be operated in accordance with any governing road vehicle lighting regulations or similar.

Appropriate sized and quantity of road signs, including delineators and cones which shall be displayed at the works area in accordance with South African Road Traffic Signs Manual, Chapter 13.

Bright coloured overalls, fluorescent over-jackets and belts for each team member for the use at all working times during the day or night.

C3.4.1.3.3 Work Site Safety

The works are to be executed in areas with high volume pedestrian and vehicular traffic. The Contractor shall ensure that:

- i) The workspace required to successfully complete installations shall be kept at a minimum. Thus, plant and equipment not used is to be removed from the work site to minimize disruption to the customer, other traffic and the general public.
- ii) The working area shall be free of debris when the Contractor leaves the site at the end of the day or each shift.
- iii) Open chambers, machinery and standing equipment are to be protected to ensure the safety and convenience of traffic, the general public or other at all times.

C3.4.1.3.4 Traffic Control

Traffic (human and vehicular) control and signage shall be in accordance to the South African Road Traffic Signs Manual, Chapter 13. And at a minimum include:

A traffic control plan with detailed diagrams showing the location of all traffic control devices and the length of time for all lane closures, as well as any location for flaggers, as necessary.

One lane of traffic in each direction must be maintained at all times and local streets may only be closed with prior approval of the JW Representative.

Provision and maintenance of the lights, guards, fencing and watching when and where necessary or required for the protection of the Works and the materials and equipment utilized therefore or for the safety and convenience of the public or others.

The name and number of the Contractor representatives responsible for traffic control shall be made available to solve traffic problems at each works site location.

C3.4.1.3.5 Encountering of water during operations

The contractor is to provide and maintain a water removal system that has sufficient capacity to remove all encountered water, during Works operations. Such system(s) shall ensure that top soil particle removal is kept at a minimum.

C3.4.1.3.6 Site Restoration

The Contractor, following all Works completion, shall disassemble all equipment and restore the site to original condition. Any noticeable surface defects, due to executed Works, shall be repaired by the contractor.

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Part	T1	T2	C1	C2	C3	C4



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Avalon 900mm HDPE Repair

Scope of Works

C3.4.1.3.7 No disturbance

The Contractor shall be required to perform Works at all surface boxes and chambers with limited approved disturbance to existing service provision.

C3.4.1.3.8 Metric Measurement

All survey recorded dimensions of infrastructure shall be in metric units, including for conduits and chambers

C3.4.1.3.9 Site Preparation

Prior to any Works commencement the Contractor shall photograph or video tape entire work area. One copy of which shall be given to the JW Representative and one copy shall remain with the contractor for a period of 52 weeks following the issue of Completion of the contract. This record shall be used to establish accountability for damages during execution of the Contract.

C3.4.1.3.10 Chamber Appurtenances

C3.4.1.3.10.1 Frames and Covers

Chamber frames and covers shall conform to the applicable standard SANS 558 requirements, however such covers and frames shall:

- a) be blue polymer reinforced concrete castings for water;
- b) be for the appropriate duty (for the installation location; i.e. light, medium and heavy) watertight type and bolt-hinged lid as noted on the standard detailed drawings;
- c) have a cover and seat and shall have machined bearing surfaces to prevent rocking and rattling;
- d) have employer's brand (logo only) cast on;
- e) be solid;
- f) have a concealed pick hole for water chambers.

C3.4.1.3.10.2 Chamber Step Irons

Chamber step iron steps shall conform to the applicable standard SANS requirements, but shall be: spaced at 300mm centres;

- a) distance not exceed 600 mm between the top of casting and the first step;
- b) Plastic or similar approved.

C3.4.1.3.10.3 Chamber Bedding

(a) Precast chamber forms

Precast chamber form bases shall be bedded

C3.4.1.3.10.4 Chamber frame and cover replacement

The Contractor shall replace an existing chamber frame and cover with a new frame and cover, including: removing the existing frame and cover, cleaning of frame and cover, check integrity of existing brickwork, removing loose brickwork, preparing area to patch brickwork or concrete, and placing and levelling the new frame and cover in mortar per the standard detail drawings.

C3.4.1.3.10.5 Spoil of Material

No indiscriminate spoiling of material by the Contractor shall be allowed. All surplus or unsuitable material shall be spoiled at a site located by the Contractor, deemed by the JW Representative as compliant with legislative requirements.

C3.4.1.3.10.6 Excavation

All excavations shall be made with accordance to SANS 1200DB but performed by hand, unless the contractor can demonstrate to the satisfaction of the JW Representative that hand excavation is impossible and/or impractical.

C3.4.1.3 Variations and Additions to the SABS 1200 Standardized Specifications

Variations and additions to the following SABS 1200 Standardized Specifications were made.

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Scope of Works

SABS 1200 A : General
SABS 1200 D : Earthworks
SABS 1200 L : Medium Pressure

The following variations and additions to the SABS 1200 Standardized Specifications referred to above apply to this Contract.

C3.4.2 CONSTRUCTION PROGRAMMING

C3.4.2.1 The contractor shall not be required to provide a contract programme as work shall be issued on an “as and when” basis.

C3.4.3 SITE ESTABLISHMENT

C3.4.3.1 Water and Power supply and other services

The Contractor is not obliged by Johannesburg Water to establish a site camp in the vicinity of the Works. The Contractor shall make his own arrangements to operate from his own premises as the contract is on an “as and when” basis.

Johannesburg Water will not provide any facilities to the Contractor.

The Contractor shall make his own arrangements and pay all installation and consumption charges for the supply of water, electrical power and other services should they be required.

C3.4.3.2 Camps and Depots

No housing is available and the Contractor shall make his own arrangements to house his employees and transport them to and from the Site. All arrangements for housing workmen shall be made in accordance with and subject to applicable regulations and requirements.

C3.4.3.3 Disposal Sites

The Contractor shall locate suitable disposal sites, off site, for the disposal of cleared vegetation, rubble, unsuitable material or surplus material. The Contractor shall inform the JW Representative of any site he proposes to use.

C3.4.3.4 Site Usage

The Tenderer shall visit the Site of the Works and shall satisfy himself as to the means of access and all matters affecting the Works, including the extent to which mechanical plant can be used for executing the Works.

C3.4.3.5 Permits and Wayleaves

The Contractor will be required to obtain permits and wayleaves from all the applicable service providers within the jurisdiction of the CoJ, thus including the following services: roads and stormwater (JRA), bulk water supply (Rand Water), electricity (Eskom and City Power), gas (Egoli Gas), telecommunications (Telkom), and the like.

The Employer will assist the Contractor to obtain clearance from the various departments with services that are likely to be affected by the Contract. It is, however, the Contractor's responsibility to obtain final permit and wayleave approval according to applicable procedures and specifications. In the case of JRA, this will be as per the CoJ COP. Further, a processing fee per wayleave will be payable to cover the cost of processing and approval of the JRA wayleave applications.

C3.4.3.6 Alteration, additions, extensions and modification to existing works

The Contractor shall, within 14 working days after taking possession of the site, satisfy himself that the position and setting out of existing structures or components thereof are compatible with the proposed works, and notify the JW Representative of any dissatisfaction. The Contractor shall, on becoming aware of a defect in existing works which will have an impact on the current works, notify the JW Representative of such a defect without delay.

C3.4.3.7 Inspection of adjoining properties

The Contractor shall, before commencing with works which have the potential to damage surrounding structures, services, buildings or property, arrange an inspection with the owners of such structures, services, buildings or property and

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



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Avalon 900mm HDPE Repair

Scope of Works

representatives of local or controlling authorities, as appropriate, to determine the condition of buildings, structures, services, paved surfaces, roads, kerbs, channels and the like, that the works could affect, and document their current condition in sufficient detail to enable disturbances or damage (or both) which might be caused by the works to be evaluated. The Contractor shall furnish the JW Representative with copies of all such documentation and shall be held responsible for any disturbance and damage to such structures, services, buildings and property arising from the performance of the contract.

C3.4.3.8 Access to properties

The Contractor shall organise the work to cause the least possible inconvenience to the public and to the property owners adjacent to or affected by the work, and except as hereunder provided, shall at all times provide and allow pedestrian and vehicular access to properties within or adjoining or affected by the area in which he is working.

C3.4.3.9 Neatness of the site

The general neatness and tidiness of the residential areas are of particular concern and the contractor should ensure the areas are kept neat and tidy at all times.

C3.4.3.10 Temporary fences

The Contractor shall erect temporary fences where required for the execution of the Works, where shown on the drawings and in place of existing fences which have to be temporarily relocated. All fences shall be maintained during construction.

The cost of the erection, maintenance and removal of temporary fencing will be deemed to be covered by the rates for the establishment of facilities for the Contractor.

C3.4.3.11 Extension of time due to abnormal rainfall

If during the time for completion of the Works, or any extension thereof, should abnormal rainfall or wet conditions occur, then an extension of time in accordance with Clause 5.12.1 to 5.12.3 of the General Conditions of Contract shall be granted by the Employer, calculated on the critical path method. It shall be applied as follows:

A delay caused by inclement weather conditions will be regarded as a delay if, in the opinion of the Employer, all progress on an item or items of work on the critical part of the working programme of the Contractor has been brought to halt. Delays on working days only (based on a five day working week) will be taken into account for the extension of time, but the Contractor shall make provision in his programme of work for an expected delay of **10 (ten)** working days caused by normal rainy weather, for which he will not receive any extension of time.

Daily records of rainfall and activities within the critical parts affected shall be kept by the Contractor and signed by the Employer's representative on the site. For this, accurate rain gauging shall be taken at a suitable point on the site, and the Contractor shall, at his own expense, take all necessary precautions to ensure that unauthorised persons do not interfere with the rain gauges. Failure to produce signed copies of the above records on a daily basis to the Employer's representative on the site after the event having occurred will be deemed to be in breach of this Clause and will not be admissible for purposes of seeking an extension of time.

The Contractor shall be permitted to take his own rainfall measurements on site subject to the Employer's approval, but access to the measuring gauge(s) shall be under the Employer's control.

The Contractor is to provide and install all the necessary equipment for accurately measuring the rainfall as well as to provide, erect and maintain a security fence plus gate, padlock and keys at each measuring station, all at his own cost.

The values of N_n , R_n , x and y for use in Clause 5.12.2.2 of the Special Conditions of Contract shall be as advised before commencement for the specific site.

C3.4.3 PLANT AND MATERIALS

C3.4.3.1 Plant and materials supplied by the employer

The Employer shall not supply any plant or materials.

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4

**Scope of Works****C3.4.4 CONSTRUCTION EQUIPMENT****C3.4.4.1 Requirements for equipment**

The Contractor's equipment shall be adequate to construct the works.

C3.4.4.2 Equipment provided by the employer

The Employer will not provide any equipment.

C3.4.5 EXISTING SERVICES**C3.4.5.1 Known services**

The Contractor:

- a) must make provision for the possible existence of numerous services (e.g.: Stormwater, Water, Eskom, City Power, Egoli Gas, Rand Water, Telkom, and the like) within and in close proximity to the work areas.
- b) is to obtain wayleaves indicating the location of existing services from all affected service providers prior to the commencement of construction. The Contractor is to comply with the conditions of the wayleaves received from the various service providers.
- c) is to ensure the protection and integrity of all existing services exposed and encountered through the course of construction activities. Adequacy in terms of protection of existing services shall be at the discretion of the JW Representative. The Contractor is to make good the protection of and any breakages to existing services. The Contractor is to record on as built drawings the location of existing services or services which have been relocated during Contract Period.
- d) must inform the relevant service provider immediately (within 2 hours of incident) such that procedures for the reinstatement of the service can be effected, should he damage or break an existing service (whether known or unknown).
- e) is responsible to provide his own equipment in order to determine the location of existing services.

NOTA BENE: Drawings indicating other existing services in the vicinity of the Works are not guaranteed as being accurate, as all other services may not have been recorded or properly recorded. It shall remain the responsibility of the Contractor to perform preoperational work, to locate existing services in advance of the commencement of the Works. All cables and pipes shall be considered "live" unless confirmed otherwise by the relevant service authority.

C3.4.5.2 Treatment of existing services

The Contractor shall ascertain and observe all conditions laid down by the relevant authorities for the execution of the work in the vicinity of their services.

C3.4.5.3 Damage to services

If any services are damaged during excavations, the relevant service provider and the Engineer shall be notified immediately. The Contractor shall be responsible for all costs to repair damaged services.

C3.4.5.4 Reinstatement of services and structures damaged during construction

When the service provider does the permanent reinstatement, the cost involved shall be payable by the Contractor. When the contractor does the permanent reinstatement, the method of reinstatement shall be approved by the services provider.

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Part	T1	T2	C1	C2	C3	C4



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Avalon 900mm HDPE Repair

Scope of Works

PSA GENERAL

PSA 1 SCOPE

This specification covers requirements, principles and responsibilities of a general nature which are generally applicable to civil engineering construction and building works contracts, as well as the requirements for the Contractor's establishment on the Site."

PSA 2 INTERPRETATIONS

PSA 2.3 DEFINITIONS

(a) General

"General Conditions' and 'Conditions of Contract': The General Conditions of Contract specified for use with this Contract, together with the Contract Data.

'Specified': As specified in the Standardized Specifications, the Drawings or the Project Specifications. 'Specifications' shall have the corresponding meaning."

(b) Measurement and payment

"Fixed charge': A charge that is not subject to adjustment on account of variations in the value of the Contract Price or the time allowed in the Contract for the completion of the work.

'Time-related charge': A charge, the amount of which varies in accordance with the Time for Completion of the Works, adjusted in accordance with the provisions of the Contract.

'Value-related charge': A charge, the amount of which varies pro rata with 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

"CKS: SABS Co-ordinating Specification."

PSA 3 MATERIALS

PSA 3.1 QUALITY

"All manufactured materials supplied shall be new materials unless the contrary is specified. All materials specified to be in accordance with SANS Specifications shall bear the accredited SANAS mark, where such a mark is available for the type of product."

Whether or not the material bears the mark or is tested, any material found not to be in accordance with the specification would be rejected and replaced by the Contractor at his own cost.

Tenderers may be required, at their own expense to submit samples of the material offered to the JW Representative for his approval and the material supplied under this contract shall be of a standard equal to that of the samples so submitted and approved. Samples will remain the property of the Tenderers, who shall remove them when called upon to do so by the JW Representative

PSA3.2 ORDERING OF MATERIAL

The quantities set out in the schedule of quantities have been based on single unit entities i.e. construction of a complete valve chambers or per square meter rate for the reinstatement of walkways and driveways. This is due to the fact that the exact number of effected civil services requiring reinstatement is unknown. It is therefore the Contractor's responsibility to inspect the effected services before ordering any materials of any kind.

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Part	T1	T2	C1	C2	C3	C4



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Scope of Works

No liability or responsibility whatsoever shall be attached to the Employer for material ordered by the Contractor except when ordered in accordance with the written confirmation issued by the JW Representative.

PSA 4 PLANT

PSA 4.1 SILENCING OF PLANT

"The Contractor's attention is drawn to the applicable regulations pertaining to noise and hearing conservation, framed under the Occupational Health and Safety Act, 1993 (Act No 85 of 1993) as amended.

The Contractor shall at all times and at his own cost, be responsible for implementing all necessary steps to ensure full compliance with such regulations, including but not restricted to the provision and use of suitable and effective silencing devices for pneumatic tools and other plant which would otherwise cause a noise level in excess of that specified in the said regulations.

Where appropriate, the Contractor shall further, by means of temporary barriers, effectively isolate the source of such noise in order to comply with the said regulations."

PSA 4.2 CONTRACTOR'S OFFICES, STORES AND SERVICES

"The Contractor shall provide on the Site and in close proximity to the actual locations where the work is being executed, one toilet per 10 workers, which toilets shall be effectively screened from public view and their use enforced. Such toilets shall be relocated from time to time as the location of the work being executed changes, so as to ensure that easy access to the toilets is maintained.

PSA 5 CONSTRUCTION

PSA 5.1 SURVEY

PSA 5.1.1 Setting out of the Works.

Before commencing any construction, the Contractor shall check the relative positions and levels of works and inform the JW Representative of any discrepancy.

The Contractor shall advise the JW Representative of any conflict between the position of any part of the Works and an existing feature.

PSA 5.2 SAFEGUARDING AND ACCOMMODATION OF TRAFFIC

The Contractor shall out and maintain such temporary works and provide all temporary road signs, temporary bridging, pipes, deviations and the like, as is necessary to maintain and safeguard the normal flow of public and private, vehicular and pedestrian traffic.

Unless the closing of streets, accesses and thoroughfares has been properly arranged, the Contractor shall accommodate and provide for through traffic, traffic at crossings and vehicular access to houses and buildings at all times. If necessary, safe ramps to mount road kerbs shall be provided where traffic is to be diverted.

PSA 5.3 PROTECTION OF EXISTING STRUCTURES

Occupational Health and Safety (Act No.27 OF 1956)

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

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Part	T1	T2	C1	C2	C3	C4



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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 subclauses 4.4 and 5.1.2.2 of SABS 1200 D 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 cognizance 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 therefrom 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 subclause 5.9 of SABS 1200 DB should be observed. In other areas compaction is to be to 93% modified AASHTO density.

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.

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



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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.

PSA 5.5

DEALING WITH WATER ON WORKS

The contractor shall in particular keep free from water the entire working area. The temporary works should divert the bulk of the water. The contractor shall supply, operate and maintain such pumping plant as may be necessary to remove, control and dispose any water, including seepage that may enter the Works. The Engineer may take or order the Contractor to take additional precautions where he is not satisfied with the Contractor's arrangements. The contractor shall not be relieved of his responsibility by reason of the Engineer taking or ordering additional precautions, or by reason of the engineer failing to do so. All expenditure incurred by JRA in taking any additional precautions or otherwise in remedying the default of the Contractor and making good of the Works shall be recovered from the moneys due to the Contractor. The Contractor shall be responsible to effect all dewatering to enable the Contractor to access and execute the Works.

The Contractor shall be responsible for the full adequate protection of the works against damage due to storms, rain, floods, stormwater, subsoil water and seepage from whatever source. The Contractor shall take over the site where the works has to be executed at the beginning of the Contract Period and the full risk and cost of dealing with all water shall be borne by the Contractor. The Contractor shall also provide all necessary pipe work, pumps and other appliances necessary for adequate dewatering of all excavations and shall maintain these in good condition and provide adequate standby equipment to ensure that no disruption of work will ensue as a result of possible breakdown of equipment.

PSA 5.7

SAFETY

"Pursuant to the provisions of the Conditions of Contract, and without in any way limiting the Contractor's obligations thereunder, 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 43.1 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 Clause 55.1.5 of the Conditions of Contract and for the Employer to cancel the Contract in accordance with the further provisions of the said Clause 55.

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4

**PSA 5.7 CONCRETE, FORMWORK AND REINFORCEMENT**

NOTA BENE: All in situ concrete work (mass and reinforced) shall comply with SANS 1200G ("8.Measurement and Payment" is not applicable) supplemented by the clauses in this section. Where: SANS 1200G and the clauses in this section are in conflict, the clauses in this section shall take precedence. The term "plain concrete" appears in SANS 1200G it shall be read as "mass concrete".)

PSA 5.7.1 Cement

Cement shall be Portland cement (or equivalent) complying with the requirements of SANS 50197-1/EN 197-1 or SANS 5831.

Samples of cement from any one, or from every consignment, may be required by the JW Representative for test purposes. Cement in any consignment from which a sample may have been taken for testing shall not be used until it has been approved. Allowance shall be made for possible delay in that tests may take 10 days to carry out.

Bags of cement shall be stacked in a waterproof, solidly constructed shed with a central door and a floor rendered damp-proof with a tarpaulin. The bags of cement shall be closely stacked (but not against walls) in order to reduce air circulation in such a manner that the cement is used in the order in which it was received, i.e. first in first out.

Unless otherwise specified in the these documents the use of ordinary Portland cement blended with ground granulated blast furnace slag complying with SANS 1491, or ordinary Portland Cement blended with Pulverized Fly Ash complying with SANS 50197-1/EN 197-1 shall be allowed in certain instances as an alternative, after acceptance of tender offer, but only with the approval of and at the sole discretion of JW Representative. If not so specified in the documents the Contractor must demonstrate a saving in favour of the Employer together with this alternative.

PSA 5.7.2 Sand (Fine aggregate)

The fine aggregate shall comply with the requirements of SANS 1083. Other aggregates may be approved if they have a satisfactory history and/or test results.

No aggregate may be used until it has been approved. Samples having a mass of 25kg (16,5l) of the aggregate proposed to be used may be required by the JW Representative for test purposes. Samples having a mass of 25kg shall be forwarded every 3 months during concreting work and also if the source of supply is changed. Allowance must be made for possible delay in that the tests may take 14 days to carry out.

PSA 5.7.3 Stone (Coarse aggregate)

The coarse aggregate shall comply with the requirements of SANS 1083. No aggregate may be used until it has been approved. Samples having a mass of 25kg (16,5l) of the aggregate it is proposed to use may be required by the JW Representative for test purposes. Samples shall be forwarded every 3 months during concreting work and also if the source of supply is changed. Allowance must be made for possible delay in that the tests may take 14 days to carry out.

NOTA BENE: Certain fine grained sand and stone originating from the Beaufort Series and Karoo Systems which are known by reputation, local experience or tests, to exhibit excessive shrinkage when used in concrete, may be deemed unacceptable by the JW Representative.

A certificate of proof is required from the Contractor that the aggregates are not alkali-reactive. The cost of testing and certification are to be borne by the Contractor.

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



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PSA 5.7.4 Concrete

Concrete shall be of the classes given in the following table. The proportions of the ingredients and the nominal size of the coarse aggregate for each class shall be as laid down therein:

Class	Cement	Aggregate			Strength (MPa)
	Part	Fine	Coarse	Size	
		Part	Part		
A	1	4	8	50	10
B	1	3	6	38	15
C	1	3	6	19	15
D	1	2	4	38	25
E	1	2	4	19	25
F	1	1 1/2	3	19	30
G	1	1	2	19	40

The strength given in the above table shall be the minimum required at 28 days. Unless otherwise specified Class B concrete shall be used for mass concrete and Class E concrete for reinforced concrete.

Maximum concrete slumps acceptable for different types of construction concrete are as follows:

Vibrated reinforced concrete = 50mm

Un-vibrated reinforced concrete = 75mm

Mass concrete = 75mm

When so required by the JW Representative, and whilst concreting is in progress, the consistency of the mixture shall be ascertained by means of the slump test as later described herein.

PSA 5.7.5 Volume Batching

The coarse and fine aggregate shall be measured by volume and, unless otherwise directed, cement shall be measured by mass: the volume of a 50 kg bag of cement shall be taken as 33l. Suitable measuring boxes for the coarse and fine aggregates shall be provided to the approval of the JW Representative.

The proportions given above are approximate only, and should the JW Representative consider that the voids in the coarse aggregate require more or less matrix than is formed by the proportions specified, he may vary the quantities of coarse and fine aggregates to obtain the required density and workability of the concrete, provided that the proportion of cement to the total volume of the aggregate shall not be less than that specified.

When the sand is not completely dry, allowance must be made for bulking due to the moisture content. The amount of bulking shall be determined by the Contractor in the presence of the JW Representative.

The amount of water shall never exceed 34l to every bag of cement used, including the water contained in the sand.

Effective screens shall be provided to protect the mixing of concrete during windy weather.

PSA 5.7.6 Weigh Batching

The proportioning of the coarse and fine aggregates by mass shall be permitted, provided the method used is approved by the JW Representative.

a) All requests received by the JW Representative to make use of weigh batching shall be submitted to a Structural Engineer for approval.

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



b) If the weigh batching process is preferred to volume batching, the proposed mix proportions are to be equivalent to the relevant volumetric mixes as documented previously herein and be based on minimum cement content.

c) The following procedures must be complied with:

- i) The Contractor must timeously obtain written approval for the use of weigh batching and submit all information as set out below, with his application.
- ii) The mix transformation from volume to weigh batching shall be carried out at an approved laboratory.
- iii) Weigh batching equipment must be calibrated and a certificate of accuracy must be submitted before such equipment may be used. On contracts of long duration and/or requiring large quantities of concrete, new calibration certificates may be required every four months.
- iv) The cement to aggregate ratio by volume for the following mixes shall apply:
 - Class C (15 MPa) - c/a = 1:9
 - Class E (25 MPa) - c/a = 1:6
 - Class F (30 MPa) - c/a = 1:4.5
 - Class G (40 MPa) - c/a = 1:3
- v) The following cement/water ratios by mass must also be complied with:
 - Class C (15 MPa) - c/w = 1.30 to 1.35
 - Class E (25 MPa) - c/w = 1.65 to 1.80
 - Class F (30 MPa) - c/w = 1.90 to 2.05
 - Class G (40 MPa) - c/w = 2.30 to 2.50

PSA 5.7.7 Ready Mixed Concrete

Any application to use ready mixed concrete shall be submitted by the Contractor at an early stage for approval by a Structural Engineer. Only suppliers on the Employer's approved list shall be considered. New applications must be submitted to the Employer, well in advance.

PSA 5.7.8 Strength Concrete

The Contractor shall be responsible for the design of strength concrete and for the measurement of the constituent materials to produce concrete that complies with the specified requirements.

a) Trial mixes

The Contractor shall ensure that samples of the constituent materials of the concrete, together with evidence that they comply with the provisions, are supplied for approval in good time and provide the JW Representative with:

- i) A statement from an approved independent laboratory of the results of tests; or
- ii) An authoritative and acceptable report, or record of the previous use of and experience with, the material concerned.

The cement, types of aggregate and their origins shall not be changed throughout the duration of the Contract without giving prior notification to the JW Representative who shall verify that the above requirements are complied with and that the important qualities of the concrete shall not be impaired.

b) Consistency

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



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Unless otherwise indicated by the general workability of the concrete, method of transportation, conditions of placement or otherwise specified by the JW Representative, the suggested slump values, for different mixes of concrete shall be as specified in this document.

c) Workability

Ensure that the concrete is of such workability that it can be readily compacted into the corners of the formwork and around reinforcement without segregation of the materials and without excessive "bleeding" of free water at the surface.

PSA 5.7.9 Expansion alkali-aggregate reaction

The use of some local aggregates may lead to an expansive alkali-aggregate reaction if the concrete in the structure shall be exposed to continual dampness, or shall be subject to alternate wetting and drying.

Alkali reactive aggregates, i.e. certain granites, quartzites and Malmesbury hornfels (shale), shall not be used in conjunction with high alkali cement for concrete in any part of the works. Where a high alkali cement shall be one in which the equivalent alkali content exceeds 0,60% by mass of the cement.

If the Contractor chooses to use one of the aggregates stated above in lieu of stone as described in this document he shall:

ensure that no high alkali cement is delivered to the site. Any such high alkali cement shall be rejected and the cost of its removal and replacement with cement having an acceptable alkali content shall be borne by him.

provide certificates stating the alkali content of each delivery of cement to the site, based on tests carried out at a laboratory approved by the JW Representative. The cost of testing, including sampling, transporting of samples and issuing of certificates, shall be borne by him.

be entitled to use an approved brand of cement as a means of ensuring that the permissible alkali content is not exceeded. Where he shall make allowance for the higher price of such approved brand, if he chooses to use this method.

PSA 5.7.10 Pumping of Concrete

The placing of concrete by pumping in any section of the works shall be subject to the written approval of the JW Representative. The Contractor shall furnish full details regarding the mix proportions of the concrete that he intends to place by pumping.

PSA 5.7.11 Admixtures to Concrete

The use of admixtures in concrete shall only be considered should special circumstances warrant this and only with the prior written approval of the JW Representative. The Contractor shall provide the following information:

- a) the trade name of the mixture, its source and the manufacturer's recommended method of use;
- b) typical dosage rates and possible detrimental effects of both under and over dosage; and
- c) the expected average air content of freshly mixed concrete containing an admixture which causes air to be entrained when used at the manufacturer's recommended rate of dosage.

PSA 5.7.12 Slump Test

The apparatus and the method of determination of the slump of freshly mixed concrete shall comply with SANS 5862-1.

a) Apparatus

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4

**Scope of Works**

i) A mould in the form of a frustum of a cone and having the following nominal internal dimensions:

Bottom diameter: 200mm

Top diameter: 100mm

Height: 300mm

The mould shall:

- Be of a metal (other than brass or aluminium) of side thickness at least 1.6 mm and shall have a smooth internal surface.
- Have suitable base plate and handles to facilitate lifting it from the test specimen in a vertical direction.
- The tamping bar shall have a nominal diameter of 16mm, a length of 600mm and with sharp corner rounded off at one end.

b) Procedure:

The test shall be carried out in an area that is free from vibration and shocks. Ensure that the internal surfaces of the mould are free from set concrete and are clean and dry. Place the mould with the bottom on a smooth, horizontal, rigid, non-absorbent surface and hold the mould firmly in place while it is being filled as follows:

- In four layers, each thickness approximately one-quarter of the height of the mould. Tamp each layer with 25 strokes uniformly spaced over the cross-section of the mould. Tamp the bottom layer throughout its depth and ensure that when tamping the second and subsequent layers the strokes penetrate into the underlying layer.
- After the top layer has been tamped, strike off the concrete level so that the mould is exactly filled. Clean off any concrete that may have leaked out between the mould and the supporting base-plate surface. Remove the mould from the concrete immediately by slowly and carefully raising it in a vertical direction. This shall allow the concrete to subside. Immediately measure the slump, to the nearest 5mm, by determining the difference between the height of the mould and the height of the specimen.

Regard the test as invalid, if a slump specimen collapses or shears off laterally, discard the result and repeat the test.

PSA 5.7.13 Concrete Cubes

The apparatus for making and testing of concrete cubes shall comply with SANS 5863.

a) Apparatus

Cubic metal moulds shall:

- be steel;
- be machined and adequately strengthened to resist distortion;
- have an internal distance between faces of 150mm;
- be constructed so as to facilitate the easy removal without damage of the moulded specimen; and
- have a metal base plate which shall be attached to the mould by springs or screws.

When assembling the mould for use, the joints between the sections of the mould, the contact surfaces between the bottom of the mould and the base plate, and the internal faces of the assembled mould shall be thinly coated with a grease or oil that shall prevent leakage of water through the joints and adhesion of the concrete to the mould.

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Works

The tamper must be a steel bar of length 400mm and mass 1.8kg, and having a 25mm square ramming face.

b) Sampling and making cubes

Sampling shall comply with SANS 5861-2.

One set of 3 cubes shall be required for every 40m³, or part thereof, of concrete cast. The sample taken from a batch of concrete and sufficient to make 3 cubes shall be placed in a tray or on a platform and mixed thoroughly.

The moulds shall each be filled in 3 layers of approximately 50mm thick concrete. Each layer shall be compacted with the tamping rod, with at least 35 blows to give full compaction of the concrete.

After the top layer has been compacted, strike off the surface of the concrete with a trowel, level with the top of the mould.

Any small hollows shall be filled in with additional concrete. Cement/sand slurry shall not be worked into the surface.

At this stage, the identity of each sample shall be placed on the moulded cube, by means of a label of absorbent material and not by scouring of the surface of the concrete.

c) Curing cubes on site

Cover the test cubes in their moulds with an impervious sheet or wet sacking and store indoors in a place that is free from vibration, excessive draughts, cold and direct sunlight.

After 24 hours the cubes shall be de-moulded, remarked with a waterproof crayon or marker and placed in a curing tank for 7 days before being transported to the laboratory.

The Contractor shall supply the curing tank which shall incorporate a thermostat to control the water temperature at 22 to 25°C and shall be kept within a building.

d) Testing of cubes

The testing of all concrete cubes shall be done in accordance with SANS 5863 by a laboratory approved by the JW Representative.

A suitable testing machine of sufficient capacity having an accuracy and repeatability that comply with the requirements for Grade A machines of BS 1610 "Method for the load verification of testing machines" shall be used to test the compressive strength of each cube.

The Contractor is responsible for the provision of the cube moulds and for timeous delivery of the cubes to the laboratory.

PSA 5.7.14

Concrete Quality

Should the Contractor dispute any results obtained from concrete test cubes, the concrete represented by the cubes shall be considered acceptable if the Contractor, at his own cost, proves to the satisfaction of the JW Representative that the estimated actual strength of cores taken from the structure (by an approved independent testing laboratory and determined in accordance with SANS 5865 is not less than the specified strength. If the concrete fails to meet the strength criteria stipulated, the JW Representative may at his sole discretion and in addition to the options listed in SANS 1200G:

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4

**Scope of Works**

a) accept the concrete subject to approved remedial measures being undertaken by the Contractor at his own cost; or

b) permit the concrete to remain, subject to reduced payment for lower strength concrete.

PSA 5.7.15 Concreting

It is essential that the Contractor representative who has charge of the construction of all concrete work, whether reinforced or not, shall be skilled in this class of work, and shall personally supervise the whole construction, paying special regard to:

a) the quality, testing and mixing of the materials;

b) the laying of the material in place and the thorough compaction of the concrete to ensure solidity and freedom from voids;

c) the construction and removal of formwork; and

d) the sizes and positions of the reinforcement.

Particular care shall be taken to work concrete against formwork and around reinforcement. Internal vibrators may be used with the approval of the JW Representative but external vibrators which act only on the formwork WILL NOT be permitted.

Concrete to be reinforced shall be deposited in such quantities as shall permit of it being properly compacted around the reinforcement.

The placing of concrete shall be completed within ½ hour after mixing or within ½ hour after agitating and within 2,5 hours after mixing in the case of ready mixed concrete. Under no circumstances shall concrete be incorporated into the work after it has attained its initial set.

Care shall be taken to prevent, as far as possible, the formation of laitance or scum. Laitance is to be understood to mean the scum of strength-less and inert material which forms on the surface of concrete.

Concrete shall not be dropped into position from a height greater than 2.5m unless prior approval is obtained from the JW Representative.

If an inclined chute is used for transporting concrete, it shall be of such slope as shall ensure a continuous flow of concrete without the use of an excessive quantity of water and without segregation of the aggregates. The chute must be flushed out and properly cleaned before and after each working period. All waste from flushing shall be discharged outside the formwork.

In beams, each portion of a successive layer shall be placed as soon as the concrete below has been properly worked around reinforcement and against formwork. Concreting shall be carried forward in irregular steps, that is to say, one layer shall not be completed over the whole section before the succeeding layer is commenced. Concreting of slabs and beams shall, as far as possible, be carried forward in one operation. When concreting has to be interrupted the concrete shall be left with a level, rough top surface with ends vertical. The concrete shall not be merely sloped down.

On resuming concreting, the old surface shall be roughened and all laitance thoroughly and carefully removed before any new concrete is deposited. This must be carried out by brushing the surface of the concrete while it is still green. Great care must be taken to avoid any weakness at the junction of old and new concrete and the old surface shall be coated with a thin layer of cement and sand mortar, in the same proportions as that of the adjoining concrete.

While the concrete is setting it shall not be disturbed or shaken by traffic, either on the concrete itself or upon adjoining formwork.

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



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No holes in concrete elements shall be patched or filled in without inspection, instruction and approval of the JW Representative.

No concreting shall be carried out when the air temperature is below 4°C when it is rising and 8°C when it is falling.

Before concreting is commenced the Contractor shall give the JW Representative 24 hours' notice of his intention to do so. On sites further than 200km from the JW Representative, 48 hours' notice must be given.

Concrete surface beds, excluding heavy industrial floors etc. shall be Class C concrete and shall be laid in suitable size panels not exceeding 20m² in area and with the length of any panel not exceeding 4.5m.

Where concrete beams are supported on concrete columns, the columns are to be concreted up to the underside of such concrete beams and then concreted up to the top of the beams, integral with the beams.

NOTA BENE: Any finish applied to the surface of concrete floors, is to be understood as being additional to the thickness of the concrete described or shown on the drawings.

PSA 5.7.16 Curing of Concrete

After the concrete has been placed, all exposed surfaces shall be kept continuously damp for at least 10 days by methods as may be approved by the JW Representative, such as covering with approved building paper, or by means of wet canvas, wet sacks, wet sand, by continuous hosing or ponding with water.

PSA 5.7.17 Concrete lintels (cast in-situ)

Concrete lintels cast in-situ shall be of Class E concrete, reinforced with steel reinforcement as well as of depths specified in the table hereunder. Each lintel shall be the full thickness of walls into which they are cast and 450mm longer than width of openings.

Clear or daylight span	Depth in brick courses	Reinforcement
< 1m	3	Nil
≥ 1m ≤ 1.5m	3	One 12mm diameter mild steel rod, 40mm up from bottom, for each half brick width of soffit.
> 1.5m ≤ 2m	4	One 16mm diameter mild steel rod, 40mm up from bottom, for each half brick width of soffit.
> 2m	To detail	To detail.

PSA 5.7.18 Building on Concrete Footing and Beams

No brickwork, stone walling or other structure shall be built on concrete footings until at least 3 days after placement of the concrete in the case of mass concrete footings and after 7 days in the case of reinforced concrete footings or as may otherwise be directed by the JW Representative.

No brickwork, stone walling or other structure shall be built on reinforced concrete beams or similar members until the formwork and all propping or supports have been removed.

PSA 5.7.19 Slip joints between concrete and brickwork

Slip joints shall be provided between brickwork and concrete slabs and beams by levelling up and trowelling smooth the bearing surfaces of brickwork with 3:1 cement mortar and covering the bearings before the concrete is cast, with two layers of one side smooth tempered hardboard, with the smooth sides in contact.

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4

**Scope of Works**

The ends and sides of beams and edges of concrete slabs shall be separated from the brickwork with 13 mm thick bitumen impregnated soft board or expanded polyethylene strips placed vertically against the brickwork before the concrete is cast.

Similar slip joints shall be provided between brickwork and concrete lintels cast in situ, but without soft board or expanded polyethylene strips at ends.

PSA 5.7.20 Movement Joints

All movement joints are to be filled in with approved bitumen impregnated soft board or expanded polyethylene strip unless otherwise specified or detailed on drawings. Form similar movement joints where pathways adjoin structures externally.

PSA 5.7.21 Cutting, punching or hacking concrete

No reinforced concrete shall be cut or hacked without the approval of the JW Representative.

PSA5.7.22 Forming key to concrete for plaster and other finishes

Where rough formwork has been used, surfaces of concrete to receive plaster and other finishes, shall, immediately after the formwork has been removed, be well wetted and wire brushed whilst the concrete is still green and then slushed over with 2:1 cement grout to form a key for the finish, all to the approval of the JW Representative. The slushing is to be allowed to set hard before the finish is applied.

Where smooth formwork is used, surfaces of the concrete to receive plaster and other finishes shall be hacked, on the distinct understanding that hacking of concrete shall be at no extra cost.

Surfaces of concrete receiving plaster or other finishes shall not be plastered or finished until the JW Representative has signified his opinion that the surfaces are suitable to receive plaster or other finishes.

PSA 5.7.23 Sleeves Pieces

Where it is necessary to leave plugs or holes in beams, slabs or any other reinforced concrete, all such plugs or holes must be situated in positions approved by the JW Representative before concreting. Where it is necessary to carry pipes, bolts, wires or any other fittings through reinforced concrete members, approved pipe sleeves must be provided and placed in position before concreting.

Where waste, ventilation, water, heating or other pipes less than 100mm diameter pass through concrete slabs and beams, uPVC (class 16) sleeve pieces of diameters shown or required shall be cast into such concrete slabs and beams.

Chases shall be formed in edges of slabs or slots shall be formed in the slabs, of sizes required, where two or more pipes pass through together.

All necessary bolts, plugs, brackets, cramps, etc. shall be cast into the concrete as the work proceeds.

PSA 5.7.24 Ties

Where brickwork abuts against concrete, the brickwork is to be tied to the concrete with galvanized hoop-iron ties 1.6mm thick by 3mm wide and approximately 600mm long to every third course of brickwork with one end of each tie cast approximately 150mm deep into the concrete. Where such fixing is impossible, i.e. where steel formwork is used, the ties are to be gun-nailed against concrete with steel nails not less than 38mm long.

PSA 5.7.25 Bagged Finish to Concrete

Concrete surfaces to receive bagged finish shall be prepared by removing sharp projections and making good defects with 3:1 cement mortar. Finish by rubbing over the whole area with wet rough sacking and cement grout to obtain an even surface.

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



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PSA 5.7.26 Power Float Finish

Power floated finish to floors or slabs means that surfaces shall be floated mechanically to a smooth and even finish before the concrete has set. Small areas inaccessible to the machine are to be floated by hand. Under no circumstances is cement mortar to be added while floating the concrete.

PSA 5.7.27 "No-Fines" Concrete

"No-fines" concrete, for grading flat concrete roofs and the like to falls, shall be in the proportion of 12 parts 19 iron cubical stone to 1 part cement mixed with 20l water per bag of cement and be laid to falls of not less than 15mm per linear metre for mastic asphalt and not less than 20mm per linear metre for sheet roof covering. For heavy load applications special mix designs may be required.

a) Fillets against up stands

Form triangular fillets, size 75 x 75mm, in corners with walls, kerbs, etc. neatly mitred at angles, stopped where necessary and finished smooth ready to receive waterproofing.

b) To raised floors, bases and other

"No-fines" concrete for raised floors, bases, etc. shall be in the proportions specified. Finish smooth with 3:1 sand/cement screed to receive waterproofing.

PSA 5.7.28 Cellular Concrete

Cellular concrete, for grading flat concrete roofs and the like to falls, shall be laid in situ in required layers; the bottom layer having a density of 400kg/m³, dressed to falls by varying the thickness, and a 20mm thick top layer having a density of 960kg/m³.

PSA 5.7.29 Formwork

Formwork shall include all shuttering, casing and centring of material required for the laying and forming of concrete floors, slabs, beams, lintels, walls, steps, columns, piers, pilasters and any other concrete work requiring moulds or forms and shall embrace all cleats, battens, fillets, wedges, struts, trestles, braces, props, shores and other requirements of material for keeping all in correct position. All materials used for formwork must be suitable and substantial and all joints must be tight enough to prevent leakage of liquid matrix.

All formwork must be designed by the Contractor and if requested to do so, he must submit fully detailed and dimensioned working drawings to the JW Representative for checking purposes. Acceptance of the proposals shall not relieve the Contractor of his responsibility for the safety and stability thereof nor for any loss or damage arising out of defective design, materials and/or workmanship.

The formwork must be so constructed that its partial removal can be carried out to the satisfaction of the JW Representative and in such stages as are required by the working conditions. As far as possible, wedges and clamps must be used in preference to nails. All formwork in its various sections for floors, beams, etc. must be so arranged that the whole may be raised or lowered either independently or together with other sections by means of wedges or other approved methods.

Immediately before concreting is begun, the formwork in contact with the concrete must be thoroughly cleaned, wetted and kept damp whilst the concrete is being placed.

Great care must be taken to keep the formwork wedged up to its correct height and this must be checked by taking levels immediately before concreting is commenced and immediately after it has been completed.

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



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All beams shall have a camber of 6mm to every 3m of length.

The minimum periods that the formwork to the various parts of the structure is to remain in position after concreting shall be as stated in the following table:

Description	Normal cement		Rapid hardening cement	
	Weather		Weather	
	Normal	Cold	Normal	Cold
Beam sides, walls, unloaded columns	2 days	4 days	1 days	2 days
Slabs with props left under	4 days	7 days	2 days	4 days
Beam soffits with props left under including ribbed Slabs	7 days	12 days	3 days	5 days
Removal of slab props	10 days	17 days	5 days	9 days
Removal of beam props	14 days	28 days	7 days	12 days

When determining the stripping time for formwork the weather shall be considered to be "normal" when the temperature is above 18°C and "cold" when the temperature is between 5°C and 10 °C, these being the average daily temperatures of the atmosphere adjacent to the concrete. When the average daily temperature lies between the above values for "normal" and "cold" weather the minimum period for stripping of formwork shall be determined by the JW Representative.

Notwithstanding the above minimum periods, formwork may be struck immediately, once the concrete in the various parts of the concrete work has attained the crushing strengths required by the JW Representative. The crushing strengths must be determined by proper tests, which shall be carried out by the Contractor.

No formwork of any nature shall be struck, either after the elapse of the minimum periods stated in the above table or on the attainment of the required crushing strengths of the concrete, without the prior consent of the JW Representative. Such consent shall not absolve the Contractor of his responsibility for the safety of the works.

In structures having either in whole or in part, two or more reinforced concrete floors, props shall be provided under the soffits of any beam or slab of any floor which is being used to support the formwork and wet concrete of the floor above, all to the approval of the JW Representative. The props shall not be removed until the formwork supporting the concrete of the floor above has been struck.

Under no circumstances shall steel formwork be oiled where concrete is to receive plaster.

PSA 5.7.30 Smooth Formwork

Smooth formwork shall be any material approved by the JW Representative which is to be used to leave concrete surfaces smooth when removed and where no other finish is to be applied.

PSA 5.7.31 Reinforcement rods

a)Mild steel

Mild steel shall comply with the requirements of SANS 920, Type A or B.

b)High tensile steel

High tensile steel shall comply with the requirements of SANS 920, Type C or D.

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4

**PSA 5.7.32 Concrete Reinforcement****a) Rod reinforcement**

Bending and hooking of rods shall be done in accordance with SANS 282. Rods shall be bent cold in an effective bending machine, or properly designed rod-bender using a steady pressure and not by hammering.

Diameters, lengths and positions of rods as shown on the drawings must be strictly adhered to. Joints in rods in beams, stairs, etc. shall be permitted only where shown on drawings.

Before being placed in position, the rods shall be thoroughly cleaned of all grease, dirt, bituminous material, scale and loose rust.

All distribution rods shall be straight and shall extend at least 150mm into beams or other support. Unless otherwise shown on the drawings, all joints in reinforcing rods shall be lapped 40 times the diameter of the rod. The laps shall be securely tied with 1.25mm diameter annealed mild steel binding wire.

Reinforcement for piles, column footings, columns and walls shall be tied at every intersection, or as directed or shown on drawings, with similar binding wire. Reinforcement in beams shall be tied at alternate intersections in a diamond pattern, unless circumstances demand every intersection.

Great care must be taken to retain the reinforcement in its correct position during the entire period of concreting. Blocks of fine concrete, size approximately 40 x 40mm, or plastic spacers, shall be provided on the formwork to soffits of beams to ensure that the rods are retained in position and that the correct concrete covering to the main reinforcing rods is provided. The blocks shall be of thickness required and shall be placed under the main reinforcing rods at approximately 600mm centres. Reinforcement in the top of slabs and the like shall be retained in position by means of cradles (stools), formed of steel reinforcing rod as follows:

- R10 for height range 100-300mm and maximum width of 300mm.
- R12 for height range 310-500mm and maximum width of 45 mm.

Recommended spacing of supports for horizontal bars in slabs:

- not further than 600mm apart (cradles ± 1000 mm c/c in both directions) for bar diameters up to 12mm.
- not further than 1,000mm apart (cradles ± 1500 mm c/c in both directions) for bar diameters of 16mm and over.

Stools are to be placed on the bottom layer of reinforcement, securely retained in position and with correct concrete cover as specified. Cradles are to be securely wired to the slab reinforcement with binding wire. Beam rods in different layers shall be separated by means of steel spacer bars of suitable diameters and lengths.

Double mats in concrete walls shall be kept in their respective positions by means of suitable steel clips.

Recommended spacing of supports for vertical bars in walls:

- 1,000mm centres in both directions for bars up to 12mm diameter; and
- 1,500mm centres in both directions for bars of 16mm diameter and over.

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



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Supports can be spaced more closely by a design Engineer, depending upon the circumstances. All stirrups shall be properly fastened to the rods so as to retain their relative positions during the entire period of concreting.

Welding of main rods shall not be permitted unless approval has been given by the JW Representative. Spot welding in lieu of wiring may be used to secure rods and stirrups in position.

The concrete covering the main reinforcement, unless otherwise specified, shall not be less than that stated in the following table:

Position	Amount of cover
Soffit of slabs	The diameter of the main rods, but never less than 15mm (mm)
End of beams	40
Soffits of beams	40
Sides of beams	40
Sides of columns	40
Slab underground	40
Concrete walls	25
Walls exposed to ground	40
Ground beams	40
Foundations	75
Water retaining structures and within 1 km from coast	50

In cases not included in the above table the cover shall be not less than 25mm. Depending on the condition of exposure and fire resistance requirements, concrete cover can be varied by the JW Representative but in no case shall the concrete cover be less than the diameter of the rod to be covered.

The cover shall be measured from the face of the concrete to the outside of main reinforcement nearest the face of the concrete, and shall exclude plaster and similar finishing materials.

Three samples of each diameter of reinforcing rods, each approximately 600mm long, must be taken from each consignment of rods of similar diameter, for testing. If any sample is found unsatisfactory, the whole consignment of rods from which the samples were taken shall be rejected.

Top reinforcement in cantilever slabs to be kept in position with a first row of stools or chairs 300mm from the beam or support, and thereafter at a maximum of 40 bar diameters under each bar.

The cover blocks, spacers, bars and stools or chairs are to be placed and/or wired in position by the steel fixer.

Welded steel fabric reinforcement

All welded steel fabric reinforcement shall comply with the requirements of SANS 1024. The preferred dimensions are as follows:

1	2	3	4	5	6
Fabric Reference number	Nominal pitch of wires	Nominal diameter of wires		Nominal mass*	
	Longitudinal (mm)	Cross (mm)	Longitudinal (mm)	Cross (mm)	kg/m2
617	200	200	10.0	10.0	6.17
500	200	200	9.0	9.0	5.00
395	200	200	8.0	8.0	3.95

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



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311	200	200	7.1	7.1	3.11
245	200	200	6.3	6.3	2.45
193	200	200	5.6	5.6	1.93
100	200	200	4.0	4.0	1.00
772	100	200	10.0	7.1	7.72
655	100	200	9.0	7.1	6.55
517	100	200	8.0	6.3	5.17
433	100	200	7.1	6.3	4.33
341	100	200	6.3	5.6	3.41
289	100	200	5.6	5.6	2.89
278	100	300	6.3	4.0	2.78
226	100	300	5.6	4.0	2.26
133	100	300	4.0	4.0	1.33

*These mass values are based on the wires having mass of 0,00785 kg/mm² per metre of length.

The actual mass of the fabric should not differ from the nominal value by more than 6%.

PSA 5.8 Precast Concrete

PSA 5.8.1 Materials

Cement, water, aggregates and reinforcement shall be as described under the concrete section.

PSA 5.8.2 Concrete

Concrete shall be as described under the applicable concrete section(s). Unless otherwise specified a Class E concrete shall be used but with coarse aggregate of an appropriate size.

PSA 5.8.3 Mould Units

The whole of this work is to be carried out by a specialist, who has appropriately skilled workers in this class of work.

All materials and finishes are to be to the approval of the JW Representative.

The moulds are to be properly constructed in the best and most up to date practice, made up in suitable sections with all necessary reinforcement, cramps, bands, bolts, etc. for fastening together and are to be constructed so that castings can be easily removed and the moulds re-used without distorting.

Those sections of the moulds which shall produce the finished faces of the units are to be specially prepared, perfectly smooth, except where the finish is of exposed aggregate, true to shape and coated with a suitable solution which shall prevent units adhering to the moulds, while not in any way discolouring the finished surfaces.

All cast units are to be properly cured and no units are to be fixed or built in until 28 days after casting.

Units are to be properly protected from the elements while curing and are to be kept wet for at least 10 days after casting by frequent spraying with clean water. Form all necessary checkings, mortices, lugs, etc. for cramps and dowels when casting.

PSA 5.8.4 Terrazzo Blocks

Precast terrazzo work shall be generally as prescribed for precast concrete above. The coarse aggregate of the mix of which blocks are to be formed shall be of 10mm stone. The finish to exposed faces shall be 10mm thick.

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4

**Scope of Works****PSA 5.8.5 Smooth Finish**

Where described as "finished smooth from the mould" such surfaces shall have a layer composed of 1 part (volume) cement and 4 parts (volume) clean fine sand, packed against the faces of the mould before placing the concrete backing. The concrete backing shall be deposited into the moulds in a wet state (not dry pressed) whilst the facing is still wet.

Projections shall be rubbed off and faces shall be of even colour and free from blemishes, cracks and other imperfections. Salient angles shall be arris rounded.

PSA 5.8.6 Sizes

Sizes given are approximate; the Contractor shall be responsible for ascertaining the exact sizes based on actual measurements.

PSA 5.8.7 Reinforcement

Unspecified reinforcement required for manufacturing, handling and erection purposes and for reinforcing projecting and other unwieldy portions of blocks shall be provided by the Contractor at his discretion, but such action shall be highlighted to the JW Representative.

PSA 5.8.8 Bedding, Joint and Pointing

Blocks shall be bedded and jointed solidly in cement mortar composed of 3 parts (volume) of sand and 1 part (volume) of cement and shall be pointed with slightly keyed joints.

PSA 5.9 Masonry (Including Brickwork and Stone Masonry)

NOTA BENE: Where sizes in descriptions are given in brick units, "one brick" shall represent the length and "half brick" the width of a brick.

PSA 5.9.1 Lime

Lime shall be hydrated bedding mortar lime in accordance with the requirements of SANS 523.

PSA 5.9.2 Cement

Cement shall be as specified in the concrete section.

PSA 5.9.3 Sand

Sand shall comply with the requirements of SANS 1090, unless specialist advice is obtained. A sample of 25kg must be delivered to an approved laboratory for testing purposes.

PSA 5.9.4 Burnt Clay Bricks

Burnt clay bricks shall comply with the requirements of SANS 227, and shall be equal in all respects to the selected samples. Clay bricks for foundations shall be as described in (a) above, but extra hard burnt. Where bricks with holes are used, the holes in such bricks must only be filled in solid with mortar where specifically specified. All bricks that do not carry the SABS Mark, must be tested by an approved laboratory.

PSA 5.9.5 Firebricks

Firebricks shall be of well burnt refractory fireclay, resistant to spalling and cracking and of same size as ordinary bricks.

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4

**Scope of Works****PSA 5.9.6 Local Stone**

Local stone shall be from an approved quarry, free from defects and to the satisfaction of the JW Representative.

PSA 5.9.7 Freestone

All freestone shall be the best and most durable of its kind, free from vents, loose beds, oxide veins and other imperfections to the satisfaction of the JW Representative and shall be set on its natural quarry bed.

PSA 5.9.8 Motor Tests**a) Sampling**

The frequency of sampling shall be decided by the JW Representative. Sufficient mortar shall be taken from each of the points of laying to prepare a composite sample to make a set of three mortar cubes.

b) Moulding

Cube moulds with a nominal size of 100mm, that comply with SANS 5863 must be used.

Fill each mould with mortar in three equal layers and compact each layer by means of a tamper. The tamper must be made of hard wood with a flat tamping surface with nominal dimensions of 50 x 25mm and shaped to provide a round stem of approximately 25mm diameter and long enough to afford sufficient hand grip. Immerse the tamper in water for 15 minutes before use.

Each layer of mortar must be compacted by means of 8 evenly spaced pressing strokes of the tamper. After the final layer has been tamped, the excess mortar must be struck off level with the top edges of the moulds.

c) Curing

Cover the test cubes (in their moulds) with an impervious sheet followed by wet matting, sacks or similar material, and store them in a place free from vibration, excessive draughts and direct sunlight. After 24 hours mark each cube so that it can be identified. After 48 hours the cubes shall be removed from their moulds and placed into water in a curing tank at 22 to 25°C for a minimum period of 7 days before they are transferred to the approved testing laboratory. Ensure that loss of moisture is prevented during transportation and that they are well protected against damage.

d) Testing of cubes

The testing of all mortar cubes shall be done by a laboratory approved by the JW Representative and in accordance with SANS 5863.

PSA 5.9.9 Cement Mortar

Cement mortar shall be composed of 6 parts (by volume) of sand and 1 part (by volume) of cement. The material shall be mixed dry until of uniform colour and then water added and the mixture turned over until the ingredients are thoroughly incorporated. Cement mortar shall be produced in such quantities as can be used before commencing to set as no cement mortar that has once commenced to set shall be used in any way.

Care shall be taken in mixing cement mortar to remove from the mixing machine or platform any old mortar that has already set as such mortar may not be incorporated into any new batch.

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4

**Scope of Works**

Mortar should achieve the minimum required strength (in MPa) for the classes of mortar as set out in the National Building Regulations.

PSA 5.9.10 Compo Mortar

Compo mortar shall be composed of 6 parts (by volume) of sand — depending on the quality of the sand available, 1 part of lime and 1 part of cement (by volume). The lime and sand shall be mixed dry, then mixed wet, before the cement is added, approximately ½ hour before using and the adding of the necessary additional water as required.

Compo mortar shall be produced in such quantities as can be used before commencing to set, as no compo mortar that has once commenced to set shall be used in any way.

Mortar should achieve the minimum required strength (in MPa) for the classes of mortar as set out in the National Building Regulations.

PSA 5.9.11 Brickwork

Brickwork shall be:

- a) wherever practicable, built in English bond. No false headers shall be used and none but whole bricks employed, except where legitimately required to form bond.
- b) built level and plumb with mortar as specified.
- c) laid on a solid bed of mortar and all joints thoroughly grouted up solid throughout the whole width of each course.
- d) carried up in a uniform manner, no one portion being raised more than 1.2m above another at any one time.

Clay bricks shall be well saturated with water, in the stack or dump, approximately 2 hours before being used. The tops of walls left unfinished shall be well wetted before work recommences.

NOTA BENE: *Cement or concrete bricks shall not be wetted.*

All rough and fair cutting, cutting of splays, skewbacks, chamfers, etc. shall be properly performed. Form or leave all necessary openings for pipes etc. and make good after pipes etc. are fixed in position.

PSA 5.9.12 Brickwork in cement mortar

All brickwork below damp course level, all isolated piers three bricks wide and under, half brick thick walls and chimney stacks above ceiling level, shall be built in cement mortar as specified.

Brick arches and brick lintels shall be built in cement mortar as specified, but in the proportion of 3:1.

NOTA BENE: This clause is essential where compo mortar has been specified.

PSA 5.9.13 Mortar Joints

Mortar joints to brickwork generally shall be 10mm in thickness with level bedding joints.

The joints in brickwork:

- a) receiving plaster, tiling or similar finishes shall be raked out whilst the mortar is soft to form key for the plaster or mortar backing. The depth of the raking out shall depend on the condition of the bricks; i.e. the rougher the bricks on face the shallower the raking out and the smoother the bricks the deeper the raking out.

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



b) shall be flushed off where walls are to be bagged, in readiness for the bagging.

PSA 5.9.14 Grout in joints in brick foundation walls

All joints in brick foundation walls shall be grouted in solid with 3:1 liquid cement mortar to obviate any crevices for ant (termite) tracks.

PSA 5.9.15 Brickwork Thicknesses

Walls built in two or three half brick thicknesses shall only be built where bonded brickwork (as specified) proves impractical or where required due to the prescribed bond of faced brickwork, all tied together with metal ties in accordance with SANS 28, of the Butterfly Types only, of sufficient length to allow not less than 75mm of each end to be built into brickwork. Ties shall be evenly spaced at not more than 1m apart to every third course and staggered.

PSA 5.9.16 Brickwork in lining

Brick linings to concrete shall be tied thereto with 4mm diameter galvanized crimped wire ties bent at ends and of necessary length to allow 75mm to be cast into concrete and 75mm of the other end to be built into brickwork and evenly spaced at not more than 1m apart to every third course and staggered.

PSA 5.9.17 Half brick thick walls

Brick linings to concrete shall be tied thereto with 4mm diameter galvanized crimped wire ties bent at ends and of necessary length to allow 75mm to be cast into concrete and 75mm of the other end to be built into brickwork and evenly spaced at not more than 1m apart to every third course and staggered.

Brickwork shall be built level and plumb.

PSA 5.9.18 Beam Filling

Beam filling shall be half brick thick, built up in mortar as used in the walls below, cut in between roof timbers and carried hard up to underside of roof covering and flushed up with mortar.

PSA 5.9.19 Reinforced Brick Lintels

Reinforced brick lintels shall be built with sound machine made bricks in 3:1 cement mortar with all vertical and horizontal joints filled solid with mortar throughout the required number of courses and to a distance of at least 330mm on either side of the clear opening.

The number of courses in lintels over the various size openings shall be as specified in the table hereunder and reinforcing steel wires or rods shall be built into the first horizontal joint over the bottom course to the number specified in the following table:

Clear or daylight span	Number of courses	Reinforcement
< 1m	4	One row 75mm wide brick reinforcement as described below, for each brick width of soffit.
≥ 1m ≥ 1.5m	6	Ditto
> 1.5m ≤ 2m	7	Three 6.3mm diameter mild steel rods for each half brick width of soffit.
> 2m ≤ 3m	8	Ditto

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



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Brick reinforcement shall be of hard drawn mild steel comprising two 2.8mm diameter main wires spaced 75mm apart and 2.5mm diameter cross wires spaced at not exceeding 300mm apart, welded to main wires.

The reinforcing wires and rods shall be of length at least equal to the width of the clear opening plus 330mm at each end. The reinforcement shall be evenly spaced in the brick joints with the outer wires or rods having at least 20mm cover from face of brickwork.

Brick lintels in 270mm thick cavity walls shall be built with inner face of outer thickness, for a depth of three courses above soffit, covered with sheeting as for damp course, the full length of lintels, and space between the two thicknesses for the depth of the sheeting filled in solid with Class E concrete. Where cavities continue above lintels, the sheeting shall be taken up and turned on to top of first course of brickwork to inner thickness of wall above the concrete filling in lintels. The sheeting is not required in lintels protected from the weather.

The lintels, except where built over pressed steel door frames and the like, shall be supported on temporary turning pieces of suitable and substantial construction left in position for at least 14 days for long spans (1 to 3m).

PSA 5.9.20 Hollow tile lintels

Hollow tile lintels shall be formed with approved 300 x 220 x 110mm burnt clay hollow tiles each having not more than 3 cavities. The tiles shall be set end to end and the cavities filled up solid with Class E concrete.

Lintels shall have bearings of not less than 220mm on walls at ends.

The lintels over the various size openings shall be reinforced as specified in the following table:

Clear or daylight span	Reinforcement
≤ 1m	One 12mm diameter mild steel rod in upper and lower cavities
> 1m ≥ 1.5m	One 16mm diameter mild steel rod in upper and lower cavities

The reinforcing rods shall be placed 12mm from top and bottom edges of concrete filling to upper and lower cavities respectively.

Lintels over openings not exceeding 1m wide in 1 brick thick walls shall be on flat and in all other cases shall be on edge using 2 or more lintels in walls 1 brick thick and over, built side by side, to make up the thickness of walls.

Lintels in 270mm thick cavity walls shall be in two 110mm thicknesses with inner face of outer thickness covered with sheeting as for damp-course, the full length and depth of lintel, and the space between the two thicknesses filled in solid with Class E concrete. Where cavities continue above lintels the sheeting in lintels shall be taken up and turned on to top of first course of brickwork to inner thickness of wall.

Lintels shall be made not less than 21 days before building in and shall be cured for at least 14 days by being kept damp in a shaded position.

The lintels shall be hoisted into position and bedded and grouted in solid in cement mortar.

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4

**Scope of Works****PSA 5.9.21 Pre-stressed Lintels**

Pre-stressed lintels shall be vibrated concrete reinforced with stressed high tensile steel wires or of burnt clay blocks with similar reinforcing wires embedded in grooves in the blocks in 1:3, cement: sand mortar, or of other approved form of construction.

Concrete in lintels shall attain a crushing strength of at least 34MPa at 28 days for ordinary and at 7 days for rapid hardening cement.

The reinforcing wires shall be of ductile high tensile steel wire not less than 4mm diameter and of tensile strength of at least 1,350MPa and shall be stressed to not less than 850MPa.

The lintels may be in a single width to the thickness of wall or may be in two widths, placed side by side, and shall have a depth of not less than 60mm. Top surface of lintels shall be suitably roughened, indented or shaped to give a good bond between the lintels and the mortar for the first course of brickwork above,

Lintels shall have bearings of not less than 225mm on walls at each end.

The number of reinforcing wires in lintels for the various wall thicknesses and spans shall be not less than specified in the table hereunder, and brick courses over lintels of the number indicated in the table and for the full length of lintels shall be built in 3:1 cement mortar with all joints filled solid with mortar:

Nominal wall thickness (mm)	Clear or daylight span	Number of wires (in total number of lintels used)	Number of brick courses over lintel
90 – 110	≤ 1.8m	2	3
90 – 110	> 1.8m ≤ 3m	3	4
180 – 230	≤ 1.8m	6	4
180 – 230	> 1.8m ≤ 3m	6	5
270	≤ 1.8m	7	4
270	> 1.8m ≤ 3m	7	5
340	As described for 1 of 230mm plus 1 of 110 mm, or 3 of 110 mm		

Lintels in 270mm thick cavity walls shall be in 2 widths with joint between the two arranged directly over the window or frame below, and the brickwork above shall be built in 2 x ½ brick thickness with inner face of the outer thickness covered with sheeting as for damp-course, the full length and depth of lintels, and taken down between the 2 widths of pre-stressed lintels. The cavity to height of lintel courses shall be filled with Class E concrete, and where cavities continue above the lintel courses the sheeting shall be taken up and turned on to top of first course of brickwork to inner thickness of wall above the lintel course. The sheeting is not required in lintels protected from the weather.

PSA 5.9.22 Bagged Finished Brickwork

Bagging to walls is to be carried out after the mortar in joints has set. The wall surfaces shall be rubbed over with wet rough sacking until all joints and crevices are filled up and an even surface is obtained. Cement grout shall be added if necessary to fill up the joints and crevices.

PSA 5.9.23 Raked out for and pointing flashing

Brick joints shall be raked out where required for fixing cover flashings and flashings, which shall be pointed in 3:1 cement mortar.

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4

**Scope of Works****PSA 5.9.24 Mastic Pointing**

Where steel door and window frames are specified to be pointed with mastic compound they shall be pointed all round externally with an approved waterproofing compound of such composition that it shall not stain surrounding surfaces and that it shall adhere steadfastly, remain plastic without sagging or running, be capable of accommodating any normal movement of the joint sealed, and shall receive paint without "bleeding". The pointing material shall be forced into the joints, which shall have been previously prepared to receive same, by means of a pressure gun or by other suitable method, all in accordance with the manufacturer's instructions.

PSA 5.9.25 Building-in

Ends of timbers, holdfasts, cramps, gratings, air bricks, dowels, etc. shall be built-in in cement mortar. Door and window frames, lift door frames and the like shall be set up in position for building in and securely strutted to prevent distortion whilst the brickwork, lintels, etc. are being built.

Pressed steel door frames and lift door frames shall be grouted in solid at back with cement mortar as the work proceeds.

Wood slips, fixing bricks, hoop iron roof ties, etc. shall be built in as the work proceeds.

PSA 5.9.26 Securing of Roofs

Roof trusses shall be fixed at each support to walls with ties of 1.6mm thick galvanised hoop iron, 32mm wide, built 750mm deep into brickwork or embedded 300mm deep into concrete or wrapped around bottom layer of reinforcing in a reinforced concrete beam and wrapped over truss and fixed with four galvanised nails, 40mm long

PSA 5.9.27 Bedding

All door, window and similar frames shall be bedded and pointed in 1:3 (cement: sand) cement mortar. All wall and floor plates shall be set true and level and bedded in 1:6 (cement: sand) cement mortar.

PSA 5.9.28 Pointing of Brickwork

Clean and point at the end of each working day all exposed masonry work including nail holes, existing brickwork shall be pointed, thus Pointing, repairing eroded and cracked mortar joints, shall be executed on existing and new brick where and when shown by the JW Representative. All disintegrated joints (erosions and/or cracks) shall be cleaned of all existing mortar for the full depth of the deterioration but not less than to a depth of 25mm. All joints shall be:

- a) brushed and washed (under pressure) clean prior pointing;
- b) kept wet during pointing; and
- c) pointed to the full depth of the cut, tooled to match existing.

Steel door and window frames shall be carefully pointed all round and made perfectly watertight.

Joints greater than 25mm shall be stage-pointed.

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4

**PSA 5.9.29 Faced Brickwork**

Faced brickwork shall be built fair and pointed with a keyed or recessed joint as specified. Keyed joint shall mean that the joints are to be pointed with a round jointing tool, well pressed into the joints as the work proceeds.

“Recessed joint” shall mean that the joints are to be square recessed to a depth of approximately 6mm formed with a rectangular jointing tool well pressed into the joints as the work proceeds.

Facing bricks shall be sorted by the brick manufacturer at his yard or by the Contractor on the site to ensure that proper mixing of the bricks within the colour range of each type of facing brick being used is obtained. Sudden changes in the general colour of face work in any 1 type of facing brick shall not be acceptable.

PSA 5.9.30 Fibre cement sills

Sills shall where in any way possible be in single lengths, cut between reveals, fitted with fixing lugs and solidly bedded in 1:3 (cement:sand) cement mortar with a slight projection beyond the finished wall face below.

Internal sills shall be level. External sills shall be set sloping on cut brickwork.

PSA 5.9.31 Installation of electrical service

The installation of electrical services, where such service is being provided, the Contractor shall embed in the concrete, as the work proceeds, all conduits, boxes, etc., which shall be fixed in position by the electricians, and must reduce all required chases and holes in walls for conduits and form recesses in walls for distribution boards, all in the positions directed. Alternatively, distribution boards may be built into walls as the work proceeds, providing prior approval is obtained from the JW Representative.

The Contractor shall afford every facility and shall render reasonable assistance to the electricians in carrying out their work and shall make good where necessary, in all trades, after installation has been completed.

•Chases, holes and recesses required in walls shall be cut and formed as follows:

•vertical chase for single conduit.

•vertical chase for two conduits.

•vertical chase 150mm wide and 110mm deep for conduits.

•vertical chase 250mm wide and 110mm deep for conduits.

•vertical chase 380mm wide and 110mm deep for conduits.

•vertical chase 560mm wide and 110mm deep for conduits.

•horizontal chase for single conduit.

•Holes 25mm diameter, or knocking out bricks and filling space and making good after a pipe has been fixed through a wall.

Recesses for distribution boards shall be:

Width (mm)	Height (mm)	Depth (mm)
330	330	110
455	330	110
635	330	110
610	660	110
610	910	110

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



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PSA 5.9.32 Cable Sleeves

Provide under buildings where required 100mm diameter vitrified clay, pitch fibre or plastic pipes as sleeves for electric cable taken up to floor level in cable duct or switch cupboard with easy bends. The pipes shall be as specified for drainage including laying and jointing.

PSA 5.9.33 Patching Brickwork

Patching of existing walls and closing of openings shall be as shown. All brick shall be keyed to the existing or stepped every course with all surfaces flush with the existing surface and all joints kept on line.

PSA 5.9.34 Protect face brickwork

All face brickwork, stonework, tiling, etc. liable to damage shall be covered up and protected during the progress of the remaining work and any damage done shall be made good to the satisfaction of the JW Representative.

All face brickwork, stonework, tiling, etc. shall be cleaned down as the work proceeds and shall be covered up with paper, pasted on, or by other approved means where necessary to prevent soiling of the surfaces during the progress of the remaining work. At completion of the works the coverings shall be removed and the surfaces again cleaned down to the satisfaction of the JW Representative.

PSA 5.9.35 Cleaning

On completion of the work all masonry must be carefully cleaned down, removing all large particles of mortar with a putty knife or chisel. If acid is required for the removal of mortar stains (see note below), it shall be hydrochloric (muriatic) and not stronger than one volume of the commercial acid to nine volumes of water. Before the acid solution is applied, the surface should be thoroughly soaked with clear water, otherwise the mortar stain may be drawn into the pores causing a permanent dulling of the rich natural masonry colors. The acid solution should be applied with a long-handled stiff fiber brush, with proper precautions as to covering of clothing, hands and arms to prevent burns. It should not be placed over an area greater than 1.5 to 2.0m² before the wall is again thoroughly washed down, or preferably hosed, with clear water immediately after cleaning. It is important to remove all trace of the acid before it attacks the mortar joint. All frames, trim, sills, or other installations adjacent to the masonry must be carefully protected against contact with the acid solution.

All paving shall be thoroughly cleaned off after laying to remove all traces of mortar and other substances, covered up and protected from damage during the progress of the works and again cleaned off at completion.

Any detergent or other materials used in the cleaning down of face brickwork etc. shall be of such nature that it shall not harm adjoining paint and other finishing(s) in any way.

NOTA BENE: Whenever possible, smooth, light coloured units should be scrubbed with warm water and soap powder in lieu of acid cleaning.

PSA 5.10 Plastering

PSA 5.10.1 Lime

Lime shall be hydrated plaster lime complying with the requirements of SANS 523.

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4

**Scope of Works****PSA 5.10.2 Cement**

Cement shall be as specified.

PSA 5.10.3 Sand

Sand for plaster shall be as specified.

PSA 5.10.4 Form key to concrete for plaster finish

All surfaces of concrete receiving plaster or similar finishes shall be well wetted and wire brushed immediately after the formwork has been removed and slushed over with 2:1 cement grout to form key for the finish, all to the approval of the JW Representative. The slushing shall be allowed to set hard before any finish is applied

Where smooth formwork has been used, particular care shall be taken in forming the key for plaster as described in applicable concrete specifications.

PSA 5.10.5 Lime Plaster

One coat work on walls

Lime plaster for 1 coat work on walls shall be composed of 4 parts (volume) of sand and 1 part (volume) of lime. The material shall be mixed dry until of uniform colour, water shall then be added and the mixture turned over until the ingredients are thoroughly mixed.

Lime plaster not used on the day it is mixed, shall be kept moist until required for use by covering with wet sacks or by other approved means.

Two coat work on walls

The rendering coat shall be of compo plaster well scratched over to form key for the setting coat. The setting coat shall be composed of 1 part hydrated putty plaster lime, complying with the requirements of SANS 523 and 1 part fine washed sand, to which retarded hemi-hydrate hardwall finishing gypsum plaster shall be added in the proportion of 1 part of gypsum plaster to 4 parts of sand, all proportioned by volume.

The gypsum plaster shall not be added to the mixture until the setting coat is to be applied and shall then be thoroughly incorporated into the mixture and used immediately.

Two coat work on metal lathing

The rendering coat shall be of compo plaster to which sisal shall be added in the proportion of 4kg of sisal to 1m³ of plaster. The rendering coat shall be well scratched over to form a key for the setting coat.

PSA 5.10.6 Compo Plaster

Compo plaster shall be composed of 10 parts (volume) of sand, depending on the quality of the sand available, 1 part (volume) lime and 1 part (volume) cement.

The lime and sand shall be mixed dry until of uniform colour and then mixed wet. Approximately ½ hour before use, add the cement and any additional water as may be required and remix until thoroughly mixed.

Compo plaster shall be produced in such quantities as can be used whilst remaining workable as no compo plaster that has become unworkable shall be used in any way.

PSA 5.10.7 Cement Plaster, one coat work on brickwork

Cement plaster for 1 coat work on brickwork shall be composed of 4 parts of sand to 1 part of cement for internal work and 5 parts of sand to 1 part of cement for external work, all measured by volume, and

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4

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mixed as described for cement mortar in sub-clause 4.2.19.9 (Cement mortar).

PSA 5.10.8 Thickness on plaster

Plaster on walls shall be not less than 12mm or more than 20mm in thickness and plaster on concrete ceilings and beams shall not be less than 9mm or more than 16mm in thickness.

PSA 5.10.9 Application of plaster

Walls shall be well wetted before plastering is commenced. The surfaces of plastered walls internally shall be steel trowelled to a smooth, even and true finish, unless otherwise specified. All external plaster shall be finished to a true and even surface with a wood float, unless otherwise specified. All plaster surfaces shall be free from blemish. Plaster shall be returned into reveals and soffits of openings and all angles shall be true and straight with salient angles slightly rounded.

The rendering coat of plaster in two coat work shall be approved by the Engineer or his duly authorized representative before the setting coat is applied and notice shall be given to him when the plaster is ready for inspection.

All cracks, blisters and other defects shall be cut out, made good and the whole left perfect at completion.

PSA 5.10.10 Granolithic Finish

Granolithic finish to floors, treads of steps, thresholds and similar horizontal surfaces shall be not less than 25mm thick, composed of 2 parts (volume) granite, or other approved hard stone chippings, or approved hard coarse sharp washed granitic or quartzitic river sand, graded up to a maximum size of 5mm, 1/6 part clean pit sand screened through a 2.4mm mesh sieve and 1 part (volume) of cement, and hand or mechanically steel trowelled to a true and smooth surface.

The material must test between 30 and 35MPa. No dry cement powder or grout shall be applied to the surface.

The granolithic shall be laid before the concrete subfloor has matured otherwise the exposed surface of the concrete shall be thoroughly cleaned with a wire brush and a coat of neat cement grout applied immediately before the granolithic is laid.

The granolithic shall be laid in panels not exceeding 20m² in area and joined to lines of panels with V-joints as directed. The length of any panel shall not exceed 4.5m and wherever possible the joints between the panels shall coincide with any joints in the concrete sub-floor.

Where granolithic is to be tinted, it shall be laid in two thicknesses in one operation, the lower thickness being brought up to within 6mm of the finished level and the upper thickness, into which the requisite quantity of approved colouring material has been mixed, shall be laid. NO DUSTING OF COLOURING MATERIAL SHALL BE ALLOWED.

Granolithic finish to stair risers, sides of kerbs and other vertical surfaces shall be not less than 12mm thick.

Exposed salient angles of granolithic shall be neatly rounded to approximately 20mm radius.

All granolithic work shall be carried out by experienced workmen and shall be protected from injury caused by rain or other extremes of weather for 12 hours after being laid, and against drying out too rapidly whilst hardening by covering with wet sacks or other suitable material and shall be protected from other injury and discoloration during the progress of the remaining work.

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4

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Edges of granolithic floors adjoining other floor finishes, edges of margins, etc. shall be true and sharp, all protected by fixing temporary wood strips which shall remain in position until laying of the adjoining flooring material is commenced.

PSA 5.10.11 Readings to step and upper surfaces

The treads of steps and upper surfaces of external thresholds finished with granolithic or sand-cement finish shall be rendered non-slip by reeding same near front edge for a width of 100mm and stopped 100mm from ends.

PSA 5.10.12 Polishing of Granolithic

All tinted granolithic finishes to floors, steps, thresholds, skirting, etc. shall at completion of all other work be twice polished with wax floor polish of an approved type.

PSA 5.10.13 Screeding to floors

Concrete sub-floors finished with wood mosaic, semi-flexible tiles and fully flexible vinyl sheeting and tiles and similar finishes shall be screeded with 1:3 (cement: sand) cement plaster of thickness required, but in no case less than 12mm, all steel trowelled to true and smooth surfaces. The sand used in the plaster shall be of such fineness as shall allow for the screed being trowelled to a surface suitable to receive the finishes.

The screeding shall be laid before the concrete sub-floors have matured, otherwise the exposed surfaces of the concrete shall be thoroughly cleaned with a wire brush and a coat of neat cement grout applied immediately before the screeding is laid.

The screeding shall be laid in good time, but no finishes are to be laid if the screed exceeds 70% moisture content when measured with a hygrometer.

No traffic shall pass over nor shall any building operations take place on the screeding unless a proper protective covering is first provided.

NOTA BENE: A similar process shall be applicable where chambers are screeded.

PSA 5.10.14 Sand-Cement Finish

Sand-cement finish to treads of steps, thresholds, etc. shall be of 1:2 (cement: sand) cement plaster not less than 20mm thick and steel trowelled to true and smooth surfaces. Finishes to risers of steps, sides of kerbs and other vertical surfaces shall be not less than 12mm thick. Exposed salient angles shall be neatly rounded to approximately 20mm radius.

PSA 5.10.15 Natural aggregate Concrete Floor Hardeners**a) Definition**

All natural aggregate hardeners for concrete floors shall consist of a factory prepared blend of clean, properly graded and oven dried natural aggregate, Portland cement and chemical aids, all suitable for monolithic application to the surface of newly placed concrete. Where required the hardener may contain certain compatible pigments for tinted floors.

b) Quality testing**i) Sampling:**

A minimum of 1% of every 5 tons of production shall be sampled and factory tested for water demand, compressive strength and proportioning.

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



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ii) Compressive strength and water demand

Mix with sufficient water to give a slump of 20 to 25mm in a 35 x 90 x 75mm high slump cone filled in three layers; tamping each layer with 15 strokes of a 16mm diameter rod, shall give the following minimum compressive strengths when tested in a 70mm mortar cube vibrated for 3mm on a vibrating table and stored in a curing room or tank at 22 to 25°C and not less than 90% humidity:

- at 7 days: 50 MPa
- at 28 days: 70 Mpa

iii) Test records:

Each quality test record shall be so referenced that the batch numbers on bags of the product may be traced back to the relevant quality control report. Such reports shall be available for inspection by the JW Representative for up to 1 year after manufacture.

c) Curing

As an integral part of this hardener, a membrane curing compound, which must be both compatible with the floor hardener offered and comply with the ASTM C.309 Type 1 specification for moisture retention, shall be used.

PSA 5.10.16 Ferrous aggregate concrete floor hardener

The ferrous aggregate hardener for concrete floors shall be a factory prepared blend of clean, properly graded ferrous metal aggregate, Portland cement and chemical aids for application and hardening, ready to apply as a dry shake to the surface of newly placed concrete before finishing. The ferrous aggregate shall be guaranteed to be free of matter deleterious to concrete, such as oil and non-ferrous particles and shall be treated for rust inhibition. Where required it may contain compatible pigments for tinted floors.

PSA 5.11 General Product Requirements

PSA 5.11.1 Local Content

Preference shall be given to materials fully manufactured in South Africa with South African raw materials.

PSA 5.11.2 Site Service

The manufacturer shall be expected to supply samples free of any other additional charge, and the services of a qualified technical representative on all of the building sites pertaining to the particular contract in order to train the placing team in the correct application methods of the product during initial placing upon 1 weeks' notice.

Circumstances may necessitate follow-up inspections.

PSA 5.11.3 Shelf Life

The shelf life of the offered product shall be stated and the expiry date displayed on each bag. The Contractor shall ensure that the product supplied shall survive the Contract Period, or replace the product at his cost.

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



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PSA 5.11.4 References

The Contractor shall submit names and locations of projects in South Africa where the offered product has been in successful use for a period of at least 5 years under similar conditions and at similar rates. The Contractor shall:

- a) make arrangements with the project owners for access for such visits, if the JW Representative wish to inspect such reference project sites.
- b) provide an acceptable alternative at the same accepted financial rate of the original proposed product, should the JW Representative find the product unacceptable.

PSA 5.11.5 Approved Products

Only products that have been tested and which have been approved by the SABS shall qualify.

PSA 5.11.6 Application Rates

As specified by the manufacturer.

PSA 5.11.7 Control Testing

The Contractor shall be required to conduct control testing as and when requested by the JW Representative, proving the quality of the product used.

PSA 5.12 Specific Work-Related Instructions

PSA 5.12.1 Damage to persons and property

The Contractor shall (except if and so far as the Contract provides otherwise) indemnify and defend at his own expense the Employer, its officers, agents, employees and servants from and against all suits, claims, demands, proceedings, and liability of any nature or kind, including costs and expenses, for injuries or damages to any person or any property whatsoever which may arise out of or in consequence of acts or omissions of the Contractor or his agents, employees, servants or sub-contractors in the execution of the Contract. The provision of this clause shall extend to suits, claims, demands, proceedings and liability in the nature of workmen's compensation claims and arising out of the use of patented inventions and devices. Provided always that nothing herein contained shall be deemed to render the Contractor liable for or in respect of or with respect to:

- a) The right of the Employer to construct the Works or any part thereof on or through any land.
- b) Interference whether temporary or permanent with any right of water or other easement which is the unavoidable result of the construction of the Works in accordance with the Contract.
- c) Death, injuries or damage to persons or property resulting from any act or neglect of the Employer, his agents, servants or other contractors, done or committed during the validity of the Contract.

PSA 5.12.2 Interference with property access and traffic

All operations necessary for the execution of the Works and for the Construction of any Temporary Works shall, so far as compliance with the requirements of the Contract permits, be carried on so as not to interfere unnecessarily or improperly with the public convenience, or the access to, use and occupation of, public or private roads and footpaths to or of properties whether in the possession of the Employer or of any other person. The Contractor shall hold harmless and indemnify the Employer in respect of all claims, demands, proceedings, damages, costs, charges and expenses whatsoever arising out of or in relation to any such matters in so far as the Contractor is responsible therefore.

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



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PSA 5.12.3 Contractor to keep site clean

During the progress of the Works, the Contractor shall keep the Site reasonably free from all unnecessary obstruction and shall store or dispose of any Constructional Plant and surplus materials and clear away and remove from the Site any rubbish or Temporary Works no longer required.

PSA 5.12.4 Removal of Rubble

Where JW has left rubble on site, the contractor shall remove it and dispose of it at a registered waste disposal site. The contractor will then be required to attach a certificate of disposal when invoicing this item

PSA 5.12.5 Demolishing of Structures

All precautionary and safety measures shall be taken when demolishing structures and prior approval to be granted

PSA 5.12.6 Clearance of site on Practical Completion

On the practical completion of the Works, the Contractor shall clear away and remove from the Site all Constructional Plant surplus materials, rubbish and Temporary Works of every kind and leave the whole of the Site and Works clean and in a workmanlike condition to the satisfaction of the JW Representative.

PSA 5.12.7 Testing

Testing of the various parts of the works shall be in accordance to the relevant standard specifications, or as required by the material manufacturer.

PSA 5.12.8 Contractor's Responsibility

The Contractor shall be held responsible for damage to street or road surfaces, kerbing, storm water drainage channels (gutters), existing utilities, etc. that result from his negligence during the implementation of all works. The Contractor shall repair, at his cost, any damage resulting there from, which shall be subject to approval by the owner of such asset and the JW Representative.

PSA 5.12.9 Plants and Materials

Sand for plaster shall be as specified.

PSA 5.12.10 Sand

The Contractor shall make available on site the following plant and equipment as and when required, together with operating personnel:

- a) road traffic signs, materials for barricading and lighting and all other items necessary for ensuring public safety and convenience. The Contractor shall furnish all labour required for the erection, maintenance and removal of these items and materials;
- b) mechanical and power tools, when ordered to do so by the JW Representative;
- c) hand tools and equipment such as shovels, picks, etc., which may, in the opinion
- d) of the JW Representative, be required for the execution of the works;
- e) forms for the casting of cast-in-situ concrete for floors and slabs. The Contractor shall supply all labour required for the erection, stripping and cleaning of forms; and

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



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f) any other plant and equipment deemed necessary for the execution of the Works

Unless otherwise indicated in the contract documents, the Contractor shall provide all such plant and equipment complete with operating personnel, fuel and power as required.

If the Contractor fails, in the opinion of the JW Representative due to his own negligence, to enable the plant or equipment to be efficiently or fully utilised, the costs of under-utilisation of plant or equipment shall be borne by the Contractor to the extent determined by the JW Representative.

The Contractor is required to prove all plant materials necessary to carry out the work as specified and required. No additional allowances other than those already specified in the Schedule of Rates shall be allowed for with respect to plant and materials.

PSA 5.12.11 Transportation of Labourers

The Contractor will provide all labour on this contract and shall be responsible for the transportation of labourers to and from site.

PSA 5.13 Security

The contractor shall be responsible for the security of his personnel, materials and construction plant on and around the site of the Works and for the security of his camp, and the personnel of the Employer and the JW Representative. The Contractor must take sufficient measures in this regard.

The use of security guards under "normal" conditions, i.e. night watchmen to prevent theft, etc., is recommended. Payment for any such security measures will not be paid separate, but considered to be included in the tendered rates.

PSA 5.14 Operation of valves

It shall be necessary to isolate a portion of the reticulation to execute the Works. The Contractor shall not operate any valves. Requests for isolation of the pipe section shall be made to the Johannesburg Water Regional Depot, at least (7) working days' notice is required.

PSA 5.15 Work outside normal working hours

Normal working hours shall be defined as between 07:00 and 17:30 Mondays to Fridays and also 07:00 to 13:00 on Saturdays.

No work outside normal working hours will be allowed. Should the Contractor wish to work outside normal working hours written permission shall be obtained from the JW Representative and all additional costs arising out of such work shall be entirely to the Contractor's account.

PSA 5.16 Sanitary facilities

The exact location of the toilets shall be as approved by the JW Representative. The Contractor shall provide toilets and shall be responsible for their maintenance and servicing on a daily basis. The contractor shall ensure that no spillage occurs when the toilets are cleaned or emptied. Burial of waste from toilets on site is strictly prohibited. The toilets shall be maintained in a clean state. Performing ablutions anywhere other than in toilets is strictly prohibited. Leaking toilets shall be repaired immediately or removed from site.

PSA 5.16 Community liaison and community relations

In all dealings with the community and workers employed from within the community, the Contractor shall take due cognizance of the character, culture and circumstances of the community involved and shall at all times use his/her best endeavour to avoid the development of disputes and to foster a spirit of co-operation and harmony towards the project.

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



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The Contractor shall at all times, keep the JW Representative fully informed on all matters affecting the community and shall at all times maintain good public relations with Johannesburg Water's customers and the public. The Contractor shall at all times, keep the Regional Manager/JW Representative fully informed of progress and planned interruption on all matters affecting the community.

PSA 5.17

Notices and warning to consumers

The Contractor shall ensure he maintains service (water and/or sanitation) provision at all times whilst executing the works where:

a) The maximum amount of time of no service shall be 8 hours for any property. Any service disruption longer than 8 hours shall be temporary bypassed by methodologies approved by the JW Representative.

b) A Public Notification Program shall be implemented, requiring at minimum that the Contractor shall deliver written notices to each domestic and non-domestic customer affected by the works, 48 hours before commencement of the works, including providing:

i. a summary of work to be completed;

ii. the time and duration of service interruption; and

iii. a local telephone number to contact the Contractor for inquiries or complaints. All complaints received shall be addressed and resolved within the standard Employer response times and a summary of such complaints and associated actions shall be presented to the JW Representative on a monthly basis.

PSA 5.18

Continuity of service supply to customers

The activities of the Contractor shall not unreasonably interfere with the service supply to customer and be executed outside the agreed and notice time frames.

Where the Contractor cannot reasonably re-establish services within times agreed and notice time frames he shall proceed to contact the affected customer and make alternative arrangements that shall be acceptable to the customer and the JW Representative.

The associated costs of any customer claim arising from a lack of service provision due to the Contractor's negligence or his disregard for the Employer's SOP or his disregard for the conditions of this Contract, whilst executing activities as per this Contract, shall be solely for his the account. The Employer shall have the right to make equivalent monetary deductions from monies owed to the Contractor or from his Guarantee under this Contract and any other active contract(s) with the Employer.

PSA 5.19

Conditions and procedures for service agencies

The contractor:

a) must make provision for the possible existence of numerous services (e.g.: Stormwater, Sewer, Eskom, City Power, Egoli Gas, Rand Water, Telkom, and the like) within and in close proximity to the work areas.

b) Is to obtain way leaves indicating the location of existing services from all affected service providers prior to the commencement of construction. The Contractor is to comply with conditions of the way leaves received from the various service providers.

c) Is to ensure the protection and integrity of all existing services exposed and encountered through the course of construction activities. Adequacy in terms of protection of existing services shall be at the discretion of JW Representative. The Contractor is to make good the protection of and any breakages to

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



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existing services. The contractor is to record on as built drawings the location of existing services or services which have been relocated during Contract Period.

d) Must inform the relevant service provider immediately (within 2 hours of incident) such that procedures for the reinstatement of the service can be effected, should the damage or break an existing service (whether known or unknown)

e) Is responsible to provide his own equipment in order to determine the location of existing services.

f) Is responsible for all costs of repairing damaged services

NOTA BENE: Drawings indicating other existing services in the vicinity of the works are not guaranteed as being accurate, as all other services may not have been recorded or properly recorded. It shall remain the responsibility of the Contractor to perform preoperational work, to locate existing services in advance of the commencement of the works

PSA 5.20

Reinstatement of asphalt by Contractor

The contractor will reinstate all asphalt surfaces, upon satisfactory completion and compaction of the proceeding layers. The Contractor must reinstate the excavations to the level of the road to keep good riding conditions and safe traffic.

It should be noted that it is generally very difficult to obtain the same quality structural layers in the confinement of a narrow trench as that of the undisturbed adjacent structural layers when the same materials are re-used.

The following method must therefore be used to ensure adequate shear strengths in trench backfill.
No fines Low strength concrete: Specially designed concrete mix for Trench Backfilling.

All Road Trenches / Openings: Place 300 mm no fines concrete manufactured according to the required specification. The mix is to be placed 50 mm below the level of the surrounding sound surface of the road. The remainder of the trench, above the bedding, shall be backfilled with selected approved material compacted to 90% of MOD AASHTO density.

All Footway Trenches / Openings: Place 150 mm no fines concrete manufactured according to the required specification. The mix is to be placed 30 mm below the level of the surrounding sound asphalt surface. The remainder of the trench, above the bedding, shall be backfilled with selected approved material compacted to 90% of MOD AASHTO density.

The following properties are achieved with no-fines concrete:

- Excellent drainage.
- Non-shrink properties.
- High compressive strength due to point-to-point contact of coarse aggregate.
- Very low tensile strength due to the limited amount of cement, i.e. less than
- 0, 5 MPa.
- Economical and easy to mix and place with wheelbarrows.

It is recommended that the coarse aggregate that is used for no-fines concrete be single-sized. Please find herewith the table of no-fines concrete for areas around Johannesburg.

Proportions by Dry Mass (kg/m³)

Class of Concrete	No-Fines N East	No-Fines N West	No-Fines N North	No-Fines N
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Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



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Avalon 900mm HDPE Repair

Scope of Works

				South
32,5 Cem 2	120	120	120	120
19mm Aggregate Single size	1430	1350	1350	1480
Water	52	52	52	52
Expected strength at 7 days	2,0	2,0	2,0	2,0
Expected strength at 28 days	3,1	3,1	3,1	3,1

Notes: No allowance has been made for wastage. The materials are defined as follows:

East-Reef Quartzite

North-Granite

South-Andesite

West-Granite

Proportions by volume to yield 65 litres (1 Wheelbarrow)

Class of Concrete	No-Fines N East	No-Fines N West	No-Fines N North	No-Fines N South
32,5 Cem 2	1/6 pockets	1/6 pockets	1/6 pockets	1/6 pockets
19mm Aggregate	1 wheelbarrow	1 wheelbarrow	1 wheelbarrow	1 wheelbarrow
Water	4 litres	4	4	4

Quality control of the backfilled structural layers can be done by measuring the shear strengths of the adjacent structural layers as well as that of the backfilled layers. The shear strength can be measured with a dynamic cone penetrometer (DCP) or a rapid compaction control device (RCCD). The shear strengths of the backfilled layers will be measured against the undisturbed structural layers. Johannesburg Roads Agency will reinstate all tarmac surfaces, upon satisfactory completion and compaction of the preceding layers by the Contractor.

PSA 5.21 Generic labour intensive specifications

EPWP guidelines shall not be applicable to this Contract, although it is expected that the Contractor execute the majority portion of the works utilising labour, but skilled labour.

PSA 5.22 Causes for rejection

Causes for rejection shall include, but not be limited to, not complying to the Employer's requirements and/or specifications and the intended purpose for this Contract, thus:

a) poor data (including: photographs, recording, prints and reports) and data management;

b) silt, grease, and debris remaining in conduits after cleaning; and

c) poor quality construction and remedial works:

i. Cracks in any concrete works or pre-cast units shall be cause for rejection.

ii. Honeycombed or patched areas in any concrete works or pre-cast unit shall be cause for rejection.

PSA 5.23 Generic labour intensive specifications

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



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Avalon 900mm HDPE Repair

Scope of Works

EPWP guidelines shall not be applicable to this Contract, although it is expected that the Contractor execute the majority portion of the works utilising labour, but skilled labour.

PSA 5.24 Causes for rejection

Causes for rejection shall include, but not be limited to, not complying to the Employer's requirements and/or specifications and the intended purpose for this Contract, thus:

- a) poor data (including: photographs, recording, prints and reports) and data management;
- b) silt, grease, and debris remaining in conduits after cleaning; and
- c) poor quality construction and remedial works:

PSA 6 TOLERANCES

PSA 6.1 USE OF TOLERANCES

No guarantee is given that the full specified tolerances will be available independently of each other, and the Contractor is cautioned 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 for measurement and payment shall be determined from the 'authorised' dimensions. These are specified dimensions or those shown on the Drawings or, if changed, as finally prescribed by the Engineer, without any allowance for the specified tolerances. Except if otherwise specified, all measurements for determining quantities for payment will be based on the 'authorised' dimensions. If the work is constructed in accordance with the 'authorised' dimensions plus or minus the tolerances allowed, the calculation of quantities will be based on the 'authorised' 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 COST FOR TESTING

The cost of all testing to be carried out by the Contractor in terms of the requirement of the relevant SANS 1200 standard shall be included in the rates for the various work items listed in the schedule of quantities. No separate payment shall be made in this regard.

The JW Representative may order the Contractor to arrange special check tests to be carried out by an approved independent laboratory. The cost of special check tests ordered by the JW Representative shall be paid by the Employer if the test results indicate compliance with the specification and paid by the Contractor if the results indicate non-compliance with the specification.

PSA 7.2 APPROVED LABORATORIES

Add the following:

The independent laboratory used by the Contractor and approved by the JW Representative shall also be deemed and approved laboratory.

PSA 8 MEASUREMENT AND PAYMENT

PSA 8.1 MEASUREMENT

PSA 8.1.1 Method of measurement, all sections of the Schedule

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



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Scope of Works

Measurements will be done continuously between the JW Representative and the Contractor on dates and times agreed on.

The progress of the following items will be recorded hereunder:

The contractor will provide a concept with quantities to the JW Representative. If any material on site is claimed, proof of ownership must be provided either by means of the necessary receipts or a letter from the supplier stating that ownership has been transferred to the contractor upon delivery.

PSA 8.1.2 Preliminary and General item or section

PSA 8.1.2.1 Tendered sums

"Except only where specific provision is made in the Specifications and/or the Bill of Quantities for separate compensation for any of these items, 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 Conditions of Contract and of this standardized specification;
- 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 the permanent or temporary work;
- providing such facilities on site as may be required by the Contractor for the proper performance of the Contract and for its personnel, including, but without limitation, providing offices, storage facilities, workshops, ablutions, services such as water, electricity, sewage and rubbish disposal, access roads and all other facilities required, as well as for the maintenance and removal on completion of the works of these facilities and cleaning-up of the site of the Contractor's establishment and reinstatement to not less than its original condition, and
- providing the facilities for the Engineer and his staff as specified in the Contract and their removal from the site on completion of the Contract."

PSA 8.2 PAYMENT

PSA 8.2.1 Time-related items

Note that the following payment items will NOT be paid separately, but are deemed to be included in the work related payment rates in the Bill of Quantities

PSA 8.3 SCHEDULE FIXED –CHARGE AND VALUE-RELATED ITEMS

Note that the following payment items will NOT be paid separately, but are deemed to be included in the work related payment rates in the Bill of Quantities

PSA 8.3.3 other fixed-charge obligations:

a)Complying with health and safety specification

This rate shall cover all the fixed charged costs incurred by the contractor to comply with the Health and Safety specifications set by the Client. This will include the compilation of all documentation, assessments, risk analysis, etc. as specified. Refer to particular specifications volume 2 of this contract documentation.

b)Provision for sufficient hand excavation tools

The Contractor is responsible for the supply of sufficient hand excavation tools for the excavation of pits by labour. The tools will remain the property of the Contractor. Payment will be made as a fixed amount and as a time related amount. Should not enough tools be made available; the payment of

PSA 8.4 SCHEDULED TIME-RELATED ITEMS

PSA 8.4.6.2 Security services costs.....Unit: Month

The sum shall cover the full compensation and all costs for a sufficient 24 hour guarded services for the duration of the contract.

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



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Avalon 900mm HDPE Repair

Scope of Works

PSA 8.5 SUMS STATED PROVISIONALLY BY ENGINEER

- i) Reinstatement of asphalt by JRA..... Unit: Stated Sum

PSA 8.2.4 DAYWORKS

PSA 8.2.4.1 Scope

This section covers the method of measurement and payment for work carried out on a day work basis.

PSA 8.2.4.2 General Requirements

Work will be classified as day work only if the Engineer considers no other rate in the Bill of Quantities appropriate for payment purposes.

An instruction regarding all work to be carried out under day work in terms of Clause 6.5 of the General Conditions of Contract 2010 will be issued at the discretion of the Engineer. Some or all of the items priced under day work in the Bill of Quantities may possibly not be required for this Contract.

Before ordering any material, the Contractor shall submit quotations to the Engineer for his approval, and shall submit such receipts or vouchers to the Engineer as may be necessary for proving the amount claimed.

PSA 8.3 TEMPORARY WORKS

PSA 8.3.1 ACCOMMODATION OF TRAFFIC:

The rates shall cover the costs of accommodation of traffic and provision of bypasses as described in SANS 1200 D 5.1.6 .Inclusive in their rates.

PSA 8.3.2 EXISTING SERVICES:

- a)Excavate by hand in soft material to expose existing services

Add the following new sub-clause:

The rate shall cover the cost for removal of premix or other surfacing where necessary, excavating in all materials, shoring, backfilling, compaction and reinstatement of surfaces except for asphalt and removal of non-usable/spoiled material.

- b)Temporary protection of existing services

Add the following new sub-clause:

All existing services, underground as well as above ground level, shall be protected by the Contractor in an appropriate manner for the duration of the construction or as deemed necessary by the JW Representative that no damage to or interruption of the services shall occur.

PSA 8.3.3 SPECIAL WATER CONTROL (INCLUDING STORMWATER)

The rate shall include all costs to ensure that no water enters or stand in excavated trenches, low laying areas or portions of the site under construction. The tendered rate shall also include all costs to ensure that access of sub-surface water is controlled and pumped out of the excavated areas.

All plant, labour and operation costs as well as equipment required to secure a dry working area and pumping of water shall be included in the tendered rate.

PSA 8.3.4 DEALING WITH OTHER SERVICE AUTHORITIES

Add the following sub clause:

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



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Avalon 900mm HDPE Repair

Scope of Works

The tendered rate shall include all costs for dealing with the following service Authorities and for fulfilment of way leave requirements:

- Johannesburg Roads Agency
- City Power
- Eskom
- Telkom SA
- Citi Connect
- SASOL
- City Parks
- Egoli Gas, etc.

Add the following sub clause:

PSA 8.3.5 FREE-HAUL AND OVERHAUL:

Notwithstanding any clauses in any Standardized Specification or Standard Specification Section dealing with the definition, measurement and/or payment for transport, free-haul and/or overhaul, neither measurement, nor payment for overhaul will be made. All haulage will be considered to be free-haul and the cost thereof will be deemed to be covered by the rates for the provision or disposal of the applicable material. Contractor is to familiarise themselves with surrounding landfill sites. Contractor is to dispose material and rates thereof are to be included in the tendered rates.

PSA 8.3.6 MEDICAL FACILITIES AND SAFETY EQUIPMENT

The Contractor shall make the first aid services and such personal safety equipment and facilities as are required, available to the JW Representative and his site staff.

PSA 8.3.7 KEY PERSONNEL:

The Contractor shall inform the JW Representative of the person whom he has charged with the duties with respect to the Site in terms of the Occupational Health and Safety Act and the person(s) who are in possession of a valid certificate of competency in first aid. The Contractor shall give copies of the minutes of the site safety meetings to the JW Representative.

PSA 8.3.8 MEASUREMENT AND PAYMENT

Note that the following payment items will NOT be paid separately, but are deemed to be included in the work related payment rates in the Bill of Quantities.

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Contract JW OPS 022/23

Avalon 900mm HDPE Repair

Scope of Works

PSC SITE CLEARANCE

PSC 3 MATERIALS

The contractor shall obtain own dumping sites for the disposal of material and all transportation costs shall be included in the rates tendered for site clearance

PSC 5 CONSTRUCTION

PSC 5.1 Areas to be cleared and grubbed:

Only the approved minimum area required for the execution of the Works including areas on which material shall be stockpiled for later reuse or on which material shall be dumped and spread, shall be cleared and grubbed. Where excavations are required under existing concrete or brick paved areas the existing concrete surfacing shall be neatly cut with a suitable blade or brick surfacing shall be carefully removed, stacked and cleaned for reuse. Where excavations take place under road surfaces the bitumen surfacing shall be neatly cut with a suitable blade and the surfacing material removed within the limits of the excavation and discarded at the disposal site.

All rubble on the Site shall be disposed of as directed by the JW Representative at an approved dump site.

PSC 5.2 Conservation of topsoil:

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

PSC 5.3 Demolish and Remove Structures:

Where shown on the drawings or ordered, valve, air, scour and hydrant chambers shall be demolished and re-built. All metal fittings shall be salvaged and delivered to the Employer's yard. All other rubble shall be disposed of to the approval of the JW Representative.

In the event that the chamber is to be relocated the resulting void shall be backfilled with material of a quality, and compacted to a density, at least equal to that of the adjacent material.

PSC 8 Measurement and payment

Note that the following payment items will NOT be paid separately, but are deemed to be included in the work related payment rates in the Bill of Quantities.

PSC 8.2.8 Demolish and Remove Structures:

In addition to the requirements of Sub-clause PSC 5.3 the rate shall cover the cost of excavation and demolition of the scheduled unit, salvaging and delivery of metal fittings, and the supply of material for and backfilling of the voids so formed, including compaction, all to the satisfaction of the JW Representative. There after rubble removal shall apply.

PSC 8.2.10 Removal and conservation of topsoil:

The rate tendered for the removal of in situ topsoil shall, in addition to the items listed in Sub-clause 8.2.10, also cover the cost of stabilizing and protecting the stockpiles of topsoil.

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



PSD EARTHWORKS (SANS 1200 D)

ii) All payment for items under this clause **ARE** to be included in the work related rates in the Bill of Quantities.

PSD 5 Construction

PSD 5.1.1.1 Barricading and lighting:

Replace sub-paragraph (a) and (b) with the following:

Adequately protected by a barrier or fence comprising fluorescent orange plastic netting of height at least 1 000mm and as close to the excavation as practicable; and

Provided with notice boards marked "CLOSED – GESLUIT" at each end of closed or partially closed roads; and

Add the following to this sub clause:

a) Provided with flashing orange lights, placed at 15m intervals along the barricading at night.

b) Should the Contractor fail to provide adequate lighting, signing and barricading, access to properties, or leave the site in a dangerous condition, the JW Representative shall be entitled to suspend all work under the Contractor until in the JW Representative's opinion the Contractor's obligation in these respects have been fulfilled and/or arrange for any emergency work to be carried out by some other agency and to deduct the cost of this work from any monies due to the Contractor.

PSD 5.1.1.2 Safeguarding of excavations:

Add the following to this sub-clause:

a) Loose ground, materials, tools and appliances shall be kept clear of the edge of the excavations and a pathway at least 0,50m shall be left clear along the edge of the excavation.

PSD 5.1.4.3 Excavated material not to endanger or interfere:

Add the following to this sub-clause:

A safe, clear path shall be kept open at all times for pedestrians. Equipment, materials and waste shall be stored, stockpiled or removed in such a manner that pedestrians are not endangered and that the nuisance level is kept to a minimum. If construction activities occupy the whole footway and verge area so that pedestrians are forced to walk in the traffic lane, adequate protection from traffic shall be provided.

Where instructed by the JW Representative or where the Works impose a danger to traffic or pedestrians, the Contractor shall remove off Site excavated material to temporary stockpiles (approved by the JW Representative) and the return to Site, excavated material for use as backfill or bedding.

PSD 5.2.2.3 Disposal of surplus or unsuitable material

Add the following:

All surplus material and all unsuitable material from excavations and clearing and grubbing operations shall be removed from the Site by the Contractor and disposed of at an approved dump site. The Contractor is to provide details of the site to the JW Representative for approval.

Dumping shall proceed in an orderly manner with coarse material placed at the bottom and covered with finer material, where possible. Upon completion of dumping the material shall be shaped to provide free-draining surfaces and slopes and finished off to the satisfaction of the JW Representative.

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



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Scope of Works

PSDB EARTHWORKS – PIPE TRENCHES (SANS1200DB)

iii) All payment for items under this clause ARE to be included in the work related rates in the Bill of Quantities.

PSDB 3 MATERIALS

PSDB 3.8 Classification for hand excavation

Classification of material for various types of hand excavation will be based on the results of a Dynamic Cone Penetrometer (DCP). The category of material shall be determined by testing the material at regular intervals and at various depths along the centre line of the trench. A minimum of 5 tests shall be done at each location and the average number of blows of the tests shall be used to determine the category of material.

The interval between test locations shall be determined by the variation of material type but shall not exceed 50m. The depth of testing shall be determined by the variation of material type and can increase or decrease in hardness with increasing depth of excavation. Table PSDB 3.8 indicates the categories:

TABLE PSDB 3.8: CLASSIFICATION FOR HAND EXCAVATION

Category of Material	Consistency		DCP Blows to Penetrate 100mm	
	Granular	Cohesive	Granular	Cohesive
<u>Soft</u> Soft excavation shall be excavation in material that can be efficiently removed from the trench using a pick and shovel but not requiring prior breaking using mechanical equipment such as pavement breakers.	Up to medium dense	Firm to stiff	0-6	1-5
<u>Intermediate</u> Intermediate excavation shall be excavation in material that require loosening with a hand spike (gwala) before being removed from the trench.	Dense	Stiff to very stiff	7-15	6-8
<u>Hard</u> Hard excavation shall be excavation in material that requires prior breaking using mechanical equipment, such as pavement breakers with clay spades, before being removed from the trench.	Very dense		16-50	-15
<u>Rock</u> Rock excavation shall be excavation in material other than described above which by nature of the material requires prior breaking using mechanical equipment, such as pavement breakers with moil points, before being removed from the trench	-	-	>50	>15

PSDB 5 CONSTRUCTION

PSDB 5.1.3 Accommodation of traffic and access to properties:

The Contractor shall make available on site at all times a sufficient number of steel plates at least 2.0m x 2.0m x 8mm thick to be laid across open trenches to provide access to private properties. The cost of providing, placing and removing the steel plates shall be included in the rates for trench excavation.

PSDB 5.9 REINSTATEMENT OF SURFACES

PSDB 5.9.7 Topsoiling:

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4

**Scope of Works**

Topsoiling will be measured by surface area covered. The rate for top soiling shall cover the cost of loading, hauling, spreading to a thickness of 100 mm, compacting and making suitable provision to avoid the topsoil slipping down the slopes of embankments and cut-slopes, all to the approval of the JW Representative.

PSDB 5.11**Location of existing services**

Add the following new sub-clause:

Positions and details of known existing services as received from the various Departments are to be exposed, identified and protected. Exact positions cannot be guaranteed by Johannesburg Water (Pty) Ltd and will not be held responsible for any damages to any services. The contractor shall excavate by hand to locate any such services and ensure that care is taken not to damage these services.

PSDB 5.13**Dealing and protecting existing services**

Add the following new sub-clause:

All existing services, underground as well as above ground level, shall be protected by the Contractor in an appropriate manner, for the duration of the construction or as deemed necessary by the JW Representative, such that no damage to or interruption of the services shall occur.

PSDB 5.14**Gas main, Electricity and Telecommunication poles**

Add the following new sub-clause:

Gas mains, electricity and telecommunication poles close to the excavations are to be stabilised and protected prior to excavation and for the duration of construction.

PSDB 5.15**Trees in construction path**

Add the following new sub clause:

No trees in the construction path must be removed. Care must be taken not to damage the trees in any way what so ever. If there are trees that cause an obstruction in the construction path, the contractor should contact the JW Representative and the Environmental Consultant prior to removal of any trees. A penalty of R1, 000.00 will be applied for each tree damaged.

PSDB 7**TESTING****PSDB 7.2****Inspection at intermediate stages of construction:**

Add the following new sub clause:

The Contractor shall call for the JW Representative, giving him reasonable notice, to inspect the works at the following intermediate stages of construction:

After completion of the chamber excavation and preparation of the chamber excavation bottom and before any blinding or floor slab is cast.

After the precast or brick walls have been placed and before any backfill is placed. Before placing of premix on driveways or any final surfacing on constructed footways. Work shall not progress through the specified stages without the approval of the JW Representative or his representative on site.

Failure to comply with the provision of this clause shall result in the suspension of work until rectified.

PSDB 8**MEASUREMENT AND PAYMENT**

Note that the following payment items will NOT be paid separately, but are deemed to be included in the work related payment rates in the Bill of Quantities.

PSD 8.3**SCHEDULED ITEMS****PSD 8.3.1****Site preparation**

REPLACE SUBCLAUSES 8.3.1.1 AND 8.3.1.2 WITH THE FOLLOWING:

"Where site preparation such as clearing, grubbing, the removal of large trees or the removal and stockpiling of topsoil is required, the provisions and scheduled items of SABS 1200 C shall apply."

PSD 8.3.2**Bulk excavation**

REPLACE THE CONTENTS OF ITEM WITH THE FOLLOWING:

"(a) Excavate in all materials and use for embankment or backfill as ordered, from:

(a) Tower Foundation Unit: m³

(b) Valve Chamber Unit: m³

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



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Avalon 900mm HDPE Repair

Scope of Works

The unit of measurement shall be the cubic metre measured in place in accordance with subclause 8.2 of SABS 1200 D. Separate items will be scheduled for embankments and backfills for different parts of the works. The tendered rates shall cover the cost of complying with all the precautions required in terms of subclause 5.1 of SABS 1200 D (as amended), in addition to the cost of excavating in all materials, basic selecting, loading, transporting, off-loading, spreading or backfilling, watering, compacting, final grading, complying with the requirements for tolerances, providing for testing, finishing and tidying, all in accordance with the specifications.

In addition to the foregoing, the tendered rate for subitem (b) shall further include for the costs of royalties (if applicable), whilst the tendered rate for subitem (c) shall also include for the costs of finding a source of suitable material, for making arrangements with the owner of the source, for procuring the material, for the payment of all requisite royalties, charges or damages, and for transporting the material to the site regardless of the distance involved. No payment will be made for the removal of overburden or stockpiling at the commercial source and no extra over payment shall apply for excavating in intermediate, hard or boulder material."

- (b) Excavate in all materials to spoil Unit: m³
The unit of measurement shall be the cubic metre of material excavated, measured in place in accordance with subclause 8.2 of SABS 1200 D.

The tendered rates shall cover the cost of complying with all the precautions required in terms of subclause 5.1 of SABS 1200 D (as amended), in addition to the cost of excavating, basic selecting, loading, transporting, off-loading at the spoil site, maintaining and finishing the spoil site, all in accordance with the specifications.

- (c) Extra over subitems PSD 8.3.2(a)(1), PSD 8.3.2(a)(2) and PSD 8.3.2(b) for:
(a) Intermediate excavation Unit: m³
(b) Hard rock excavation Unit: m³

The rate shall cover the additional cost of the operations enumerated in subclauses 8.3.2.(a) and 8.3.2.(b) above for any portion of the excavation that is classified as intermediate, hard rock, boulder excavation class A or boulder excavation class B as applicable. (See Drawing D-2.)

- (d) Extra over item PSD 8.3.2(c)(2) for hand excavation or other method (excluding blasting) to remove rock outcrops or rock underbreak after bulk excavation to form level site (alternative for soilcrete backfilling in rock overbreak)
Unit: m³

The unit shall be the cubic metre (including bulking of volume) of rock outcrops removed by hand or other labour intensive method.

The rate shall cover all additional costs of the operations including labour, plant, equipment, transport etc to break, excavate, load and removal off site of small rock outcrops not successfully removed during the bulk excavation operations.

PSDB 8.3.8

Topsoiling:

Topsoiling will be measured by surface area covered.

The rate for topsoiling shall cover the cost of loading, hauling, spreading to a thickness of 100 mm, compacting and making suitable provision to avoid the topsoil slipping down the slopes of embankments and cut-slopes, all to the approval of the JW Representative. The structural integrity still remains the responsibility of the contractor.

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



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Avalon 900mm HDPE Repair

Scope of Works

PSG CONCRETE (STRUCTURAL)

PSG 3 MATERIALS

PSG 3.2 CEMENT

PSG 3.2.2 Alternative types of cement

REPLACE THE CONTENTS OF THIS SUBCLAUSE WITH THE FOLLOWING:

Refer to Specification No LE1 for type of cement to be used on this project.

ADD THE FOLLOWING SUBCLAUSES:

"PSG 3.9 WATERSTOPS

PVC waterstops shall comply with the requirements of CKS 389.

PSG 3.10 ROOFING FELT

Three-ply roofing felt shall comply with the requirements of SABS 92 for type 40 felt.

PSG 3.11 BUTYL RUBBER OR POLYMER SEALING STRIPS

The dimensions of the sealing strip for use in the structures are shown on the drawings. The strips shall be permanently bonded to the prepared concrete surface in accordance with the manufacturer's specifications. The strip shall have a breaking elongation of not less than 300% and a tensile strength of not less than 4 MPa as per manufacturer's specification. The completed joint shall be guaranteed 100% watertight and resistant to the long-term effects of the retained aqueous liquid.

PSG 3.12 LAMINATED BUTYL RUBBER OR POLYMER WATERPROOFING STRIPS

3 mm thick laminated butyl rubber OR 2 mm thick polymer strips shall be permanently fixed to the concrete where shown on the drawings. The preparation of the concrete surface, the installation of bond breakers and aluminium backing strips, the fixing of the laminated butyl rubber or polymer waterproofing strip with an approved epoxy adhesive as specified by the particular manufacturer and the forming of lapped joints shall all be done according to the manufacturer's specifications to provide a watertight joint."

PSG 4 PLANT

PSG 4.5 FORMWORK

PSG 4.5.1 Design

ADD THE FOLLOWING:

"All formwork or scaffolding required for any part of the works shall be designed by the Contractor, and before commencing with the erection of any formwork or scaffolding, the Contractor shall submit the methods he proposes to use to the Engineer for approval. The Engineer has the authority to order alterations to the design or the sizes of any part of the formwork or scaffolding. The Contractor shall check the safety and suitability of all such alterations. The fact that the Engineer has approved or altered any part of the formwork or scaffolding shall not be construed as relieving the Contractor of his responsibility with regard to the strength and stability of the formwork or scaffolding."

PSG 4.5.3 Ties

ADD THE FOLLOWING:

"No plugs, bolts, ties or clamps of any description used to hold the formwork will be allowed to project into or through the concrete unless expressly approved by the Engineer. Only approved ferrules consisting of solid rods (that remain embedded in the concrete) and with removable ends shall be used to hold the formwork of the walls. The removable tie-rod ends shall facilitate removal without damage to the concrete, and no permanently embedded parts of such tie-rods shall have less than 50 mm of cover to the finished concrete surface.

The cavities left in the concrete when the tie-rod end cones are removed shall be soundly caulked with a cement mortar to which an approved shrinkage-reducing agent has been added and shall be neatly finished to a smooth surface uniform with that of the surrounding concrete. The cost of supplying special tie-rods as well as the filling of cavities left by the tie-

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



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rod cones shall be included in the rates tendered for formwork under the appropriate payment items. On no account shall formwork be secured to reinforcing bars.

The Contractor may submit an alternative method statement for plugging of ferrule system for approval prior to commencement of construction."

PSG 5 CONSTRUCTION

PSG 5.1 REINFORCEMENT

PSG 5.1.2 Fixing

ADD THE FOLLOWING:

"The Engineer will inspect the reinforcing after it has been fixed in place, the formwork has been cleaned, cover blocks have been positioned, and before concreting commences. Should the reinforcement be supported by the joint filler, the filler shall be covered with a hard surface on the side to be concreted. The hard surface shall be sufficiently resilient to ensure that the joint and surfaces will be without defects.

Welding of reinforcing steel will not be permitted."

PSG 5.1.3 Cover

ADD THE FOLLOWING:

"The distance between pipes in the concrete and the reinforcing steel shall nowhere be less than 40 mm or 5 mm plus the maximum size of the coarse aggregate, whichever is the largest, unless otherwise specified on the drawings."

PSG 5.2 FORMWORK

PSG 5.2.2 Preparation for formwork

ADD THE FOLLOWING:

"Construction joints shall be positioned as shown on the drawings."

PSG 5.2.5 Removal of formwork

ADD THE FOLLOWING SUBCLAUSE:

"PSG 5.2.5.7 The Contractor shall make provision for the continued support of beams and slabs while the formwork is being removed and/or for back propping of beams and slabs."

PSG 5.3 HOLES, CHASES AND FIXING BLOCKS

ADD THE FOLLOWING:

"Cover blocks for reinforcing and fixtures may be placed into the concrete provided that neither the strength nor any other desirable characteristic (such as the appearance) of the concrete section is affected or impaired in the opinion of the Engineer.

The holes or cavities left by ferrule heads in the concrete of water-retaining structures shall be filled with an approved non-shrink grout applied strictly in accordance with the manufacturer's specifications."

PSG 5.4 PIPES AND CONDUITS

ADD THE FOLLOWING:

"All pipes passing through concrete floors, walls or slabs shall be cast into a concrete member simultaneously with the casting of the member. Openings for pipes shall only be left in concrete members when so directed by the Engineer or when shown on the drawings. Pipes shall be installed in such openings according to the details shown on the drawings. If watertightness is a requirement where pipes are cast into walls, floors and slabs, the Contractor shall ensure watertightness where smooth-surfaced pipes are used by using an approved method such as tape wrapping the pipes prior to casting in. The cost of such method will be deemed to be included in the rates tendered for item PSG 8.10."

PSG 5.5 CONCRETE

PSG 5.5.1 Quality

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



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PSG 5.5.1.5 Durability

The exposure conditions of the concrete are classified as "severe".

PSG 5.5.1.7 Strength concrete

ADD THE FOLLOWING:

"The concrete mixes shall be designed by the Portland Cement Institute or a similar approved laboratory.

The minimum cement content shall be 325 kg/m³. The maximum water/cement ratio shall be 0,55 for ordinary Portland cement (OPC), CEM I 42,5 according to SANS 50197-1, or 0,50 for ordinary Portland cement blended with pulverized fuel ash (PFA).

The cement content shall not exceed 400 kg/m³ OPC in reinforced concrete or 450 kg/m³ OPC blended with PFA in reinforced concrete."

PSG 5.5.3 Mixing

PSG 5.5.3.2 Ready-mixed concrete

ADD THE FOLLOWING:

"Ready-mixed concrete may be used on the Site. The Contractor shall take samples for testing from every load delivered to the Site."

PSG 5.5.5 Placing

ADD THE FOLLOWING:

"Concreting of walls between horizontal construction joints shall be carried out in both directions from a point on the wall in order to close the gap with fresh concrete."

PSG 5.5.7 Construction joints

ADD THE FOLLOWING:

"Horizontal construction joints are permitted in structure walls in positions indicated on the drawings or approved by the Engineer. Vertical construction joints in the walls are subject to the written approval of the Engineer and the cost of all such vertical or horizontal construction joints will be deemed to be included in the rates for cast-in-situ concrete.

The construction joints in water-retaining structures shall be made strictly in accordance with the details shown on the drawings. The joints between screeds and concrete floors shall be regarded as construction joints and the surface of the floor shall be prepared as described for construction joints. Should the Contractor's method of construction necessitate the placing of a construction or other joint in a position not shown on the drawings, such method of construction and position of the joint shall be approved by the Engineer in writing. The cost of such joint shall be included in the tendered rates and shall include scabbling of the concrete where steel reinforcement is continuous. The walls shall be cast in lifts of a height that permits each lift to be poured without interruption in one continuous operation during normal working hours.

It is the Contractor's responsibility to ensure that construction joints are watertight. The Contractor's proposed method for ensuring the watertightness of such joints shall be submitted to the Engineer for his approval. For construction joints at kickers all additional costs for concrete, preparation, etc will be deemed to be included in the rates tendered for concrete in walls or sides and kicker joints or construction joints will not be measured separately."

PSG 5.5.8 Curing and protection

ADD THE FOLLOWING:

"The curing methods of retaining the formwork in place or covering with a waterproof membrane are strongly recommended. Concrete will not be paid for unless properly cured and proof of curing is continuously visible on site."

PSG 5.5.10 Concrete surfaces

ADD THE FOLLOWING SUBCLAUSE:

"5.5.10.4

Where the surfaces of the concrete are to be additionally hardened or protected, the positions of such surfaces and the method to be used will be shown on the drawings and will be scheduled. Materials or products with a ferrous content will not be allowed."

PSG 5.5.11 Watertight concrete

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



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ADD THE FOLLOWING:

"The minimum cement content shall be 325 kg/m³. The maximum water:cement ration shall be 0,55 for ordinary Portland cement (OPC), CEM I 42,5 according to SANS 50197-1, or 0,50 for ordinary Portland cement blended with pulverized fuel ash (PFA).

The cement content shall not exceed 400 kg/m³ OPC in reinforced concrete or 450 kg/m³ OPC blended with PFA in reinforced concrete."

ADD THE FOLLOWING SUBCLAUSES:

PSG 5.5.16 Soilcrete

Where soilcrete is specified for filling under floor slabs, the soilcrete shall comply with the requirements of subclause PSDB 3.5(d) of section 1200 DB as amended and shall be placed as specified in the subclause."

PSG 5.5.18 Pipes and conduits

All pipes passing through concrete floors, walls or slabs shall be cast into the concrete member simultaneously with the casting of the member. Openings for pipes shall only be left in the concrete members when so directed by the Engineer or when shown on the drawings. Pipes shall be installed in such openings according to the details shown on the drawings. If watertightness is a requirement where pipes are cast into walls, floors and slabs, the Contractor shall ensure watertightness where smooth-surfaced pipes are used by using an approved method such as tape wrapping the pipes prior to casting in. The cost of such method will be deemed to be included in the rates tendered for in item PSG 8.10."

PSG 6 TOLERANCES

PSG 6.2 PERMISSIBLE DEVIATIONS

PSG 6.2.3 Specified permissible deviations

ADD THE FOLLOWING:

"Degree-of-accuracy I is applicable.

Every specified permissible deviation is binding in itself. The cumulative effect of permissible deviations will not be considered. The maximum permissible vertical deviation is subject to the other permissible deviations."

REPLACE SUBCLAUSE 6.2.3(d)(5) WITH THE FOLLOWING:

Permissible deviation		
Degree of accuracy		
III	II	I
mm	mm	mm
5 50	3 30	2 10

"Vertically, per metre of height subject to a maximum of"

PSG 7 TESTS

PSG 7.1 FACILITIES AND FREQUENCY OF SAMPLING

PSG 7.1.1 Facilities

ADD THE FOLLOWING:

"The Contractor shall provide sufficient storage capacity for the concrete cubes and shall arrange to have them tested by an approved laboratory.

The cost of all testing, including the cost of sampling, storage and transport of samples shall be included in the rates tendered for concrete work."

PSG 7.3 ACCEPTANCE CRITERIA FOR STRENGTH CONCRETE

ADD THE FOLLOWING:

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



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"Test results obtained from the supplier of ready-mixed concrete will not be accepted for evaluation in terms of subclause 7.3, but samples for testing shall be taken of such concrete at the point of placing."

PSG 8 MEASUREMENT AND PAYMENT

PSG 8.1 MEASUREMENT AND RATES

PSG 8.1.1 Formwork

DELETE "or splays over 20 mm x 20 mm" FROM THE FIRST LINE OF PARAGRAPH 8.1.1.2.

ADD THE FOLLOWING TO PARAGRAPH 8.1.1.2:

"Splays up to and including 25 mm x 25 mm will not be measured separately and will be deemed to be included in the formwork costs."

ADD THE FOLLOWING PARAGRAPHS:

8.1.1.7 For construction joints at kickers, all additional costs for formwork to edges up to 300 mm high will be deemed to be included in the rates tendered for vertical formwork to sides of walls and will not be measured separately in narrow widths.

8.1.1.8 No formwork will be measured to edges of blinding layers under structures, and the cost thereof (if needed) will be deemed to be included in the rates tendered for concrete in blinding layers.

8.1.1.9 Back-shuttering or formwork to top revealed surfaces of sloping or conical formwork will only be measured to surfaces of over 40° and up to 85° to the horizontal.

8.1.1.10 Formwork to horizontal surfaces in pump stations, valve chambers, manholes or sumps can either be removed through the manhole cover opening or the Contractor may use permanent formwork at his own cost as no claims in this regard will be considered."

PSG 8.1.2 Reinforcement

REPLACE THE CONTENTS OF THIS SUBCLAUSE WITH THE FOLLOWING:

"The unit of measurement for steel bars shall be the ton of reinforcement in place, in accordance with the drawings or as authorised by the Engineer.

The unit of measurement for welded steel fabric shall be the kilogram of fabric reinforcement in place, and the quantity shall be calculated from the net area covered by the mesh, excluding overlaps.

Clips, ties, separators, stools and other steel used for positioning reinforcement will not be measured, unless these are shown on the bending schedules.

The tendered rate shall include full compensation for the supply, delivery, cutting, bending, welding, placing and fixing of the steel reinforcement, including all tying wire, stools, supports and waste."

PSG 8.1.3 Concrete

Delete ", or the plan size of the excavation where additional excavation is provided to facilitate erection of forms" from the second line of paragraph 8.1.3.1(c).

PSG 8.5 JOINTS

REPLACE "Unit: m" WITH "Unit: m or m²".

ADD THE FOLLOWING ITEMS:

"PSG 8.9 MISCELLANEOUS WORK OTHER THAN METALWORK

- (a) Testing of concrete cubes..... Unit: No
- (b) Supply cube-testing machine on site with recent calibration certificate and water trough Unit: Sum

The tendered rates shall include full compensation for providing all labour, materials and equipment required to carry out the work, for all preparatory work, for constructing the work scheduled in a workmanlike manner and for finishing off and cleaning up when the work has been completed.

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



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PSG 8.10

CAST IN OF PIPES WITH OR WITHOUT PUDDLE FLANGES

All pipes cast into concrete will be with a puddle flange, or as indicated on the drawing. The rate to supply and install all special pipe fittings are as per Section L: Water Mains of the Bill of Quantities which will include all costs associated with the installation of the pipe into the concrete wall as a cast in item, including labour, formwork, grout, bentonite strips etc.

The tendered rates shall include full compensation for installing the pipe where new pipes are used (with or without a puddle flange) in the exact position as shown on the drawings, for splitting or cutting the formwork where required, for ensuring water tightness where required and for all additional costs required to install the pipes specified or shown on the drawings.

New pipes shall be measured under the items of the relevant section of the specifications.

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



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PSL MEDIUM-PRESSURE PIPELINES (SANS 1200 L)

PSL 3 Materials

The Contractor is responsible for the supply and installation of materials.

PSL 5 Construction

PSL 5.6.1 Valve and hydrant chambers: (Sub-clause 5.6.1)

Amend the first sentence of subclause 5.6.1 to read as follows:

On reticulation pipelines of nominal diameter 300mm or less, each Isolation Valve, Scour Valve, Air Valve or Fire Hydrant should be housed in a chamber as per detailed drawings attached in Part 4 of the Document. Refer to drawings.

PSL 5.8 Brickwork in Chambers and Manholes:

Add the following to this sub-clause:

The joints of exposed faces shall be flush-trowelled, hard and smooth and shall be rubbed for the full width of the joint as the work proceeds to give a hard polished finish.

PSL 5.10 Dismantling of chambers:

Some chambers may need to be completely demolished due to excessive damage, before they can be rebuilt or refurbished. The chamber shall be carefully dismantled and all usable material stockpiled for later reinstatement.

PSL 5.11 Installation of Service Markers (Air valve, Isolation valve, Scour valve and Fire Hydrant):

Add the following to this sub clause:

Service markers are to be placed within one (1m) meter from the newly constructed chambers. It should be clearly visible to both pedestrians and vehicles. It should be painted white with quality approved paint. Bold "BLACK" letters indicating the type of service should be clearly visible. For example "FH" will indicate that the chamber contains a Fire Hydrant.

PSL 8 Measurement and payment

PSL 8.2.13 Valve, Air Valve, Scour Valve and Hydrant chambers:

Add the following new sub clause:

Isolation valve, air valve, scour valve and fire hydrant chambers will be measured as complete units. The rate will include for the excavation, demolishing, disposal of rubble at an approved dump site. The Contractor to ensure the supply of all materials, tools, labour and construction of the chamber is to the satisfaction of the JW Representative.

PSL 8.2.15 Service Markers:

Add the following new sub clause:

Service markers will be measured per No.

The rate will include supply, delivery, painting and installation.

- (a) Isolation Valve Markers.....Unit: No
- (b) Air Valve MarkerUnit: No
- (c) Scour Valve MarkerUnit: No
- (d) Fire Hydrant MarkerUnit: No
- (e) Plates.....Unit: No

PSL 8.2.16 Reinstatement of Existing Driveways, Walkways and Paved Areas re-using existing material on

site:

Add the following new sub-clause:

The rate will include supply and delivery of all materials in cases where the previously used material can be used. The preparation, cutting and compaction of the affected area ready to receive surfacing. The labour, plant, transport and tools required to installation the surfacing to the JW Representative's approval.

- (a) 60mm Concrete Paving Blocks (Interlocking)..... Unit: m²
- (b) 80mm Concrete Paving Blocks (Interlocking)..... Unit: m²
- (c) Brick Paving(all types)..... Unit: m²
- (d) 450mm X 450mm x 50mm Concrete Blocks.....Unit: m²

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



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(e)30mm Asphalt Premix.....	Unit: m ²
(f)Slate Paving.....	Unit: m ²
(g)75mm Thick Concrete.....	Unit: m ²
(h)100mm Thick Concrete.....	Unit: m ²
(i)150mm Thick Concrete.....	Unit: m ²
(j)Other (imprints, concrete work etc.).....	Unit: m ²
(k)30mm Bitumen hot-mix: fine.....	Unit: m ²

PSL 8.2.17 Reinstatement of Existing Driveways, Walkways and Paved Areas:

Add the following new sub-clause:

The rate will include supply and delivery of new materials in cases where the previously used material cannot be used. The preparation, cutting and compaction of the affected area ready to receive surfacing. The labour, plant, transport and tools required to installation the surfacing to the JW Representative's approval.

(a)60mm Concrete Paving Blocks (Interlocking).....	Unit: m ²
(b)80mm Concrete Paving Blocks (Interlocking).....	Unit: m ²
(c)Brick Paving(all types).....	Unit: m ²
(d)450mm X 450mm x 50mm Concrete Blocks.....	Unit: m ²
(e)30mm Asphalt Premix.....	Unit: m ²
(f)Slate Paving.....	Unit: m ²
(g)75mm Thick Concrete.....	Unit: m ²
(h)100mm Thick Concrete.....	Unit: m ²
(i)150mm Thick Concrete.....	Unit: m ²
(j)Other (imprints, concrete work etc.).....	Unit: m ²
(k)30mm Bitumen hot-mix: fine.....	Unit: m ²

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



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PSME SUBBASE

PSME 3 MATERIALS

PSME 3.2 PHYSICAL PROPERTIES

PSME 3.2.1 Subbase material

REPLACE THE CONTENTS OF PARAGRAPH (a) WITH THE FOLLOWING:

"(a) The maximum particle dimension of the gravel shall not exceed 63 mm."

REPLACE THE CONTENTS OF PARAGRAPH (d) WITH THE FOLLOWING:

"(d) The CBR at specified density shall be 45 for unstabilized material as well as for stabilized material prior to stabilization."

DELETE PARAGRAPH (e).

PSME 8 MEASUREMENT AND PAYMENT

PSME 8.1 BASIC PRINCIPLES

INSERT A SEMICOLON IN THE FIRST LINE OF PARAGRAPH (b) AFTER THE WORDS "will be paid for once only" AND DELETE THE REST OF THE PARAGRAPH.

AMEND PARAGRAPH (d) AS FOLLOWS:

"(d) that, in the case of material from a commercial source or from borrow pits selected by the Contractor, no additional payment will be made for the class of excavation, method of processing (except stabilizing), or overhaul."

PSME 8.3 SCHEDULED ITEMS

PSME 8.3.3 Construct the subbase course/shoulders/gravel wearing course with material from commercial sources or designated borrow areas

REPLACE THE HEADING OF THIS ITEM WITH THE FOLLOWING:

"PSME 8.3.3 Construct the subbase course/shoulders/gravel wearing course with material from commercial sources"

ADD THE FOLLOWING PARAGRAPH:

"This item shall also apply to the construction of subbase course/shoulders/gravel wearing course with material from borrow pits selected by the Contractor."

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



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PSMJ SEGMENTED PAVING

PSMJ 8 MEASUREMENT AND PAYMENT

PSMJ 8.2 SCHEDULED ITEMS

PSMJ 8.2.2 Construction of paving complete

ADD THE FOLLOWING:

"The tendered rate shall also include full compensation for straight or curved cutting units to fit edge restraints or kerbing and for the removal of waste material from the Site."

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



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PSMK KERBING AND CHANNELLING

PSMK 3 MATERIALS

PSMK 3.1 CONCRETE

ADD THE FOLLOWING:

"The Contractor shall timeously submit the concrete mix design for cast-in-situ kerbing to the Engineer for approval and no kerbing shall be placed before the mix design has been approved."

PSMK 5 CONSTRUCTION

PSMK 5.11 TRANSITION SECTIONS AND INLET AND OUTLET STRUCTURES

DELETE THE WORDS "and with the requirements of the Project Specification" IN THE SECOND PARAGRAPH.

PSMK 7 TESTING

PSMK 7.2 CAST-IN-SITU AND EXTRUDED KERBING AND CHANNELLING

PSMK 7.2.1 General tests

PSMK 7.2.2 Alternative tests

REPLACE THE HEADING AND CONTENTS OF THIS SUBCLAUSE WITH THE FOLLOWING:

"PSMK 7.2.2 Tests

The Contractor shall carry out a minimum of three cube crushing tests per 1 000 m of kerbing placed. The cost of such tests shall be deemed included in the rates tendered for kerbing.

One cube crushing test shall consist of a set of six cubes made with concrete taken from the mixer, the kerbing machine or from any part of the work as ordered.

If, after 28 days in an approved laboratory, after three cubes of any set of six cubes have been tested, the average crushing strength is found to be more than 3 MPa below the specified strength, the kerbing represented by the cubes will be rejected.

The Contractor may apply for resubmission of the rejected section on the basis of cores drilled from this section and tested for the estimated actual crushing strength in accordance with SABS method 865 (excluding Appendix A). The cost of drilling and testing the cores is for the Contractor's account, regardless of the outcome of the tests on the cores. The number of cores required will be determined by the Engineer and the criterion for rejection or acceptance of the section represented by the cores shall be as specified above for cubes."

PSMK 7.3 RESPONSIBILITY FOR THE COST OF TESTING

DELETE THIS SUBCLAUSE.

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



PARTICULAR SPECIFICATION

PLA SPECIFICATION FOR LOW PRESSURE VALVES

CONTENT

PLA 1.	SCOPE
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PLA6.	TOLERANCES
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PLA8.	MEASUREMENT AND PAYMENT

PLA1. SCOPE

This specification covers valves for use on low pressure pipelines up 1 000 mm diameter for transporting and controlling cold water and sewage under working pressures as stated but not exceeding 4,0 MPa. This specification must be read in conjunction with the standards laid down Johannesburg Water and in the case of a discrepancy the Council standards will take precedence. All equipment including valves, pumps must be approved by the Engineer in writing prior to procurement.

PLA2. INTERPRETATIONS

SUPPORTING SPECIFICATIONS

Where this specification is required for a project, the following specifications shall, inter alia, form part of the Contract:

- (a) Project Specification
- (b) SABS 1200 A or SABS 1200 AA
- (c) SABS 1200 L

and the following specifications may form part of the Contract:

- (a) SABS 1200 D or SABS 1200 DA
- (b) SABS 1200 DB
- (c) SABS 1200 G or SABS 1200 GA
- (d) SABS 1200 LB

2.2 APPLICATION

This specification contains clauses which are of general application for valve contracts. Interpretations of, or modifications, alternations or additions to this specification for the purpose of this contract are set out in Portion 2 of the project specification which precedes this specification and forms part of the Contract.

1.3 DEFINITIONS

The definitions set out in the specifications listed in 2.1 shall apply.

1.4 ABBREVIATIONS

The abbreviation set out in the specifications listed in 2.1 and the following shall apply:

MFB: Metropolitan Fire Board
 BSP : British Standard Pipe Thread
 nb : nominal bore
 SOAV: Small orifice air valve
 LOAV : Large orifice air valve
 DOAV : Double orifice air valve

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



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PLA3. MATERIALS

PLA 3.1 GENERAL REQUIREMENTS

Unless otherwise required by the project specification:

- (a) valves shall be manufactured from the materials specified in the relevant sub-clause below;
- (b) shall be of the type and class or suitable for the working pressure specified in the project specifications or stated in the schedule or given on the drawings;
- (c) shall be capable of withstanding the applicable test pressures specified in sub-clause 7.3.1 of SABS 1200 L; and
- (d) jointing of the type scheduled, shown on the drawings or specified in the project specification, shall be complete with insertions, rings, packings, bolts, nuts, etc., as relevant.

PLA 3.2 PROTECTION

3.2.1 Against corrosion

The cleaning and painting of valves as specified hereunder is to be carried out at the factory prior to dispatch to site.

- (a) All cast iron surfaces of every valve shall be prepared for painting to a thoroughly clean condition free of all grease and deleterious matter. Steel surfaces shall be prepared in accordance with Swedish Standard SIS 05 5900 for an Sa 2½ finish.
- (b) Internal surfaces shall then be treated with two coats of Copon EP 2300 or other approved non-toxic epoxy resin paint to give a total minimum dry film thickness of 160 micrometres; both coats being applied within 48 hours of commencement of painting.
- (c) External surfaces shall, immediately after cleaning, be treated with one of the following alternative paint systems:
 - (i) System 1: for valves situated in underground chambers or exposed conditions.
Apply three coats of an approved epoxy coal tar paint to give a minimum total dry film thickness of 240 micrometres; all three coats being applied within 72 hours of commencing the first coat.
 - (ii) System 2: for valves situated in pump stations etc.
Apply one coat of zinc chromate primer followed by one coat of undercoat tinted where necessary, and a final coat of best quality gloss enamel. The total dry film thickness of the system shall be not less than 200 micrometres.
- (d) Non-ferrous metal or stainless steel surfaces shall not be painted.
- (e) After erection on site all valves shall be cleaned and the paint work refurbished where necessary to restore the condition to that at the time of leaving the factory.

3.2.2 Against damage during transit to the work site

The body ends shall be sealed and the jointing surfaces protected before dispatch to the site. Any damage to the corrosion protection shall be made good after delivery to the site and prior to installation into the pipeline as per sub-clause 5.4.

PLA 3.3 REQUIREMENTS FOR SPECIFIC TYPES OF VALVES

In addition to the requirements of 3.1 and 3.2 the relevant requirements of 3.3 shall apply.

3.3.1 Gate valves

Gate valves shall comply with SABS 664 for water works pattern valves of the types, classes and sizes scheduled and shall be provided with the following:

- (a) the outlet connections shall be flanged or spigot plain ended as scheduled;
- (b) the spindles shall be non-rising;
- (c) the spindles shall be fitted with caps unless otherwise scheduled;
- (d) the direction of closing shall be clockwise;
- (e) type B gunmetal trim, except where type C stainless steel is scheduled in which case the latter trim shall be provided;
- (f) suitable gearing, where necessary to limit the maximum torque to be applied at the hand wheel to 95 Nm under an unbalanced pressure equal to the maximum working pressure for the classes specified or scheduled. An indicator on the gear casing to show the position of the gate is to be included with the gearing;
- (g) a vent cock on valves of 200 n b and larger to permit the evacuation of air or water from the body of the installed valve;
- (h) the facility to permit repacking of the gland whilst the valve is under pressure;
- (i) test certificates from the manufacturer, except where an inspector is appointed by the Employer to witness the testing;

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



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- (j) a suitable cast on arrow indicating the preferred flow direction through the valve, where such preference is applicable;
- (k) valves of sizes and classes not covered by SABS 664 shall be at least equal to the requirements of the Specification with regard to materials and workmanship;
- (l) the seat rings shall be pinned;
- (m) the gland packing shall be lubricated and graphited cotton packing in accordance with the requirements of BS 437 Type A;
- (n) the design of all valves shall be such that they may be mounted upright; and
- (o) in addition to the tests specified in 7.1 gate valves shall be subjected to the test procedure specified in sub-clause 6.3.1(b), 6.3.1(c), 6.3.3.2 and 6.4 of SABS 664.

3.3.5 Flanges

The dimensions and drillings of flanges for valves shall comply with SABS 1123 as follows except where otherwise scheduled:

VALVE CLASS	APPLICABLE TABLE
Class 10	table 1000/3 but flat faced
Class 16	table 1600/3 but flat faced
Class 25	table 2500/3 but flat faced
Class 40	table 4000/3 but flat faced

PLA 4.

PLANT

The terms of Clause 4 of SABS 1200 L shall apply where relevant.

PLA 5.

CONSTRUCTION

PLA 5.1

SETTING OF VALVES AND FITTINGS

5.1.1 General

- (a) Unless otherwise specified or shown on the drawings, gate valves, fire hydrants and air valves shall be installed upright and butterfly valves shall be installed with the main shaft horizontal.
- (a) All valves inside valve chambers shall have a removable type coupling on one side.
- (b) All valves shall be located in the position shown on the drawings or as otherwise directed, and not merely to suit standards lengths of pipe in urban, factory and such like areas. Closure pieces for fitting a valve into a pipeline shall not be shorter than 500 mm.
- (d) Subject to approval before pipe laying commences in open country, valves may be located to suit whole pipe lengths.

PLA 5.2

CONCRETE PEDESTALS

Where so scheduled the Contractor shall construct valve pedestals complete with reinforcing, (if any), as shown on the drawings. Unless otherwise specified, prescribed mix 20 concrete with 40 mm stone shall be used. The pedestal shall be so constructed that access to bolts, plugs, cocks, etc is maintained.

PLA 5.3

HOLDING DOWN BOLTS, STRAPS, CLAMPS ETC.

Where so scheduled the Contractor shall supply and install holding down bolts, straps, clamps, or other devices as shown on the drawings for anchoring valves to valve pedestals or other concrete structures.

5.4 DAMAGE TO CORROSION PROTECTION

All valves and fittings shall be inspected after installation for damage to the corrosion protection. Any damaged areas shall be thoroughly cleaned and retreated according to the applicable subsection of section 3.2.1.

PLA 6.

TOLERANCES

The relevant terms of clause 6 of SABS 1200 L shall apply. The tolerance in the direction of the pipeline for locating a valve shall be plus minus 100 mm.

PLA 7.

TESTING

PLA 7.1

VALVE BODIES

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Contract JW OPS 022/23

Avalon 900mm HDPE Repair

Scope of Works

(a) Before being dispatched from the manufacturer's works, the body of the valve shall be subjected to the hydraulic test specified in sub-clause 6.3 of SABS 664 carried out in accordance with the procedure set out in sub-clause 6.3.2 (a) of SABS 664. The test pressure shall be twice the specified working pressure. The Contractor shall give one week's notice to the Engineer as to the proposed time of carrying out of tests in the manufacturer's work to enable him to be present if he so wishes.

(b) In addition, each valve tested in terms of (a) above shall be subjected to the appropriate test for the particular type of valve in terms of 7.3. Each test carried out after installation shall be carried out in the presence of the Engineer.

PLA 7.2

COMMISSIONING TESTS

After installation, each valve shall be commissioned under normal conditions of flow in the pipeline, to establish that the valve performs the functions required of it in terms of the specification. After commissioning tests have been completed the Contractor shall, from time to time, make such adjustments to mechanisms as are necessary, until the period of maintenance has expired.

PLA 8.

MEASUREMENT AND PAYMENT

Measurement and payment for valves will be made in accordance with the relevant clauses of SABS 1200 L, as may be amended by the Project Specification.

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Contract JW OPS 022/19
Reinstatement of Civil Services

Drawings

 Johannesburg Water	OCCUPATIONAL HEALTH & SAFETY (OHS) SPECIFICATION	
	PROJECT NUMBER:	RFQ 18-2023
	PROJECT LOCATION:	Protea Glen Ext 11
	PROJECT DESCR:	Repair, Test and commission the 900mm diameter HDPE Pipe

VOLUME 2

Occupational Health & Safety Specification

RFQ 18-2023

REPAIR, TEST AND COMMISSION THE 900MM DIAMETER HDPE PIPE

Prepared by: OHS Department PO Box 61542 Marshalltown 2107 Tel: +27 11 688 1476	PRINCIPAL CONTRACTOR:	
	CEO (16.1 APPOINTEE):	
	TELEPHONE NUMBER:	
	FAX NUMBER	
	E-MAIL ADDRESS:	
	SIGNATURE:	

 Johannesburg Water	OCCUPATIONAL HEALTH & SAFETY (OHS) SPECIFICATION	
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	PROJECT LOCATION:	Protea Glen Ext 11
	PROJECT DESCR:	Repair, Test and commission the 900mm diameter HDPE Pipe

General Notification

This document forms an integral part of the Contract Specification and, in particular, shall constitute the Client's (Johannesburg Water SOC Ltd.) Occupational Health & Safety (OHS) Specification, as required by the Construction Regulations, 2014, as promulgated under the Occupational Health and Safety Act (Act no. 85 of 1993). The Specification shall furthermore be applied for the management of Mandatories performing activities for or on behalf of Johannesburg Water SOC Ltd, irrespective whether the contract work constitutes construction work or not.

The Contract Specification is contained in Volume 1 of the contract documents in Part 3: Scope of Work.

Acknowledgements

This Occupational Health & Safety (OHS) Specification was developed by the internal OHS Department for the sole use by Johannesburg Water SOC Ltd. The issue date of this OHS Specification is September 2016.

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ABBREVIATIONS

Abbreviation	Description
CR	Construction Regulations
COLD	Compensation for Occupational Injuries and Diseases
DoL	Department of Labour
GAR	General Administrative Regulations
GMR	General Machinery Regulations
GSR	General Safety Regulations
HCS	Hazardous Chemical Substances
HIRA	Hazard Identification and Risk Assessment
JW	Johannesburg Water (SOC) Ltd
SDS	Safety Data Sheet
OHS	Occupational Health and Safety
PPE	Personal Protective Equipment
PER	Pressure Equipment Regulations
SANS	South African National Standards
SABS	South African Bureau Standard
SOC	State Owned Company

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DEFINITIONS

Word / Phrase	Definition
“WCL 1”, “WCL 2” and “WCL 22”	Means the prescribed forms for reporting of incidents and occupational diseases referred to in the Compensation for Occupational Injuries and Diseases Act.
Competent Person	A person who has in respect of the work or task to be performed the required knowledge, training, experience and, where applicable, qualifications specific to that work or task: provided that where appropriate, qualifications and training are registered in terms of the provisions of the National Qualification Framework Act, 2000 (Act 67 of 2000).
Construction work	Any work in connection with: a) The construction, erection, alteration, renovation, repair, demolition or dismantling of or addition to a building or any similar structure b) 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 the moving of earth, clearing of land, the making of an excavation, piling, or any similar type of work
Contractor (inclusive of Principal Contractor)	Any organization, person, entity performing activities for or on behalf of Johannesburg Water SOC Ltd.
Corrective Action	Action to eliminate the cause of a detected nonconformity or other undesirable situation.
Employee	Any person who is employed by or works for an employer and who receives or is entitled to receive any remuneration or who works under the direction or supervision of an employer or any other person
Employer	Any person who employs or provides work for any person and remunerates that person or expressly or tacitly undertakes to remunerate him, but excludes a labour broker as defined in section 1 (1) of the Labour Relations Act, 1956 (Act No. 28 of 1956)
Hazard	Means a source of or exposure to danger.
Hazard identification	The identification and documenting of existing or expected hazards to the health and safety of persons, which are normally associated with the type of construction work being executed or to be executed.
Incident	Means an incident as contemplated in section 24 (1) of the OHS Act 85 of 1993.
Machinery	means any article or combination of articles assembled, arranged or connected and which is used or intended to be used for converting any form of energy to performing work, or which is used or intended to be used, whether incidental thereto or not, for developing, receiving, storing, containing, confining, transforming, transmitting, transferring or controlling any form of energy
Mandatory	Includes an agent, a contractor or a subcontractor for work, but without derogating from his status in his own right as an employer or a user
Medical surveillance	Means a planned programme or periodic examination (which may include clinical examinations, biological monitoring or medical tests) of employees by an occupational health practitioner or, in prescribed cases, by an occupational medicine practitioner.
Method Statement	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	Any employer who performs work and is appointed by the Client to be in overall control and management of the contract work (inclusive of Mandatories).
SHE File	A file or other record in permanent form, containing the information required as contemplated in the S.H.E Specification Document and legal requirements applicable to work activities.
SHE Plan	A documented plan which seeks to address all hazards identified means and ways to control and eliminate such to ensure compliance to the S.H.E Specification.
Workplace	Any physical location in which work related activities are performed under the control of the organization.

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1. Introduction

In terms of Section 37 of the Occupational Health and Safety Act (Act no. 85 of 1993), Johannesburg Water SOC Ltd is required to control persons/organizations conducting activities for or on their behalf (Mandatories) and the Construction Regulations promulgated under the Occupational Health and Safety Act (Act no. 85 of 1993), is requiring Johannesburg Water SOC) Ltd. to compile an occupational health and safety specification for any intended project classified as construction work and to provide the specification to prospective tenderers / Mandatories.

The dual objective of this specification is to ensure that the Mandatories and Principal Contractors (herein after called Principal Contractor (including Mandatories)) entering into a contractual agreement/relationship with Johannesburg Water SOC Ltd. achieves and maintains an acceptable level of occupational health, safety and environmental performance whilst conducting activities to perform the contract work.

This document forms an integral part of the Contract Specification and, in particular, shall be the OCCUPATIONAL HEALTH & SAFETY (OHS) SPECIFICATION FOR CONSTRUCTION WORK. The Contract Specification is contained in Volume 1 of the contract documents. The principal and other contractors shall ensure that this specification is included with any contract/s that they may have with other contractors and/or suppliers that are engaged for the provision of labour, goods or services for this project. The Principal Contractor and its Contractors shall furthermore implement any reasonable practicable means to ensure compliance to this Occupational Health & Safety (OHS) Specification and any other applicable legislation on their organization and/or activities performed by or for them. This OHS Specification will be read in conjunction, where issued and applicable, with the Environmental Specification issued for listed activities requiring environmental authorization by a relevant authority.

Compliance with this OHS specification does not absolve the Principal Contractor from complying with any other applicable minimum legal requirement and the Principal Contractor remains responsible for the sustainable integrity of the environment and the health and safety of its employees, mandatories as well as any persons affected by activities conducted for or on behalf of Johannesburg Water SOC Ltd (SOC) Ltd..

1.1 Johannesburg Water SOC Ltd's commitment to Occupational Health, Safety & Environmental (SHE) Management

Johannesburg Water SOC Ltd is committed to responsible occupational health, safety and environmental management. This commitment is essential to protect the environment, employees, Mandatories, visitors and provide a work environment conducive to health and safety. Principal Contractors and their Contractors shall demonstrate their commitment and concern by:

- Ensuring that decisions and practices affecting occupational health, safety and environmental performance are consistent with the issued SHE specification;
- Ensuring adequate resources are made available for the effective implementation of occupational health, safety and environmental control and mitigation measures;
- Participating in hazard identification and risk assessments and design safety reviews;
- Communicating occupational health, safety and environmental management processes, strategies and control measures with all levels of employees, contractor and/or visitors;
- Ensuring visible leadership at all sites;
- Promoting and enforcing the use of correct types of Personal Protective Equipment (PPE);
- Reporting and investigation of incidents and accidents and ensuring actions are identified and implemented to prevent similar types of incidents reoccurring;
- Participating in Client audits and meetings and ensuring required actions are implemented within reasonable time frames on the site/project;
- Recognizing and commending safe work practices and coaching employees who require guidance;
- Applying and enforcing consequence management from deviations and transgressions of/from compliance to this SHE Specification noted and/or observed, where applicable;
- Carrying out safety observations, implement corrective and preventative actions and giving immediate feedback;

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- Encouraging employee participation in the formulation of work instructions and safety rules.

1.2 Scope of Occupational Health, Safety and Environmental (SHE) Specification

The scope of this Occupational Health, Safety and Environmental (SHE) Specification is to address the reasonable and foreseeable aspects of occupational health, safety and environmental management, which will be affected by the contract work.

The specification will provide the requirements that the Principal Contractor and other Contractors shall comply with in order to reduce the risks associated with the contract work, and that may lead to incidents causing injury and/or ill health or degradation of the environment, to a level as low as reasonably practicable and possible.

In particular, Johannesburg Water SOC Ltd will ensure that it shall not appoint any Principal Contractor unless it is reasonably satisfied that the contractor which it intends to appoint has the necessary competencies and resources to carry out the work safely.

1.3 Omissions from SHE Specification

Where any omission from the SHE Specification is identified, applicable legal requirements will constitute the minimum standard for compliance to the relevant omission. The responsibility will be on the Principal Contractor to provide assurance to Johannesburg Water SOC Ltd on compliance to the applicable legal requirements related to the activity / task / process.

1.4 Change management

Whenever Johannesburg Water SOC Ltd identifies the need to change or review the SHE Specification, approved changes and revisions will be communicated to the Principal Contractor. A cost analysis on the implementation of the proposed changes / revisions will be calculated through a collaborative processes between Johannesburg Water SOC Ltd and the Principal Contractor – where the approved changes and/or revisions has no cost implication for the Principal Contractor the Principal Contractor will be required to accept the approved changes / revisions and ensure implementation within the SHE Plan / File framework.

2 Overview of contractor management process

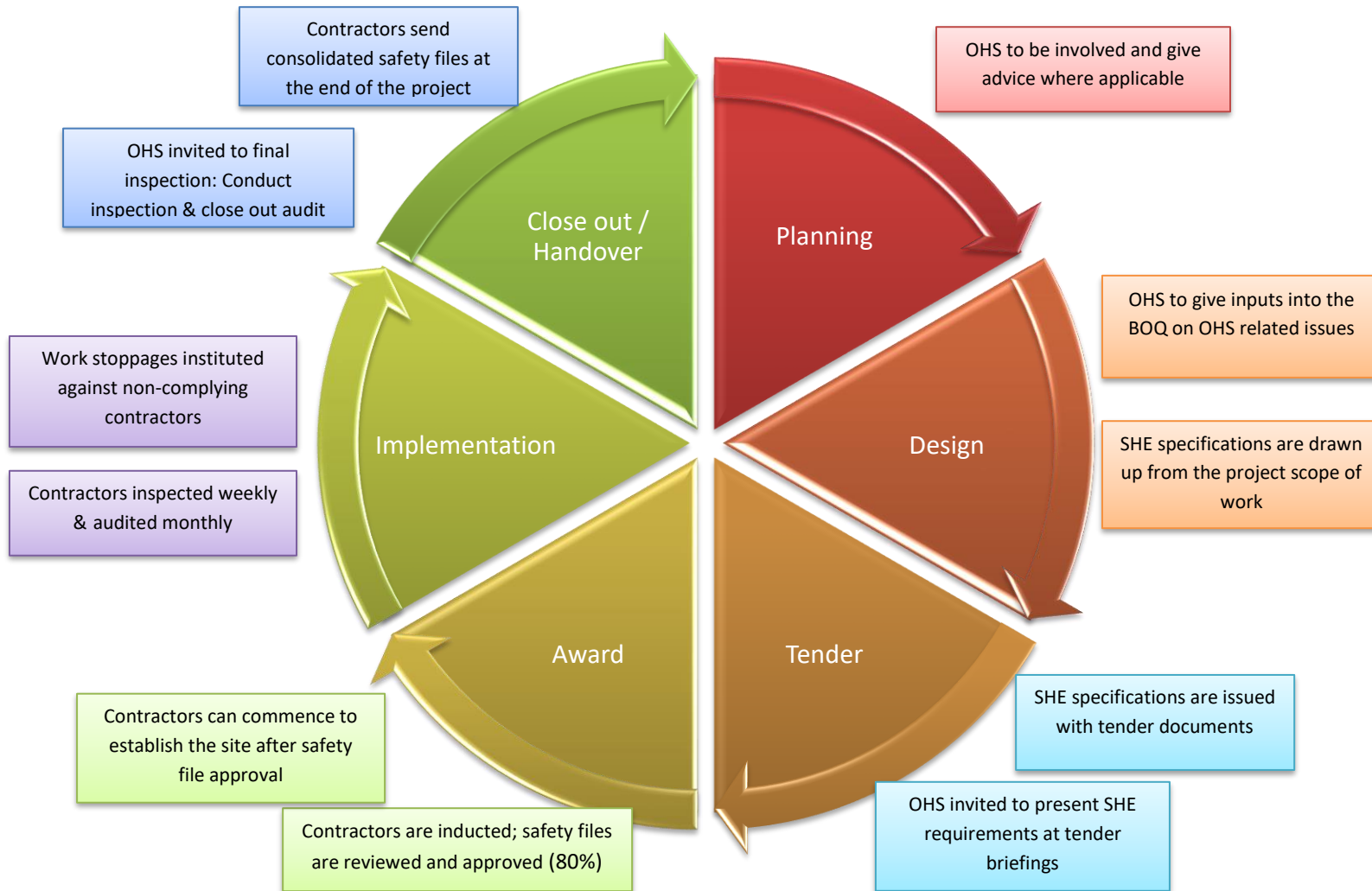
The contractor management process consists of the following phases:

- Tender briefing and tender documentation;
- Competency evaluation of Principal Contractors (integrated into Supply Chain Management processes);
- Appointed contractor to attend SHE system induction;
- Preparation of SHE File by Principal Contractor;
- Evaluation of SHE File;
- Principal Contractor engagement phase;
- Project close-out and submission of consolidated Health & Safety File.



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2. SHE DOCUMENTATION

2.1 Safety file

The Principal Contractor will prepare a SHE File containing the processes / procedures and templates to be applied during the project period for the scope of work. The Principal Contractor will be evaluated during the contract period against the submitted SHE File.

At a minimum the SHE File will contain the following documentation:

- Notification of construction work to the relevant Department of Labour (stamped on each page)
- Scope of work to be performed;
- Personnel list (Principal Contractor employees);
- OH&S / SHE Policy and other Policies;
- Updated copy of the Occupational Health and Safety Act (Act no. 85 of 1993) and its Regulations; COIDA Act.
- Proof of valid registration and good standing with the Compensation Commissioner or another licensed Insurer;
- SHE Plan agreed with Johannesburg Water SOC Ltd.
- Approved risk assessments, review and monitoring plans and safe work procedures (method statements);
- A list of contractors (sub-contractors) including copies of the agreements between the parties and the type of work being done by each contractor;
- All written designations and appointments for project scope of work (CV and competency copies);
- Management structure (inclusive of OH&S responsibility & meeting structure);
- Induction training and site SHE rules;
- Occupational health and safety training matrix / plan;
- Arrangements with contractors and/or mandatories;
- Description of security measures;
- The following registers (as applicable to contract scope of work):
 - Accident and/or incident notifications, investigation & control register;
 - Occupational health and safety representatives inspection register;
 - Template for entry into confined space;
 - Toolbox talks pro-forma;
 - Fall protection inspections template;
 - First-aid box content template;
 - Record of first-aid treatment template;
 - Fire equipment inspection and maintenance template;
 - Ladder inspection template;
 - Machine safety inspections template (including machine guards, lock-outs etcetera);
 - Inspection templates for lifting machines and –tackle (including daily inspections by drivers/operators);
 - Inspection templates of scaffolding;
 - Inspections templates of structures;
 - Templates of issuing of Personal Protective Equipment;
 - Monthly reporting and recording of statistics templates;
 - Keeping of any other record in terms of applicable legislation falling within the scope of SHE Legislation applicable to the project and the Principal Contractor / Contractor's activities and organization.
- Emergency preparedness and response programmes;
- Medical examination tests

2.2 Principal contractor appointment

- The principal contractor will be appointed in terms of Construction Regulations 2014, Reg 5(1) k
- All responsibilities imposed on the contractor by the Regulations will be applicable
- The duties will include:
 - a) Prepare a site specific SHE file based on client SHE specification and project scope.

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- b) Have an updated Letter of Good standing.
- c) Ensure the necessary legal appointment letters are compiled and signed by affected parties.
- d) Ensure SHE file submitted before work commences to Johannesburg Water for evaluation and approval.
- e) Must ensure an organizational medical programme for its employees is in place. This must address pre-employment, periodic examination, and exit examinations.
- f) Ensure all employees undergo medical examination and are declared fit for the job they are employed for by a Medical Practitioner.
- g) All employees undergo his control undergo company specific induction and Johannesburg water induction.
- h) Ensure before work commences employees are trained on the health and safety risks associated with the work they are conducting.
- i) Ensure employees are trained on company procedures, policies, method statements and informed of the Johannesburg Water SHE requirements as per the specification.
- j) Ensure legislative requirements are complied with during the duration of the contract and ensure that their employees comply also.
- k) Sign the 37 (2) Agreement between Johannesburg Water and themselves before any work commences and kept on their SHE file.
- l) Ensure that 37(2) Agreement(s) are signed between themselves and their sub-contractors.
- m) Ensure that sub-contractors have valid Compensation Commissioner Letter of Good Standing.
- n) Have a disciplinary procedure to address those found to be transgressing requirements of SHE specification, SHE plan, site rules or any other OHS act and its Regulation requirement.
- o) Prevent any employee or visitor who is under the influence of any alcohol or drugs (in state of intoxication) from being allowed to site.
- p) Ensure the safety of employees who are taking legal medication.
- q) Must hand over a consolidated SHE file at the end of the contract.
- r) Stop his/her employees who are doing unsafe acts or who are creating an unsafe environment.
- s) Investigate all incidents and report to Johannesburg water and ensure all reportable incidents as per the legislative requirement are complied with.
- t) Ensure work is supervised by competent personnel and that work is done by competent employees.
- u) Ensure pre-task risk assessment is done by a competent person and that employees are informed of the pre-task risks and the risk control measures.
- v) Ensure tool box talks are conducted to communicate SHE issues in connection to the work being done and any other aspects.
- w) Ensure that appointed personnel as per the SHE file are executing their duties as per the legal appointment.
- x) Ensure first aid kit is made available in case of any emergency.
- y) Ensure that housekeeping is maintained in good condition and that materials are store/stacked properly in designated areas.
- z) Have sufficient waste receptacles and ensure the correct disposal of the different wastes.
- aa) Proof of hazardous waste disposal to be requested from disposal site and to be kept inside SHE file.
- bb) Take reasonable steps to ensure that each appointed sub-contractor health and safety plan is implemented and maintained on the site and SHE File documentation is up to date.
- cc) Stop any work from being executed which is not in accordance with the client's health and safety specification and the principal contractor's health and safety plan for the site or which poses a threat to the health and safety of persons.
- dd) Must maintain an up to date list of all the sub-contractors on site accountable to the principal contractor, the agreements between the parties and the type of work being done; and
- ee) Ensure that all his or her employees have a valid medical certificate of fitness.

2.3 37.2 Agreement

- Johannesburg Water will enter into a 37(2) Agreement with all the appointed contractors
- A copy of the 37(2) Agreement must be kept in the SHE file of the contractor at all times.
- It is the responsibility of the contractor to ensure that there are 37(2) agreements between themselves and all their appointed sub-contractors.

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2.4 SHE Plan

- The contractor shall prepare a SHE plan to address and manage all applicable sources of risk that are identified during the execution of the project. The SHE plan shall incorporate the requirements as listed in the SHE specification.
- A copy of the SHE plan shall be submitted together with SHE file for review and approval.
- It is the contractor responsibility to ensure they sub-contractor compiles a SHE plan that in line with the SHE specification requirement of Johannesburg Water.

2.5 Legislative framework

All contractors shall comply with legislation pertaining to this contract, including but not limited to:

- Constitution of the Republic of South Africa
- Occupational Health and Safety Act and its associated Regulations
- National Environmental Management Framework Legislation
- National Road Traffic Act
- Applicable South African National Standards (SANS)
- Compensation of Occupational Injuries and Diseases Act (COID)
- Local by-laws and provincial ordinances

2.6 SHE Policy

A SHE policy is a statement of intent and a commitment by the organization Chief Executive or Managing Director (OHS Act 16(1) appointee) in relation to requirements applicable to their Safety, Health and Environmental legal obligation, relevant SHE roles and responsibilities, and contractual obligations to the Client.

The contractor and their sub-contractor companies shall each have a documented SHE Policy authorized by their Chief Executive/Managing Director (OHS Act Section 16 (1) Appointee). The SHE Policy must meet the following minimum requirements;

- Organizational Mission and Goal.
- State the overall SHE objectives within the project.
- Show commitment to the prevention of injuries and ill-health.
- Show commitment to the protection of environment and the conservation of natural resources.
- Must be reviewed at predetermined intervals, or when there is change in work process, serious incident occurs.
- The SHE Policy must be in line with ISO 45001 and ISO 14001 requirements and guidance documentation.
- Must be authorized by contractor CEO.

2.7 Appointments and competencies

- The contractor and its appointed sub-contractor must make the relevant legislative and non-statutory appointments, which must be maintained valid for the entire contract duration.
- All appointees shall be suitably trained and certified competent for the responsibilities they are assigned for.
- Copies of all relevant appointments and the relevant competence certificates must be kept in the relevant SHE file.

2.8 Supervision of construction work

- The principal contractor shall ensure that the construction manager and construction health and safety officer are appointed for a **single site** on a full time basis.
- In the event that the appointed Safety Officer / Construction Manager cannot come to work for more than 5 days, the contractor must ensure that a substitute is appointed until they are back on site.
- JW should be informed in writing of the absence of the above-mentioned on site.

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Appointment index

Appointment	Legislative Ref	Competency requirements (Min)
Alternate Construction Manager	CR 8.1	N.Dip Eng + 4yrs exp
Assistant Construction Manager	CR 8.2	N.Dip Eng + 4yrs exp
Assistant Construction Supervisor	CR 8.8	-
Bulk mixing plant	CR 20	Certificate
Confined Space Supervisor	GSR 5	Certificate + Proven experience
Construction Manager	CR 8.1	N.Dip Eng + 4yrs exp Full time on site
Construction Health, Safety & Environmental Officer	CR 8.5 & JW Requirement	N.Dip Safety + 2yrs exp; OR N.Dip Enviro + 3yrs exp; OR NEBOSH / SAMTRAC + 4yrs exp Full time on site Experience in enviro / certificate In the process of registration with SACPCMP as CHSO
Construction supervisor	CR 8.7	3 yrs experience
Construction vehicle & mobile plant supervisor	CR 23.1	Certificate
Electrical installation and appliances inspector	CR 24	
Emergency, security and fire coordinator	CR 29	Certificate
Excavation supervisor (including piling)	CR 13	3yrs exp / N.Dip building
Fall protection supervisor	CR 10.1	Certificate
First-aiders	GSR 3	Certificate
Fire fighting equipment inspector	CR 29	Certificate
General Machinery Supervisor	GMR 2.1/7	GCC (GMR 2.1)/ 3yrs exp (GMR 2.7)
Temporary work supervisor (Formwork)	CR 12.2	N.Dip building + 4yrs exp
Hazardous chemical substances supervisor	HCS Regs	Certificate
Incident investigator	GAR 9.2	Certificate
Ladder inspector	GSR 13A	-
Lifting machines and equipment inspector	DMR 18.5	Certificate + 3yrs experience
Materials hoist inspector	CR 19.8	Certificate
Occupational health and safety committee	OHS Act 19	-
Occupational health and safety representatives	OHS Act 17	Certificate
Risk assessor	CR 9.1	Certificate
Stacking and storage supervisor	CR 28	Certificate
Structures supervisor	CR 11.2	N.Dip building + 4yrs exp
Suspended platform supervisor	CR 17.1	Certificate
Welding supervisor	GSR 9	Certificate

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2.9 Insurances

- The principal contractor and all his appointed contractors shall be registered with an appropriate compensation commissioner and have available a valid letter of good standing at all times.
- The obligation lies with the contractor to ensure that the Letter of Good Standing remains valid throughout the entire duration of the project.
- A copy of the said letter must be filed in all SHE files and made available during inspections and audits.

2.10 Costing for SHE

The contractor is responsible for ensuring that SHE costing is taken into consideration for the entire project/contract as this will ensure they comply with the SHE legislative requirements.

2.11 Sub-contractors

- Whenever the Principal Contractor appoints contractors or sub-contractors, it is a requirement that an Occupational Health and Safety Act (Act no. 85 of 1993) Section 37(2) agreement (i.e. Agreement with Mandatory) is entered into between the Principal Contractor and Contractors.
- The Principal Contractor will ensure that all appointed contractors comply with the Johannesburg Water SOC Ltd SHE Specification requirements.
- The Principal Contractor will establish a procedure on sub-contractor management and assurance on compliance to the established procedure will be provided to Johannesburg Water SOC Ltd on a monthly basis.
- Principal Contractors are required to formally notify Johannesburg Water SOC Ltd before appointing subcontractors.
- Johannesburg Water SOC Ltd shall approve all specialist subcontractors to be appointed and/or engaged by the Principal Contractor.

The Principal Contractor shall:

- Ensure prior to work commencing on the site that every contractor is registered and in good standing with the compensation fund or with a licensed compensation insurer as contemplated in the Compensation for Occupational Injuries and Diseases Act, 1993;
- Appoint each contractor in writing for the part of the project on the construction site;
- Take reasonable steps to ensure that each contractor's health and safety plan is implemented and maintained on the construction site;
- Ensure that the periodic site audits and document verification are conducted at intervals mutually agreed upon between the principal contractor and any contractor, but at least once every 30 days;
- Stop any contractor from executing construction work which is not in accordance with the client's health and safety specifications and the principal contractor's health and safety plan for the site or which poses a threat to the health and safety of persons;
- Include and make available a comprehensive and updated list of all the contractors on site accountable to the principal contractor, the agreements between the parties and the type of work being done; and
- Ensure that all his or her employees have a valid medical certificate of fitness specific to the construction work to be performed and issued by an occupational health practitioner in the form of Annexure 3.

2.12 Notification of construction work

- The Principal Contractor shall, before carrying out any work, notify the relevant Department of Labour of the intention to carry out construction work and use the form (*Annexure 2 in the Construction Regulations 2014*) for this purpose.
- Only a certified copy stamped (each page) by the Department of Labour will be acceptable. No faxed or emailed notifications will be accepted.
- No work shall commence before the Principal Contractor has submitted notification of construction work to the relevant Department of Labour.
- Johannesburg Water SOC Ltd will not approve the OHS File if no original stamped / certified copy of the notification of construction work has been done.

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2.13 Construction work permit

- The construction work permit will not be required based on the project value and duration of the project. The notification of construction work will be required instead.

3. ORGANISATIONAL STRUCTURE

- The contractor shall develop and submit together with SHE file an organizational organogram related to the contractor, listing all the levels of responsibility from the Chief Executive down to the supervisor(s) responsible for the project.
- The organogram diagram must list all relevant positions, names of appointees and legal appointments.
- The contractor is responsible for updating the organogram timeously when there are changes to the appointments.
- All appointed sub-contractors are also required to compile their own organograms.

4. COMMITMENT TO SHE

- Visible commitment is essential to providing a safe working environment.
- Managers, supervisors and employees at all levels must demonstrate their commitment by being proactively involved in the day to day SHE operations.
- Legislation requires that each employee takes reasonable care of themselves and their fellow workers

5. HIRA

Annexure 1: List of possible hazards emanating from projects and activities conducted for or on behalf of Johannesburg Water SOC Ltd includes an assessment of site specific health and safety hazards and risks and environmental aspects and impacts that have been identified by Johannesburg Water SOC Ltd as possibly applicable to the contract work for this project. It is by no means exhaustive and is offered as assistance to the tenderers and contractors.

Development of risk assessments

Every Contractor performing construction work shall, before the commencement of any construction work or work associated with the construction work, and during construction work, ensure that a risk assessment is undertaken by a competent person, appointed in writing, and the risk assessment shall form part of the SHE plan to be applied on the site. Risk assessments shall identify occupational health and safety hazards and risks and environmental aspects and impacts emanating from the activity to be performed by the Principal Contractor / Contractor.

The risk assessment (inclusive of impact assessment) shall include (at a minimum):

- Identification of the relevant Johannesburg Water SOC Ltd Project with regard to JW Number, Project name and area;
- Date on which risk assessments were conducted / reviewed;
- The identification of the risks / hazards and aspects / impacts to which persons may be exposed to per activity;
- The analysis and evaluation of the risks / hazards and aspects / impacts identified;
- Existing control measures and proposed corrective measures;
- A plan to review the risk assessments as the work progresses and changes are introduced;
- Identification of significant risks (e.g. high; exceeding 75%);
- A documented plan of Safe Working Procedures (SWP)', and its relevance to the risk assessment, inclusive of method statements, to mitigate, reduce or control the risks and hazards that have been identified;
- A plan to monitor the application of the Safe Working Procedures (SWP);
- Signature of appointed competent person conducting risk assessment; and
- Signature of approval by Principal Contractor management and employees involved in risk assessment.

Based on the risk assessments, the Principal Contractor must develop a set of site-specific occupational SHE rules that will be applied to regulate the health, safety and environmental hazards/aspects of the construction work.

The risk assessments, together with the site-specific occupational health and safety rules, must be submitted to Johannesburg Water SOC Ltd before mobilisation on site commences. These will be included in the SHE plan. The

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Contractor shall ensure through his risk management process the hierarchy of controls stipulated as follows, are implemented:

- **Eliminate** - The complete elimination of the hazard.
- **Substitute** - Replacing the material or process with a less hazardous one.
- **Redesign** - Redesign the equipment or work process.
- **Separate** - Isolating the hazard by guarding or enclosing it.
- **Administrate** - Providing control such as training, procedures etc.
- **Personal Protective Equipment (PPE)** - Use of appropriate and properly fitted PPE where other controls are not practical. (PPE as the last resort)

The Principal Contractor will be required to carry out the following three forms of risk assessment:

- Baseline risk assessment;
- Issue based risk assessment;
- Continuous risk assessments.

Baseline risk assessments

The Principal Contractor is required to develop a baseline risk assessment taking the resources, competency levels, nature and scale of their organization into consideration for submission during SHE File evaluation phase. The hazards and risks to which persons, plant, vehicles and facilities may be exposed during the construction should be identified and evaluated. The aspects and impacts resulting in environmental pollution or degradation should also be identified and evaluated. Measures to reduce or control these risks or hazards should be defined during this assessment. The effectiveness of the measures defined and the baseline risk assessment prepared shall be monitored and reviewed from time to time to ensure that it remains relevant and accurate.

Issue based risk assessments

The Contractor will be required to carry out separate risk assessments during construction of the project when methods and procedures are varied, for example when:

- Designs are amended;
- New machines are introduced;
- Plant is periodically cleaned and maintained;
- Plant is started-up or shut-down;
- Systems of work change or operations alter;
- Indents or near-misses occur; or
- Technological developments invalidate prior risk assessments.

Continuous risk assessments

The Occupational Health and Safety Act (Act no. 85 of 1993) specifically requires that employers shall provide and maintain working environments that are safe and without risk to health. The general awareness of hazards needs to be raised as work ethic to maintain a safe and risk free environment on an on-going basis. This is achieved by continuous risk assessments, a form of risk assessment that takes place as an integral part of day-to-day management. Examples of continuous risk assessments include:

- Maintaining general hazard awareness, and
- Pre-work risk assessments / Daily Safety Task Instructions.

Occupational health and safety risks or environmental impacts that are identified during the risk assessment process shall be communicated before the commencement of the said activity to every employee whose work is associated with the risk. Each employee shall sign to confirm understanding of the safety, health or environmental risks in the tasks.

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Review of risk assessments

The Principal Contractor is required to review the hazards identified, the risk assessments and the Safe Work Procedures as the contract work develops and progresses and each time changes are made to the designs, plans and construction methods and/or processes. Revisions to the approved risk assessments and Safe Work Procedures will be presented at each production planning and progress meeting.

Risk assessments are to be reviewed whenever there is change on the scope of work, process, and accidents or when required by Johannesburg Water SOC Ltd

The Principal Contractor must provide Johannesburg Water SOC Ltd, other contractors and all other concerned or affected parties with copies of any changes, alterations or amendments to risk assessments and Safe Work Procedures within 14 days of such changes.

6. SAFE WORK PROCEDURES / METHOD STATEMENTS

Method statements or written safe work procedures shall be documented for all high risk activities:

- Design change or scope change/addition
- Change in job or task
- Introduction of new machinery, equipment or substance.

Method statements or written safe work procedures shall identify following:

- Tasks that are to be undertaken
- The hazards and associated risks of the task(s)
- The control measures for the task(s)
- The equipment and substances that are associated with task(s)
- Any training or qualification needed to do the task
- Personal protective equipment to be worn.

7. INCIDENT MANAGEMENT

7.1 Reporting of accidents and incidents

The Principal Contractor must report all incidents where an employee is injured on duty to the extent that he:

- Dies
- Becomes unconscious
- Loses a limb or part of a limb
- Is injured or becomes ill to such a degree that he is likely either to die or to suffer a permanent physical defect or likely to be unable for a period of at least 14 days either to work or continue with the activity for which he was usually employed

Or where -

- A major incident occurred
- The health or safety of any person was endangered
- Where a dangerous substance was spilled
- The uncontrolled release of any substance under pressure took place
- Machinery or any part of machinery fractured or failed resulting in flying, falling or uncontrolled moving objects
- Machinery ran out of control

to Johannesburg Water SOC Ltd within two days and to the Provincial Director of the Department of Labour within seven days from date of incident (Section 24 of the Occupational Health and Safety Act (Act no. 85 of 1993) and General Administrative Regulations), except that, where a person has died, has become unconscious for any reason or has lost a limb or part of a limb or may die or suffer a permanent physical defect, the incident must be reported to both Johannesburg Water SOC Ltd and the Provincial Director of the Department of Labour forthwith by telephone, telefax or e-mail.

- All other reports required by this specification must also be completed. Reporting of accidents / incidents to Johannesburg Water SOC Ltd will be on the prescribed format.

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- The Principal Contractor is required to provide Johannesburg Water SOC Ltd with copies of all statutory reports required in terms of the Occupational Health and Safety Act (Act no. 85 of 1993) within 7 days of the incident occurring.
- The Principal Contractor is required to provide Johannesburg Water SOC Ltd with copies of all internal and external accident/incident investigation reports, within 7 days of the incident occurring.

7.2 Accident and incident investigation

- The Principal Contractor is responsible for the investigation of all accidents and/or incidents where employees and non-employees were injured to the extent that they had to receive medical treatment other than first aid.
- The results of the investigation are to be entered into the accident and/or incident register. The Principal Contractor is responsible for the investigation of all incidents, including those described in Section 24 (1) (b) and (c) of the Occupational Health and Safety Act (Act no. 85 of 1993) and for keeping a record of the results of the investigations including the steps taken to prevent similar accidents in future.
- The Principal Contractor is responsible for the investigation of all road traffic accidents, related to the construction activities, and for keeping a record of the results of the investigations including the steps taken to prevent similar accidents in future.
- Johannesburg Water SOC Ltd reserves the right to hold its own investigation into an incident or call for an independent external investigation.

7.3 Close out

- All incident investigation reports will be closed out once all the recommendations to prevent further incidents have been implemented.
- A copy of the investigation report must be handed to JW Safety Officer conducting the investigation.

8. MEDICAL SCREENING REQUIREMENTS

- The Principal Contractor shall ensure that a medical surveillance programme is implemented for all employees.
- An initial health evaluation shall be carried out by an occupational health practitioner immediately, before after a person commences employment, where any exposure exists or may exist, which comprises:
 - an evaluation of the employees medical and occupational history;
 - a physical examination; and
 - any other essential examination which in the opinion of the occupational health practitioner is desirable in order to enable the practitioner to do a proper evaluation.
- Medical surveillance and immunisation shall be done accredited at / by institutions or occupational health personnel, including, but not limited to:
 - Audiograms.
 - A cardio-respiratory examination / Lung function test;
 - Chest X-rays
 - Eye/ sight tests.
 - A general physical examination;
 - A review of previous medical history.
 - Glucose levels
 - Blood pressure
- An entry medical certificate shall be obtained for all workers prior to commencing with site activities from approved medical institution. Copies of all medical certificates shall be retained in the SHE File prior to site establishment and before an employee is allowed to come onto site.
- Specific attention shall be given to the physical and psychological fitness of people who will be required to work in elevated positions and operators of mobile machinery.

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- An exit medical certificate shall be obtained for all workers at the end of the contract and for all workers who leave the employment of the Contractor before the end of the Project. Copies of all exit medical certificates shall be submitted to the Johannesburg Water SOC Ltd Project Specialist or Appointed OHS Agent.

9 EMERGENCY MANAGEMENT

The Principal Contractor must appoint a competent person to act as emergency controller and/or coordinator.

The Principal Contractor must conduct an emergency identification exercise and establish what emergencies could possibly develop. He must then develop detailed contingency plans and emergency procedures, taking into account any emergency plan that Johannesburg Water SOC Ltd may have in place.

In the event where a contractor incorporates the services of a 3rd party service provider for the provision of Emergency Response Services, the following criteria must be met:

- Identification of 3rd party emergency response services (organization & contact details);
- Notification of contractor to 3rd party emergency response service of incorporation of services into contractor's emergency response plan (written agreement / signed letter).

The Principal Contractor and the other contractors must hold regular practice drills of contingency plans and emergency procedures to test them and familiarise employees with them.

First-aid

The Principal Contractor must provide first-aid equipment (including a stretcher) and have qualified first-aiders(s) on site as required by General Safety Regulations promulgated in terms of the Occupational Health and Safety Act (Act no. 85 of 1993).

The contingency plan of the Principal Contractor must include arrangements for the speedy and timeous transporting of injured and/or ill person(s) to a medical facility or of getting emergency medical aid to person(s) who may require it.

The Principal Contractor must have written arrangements in place with his other contractors regarding the responsibility of the other contractors towards their own injured and/or ill employees.

10 SHE TRAINING

All employees in jobs requiring training in terms of the Occupational Health and Safety Act (Act no 85 of 1993) and any other applicable legislative requirements are to be in possession of valid proof of training. Other occupational health, safety and environmental training requirements of the Occupational Health and Safety Act (Act no 85 of 1993) and Construction Regulations can include:

- General induction;
- Site and job specific induction, including visitors;
- Occupational health and safety representatives;
- Training of the legal and nominated appointees;
- Operators and drivers of construction vehicles and mobile plant;
- Basic fire prevention and protection;
- Basic first-aid;
- Storekeeping methods and safe stacking; and
- Emergency planning and coordination
- Incident investigation
- Risk Assessment
- Planned job observations (supervisors)

All operators, drivers and users of construction vehicles, mobile plant and other equipment are to be in possession of valid proof of training and, where applicable, valid licenses.

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12.1 General Job training

The contractor is required to ensure that before an employee commences work their direct supervisor or line manager who is responsible for the employee has informed the employees of his scope of authority, hazards and risks associated with the work to be performed as well as the safety control measure(s). This will involve discussion in connection with any work standard, job description or company policy or procedure.

12.2 Awareness and promotion

The Principal Contractor is required to have a promotion and awareness programme in place to create an occupational health and safety culture within employees. The following are some of the methods that may be used:

- Toolbox talks;
- Posters;
- Videos;
- Competitions;
- Suggestion schemes;
- Participative employee activities such as “occupational health and safety circles”.

The Principal Contractor is, at a minimum, required to provide awareness programmes to employees on the following:

- General Health and Safety Awareness
- Environmental Awareness;
- HIV / AIDS awareness.

12.3 General competence requirement

The Principal Contractor shall ensure that his personnel and other contractors' personnel are trained and competent to carry out work safely and without risk to health has been completed before work commences. The Principal Contractor shall ensure that follow-up and refresher training is conducted as the work progresses and whenever the scope or nature of the work changes.

A “**competent person**” in relation to construction work, means any person having the knowledge, training and experience specific to the work or task being performed: Provided that where appropriate qualifications and training are registered in terms of the provisions of the South African Qualifications Authority Act, 1995 (Act No. 58 of 1995), these qualifications and training shall be deemed to be the required qualifications and training. It is the responsibility of the Contractor to determine whether any appropriate qualifications and training are registered in terms of the provisions of the South African Qualifications Authority Act.

Records of all training must be kept in the SHE File. The contents of the file will be audited from time to time.

At a minimum, the Principal Contractor will provide training on Safe Work Procedures / Safe Operating Standards to personnel responsible for performing the related task. Records of training on Safe Work Procedures / Safe Operating Standards will be retained. Competence and skill levels by the employees responsible for performing the task on the implementation of the Safe Work Procedures / Safe Operating Standards will be measured through Planned Job Observations.

12.4 Site-specific induction training

The Principal Contractor will be required to develop a project specific induction-training course based on the baseline risk assessment for the contract work. He will ensure that all his employees and other contractors and their employees have received training on the submitted induction-training programme.

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All employees of the principal and other contractors are to be in possession of proof (on person) that they have attended a site-specific occupational health and safety induction-training course.

No contractor shall allow or permit any employee, visitor or any other person to enter the site, unless such employee or person has undergone health, safety and environmental induction training pertaining to the hazards prevalent on the site at the time of entry.

Where the Principal Contractor is required to operate within Johannesburg Water SOC Ltd Depot's the Principal Contractor will ensure that all employees undergo the Johannesburg Water SOC Ltd induction.

11 PPE REQUIREMENTS

- The Principal Contractor is required to continuously identify the hazards in the workplace and deal with them. He must either remove them or, where impracticable take steps to protect workers and make it possible for them to work safely and without risk to health under the hazardous conditions.
- The Principal Contractor will establish a Personal Protective Equipment Policy and a Personal Protective Equipment study will be conducted to determine the types of Personal Protective Equipment (PPE) to be supplied related to the hazards and risks emanating from the tasks.
- Cognisance shall be given to the gender of individuals required to where PPE; size required by the employee and size issued.
- Personal protective equipment should, however, be the last resort and there should always first be an attempt to apply engineering and other solutions to mitigating hazardous situations before the issuing of personal protective equipment is considered.
- Where it is not possible to create an absolutely safe and healthy workplace the Principal Contractor is required to inform employees regarding this and issue, free of charge, suitable equipment to protect them from any hazards being present and that allows them to work safely and without risk to health in the hazardous environment.
- It is a further requirement that the Principal Contractor maintains the equipment, instructs and trains the employees in the use of the equipment and ensures that the employees use the prescribed equipment.
- Employees do not have the right to refuse to use and/or wear the equipment prescribed by the employer and, if it is impossible for an employee to use or wear the prescribed protective equipment through health or any other reason, the employee cannot be allowed to continue working under the hazardous condition(s) for which the equipment was prescribed. An alternative solution has to be found that may include relocating the employee.
- The Principal Contractor may not charge any fee for protective equipment prescribed by him but may charge for equipment under the following conditions:
 - Where the employee requests additional issue in excess of what is prescribed;
 - Where the employee has patently abused or neglected the equipment leading to early failure; and
 - Where the employee has lost the equipment.

All employees shall, as a minimum, be required to wear the following personal protective equipment on any of Johannesburg Water SOC Ltd's projects:

- Protective overalls;
- Protective footwear;
- Protective headwear; and
- Eye, face and ear protection.
- NO SHORTS OR DRESSES WILL BE ALLOWED ON SITE!!!

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All Personal Protective Equipment will clearly display the branding components of the Principal Contractor's organization (e.g. Name of Organization, logo).

12 DISCIPLINARY PROCESSES

- The contractor is required to implement disciplinary process in order to enforce compliance with requirements.
- All sub-contractors are required to have the same.

13 SITE RULES

- The Principal Contractor must develop a set of site-specific OH&S rules that will be applied to regulate the Health and Safety Plan and associated aspects of the construction.
- When required for a site by law, visitors and non-employees upon entering the site shall be issued with the proper Personal Protective Equipment (PPE) as and when necessary.

14 PUBLIC HEALTH AND SAFETY

The Principal Contractor is responsible for ensuring that non-employees affected by the construction work are made aware of the dangers likely to arise from the construction work as well as the precautionary measures to be observed to avoid or minimise those dangers. This includes:

- Non- employees entering the site for whatever reason;
- The surrounding community; and
- Passers-by the site.
- The Principal Contractor shall organize the site in such a manner that pedestrians and vehicles can move safely and without risks to health, including sufficient and suitable traffic routes and safe walkways with relevant signage.
- Appropriate signage must be posted to this effect and all employees on site must be instructed to ensure that non-employees are protected at all times.
- All non-employees entering the site must receive induction into the hazards and risks of the site and the control measures to be observed.
- The Principal Contractor shall recognize that the Community Liaison Officer (CLO) is the link between Johannesburg Water SOC Ltd and the community and provide all reasonable support to the Community Liaison Officer to ensure relevant responsibilities are fulfilled and positive relationships with the community are maintained.
- Where activities are performed close to public routes, the Principal Contractor will establish a traffic management plan incorporating the requirements of relevant by-laws. At a minimum, barricading, warning signage and flagmen will be provided to ensure the protection of workers from vehicles in transit. Where required, the Principal Contractor will interact with the local traffic department to establish minimum requirements to be implemented on public routes.

15 REFUSAL TO WORK

- Section 14 of the OHS Act states that employees shall carry out any lawful orders given to them, suggesting that they have the right to refuse to obey any unlawful order or work instruction.
- In terms of legal and JW requirements, if an employee has reasonable belief that the work to be carried out is likely to endanger themselves or other persons in any way, he/she has the right to refuse to work.
- An employee may also refuse to work in term of Section 29 of NEMA, if the work would result in imminent and serious threat to the environment.
- All contractors shall ensure that their employees are conversant with hazards associated with their work and work environment, and be aware of the precautionary measures to take.
- The contractor must ensure that all refusals to work are investigated promptly and resolved timeously.

16 SECURITY

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The Principal Contractor must establish site access rules and implement and maintain these throughout the construction period. Access control must, amongst other, include the rule that non-employees will not be allowed on site unaccompanied.

The Principal Contractor must develop a set of security rules and procedures and maintain these throughout the construction period.

The Principal Contractor shall:

- Provide a guardhouse for security personnel. The guardhouse should be in good condition and at-least meet minimum requirements as per Environmental Regulations for Workplaces as promulgated under the Occupational Health and Safety Act (Act no. 85 of 1993).
- Supply an access card containing the name, surname, employee number and photograph for all appointed employees (full or part time) for the site.
- Ensure that no person enters the construction site without wearing the necessary Personal Protective Equipment (PPE).
- Ensure that no children are allowed on the construction site.
- Ensure that no family members are sleeping over on the construction site.
- Ensure that no pets are allowed on the construction site.

17 ACCOMMODATION ON SITE

No employees shall be accommodated on site.

18 WELFARE FACILITIES

The provision of toilets for each sex is required in terms of the National Building Regulations and Construction Regulation 28. Chemical toilets are allowed instead of the water borne sewerage type. Toilets have to be provided at a ratio of 1 toilet per 30 workers. The Principal Contractor shall provide flushing toilets on the construction premises.

- At least cold-water showers for each sex have to be provided at a ratio of 1 shower per 15 workers.
- Some form of screened off changing facility must be provided separately for each sex.
- Some form of eating facility sheltered from the sun, wind and rain must be provided.

The employer needs to provide his employees with the following:

- Potable water for drinking;
- Water and soap for hand washing
- Toilet paper

19 COMPLIANCE MONITORING

19.1 Inspections

- Contractors will be inspected at least once per week by the JW Project Inspectors.
- Feedback of the inspections will be issued immediately on work instructions, and a formal report sent within 7 days of conducting the inspection to all relevant stakeholders.
- Johannesburg Water SOC Ltd. reserves the right to conduct other ad-hoc assessments and inspections as deemed necessary.
- This may include, amongst other measures, site safety walks. Corrective actions will be identified by Johannesburg Water SOC Ltd. and the Principal Contractor's representative and implemented by the Principal Contractor (at no cost to Johannesburg Water SOC Ltd.) to ensure SHE Performance improvement.

19.2 Monthly audits

- Monthly audits will be conducted within periods not exceeding 30 days.

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- The Principal Contractor is to conduct his own monthly internal audits and inspections to verify compliance with his own occupational health and safety plan and management system as well as compliance with the requirements of the Johannesburg Water SOC Ltd. SHE Specification.
- The Principal Contractor will also assess and inspect the compliance of other contractors under its control. Management members of the Principal Contractor will be involved in the internal assessments and inspections.

19.3 Monthly compliance rating

A monthly compliance rating will be calculated for each Principal Contractor as per a formula determined by Johannesburg Water SOC Ltd focussing on or incorporating outcomes of assurance (e.g. monthly audit), operational (e.g. behavioural based safety inspection) assessments and other requirements, as necessary. Johannesburg Water SOC Ltd reserves the right to adjust the monthly compliance calculation formula as and when required – each revision of the monthly compliance calculation formula will be communicated to the Principal Contractor before implementation.

Each Principal Contractor is required to maintain a minimum compliance rating of 93% (Ninety Three Percent).

Scoring	Classification	Classification description
93% -100%	Good	Substantial compliance
80% -92%	Average	Compliance status needs to be improved
60% - 79%	Poor	Methods to ensure compliance require substantial improvement - operations with substantial non-compliance risks
<60%	Very poor	Methods to ensure compliance failed completely - troubled operation with severe non-compliance risks

19.4 Work stoppages

Work stoppages will be identified for 2 (two) types of work stoppages to be implemented:

- Overall work stoppage – the Principal Contractor and its Contractors are not allowed to continue with any type of construction / site work up until the work stoppage has been closed-out;
- Activity work stoppage – The Principal Contractor and its Contractors are not allowed to continue with the specific activity / task / job up until the work stoppage has been closed-out.

Overall work stoppages will be issued where non-conformances are identified against the criteria in the following table.

NR	DESCRIPTION OF AUDIT NON-CONFORMANCE / NON-COMPLIANCE
1	NOTIFICATION OF CONSTRUCTION WORK
1.1	Local Department of Labour not notified of construction work before commencement of construction activities
1.2	Notification of construction work not stamped by local Department of Labour (no faxed copies)
1.3	Copy of notification of construction work not available on site
2	PROOF OF REGISTRATION WITH COMPENSATION COMMISSIONER
2.1	Proof of registration with Compensation Commissioner or other insurer not available
2.2	Registration with Compensation Commissioner or other insurer not valid and up-to-date

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NR	DESCRIPTION OF AUDIT NON-CONFORMANCE / NON-COMPLIANCE
3	POLICY COMMITMENT & SHE SPECIFICATION
3.1	SHE Plan not compiled, approved by contractor management and available on site
4	SECTION 37(2) AGREEMENT
4.1	Signed section 37(2) Agreement not signed and available on site
5	RISK ASSESSMENTS
5.1	Risk assessments not developed/ not applicable to scope of work issued by Client
6	CONSTRUCTION MANAGER
6.1	No construction manager appointed / available on site
6.2	Appointed construction manager does not meet requirements
6.3	Proof of competency not available on-site
7	SITE SAFETY OFFICER
7.1	No safety officer appointed/ available on site
7.2	Safety officer does not meet requirements
8	SHE FILE
8.1	No file on site

Activity work stoppages will be issued where non-conformance are identified per activity where the health and safety of employees or the public is compromised.

20.4 Non-compliance management process

The following actions will be instituted where non-conformances are identified in terms of compliance to relevant legislative requirements and the Johannesburg Water SOC Ltd SHE Specification.

CRITERIA	ACTION TO BE INSTITUTED	RESPONSIBLE PARTY
Compliance rating: 93-100%	Non-conformance closure	Principal Contractor / Contractor
Compliance rating: 80-92%	Letter of compliance improvement to Principal Contractor	Johannesburg Water SOC Ltd
	Non-conformance closure	Principal Contractor / Contractor
Compliance rating: 60-79%	Non-compliance hearing	Johannesburg Water SOC Ltd
	Letter of commitment for performance improvement	Principal Contractor / Contractor
	Non-conformance closure	Principal Contractor / Contractor
Compliance rating: <60%	Non-compliance hearing	Johannesburg Water SOC Ltd
	Letter of commitment for performance improvement	Principal Contractor / Contractor

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CRITERIA	ACTION TO BE INSTITUTED	RESPONSIBLE PARTY
3 x Work stoppages	Non-conformance closure	Principal Contractor / Contractor
	Supply Chain Management to be informed of non-compliance standing	Johannesburg Water SOC Ltd
	Non-compliance hearing	Johannesburg Water SOC Ltd
	Letter of commitment for performance improvement	Principal Contractor / Contractor
3 x Non-conformance to <93% monthly compliance rating	Non-conformance closure	Principal Contractor / Contractor
	Supply Chain Management to be informed of non-compliance standing	Johannesburg Water SOC Ltd
	Non-compliance hearing	Johannesburg Water SOC Ltd
	Letter of commitment for performance improvement	Principal Contractor / Contractor
3 x consecutive repeat findings	Non-conformance closure	Principal Contractor / Contractor
	Supply Chain Management to be informed of non-compliance standing	Johannesburg Water SOC Ltd
	Non-compliance hearing	Johannesburg Water SOC Ltd
	Letter of commitment for performance improvement	Principal Contractor / Contractor
	Non-conformance closure	Principal Contractor / Contractor
	Escalation to SCMU & CAPEX	Johannesburg Water SOC Ltd

20 OPERATIONAL REQUIREMENTS

20.1 EXCAVATIONS

- Where excavations will exceed 1.5 m in depth the contractor will be required to submit a method statement to Johannesburg Water SOC Ltd for approval before commencing with the excavation and Johannesburg Water SOC Ltd will issue a permit to proceed once the risk assessment and method statement is approved.
- Excavations must be limited to 100m per day, or equated to the amount of work to be done for the day.
- All open excavations shall be closed within 3 days of excavation. No excavation will remain open beyond 3 days or during holidays.
- Excavation work must be carried out under the supervision of a competent person, who has been appointed in writing, with at least two years' experience in excavation work. Before excavation work begins the stability of the ground must be evaluated.
- Whilst excavation work is being performed, the contractor must take suitable and sufficient steps to prevent any person from being buried or trapped by a fall or dislodgement of material.
- No person may be required or permitted to work in an excavation that has not been adequately shored or braced.
- Where the excavation is in stable material and where the sides of the excavation are sloped back to at least the angle of repose of the excavated material, shoring or bracing may be left out but only after written permission has been obtained from the appointed competent person.
- Shoring and bracing must be designed and constructed to safely support the sides of the excavation.

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- Where uncertainty exists regarding the stability of the soil the opinion of a competent professional engineer or professional technologist must be obtained whose opinion will be decisive. The opinion must be in writing and signed by the engineer or technologist as well as the appointed competent person.
- No load or material may be placed near the edge of an excavation unless suitable shoring has been installed to be able to carry the additional load.
- Neighbouring/adjoining buildings, structures or roads that may be affected or endangered by the excavation must be suitably protected.
- Every excavation must be provided with means of access that must be within 6 metres of any worker within the excavation.
- The location and nature of any existing services such as water, electricity, gas etc. must be established before any excavation is commenced with and any service that may be affected by the excavation must be protected and made safe for workers in the excavation.
- The appointed competent person must inspect every excavation, including the shoring and bracing or any other method to prevent collapse, as follows:
 - Daily before work commences
 - After every blasting operation
 - After an unexpected collapse of the excavation
 - After substantial damage to any supports
 - After rain
- The results of any inspections must be recorded in a register kept on site and in the safety file.
- Every excavation accessible to the public or that is adjacent to a public road or thoroughfare or that threatens the safety of persons, must be adequately barricaded or fenced to at least one meter high and as close to the excavation as practicable, regardless of the depth of the excavation.
- Every excavation must be provided with warning lights or visible boundary indicators after dark or when visibility is poor.
- Upon entering an excavation the requirements of General Safety Regulation 5, work in confined spaces, must be observed:
- Any confined space may only be entered after the air quality has been tested to ensure that it is safe to breathe and does not contain any flammable or noxious air mixture.
- The confined space must be purged and ventilated of any hazardous or flammable gas, vapour, dust or fumes.
- The safe atmosphere must be maintained and, where necessary.
 - Employees are to be provided with breathing apparatus and must wear a safety harness with a rope with the free end of the rope being continuously attended to by a person outside the confined space.
- Furthermore, an additional person, trained in resuscitation, to be in full-time attendance immediately outside the confined space.
- Additional serviceable breathing and rescue apparatus is kept immediately outside the confined space for rescue purposes.
- All pipes, ducts etc. that may leak into the confined space to be blanked off sufficiently to prevent any leakage or seepage.
- The employer must ensure that all employees have left the confined space after the completion of work.
- Where flammable gas is present in a confined space no work may be performed in close proximity to the flammable atmosphere.
- Excavations and other openings must be provided with sufficient barriers to prevent construction vehicles and mobile plant from falling into them.

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- Excavations left open for extended periods of time (exceeding 72 hours) must be approved by the relevant Engineer / Client Agent.

20.2 EXISTING SERVICES

- The Contractor shall note that although the drawings have been prepared using available information they show only the approximate positions of existing services where applicable.
- The information is supplied in good faith but shall be used as a guide only and does not relieve the Contractor of his responsibility to exercise due caution when working in areas where existing services can reasonably be expected, nor his obligation to liaise with the authorities in this regard and the obtaining of the necessary work permits and wayleaves.
- The Contractor shall be responsible to locate and safeguard any existing service he may encounter during construction. The Contractor shall be responsible for any damage to such existing services and works in the execution of this contract and shall reimburse the Employer, authority or the owner concerned for any repairs required following damages due to the Contractor's negligence.
- The Contractor shall be responsible for immediately notifying the Engineer and the authorities concerned regarding any damage caused to public services and existing works.
- Any alterations to public services shall be carried out by the Authority concerned unless the Contractor is instructed otherwise.

20.3 SETTING OUT OF 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 datum 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

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adjusted by the authorized agents before the commencement of the contract and subsequently when required by the Engineer and when otherwise necessary.

- 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.

20.4 CONFINED SPACE ENTRY

- Enclosed space work necessitates a Confined Space Permit. This may only be obtained from the authorized person nominated in writing.
- The responsibility for safe procedure, both at the time of entry and during the entire operation of entering and working in confined spaces, rests with the Contractor.
- The Contractor shall be sure that adequate steps have been taken to eliminate or control hazards.
- Before working in an area that contains dust, the area is to be ventilated and hosed down to settle and dampen the dust.
- The Contractor shall provide all necessary equipment to manage confined spaces, including all necessary monitoring and rescue equipment (such as tripods, breathing equipment and the like).
- The Contractor shall ensure all persons working in a confined space or managing entry to a confined space are appropriately trained.
- Compulsory - Continuous monitoring, trained rescue teams, radio communication & adequate ventilation.

20.5 BARRICADING

- Barricading plans are to be presented by the Principal Contractor for any major operations involving site works for approval by Johannesburg Water SOC Ltd. Where areas are unsafe, they should be enclosed with barricading. Examples are people working overhead, welding splatter etc.
- Where there is a risk of injury, the area should be barricaded off with secure solid barricades.
- Barricading for the prevention of access into areas with a potential risk of injury shall as a minimum be constructed of a handrail, knee-rail and appropriately supported as to prevent any person from falling into the restricted/risk area.
- Appropriate signage shall be affixed to the barricade indicating the risk associated (i.e. deep excavation, lifting operations etc.) and the responsible Supervisor and contact details shall be displayed. All barricading shall have a "No Entry" signs on all sides and at each change of direction. Signage shall be placed at 20 m intervals where lengths exceed. All signage shall be a minimum size of 290 mm x 290 mm.
- Danger tape shall not be utilised to prevent personnel from entering into areas.
- Where no risk exists of injury to personnel such as stacking and storage areas, the use of wire for hand and knee rails netting shall be acceptable to demarcate the area.
- All barricades will have a dedicated entrance where it is required that personnel enter the areas.
- Appropriate signage shall be placed at the entrance indicating which Contractor has right of entry.
- It is the Contractor's responsibility to remove all redundant barricades directly after use. The Contractor's Safety Officers will maintain a marked-up site plan indicating where barricades are erected.
- It will be a requirement that the contractor protects employees against contact with exposed rebar and poles by the installation of rebar-caps on all exposed areas where there is a potential that an employee could be injured.

20.6 SYMBOLIC SIGNAGE

Contractors shall use mandatory and prescribed symbolic safety signs at their lay down and site areas. The display of the following signs is mandatory:

- "Radio-Active Material" symbolic signs at radioactive storage areas.

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- “Eye Protection” symbolic signs shall be displayed at all grinding machines and at any area where it is mandatory to wear eye protection or where there is danger of an eye injury being sustained.
- “Ear Protection” symbolic signs shall be displayed at all areas where there is a danger of noise induced hearing loss being sustained.
- Every separate room of a workplace shall be consecutively numbered.
- All toilets or urinals shall be marked in a conspicuous place with painted or stencilled letters to indicate the sex for which they are intended.
- The location of every first aid box is to be clearly indicated by means of a sign.
- In any room, cabinet or enclosure where flammable substances are used or stored shall be fixed a suitable and conspicuous sign prohibiting smoking or the use of naked flames in the area.
- At the entrance to premises where machinery is used
- Restricted access on “Authorised Person Only” signs on entry. “No person shall enter the workplace or premises without the permission of the employer or user of the machinery”.
- At every place where machinery is used a notice (English & Pictograms) shall be posted.
- Explosive Power Tool shall have a sign warning people when it is in use.
- Electrical Control Gear. A notice shall be posted so as to warn against the re-closing of a switch of control gear whilst a person is working on such equipment.
- Emergency contact telephone numbers.
- Adequate scaffolding signs. (When applicable).
- Adequate fire fighting equipment signs.
- Speed limit signs.
- Warning notices at openings through which people may fall.
- Risk based signage depending on the task being performed e.g.:
 - “Men working above”, “Men working below”, “Road closed – detour”, “Excavation in progress”, “No walkway” etc.;
- No-entry signs to incomplete platforms

The Principal Contractor shall install a notification board indicating the following information at the site entrance:

- Johannesburg Water SOC Ltd project number;
- Principal Contractor identification details (name, telephone number)
- Name and contact details of Construction Supervisor;
- Name and contact details of site safety officer;
- Monthly compliance rating;
- Lost Time Injury Rate;

The Principal Contractor will ensure that information on the notification board is kept up-to-date.

20.7 USE AND STORAGE OF FLAMMABLES

The Principal Contractor to ensure that:

- No person is required or permitted to work in a place where there is the danger of fire or an explosion due to flammable vapours being present unless adequate precautions are taken;
- No flammable material is used or applied e.g. in spray painting, unless in a room or cabinet or other enclosure specially designed and constructed for the purpose unless there is no danger of fire or explosion due to the application of adequate ventilation;
- The workplace is effectively ventilated. Where this cannot be achieved:
 - Employees must wear suitable respiratory equipment
 - No smoking or other source of ignition is allowed in the area
 - The area is conspicuously demarcated as “flammable”
- Flammables stored on a construction site are stored in a well-ventilated, reasonably fire-resistant container, cage or room that is kept locked with access control measures in place. Sufficient fire fighting equipment is installed and fire prevention methods practiced. Proper housekeeping may achieve this;
- Flammables stored in a permanent flammable store are stored so that no fire or explosion is caused.

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- Stored in a locked and well-ventilated reasonably fire resistant container, cage or room conspicuously demarcated as “Flammable Store – No Smoking or Naked Lights”
- The flammables store to be constructed of two-hour fire retardant walls and roof and separated from adjoining rooms or workplaces by means of a two-hour fire retardant fire wall
- Adequate and suitable fire fighting equipment installed around the flammables store and marked with the prescribed signs
- All electrical switches and fittings to be of a flameproof design
- Any work done with tools in a flammable store or work areas to be of a non-sparking nature
- No Class A combustibles such as paper, cardboard, wood, plastic, straw and the like to be stored together with flammables
- The flammable store to be designed and constructed such that in the event of spillage of liquids the store is able to contain the full quantity + 10% of the liquids stored
- A sign indicating the capacity of the store to be displayed on the door
- Only one day’s quantity of flammable is to be kept in the workplace;
- Containers (including empty containers) to be kept closed to prevent fumes/vapours from escaping and accumulating in low lying areas;
- Metal containers to be bonded to earth whilst decanting to prevent build-up of static forces; and
- Welding and other flammable gases to be stored segregated according to the type of gas and empty and full cylinders.

20.8 HAZARDOUS CHEMICAL SUBSTANCES

The Principal Contractor must ensure that:

- Employees receive the necessary information and training to be able to use and store hazardous chemical substances safely;
- Employees obey lawful instructions regarding:
 - The wearing and use of protective equipment
 - The use and storage of hazardous chemical substances
 - The prevention of the release of hazardous chemical substances
 - The wearing of exposure monitoring and measuring equipment
 - The cleaning up and disposal of materials containing hazardous chemical substances
 - Housekeeping, personal hygiene and the protection of the environment
- The risk assessments required in terms of Construction Regulation include employee exposure to hazardous chemical substances and that the necessary measures be taken to protect persons from being detrimentally affected by hazardous chemical substances present or used in the workplace;
- Suppliers provide the necessary information in the form of a material safety data sheet regarding a hazardous chemical substances required to ensure the safe use and storage of that substances;
- An up-to-date list is kept on site of hazardous chemical substances stored and used together with the material safety data sheet of the hazardous chemical substances;
- Hazardous chemical substances containers be clearly marked with the contents and main hazardous category e.g. “Flammable” or “Corrosive” and the reference number of the hazardous chemical substances on the list indicated above;
- Hazardous chemical substances, for example asbestos dust, are not cleared by using compressed air but should be vacuumed;
- No person eats or drinks in a hazardous chemical substances workplace; and
- Hazardous chemical substances waste is disposed of safely in terms of hazardous waste disposal requirements.
- MSDS’s to be in 16 point format- available on site

20.9 FIRE PREVENTION AND PROTECTION

The Principal Contractor must ensure that:

- The risk of fire is avoided;

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- Sufficient and suitable storage for flammables is provided;
- Sources of ignition are removed wherever flammable or highly combustible material is present in the workplace, for example:
 - Notices prohibiting smoking are displayed and enforced
 - Welding and flame cutting is only allowed under controlled conditions that includes written hot work permits
 - Only spark-free hand and power tools are used
 - No grinding, cutting and shaping of ferrous metals is allowed using electrically driven power tools that produce sparks
 - Flameproof switches and fittings are to be used in the flammable atmosphere
 - Good housekeeping is maintained to prevent the accumulation of unnecessary combustibles
 - Adequate ventilation is maintained
 - Adequate and suitable fixed and portable fire fighting equipment is provided and maintained in good working order.
- Maintenance must include:
 - Regular inspection of fire equipment by a competent person appointed in writing and keeping a register
 - Annual inspection and service by an accredited service provider
- All employees are instructed in the use of the fire fighting equipment and know how to attempt to extinguish a fire;
- A sufficient number of employees are appointed and trained to act as an emergency team to deal with fires and other emergencies;
- Employees are informed regarding emergency evacuation procedures and escape routes;
- Emergency escape routes are kept clear at all times and clearly marked;
- Evacuation assembly points are demarcated;
- Evacuation is practiced to ensure that all persons are evacuated timeously;
- Roll call is held after evacuation to account for all personnel and ensure that no-one has been left behind; and
- A siren or alarm is fitted which is clearly audible to all persons on site.

20.10 STACKING AND STORAGE

The Principal Contractor must ensure that:

- A competent person is appointed in writing to supervise all stacking and storage on a construction site;
- Adequate storage areas are provided and demarcated;
- The storage areas are kept neat and under control;
- The base of any stack is level and capable of sustaining the weight exerted on it by the stack;
- The items in the lower layers can support the weight exerted by the top layers;
- Cartons and other containers that may become unstable due to wet conditions are kept dry;
- Pallets and containers are in good condition and no material is allowed to spill out;
- The height of any stack does not exceed 3 times the base unless stepped back at least half the depth of a single container at least every fifth tier or the approval of an inspector has been obtained to build the stacks higher with the aid of a machine. The operator of the machine must be protected against items falling from overhead off the stack and no items may overhang;
- The articles that make up a single tier are consistently of the same size, shape and mass;
- Structures for supporting stacks are structurally sound and able to support the mass of the stack;
- No articles are removed from the bottom of the stack first but from the top tier first;
- Anybody climbing onto a stack must do it in a safe manner, taking reasonable safety precautions, and ensuring that the stack is stable and capable of supporting him or her
- Stacks that are in danger of collapsing are broken down and restacked;
- Stability of stacks are not threatened by vehicles or other moving plant and machinery;
- Stacks are built in a header and stretcher fashion and that corners are securely bonded;
- Stacks are stepped back at least half the depth of a single container at least every fifth tier; and
- Persons climbing onto stacks do not approach unguarded moving machinery or electrical installations.

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- Laydown area is allocated for Contractor-supplied items.
- At all times, the Contractor shall be responsible for the safe and adequate storage of all materials and equipment on site which he is to install, whether they are supplied by himself or others.
- The safe handling, unloading and loading of material receipts and dispatches at site or storage areas shall be the Contractors' responsibility.

The Contractor shall provide a suitable and adequate lock-up store for the storage of items of equipment and material, which would be damaged or pilfered if stored in the open. The Principal Contractor shall provide all facilities required for weather-proofing, dust proofing or vermin proofing.

The Contractor is responsible for the proper storage and maintenance of all equipment until issue of the Certificate of Practical Completion.

All equipment and materials will be stored on suitable wood poles or pallets which will not protrude more than a meter from any of the stored material. Safe access ways shall be maintained between all stored items preventing employees from having to climb over or under equipment to retrieve the necessary.

20.11 HOUSEKEEPING

The Principal Contractor to ensure that:

- Housekeeping is continuously implemented and maintained;
- Materials and equipment are properly stored;
- Scrap, waste and debris is removed regularly;
- Materials placed for use are placed safely and not allowed to accumulate or cause obstruction to the free-flow of pedestrians and vehicular traffic;
- Waste and debris not to be removed from heights by throwing but rather by chute or crane;
- Where practicable, construction sites are fenced off to prevent entry of unauthorised persons;
- Catch platforms or nets are erected over entry and exit ways or over places where persons are working to prevent them being struck by falling objects;
- An unimpeded work space is maintained for every employee;
- Every workplace is kept clean, orderly and free of tools, materials and the like that are not required for the work being done;
- As far as is practicable, every floor, walkway, stair, passage and gangway is kept in good state of repair, skid-free and free of obstruction, waste and materials;
- The walls and roof of every indoors workplace sound and leak-free; and
- Openings in floors, hatchways, stairways and open sides of floors or buildings are barricaded, fenced, boarded over or provided with protection to prevent persons from falling.

20.12 PUBLIC HEALTH AND SAFETY

The Principal Contractor is responsible for ensuring that non-employees affected by the construction work are made aware of the dangers likely to arise from the construction work as well as the precautionary measures to be observed to avoid or minimise those dangers. This includes:

- Non- employees entering the site for whatever reason;
- The surrounding community; and
- Passers-by the site.
- The Principal Contractor shall organize the site in such a manner that pedestrians and vehicles can move safely and without risks to health, including sufficient and suitable traffic routes and safe walkways with relevant signage.
- Appropriate signage must be posted to this effect and all employees on site must be instructed to ensure that non-employees are protected at all times. All non-employees entering the site must receive induction into the hazards and risks of the site and the control measures to be observed.

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- The Principal Contractor shall recognize that the Community Liaison Officer (CLO) is the link between Johannesburg Water SOC Ltd and the community and provide all reasonable support to the Community Liaison Officer to ensure relevant responsibilities are fulfilled and positive relationships with the community are maintained.

20.13 TRAFFIC MANAGEMENT

- Where activities are performed close to public routes, the Principal Contractor will establish a traffic management plan incorporating the requirements of relevant by-laws.
- At a minimum, barricading, warning signage and flagmen will be provided to ensure the protection of workers from vehicles in transit.
- Where required, the Principal Contractor will interact with the local traffic department to establish minimum requirements to be implemented on public routes.

20.14 HAND TOOLS

The Principal Contractor must inspect all hand tools before it is brought onto the site.

- As far as possible all hand tools must be numbered and placed on register to be inspected monthly by a person designated to do so.
- Any tools found to be in an unsafe condition must immediately be removed from service and either discarded or rectified.
- No chisels with "mushroomed" heads must be used.
- No hammer shall be used with a cracked or damaged handle.
- All files must be fitted with handles.
- All trolleys, pushcarts, etc. used on site must be identifiable, placed on register and inspected at least once every month.
- Non-sparking tools must be used in areas where the risk of fire or explosion is present.
- No homemade hand tools are allowed on the project.
- All tools shall be attached to a suitable lanyard when utilised in elevated positions

20.15 PORTABLE ELECTRICAL EQUIPMENT

Portable electrical tools and equipment includes every unit that takes electrical power from a 15 ampere plug point and is moved around for use in the workplace for example; drills, saws, grindstones, portable lights, etcetera. Other electrical appliances such as fridges, hotplates, heaters, and etcetera must be inspected and maintained to the same standards as portable electrical tools and appliances.

The use, inspection and maintenance of portable electrical tools and equipment shall be as follows:

- Periodical inspections must be carried out by a competent person appointed in writing;
- Inspection results must be recorded in a register;
- Only competent authorised persons are allowed to use portable electrical tools and equipment; and
- The correct protective equipment must be worn or used whilst operating portable electrical tools and equipment.

This equipment:

- Must be maintained in good condition at all times to prevent an electrical shock to the user;
- The main power source should incorporate an earth leakage protection device or receive power through a double wound transformer or be double insulated and clearly marked as such; and
- All equipment must be fitted with a switch to allow for safe and easy starting and stopping.

The following requirements apply to portable lights:

- Must be fitted with a robust non-hygroscopic non-conducting handle;
- Live metal parts or parts which may become live must be protected against contact;
- The lamp must be protected by a strong guard;

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- The cable lead-in must withstand rough handling;
- Inspections must be undertaken that concentrate on plug, cord, switch and any obvious faults;
- A register be kept for each piece of equipment with findings of regular inspections undertaken to evaluate the condition of these lights; and
- When used in wet/damp/metal container conditions, the lamp must be protected.

20.16 LIFTING EQUIPMENT & MACHINERY

Lifting equipment must be designed and constructed in accordance with the manufactures/designers specifications as well as generally accepted technical standards and operated, used, inspected and maintained in accordance with the manufactures requirements as well as that of the of Driven Machinery Regulations promulgated in terms of the Occupational Health and Safety Act (Act no 85 of 1993).

The Driven Machinery Regulations requires that:

- Lifting equipment is clearly and conspicuously marked with the maximum mass load (MML) that it is designed to carry safely. When the MML varies with the conditions of use a table showing the maximum mass load with respect to every variable condition shall be posted up by the user in a conspicuous, place easily visible to the operator and the table shall be used by the driver/operator;
- Each winch on a lifting machine must at all times have, at least, three full turns of rope on the drum when the winch has been run to its lowest limit;
- Lifting equipment shall be fitted with a brake or other device capable of holding the MML. This brake or device shall automatically prevent the downward movement of the load when the lifting power is interrupted;
- Lifting equipment shall be fitted with a load limiting device that automatically arrest the lift when the load reaches its highest safe position or when the mass of the load is greater than the MML;
- Every chain or rope on a lifting machine that forms an integral part of the machine must have a factor of safety as prescribed by the manufacturer of the machine. Where no standard is available the factor of safety must be:
 - chains – 4 (four)
 - steel wire ropes 5 (five)
 - fibre ropes- 10 (ten)
- Every hook or load attaching device must be designed to prevent the load from slipping off or disconnecting;
- Every lifting machine must be inspected and load tested by a competent person every time it has been dismantled and re-erected and every 12 months after that. The load test must be in accordance with the manufacturer's requirements or to 110% of the MML. In addition, all ropes, chains, hooks or other attaching devices, sheaves, brakes and safety devices forming an integral part of a lifting machine must be inspected every 6 months by a competent person;
- All maintenance, repairs, alterations and inspection results must be recorded in a log book and each lifting machine must have its own log book; and
- No person may be lifted by a lifting machine not designed for lifting persons unless in a cradle approved by the inspector of the Department of Labour.

General requirements for cranes and lifting equipment

All documentation must be provided to the Johannesburg Water SOC Ltd Project Engineer prior to mobilisation. Failure to do so and the resulting cost of any delays and/or remedial activities will be for the Contractor's account.

All crane operators must be authorised by the relevant Engineer before they may operate a crane or lifting machine. The Load charts must be displayed at the crane.

Daily pre-use inspections of the cranes must be done and be kept on the file. The inspections must be logged in a logbook. The area in which a lift is performed must always be barricaded to prevent employees from entering.

A crane or lifting machine must not be left unattended and the keys may never be left in the ignition when the operator is not present. Properly constructed out rigger pads must be used when soil is uneven or unstable. (Only sleepers or appropriately designed steel plate pads may be used for this purpose).

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Only a competent rigger may direct a lift of any kind unless the following requirements are met. Rigger assistants used for performing lifting operations shall be limited to lifts with all of the following requirements:

- Lifts lower than 5 tons
- Easy lifts that does not require the load to be lifted over structures, equipment or machinery
- Equipment that is not critical
- Rigging configuration that requires the attachment of several parts of lifting equipment such as chain blocks to adjust the angle of loads.
- All safety devices on a crane or lifting machine must be functional.

Certification will be required for record purpose, and shall cover the following:

- A Brake or other device capable of holding the maximum mass should the power fail, or which is such that it shall automatically prevent the uncontrolled downward movement of the load when the raising effort is interrupted; and
- A Limiting device which shall automatically arrest the driving effort when:
- The Hook or Load attachment point of the Power Driven lifting machine reaches its highest safe position; and
- In the case of a Winch Operated lifting machine with a lifting capacity of 5000kg or more, the load is greater than the rated mass load of such machine.

The user shall ensure that every lifting machine is operated by an Operator specifically trained for a particular type of lifting machine; the user shall not require or permit a person to operate such lifting machine unless the operator is in possession of a certificate of training, issued by an accredited person or organisation.

No Crane shall be used at arrival on site before copies of all documentation have been handed over to the Johannesburg Water SOC Ltd and the Crane have been checked by a person duly authorised and signed off as acceptable. Copies of all documentation shall be kept in the SHE File at all times.

No Crane shall be used without a pre-use check and findings entered on an approved checklist. Before any cranes are established on site the following must be inspected and approved:

- Operator's licences
- Training certificates
- Medical fitness certificate.
- The cranes load test certificate.
- Rope test certificates including Mill / Destructive test.
- The lifting gear load test certificates.
- The load limiting device calibration certificate.
- Proof that the hooks have been measured for spreading.
- The service inspection history.
- Monthly comprehensive inspection certificate
- Operation and maintenance Manuals and crane condition.

Cranes and Lifting Machines

A contractor shall ensure that where tower cranes are used:

- Account is taken of the effects of wind forces on the structure;
- Account is taken of the bearing capacity of the ground on which the tower crane is to stand;
- The bases for the tower cranes and tracks for rail-mounted tower cranes are firm and level;
- The tower cranes are erected at a safe distance from excavations;
- There is sufficient clear space available for erection, operation and dismantling;
- The tower crane operators are competent to carry out the work safely; and
- The tower crane operators are physically and psychologically fit to work in such an environment by being in possession of a medical certificate of fitness."

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No user shall use or permit any person to use a Jib-Crane with a lifting capacity of 5000kg or more at a minimum Jib radius, unless it is provided with:

- A load indicator that shall indicate to the operator of the Jib-Crane the mass of the load being lifted, provided that such a device shall not require manual adjustment from the application of the load, to the Jib-Crane, until the release of the load.
- A Limiting Device, which shall automatically arrest the driving effort whenever the load is lifted, is greater than the rated mass load of the Jib-Crane.

Mobile Crane near Power Lines

No mobile cranes are to be used near overhead power lines until the Johannesburg Water SOC Ltd representative has been notified and provided safe access conditions and a valid permit to work is obtained. Mobile cranes shall be effectively earthed when working in the vicinity of electrical wires. Assume that all electrical equipment and wires are live and avoid them.

Lifting tackle

The following requirements will apply to lifting tackle:

- Manufactured of sound material, well-constructed and free from patent defects;
- Clearly and conspicuously marked with an identity number;
- MML factor of safety:
 - Natural fibre ropes - 10(ten)
 - Man-made fibre ropes and woven webbing - 06(six)
 - Steel wire ropes – single rope - 06(six)
 - Steel wire ropes – combination slings - 08(eight)
 - Mild Steel chains - 05(five)
 - High tensile/alloy steel chains - 04(four)
- Steel wire ropes must be examined by a competent person every three months and the results recorded in a designated logbook. The ropes must be discarded (not used any further for lifting purposes) when wear and corrosion is evident.

20.17 LADDERS

The following requirements for ladders will apply:

- All ladders used on the site shall be constructed and used in compliance with the OH&S Act and Regulations.
- Ladders, which provide access to a working platform, shall extend one metre above the platform where it provides access, and shall be secured to prevent slipping.
- Timber ladders shall not be painted other than with clear preserving oils, clear varnishes or clear plastics.
- Ladders, which are in a damaged condition, shall not be used and shall be labelled accordingly and removed from the Premises.
- All Ladders shall be numbered, logged in a register, and inspected monthly.
- A ladder in use shall be held by an assistant and/or properly tied down in position.
- Only ladders that do not conduct electricity shall be used in live electrical sub-stations and switching rooms.
- Ladders shall be removed after use and stored in an appropriate facility as to not expose them unnecessarily to the elements or potential damage by surrounding activities.

20.18 CONSTRUCTION VEHICLES AND MOBILE PLANT

Johannesburg Water SOC Ltd will inspect construction vehicles and mobile plant prior to being allowed on a project site. Suppliers of hired vehicles, plant and equipment will be required to comply with this specification as well as the Occupational Health and Safety Act (Act no. 85 of 1993) and Regulations.

Construction vehicles and mobile plant to be:

- Of acceptable design and construction;

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- Maintained in good working order;
- Used in accordance with their design and intention for which they were designed;
- Operated and/or driven by trained, competent and authorised operators/drivers. No unauthorised persons are to be allowed to drive construction vehicles and mobile plant;
- Provided with safe and suitable means of access;
- Fitted with adequate signalling devices to make movement safe including reversing;
- Provided with roll-over protection (where applicable);
- Inspected daily before start-up by the driver, operator and/or user and the findings recorded in a register/log book;
- Fitted with two head and two tail lights that are in good working condition and must be used whilst operating under poor visibility conditions;
- When used for transporting persons must have seats firmly secured and sufficient for the number of persons being transported.

Operators and drivers of construction vehicles and mobile plant must be in possession of a valid medical certificate declaring the operator and/or driver physically and psychologically fit to operate or drive construction vehicles and mobile plant.

No loose tools, materials etc. are allowed in the driver and/or operators compartment/cabin or in the compartment in which any other persons are transported.

No person shall ride on any construction vehicle or mobile plant otherwise than in a safe place provided thereon for that purpose. Employees shall only be transported if provision for seating and safety belts has been provided with an adequate canopy or rollover protection.

All construction vehicles and mobile plant left unattended at night, adjacent to a freeway in normal use or adjacent to construction areas where work is in progress, must have appropriate lights or reflectors, or barricades equipped with appropriate lights or reflectors, in order to identify the location of the vehicles or plant.

Bulldozers, scrapers, loaders, and other similar mobile plant must, when being repaired or when not in use, be fully lowered or blocked with controls in a neutral position, motors stopped and brakes set.

Self-Propelled Mobile Machinery

All Self-Propelled Mobile Machinery must be inspected daily and the findings recorded in a register. Pre-use inspection checklist shall identify critical items that would stop the operator from operating machinery should a defect be detected.

All operators shall be tested on their ability to operate machinery and equipment inspected prior to be used on any of the premises by the Johannesburg Water SOC Ltd Project Inspectors and Responsible Engineer. Relief drivers shall be made available for mobile machinery where there is a need for on-going operations and the contractor shall establish a rotation schedule.

All Drivers/Operators shall be appointed under the applicable legislation prior to operating any type of mobile equipment or machinery:

- If Driver/Operator does not adhere to the rules and regulations his appointment as operator shall be cancelled and he shall not be able to carry on with his duty.
- No Driver/Operator shall be appointed without proof of training, driver's licence or letter of competency.
- No training of Drivers/Operators on Site.
- No passengers on dump truck, Loaders or Excavators.
- No eating or drinking allowed while operating equipment.
- No vehicle shall be left unattended with engine running or key in ignition.
- Drivers may use no cellular phones during operations.

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Equipment Approval

Authorization for the use of equipment shall be given in writing only after the following minimum requirements and documentation have been verified and shall as a minimum include the following:

- Minimum two lights in front and rear of vehicle
- Communications system (where required);
- Reflective Taping;
- First-aid kit, fire-fighting equipment and emergency roadside triangles;
- Tyres in good condition;
- Windscreen clear of cracks;
- Safety belts fitted for all occupants;
- Signage for clear identification;
- Windscreen wipers;
- Warning hooter and reverse alarm;
- Rotating warning lights (where applicable);
- Maximum number of persons indicated;
- Equipment free of oil and other leaks;
- Maintenance/Service & Equipment manuals available;

Operator Approval

Authorization for operators for the use of equipment shall be given in writing only after the following minimum requirements and documentation have been verified and shall as a minimum include the following:

- Operator's Certificate (accredited training organisation);
- Operators Licence appropriate to the nature of the Mobile equipment;
- Operator's knowledge tested and familiar with the controls for the vehicle;
- Public driver's permit where required;
- Medical fitness certificate.

20.19 Fall protection (Working in elevated positions)

A pre-emptive risk assessment will be required for any work to be carried out above **two metres** from the ground or any floor level. This work will be classified as "work in elevated positions".

As far as is practicable, any person working in an elevated position will work from a platform, ladder or other device that is at least as safe as if he is working at ground level. Whilst working in this position he shall be wearing a single belt with lanyard to prevent the person falling from the platform, ladder or other device. This safety belt will be, as far as is possible, secured to a point away from the edge over which the person might fall and the lanyard must be of such a length and strength that the person will not be able to move over the edge.

Alternatively, any platform, slab, deck or surface forming an edge over which a person may fall may be fitted with suitable guard rails at two different heights as prescribed in the relevant South African National Standard for the design, erection, use and inspection of access scaffolding.

Where the requirement in the paragraph above is not practicable, the person will be provided with a full body harness that will be worn at all times and shall be attached above the wearer's head at all times. The lanyard must be fitted with a shock-absorbing device or the person must be attached to a fall arrest system (anchorage connector; body wear; and connecting device) approved by Johannesburg Water SOC Ltd.

Where the requirements in the paragraph above are not practicable, a suitable catch net must be erected.

Employees working in elevated positions must be trained to work without risk to their health and safety or to the health and safety of others and be declared medically and psychologically fit to perform work at elevated positions.

Where work on roofs is carried out, the risk assessment must take into account the possibility of persons falling through fragile material, i.e. skylights and openings in the roof.

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20.20 Working in proximity to Eskom power lines

- No mechanical equipment, including mechanical excavators, may be used under or in close proximity to Eskom's services without the prior approval of Eskom's authorized representatives. No excavations may be executed closer than 3 meters from any of Eskom underground electric power cables and 10 meters from Eskom overhead electrical power lines unless Eskom authorized representative is on site.
- No excavations may take place closer than 5m from any overhead line infrastructure (poles and stays and only excavation by hand will be allowed. Only excavation by hand will be allowed on the same route and in close proximity to the Eskom's 132 kV cables.
- The use of explosives of any type within 500 meters of Eskom's services shall only occur with Eskom's previous written permission. If such permission is granted the applicant must give at least fourteen working days prior notice of the commencement of blasting. This allows time for arrangements to be made for supervision and/or precautionary instructions to be issued in terms of the blasting process.
- The contractor shall be liable for any death or injury to any person or for the loss of or damage to any property caused in whatsoever manner by the contractor, his employees, agents or sub-contractors. The contractor's attention is drawn to section 27(3) of the Electricity Act 1987.
- The contractor is advised to negotiate a proper route with the CNC (Customer Network Centre. Lat Long co-ordinates of all proposed routes to be provided on site and during the application process. The contractor is required to provide the same to the CNC on site during the signing of the Stakeholder On-Site Risk Identification Form.
- Parallel encroachment into overhead power line servitudes is limited to one meter from the boundary of the servitude. (Where applicable for underground pipelines only.)
- All Eskom servitudes to be kept clear of any obstacles and other services. No dumping, manholes and illegal structures whether occupied by equipment or humans, shall be allowed directly underneath or within Eskom servitude areas.
- Eskom Overhead Lines, Cables and Eskom Plant to be adequately protected against other services and water sources.
- Adequate protection fence should be installed around all Eskom Overhead Structures. The type of fence will be proposed and approved by Eskom CNC / Engineering as listed above.
- Interlocking bricks to be used along all roads and reserves as to ensure Eskom cables could be easily accessed for maintenance and repair / emergency purposes. No roads should be tarred with Eskom cables within the road.
- For developer projects and other works that might affect access to Eskom mini-sub, an appropriate fence with access / gate as approved by the CNC should be installed on street front side.
- The applicant shall ensure that the existing natural ground level is maintained within the Eskom servitude area and where Eskom cables are affected. Should there be a need for the lifting of lines and / or replacement of existing structures / cables and application should be made via **Eskom Customer Services**.
- The vertical clearance required between the road surface and the 11kV / 22kV power-lines shall be at least 6.4m. (Where applicable.)
- Eskom Plant and Cables to be protected from proposed landscaping i.e. no big trees and large plants / scrubs (large roots.) to be planted in close proximity to Eskom services.
- Construction / Amendment of boundary wall/s / fences to be closely monitored with guidance from the CNC – where walls / fences are in close proximity of Eskom Plant.
- At all entrances and road crossings, corrosion-free sleeves must be installed at least 600 mm below undisturbed ground level to provide for existing and future installation of Eskom cables. (Where applicable.)
- Cross trenches by hand need to be done for each road crossing on both sides of the road before the services are installed, to ensure Eskom services do not get damaged during drilling operations. For installations where the service will be installed parallel to Eskom services, cross trenches need to be done by hand at regular intervals, which is to be determined by site conditions and the Eskom PPM cables representative.
- The contractor must inform and update Eskom PPM cables on a weekly basis of the on-site work being planned and performed.

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- Equipment shall be regarded electrically live and therefore dangerous at all times.
- Eskom may stipulate any additional requirements to illuminate any possible exposure to Customers or Public to coming into contact or be exposed to any dangers of Eskom plant.
- Security must be on-site 24/7 when trenching and working in close proximity to the Eskom 132 kV cables
- Extra care must be taken when working in close proximity to the 132 kV cables. (Eskom's PPM cables can assist in identifying these cables on-site.)
- The contractor in charge of the construction or maintenance work on site must at all times be in possession of the Approved Wayleave letter of the affected Eskom services, as well as all plans related to the wayleave application. This should be available upon the request of any Eskom and Municipal official, during site visits. If no approval is presented, then the Eskom Official(s) can order that all work to be ceased until approval can be presented.

20.24 Horizontal Drilling

- All HDD work shall be carried out under the supervision of a competent person.
- All employees involved in HDD shall be trained.
- A risk assessment as well as a method statement for the HDD shall be compiled and submitted for approval by the Client.
- Contractor will submit specifications on directional boring equipment to be used to ensure that the equipment will be adequate to complete the project. Spares inventory shall be included
- The directional boring equipment shall consist of a directional boring rig of sufficient capacity to perform the bore and pullback the pipe, a boring fluid mixing & delivery system of sufficient capacity to successfully complete the crossing, a guidance system to accurately guide boring operations and trained and competent personnel to operate the system.
- All equipment shall be in good, safe operating condition with sufficient supplies, materials and spare parts on hand to maintain the system in good working order for the duration of this project.
- The directional boring machine shall consist of a hydraulically powered system to rotate, push and pull hollow drill pipe into the ground at a variable angle while delivering a pressurized fluid mixture to a guidable drill (bore) head.
- The machine shall be anchored to the ground to withstand the pulling, pushing and rotating pressure required to complete the crossing.
- The hydraulic power system shall be self-contained with sufficient pressure and volume to power boring operations.
- Hydraulic system shall be free of leaks.
- Rig shall have a system to monitor and record maximum pull-back pressure during pull-back operations.
- The rig shall be grounded during boring and pull-back operations.
- Sufficient spares shall be kept on hand for any break-downs which can be reasonably anticipated.
- The Guidance System shall be of a proven type and shall be setup and operated by personnel trained and experienced with this system.
- The Operator shall be aware of any magnetic anomalies and shall consider such influences in the operation of the guidance system if using a magnetic system.
- The Engineer must be notified 48 hours in advance of starting work.
- The Directional Bore shall not begin until the Engineer is present at the job site and agrees that proper preparations for the operation have been made.
- The Engineer approval for beginning the installation shall in no way relieve the Contractor of the ultimate responsibility for the satisfactory completion of the work as authorized under the Contract.
- It shall be the responsibility of Engineer to provide inspection personnel at such times as appropriate without causing undue hardship by reason of delay to the Contractor.

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20.26 WATER ENVIRONMENTS

- The contractor must ensure that where construction work is done over or in close proximity to water, provision is made for—
 - preventing persons from falling into water; and
 - the rescuing of persons in danger of drowning.
- The contractor must ensure that where a person is exposed to the risk of drowning by falling into the water, the person is provided with and wears a lifejacket.

22. Monthly reporting

- The Principal Contractor is required to provide Johannesburg Water SOC Ltd. with a monthly report in the format provided on the last working day of the month.
- The report will include the monthly man-hours, incidents, training, inductions, audits, etc

23. Project close out

- Upon completion of the project, the contractor is required to hand over a consolidated project file to the Client with all the working documents for retention.

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Returnable Annexure A: Acknowledgement of SHE Specification & Annexures

CONTRACTOR:	
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I, the undersigned, hereby acknowledge that I have obtained copies of the following listed documentation and confirm that I fully understand the contents thereof and the consequences of non-compliance. The Contractor furthermore reiterates its commitment to compliance of the requirements contained within the following provided documentation:

- Johannesburg Water SOC Ltd, Occupational Health and Safety Specification, Volume 2;
- Annexure 1: Baseline Risk Assessment
- Annexure 2: Medical Screening Policy

Signed at on this Day of 20.....

CONTRACT MANAGER			
NAME	DESIGNATION	DATE	SIGNATURE
CONTRACT SUPERVISOR			
NAME	DESIGNATION	DATE	SIGNATURE
WITNESS (1)			
NAME	DESIGNATION	DATE	SIGNATURE
WITNESS (2)			
NAME	DESIGNATION	DATE	SIGNATURE



OCCUPATIONAL HEALTH & SAFETY (OHS) SPECIFICATION: BASELINE RISK ASSESSMENT

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BASELINE RISK ASSESSMENT



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ACTIVITY: TRANSPORTATION OF MATERIALS TO SITE

Task	Hazard	Risk	Consequence	Rating	Controls
Transportation of material to site	✓ Unsafe road conditions ✓ Un-road worthy vehicles ✓ Equipment and material not safely secured ✓ Incompetent drivers ✓ Driving under the influence of alcohol ✓ Inclement weather ✓ Speeding ✓ Slippery road	✓ Overturning vehicles ✓ Vehicle collisions ✓ Bumping pedestrians / employees	✓ Injuries ✓ Property damages ✓ Third party liability	M	✓ Adherence to the speed limit ✓ Only competent/ authorized drivers should operate the vehicle ✓ Inspection of vehicles ✓ Equipment and material to be properly secured ✓ Alcohol testing to be done ✓ The road to be paved to prevent accidents ✓ Traffic control to be implemented to avoid collisions
Offloading of material	✓ Faulty lifting machinery & equipment ✓ Suspended load ✓ Poor housekeeping	✓ Malfunctioning ✓ Falling on employees ✓ Obstructed walkways by materials	✓ Injuries	M	✓ Inspect lifting equipment prior to use. ✓ Ensure the safe working load prior to use ✓ Train the employees in manual lifting ✓ Ensure proper housekeeping ✓ The correct PPE must be worn ✓ Designate the stacking areas and put signs ✓ Stacking and storage inspector must be appointed and in charge



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ACTIVITY: EXCAVATION

Task	Hazard	Risk	Consequence	Rating	Controls
Excavation	✓ Deep excavations	✓ Collapse ✓ Falling ✓ Unsafe entry and exit	Fatalities	H	✓ Geotechnical surveys to be conducted prior to construction ✓ Shoring of the excavation ✓ No unauthorised entry into the project site. ✓ Fencing off of the excavation and prompt supervision of the area. ✓ Full time security on site to monitor entry and exit. ✓ Safe method of entry and exit to be provided for employees ✓ Spoil material to be stored at least 2m away from the excavation ✓ Signage to be displayed indicating deep excavations
	✓ Incompetent operator ✓ Faulty excavator	✓ Overturning ✓ Bumping against people	✓ Serious injuries	H	✓ Only competent personnel may operate the excavator ✓ All excavators must be inspected prior to use
Mechanical excavation	✓ Ignition on	✓ Accidental movement	✓ Fatalities ✓ Property damages	H	✓ Operators should ensure that the ignition is off prior to leaving the plant. ✓ Keys should be removed from the ignition and returned to the office for safekeeping,



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ACTIVITY: EXCAVATION

Task	Hazard	Risk	Consequence	Rating	Controls
Mechanical excavation	✓ Deep excavation ✓ Lack of safety signage	✓ Employees falling into excavations	✓ Fatalities	H	✓ Ensure that deep excavation signage is placed and visible. ✓ Deep excavations must be fenced off and access controlled.
	✓ Spoil material	✓ Collapse of excavation walls. ✓ Entrapment	✓ Fatalities	H	✓ Excavated soil to be placed at least 2m away from the excavation wall.
	✓ Underground service	✓ Contact with plant	✓ Injuries ✓ Property damages ✓ Electrocution	H	✓ All underground services to be identified and marked prior to excavation.
	✓ Unsafe access and exit	✓ Falling	✓ Injuries	H	✓ TLB / Excavator may not be used by employees to access and exit the excavation



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ACTIVITY: CONTACT WITH UNDERGROUND SERVICES

Task	Hazard	Risk	Consequence	Rating	Controls
Working close to Eskom line	✓ High voltage	✓ Electrocution	✓ Fatalities ✓ Power cuts ✓ Property damages	H	✓ Proper scanning of services prior to starting with excavations ✓ Obtain wayleaves from Eskom prior to starting with work ✓ Do not use lifting equipment in close proximity to power lines unless authorized to do so. ✓ Appoint an OHRVS to supervise all work done in close proximity to power lines ✓ Contact Eskom if services are identified for isolation ✓ Develop a method statement and risk assessment ✓ Train employees in the method statement as well as risk assessment ✓ Develop emergency response procedures for explosions
Working close to gas lines	✓ Gas leaks	✓ Explosion ✓ Suffocation ✓ Inhalation	✓ Fatalities ✓ Property damages	H	✓ Proper scanning of services prior to starting with excavations ✓ Obtain wayleaves from service provider prior to starting with work ✓ Develop a method statement and risk assessment ✓ Develop emergency response procedures for leaks and explosions



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ACTIVITY: MECHANICAL LIFTING

Task	Hazard	Risk	Consequence	Rating	Controls
Lifting using a crane	✓ Overhead lines	✓ Contact with crane	✓ Electrocution ✓ Property damages	H	✓ All lifting activities to be planned at least 2m away from overhead lines ✓ Obtain wayleaves from Eskom ✓ Appoint ORHVS
	✓ Wind / Unfavourable weather	✓ Deflection ✓ Loss of control	✓ Injuries ✓ Property damages	H	✓ Do not use during unfavourable weather conditions
	✓ Incompetent operator	✓ Loss of control ✓ Hitting structures and people	✓ Injuries ✓ Property damages	H	✓ Only trained and competent operators may operate the crane
	✓ Overloading	✓ Collapse of material	✓ Injuries ✓ Property damages	H	✓ Display safe working load on the crane
	✓ Faulty crane	✓ Malfunctioning	✓ Injuries ✓ Property damages	H	✓ Cranes to be inspected by competent persons prior to being used ✓ All faulty cranes to be tagged and locked out



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ACTIVITY: PIPE LAYING & WELDING

Task	Hazard	Risk	Consequence	Rating	Controls
Pipe laying	✓ Steel ✓ Employees working around the excavation	✓ Static electricity ✓ Rough edges ✓ Heavy steel ✓ Hit by pipe	✓ Electrocution ✓ Injuries	M	✓ Ensure that pipes are earthed ✓ Provide gloves to employees ✓ Heavy pipes to be lifted mechanically
Pipe laying	✓ Crane	✓ Failure of the crane ✓ Employees	✓ Fatalities	H	✓ Inspect the crane prior to use. ✓ Only trained and competent person to operate the crane ✓ Employees to steer clear of lifting operations ✓ Faulty cranes to be tagged and not used ✓ Wind speed and direction to be considered before using the crane ✓ Crane to be load tested ✓ Only certified loads to be carried on the crane
Cutting	✓ High Noise Levels ✓ Cutting Grinder/Disc	✓ Vibration ✓ Cutting edges ✓ Eye penetration ✓ Finger cuts ✓ Expose to high noise level area ✓ Uncontrolled disc ✓ Electrical equipment failure ✓ Sharp edges	✓ Damaged hearing ✓ Carpal tunnel syndrome ✓ Cuts/ injuries ✓ Eye irritation / blindness ✓ Injuries ✓ Eye injuries	M	✓ Use hearing protection when exposed to excessive noise levels (greater than 85 dB over an 8-hour work period) ✓ Assess manual guide carefully to ensure correct usage of portable electrical devices.



OCCUPATIONAL HEALTH & SAFETY (OHS) SPECIFICATION: BASELINE RISK ASSESSMENT

PROJECT NUMBER:	RFQ 18-2023
PROJECT LOCATION:	Protea Glen Ext 11
PROJECT DESCR:	Repair, Test and commission the 900mm diameter HDPE Pipe

ACTIVITY: PIPE LAYING & WELDING

Task	Hazard	Risk	Consequence	Rating	Controls
Pipe installation next to the road	✓ Moving vehicles and pedestrians ✓ Improperly placed signage ✓ Incorrect signage displayed ✓ Poor communication between flagmen	✓ Road accidents ✓ People getting knocked down by cars	✓ Fatalities ✓ Serious injuries ✓ Property damages	H	✓ Adhere to traffic management procedures ✓ Proper training of flagpersons ✓ Ensure good communication between flagmen ✓ Display correct road signage, and put reflective barricades for additional visibility, especially at night and when it is dark / foggy. ✓ Employees should wear reflective PPE ✓ Keep area clean & clear of obstacles. ✓ Obtain wayleaves from the roads agency (JRA)
Pipe welding (Butt welding)	✓ Welding equipment	✓ Pinch points	✓ Injuries	L	✓ Welding equipment is visually checked before each use;
	✓ Welding equipment	✓ Heat	✓ Burns	L	✓ Provide employees with gloves ✓ Only trained employees to operate the butt welding machine ✓ Develop method statement for butt welding
Tie-ins & Pressure testing	✓ Pressurized water	✓ Hitting employees ✓ Burst	✓ Fatalities ✓ High water losses	E	✓ Ensure that the water is shut down ✓ Ensure that the correct class of pipe is used as well as valve specifications are correct ✓ Develop and follow a method statement. ✓ Use only competent person to perform the task. ✓ Don't exceed pipe operating pressure, ensure pipe is correct diameter and is not damaged.
Backfilling	✓ Soil	✓ Entrapment	✓ Serious injuries	M	✓ Backfilling to be done by mechanical means where excavations are deep ✓ No unauthorized entry



OCCUPATIONAL HEALTH & SAFETY (OHS) SPECIFICATION: BASELINE RISK ASSESSMENT

PROJECT NUMBER:	RFQ 18-2023
PROJECT LOCATION:	Protea Glen Ext 11
PROJECT DESCR:	Repair, Test and commission the 900mm diameter HDPE Pipe

ACTIVITY: PIPE LAYING & WELDING

Task	Hazard	Risk	Consequence	Rating	Controls
	✓ Unstable ground	✓ Excavation collapse	✓ Serious injuries ✓ Fatalities	H	✓ The correct types of backfilling material to be used for backfilling ✓ Ensure that backfilling is done according to relevant standards. ✓ Ensure that the area is well barricaded. ✓ Compaction tests to be done ✓ Put relevant signage ✓ No unauthorized entry to the construction site
Compacting	✓ Compactor ✓ Noise ✓ Dust ✓ Vibration	✓ Overexposure to noise and vibration ✓ Collapsing excavation wall ✓ Inhalation of dust	✓ Noise induced hearing loss ✓ Raynaud's Syndrome ✓ Injuries ✓ Respiratory problems	M	✓ Use of earmuffs by compactor operator ✓ Dust mask to be worn by compactor operator ✓ Compactor operator to be declared competent before using the machine ✓ Provide operator with anti-vibration gloves and provide rest periods in between. ✓



OCCUPATIONAL HEALTH & SAFETY (OHS) SPECIFICATION: BASELINE RISK ASSESSMENT

PROJECT NUMBER:	RFQ 18-2023
PROJECT LOCATION:	Protea Glen Ext 11
PROJECT DESCR:	Repair, Test and commission the 900mm diameter HDPE Pipe

ACTIVITY: GENERAL ACTIVITIES ON SITE

Task	Hazard	Risk	Consequence	Rating	Controls
✓ Working on site	✓ Unhappy community	✓ Community coming to survey site ✓ Violence against employees	✓ Property damages ✓ Serious injuries	H	✓ Develop an emergency response procedure ✓ Meet with the community and all stakeholders prior to commencement of the project ✓ Have the contact details of the nearest police station / JMPD offices
	✓ Unfavourable weather conditions	✓ Exposure to temperature extremes	✓ Heat exhaustion ✓ Frost bite	M	✓ Provide employees with water for cooling down. ✓ Provide employees with warm jackets and gloves during winter ✓ Provide 5-minute rest periods for every 30 minutes of exposure to temperature extremes. ✓ No work to be undertaken in rainy conditions
	✓ Housekeeping	✓ Trips and falls	✓ Injuries	M	✓ Ensure that proper housekeeping is maintained on site at all times.
✓ Working in open spaces	✓ Snakes	✓ Bites ✓ Poisoning	✓ Fatalities ✓ Serious injuries	H	✓ Inspect the area for snakes prior to entering ✓ Conduct snake awareness training ✓ Know the do's and don'ts of what to do when coming across snakes
✓ Working in open spaces	✓ Bees	✓ Bites	✓ Allergic reaction	M	✓ Inspect the area for bees / wasps prior to entering ✓ Conduct bees awareness training ✓ Know the do's and don'ts of what to do when coming across bees
✓ Working in open spaces	✓ Sharp objects	✓ Getting pricked by sharp objects	✓ Tetanus ✓ Injuries	M	✓ All employees to get Tetanus vaccination. ✓ Provide employees with proper safety boots



OCCUPATIONAL HEALTH & SAFETY (OHS) SPECIFICATION: BASELINE RISK ASSESSMENT

PROJECT NUMBER:	RFQ 18-2023
PROJECT LOCATION:	Protea Glen Ext 11
PROJECT DESCR:	Repair, Test and commission the 900mm diameter HDPE Pipe

ACTIVITY: GENERAL ACTIVITIES ON SITE

Task	Hazard	Risk	Consequence	Rating	Controls
✓ Working in open spaces	✓ Criminals	✓ Getting mugged ✓	✓ Loss of personal possession	M	✓ Personal belongings such as phones and car keys to be safely put in pockets while working. ✓ Employees to report any suspicious activities to the local police. ✓ Equipment to be safely stored while not in use
✓ Working in open spaces	✓ Criminals	✓ Employees being attacked	✓ Injuries ✓ Fatalities	H	✓ Ensure that employees do not work in isolation. ✓ Employees to report any suspicious activities to the local police. ✓ Develop an emergency response procedure
✓ Working in open spaces	✓ Open excavations	✓ Falling inside	✓ Injuries	M	✓ Employees to be vigilant while working on site
✓ Working in open spaces	✓ Water bodies	✓ Falling inside	✓ Serious injuries ✓ Fatalities	H	✓ Employees to be vigilant while working on site ✓ Emergency procedures to be developed

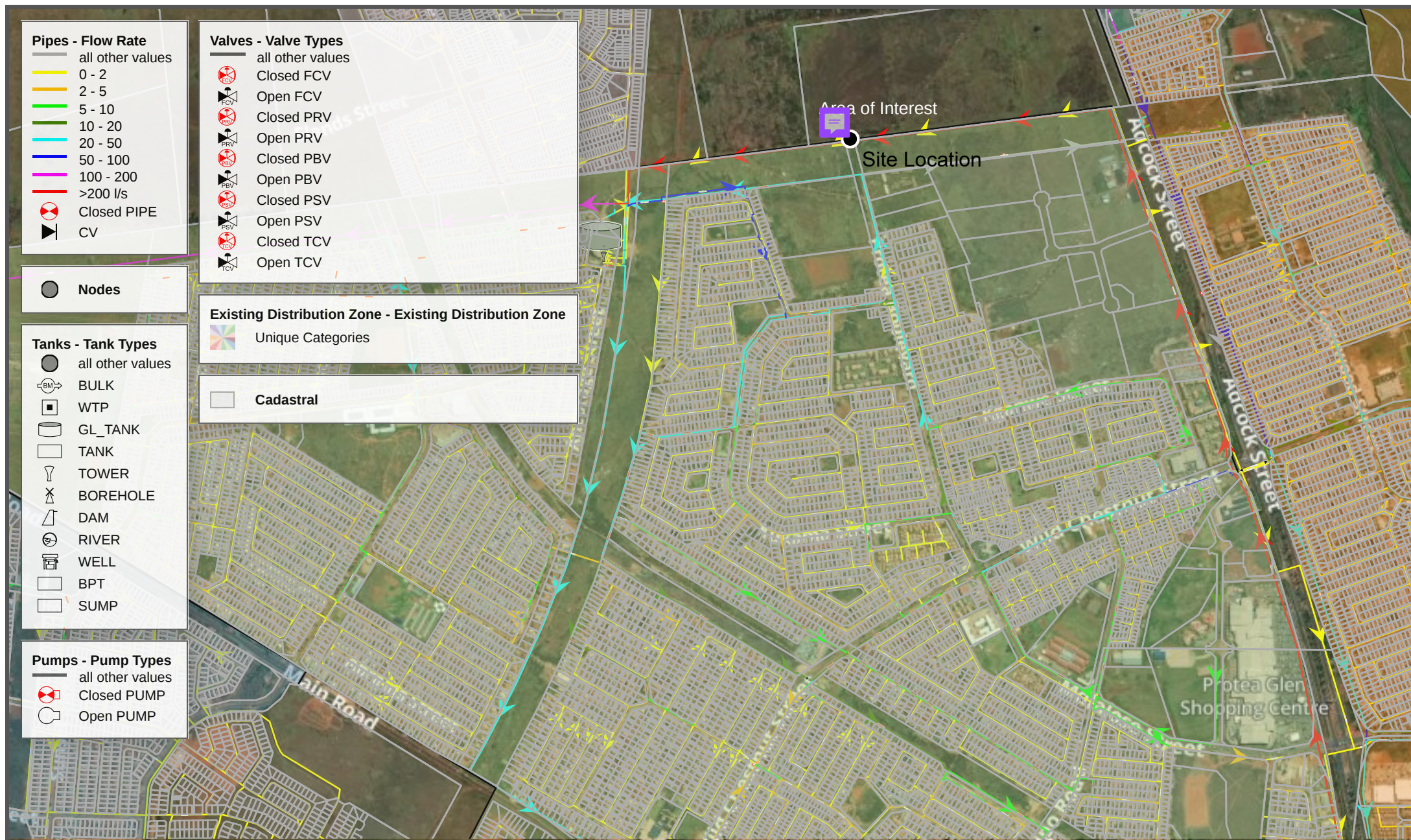


OCCUPATIONAL HEALTH & SAFETY (OHS) SPECIFICATION: BASELINE RISK ASSESSMENT

PROJECT NUMBER:	RFQ 18-2023
PROJECT LOCATION:	Protea Glen Ext 11
PROJECT DESCR:	Repair, Test and commission the 900mm diameter HDPE Pipe

RISK ASSESSMENT MATRIX

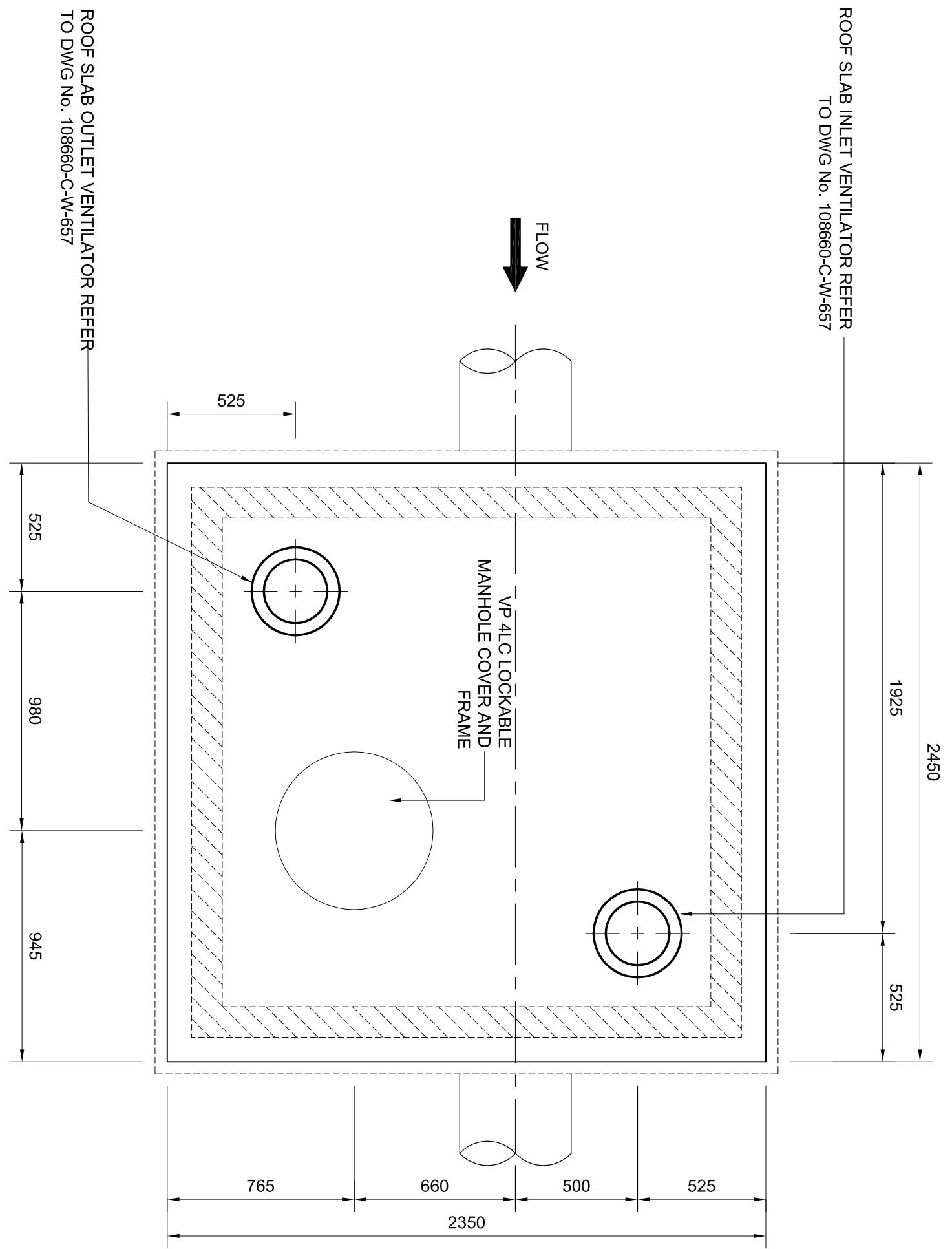
Likelihood	Consequences				
	Insignificant (minor problem easily handled by normal day to day processes)	Minor (Some disruption possible e.g., damage equal to R150k)	Moderate (significant time / resources required. E.g., damage equal to R500k)	Major (Operations severely damaged. E.g., damages equal to R1m)	Catastrophic (business survival is at risk. Damage equal to R5m – 10m)
Almost certain (90% chance)	High	High	Extreme	Extreme	Extreme
Likely (between 50-90%)	Moderate	High	High	Extreme	Extreme
Moderate (between 10-50%)	Low	Moderate	High	Extreme	Extreme
Unlikely (between 3-10%)	Low	Low	Moderate	High	Extreme
Rare (<3%)	Low	Low	Moderate	High	High



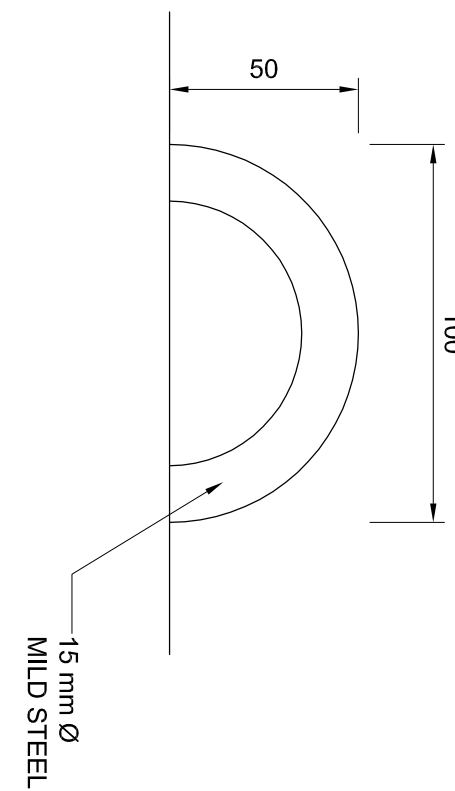
Water: Flow Rate

2024-07-30 16:16

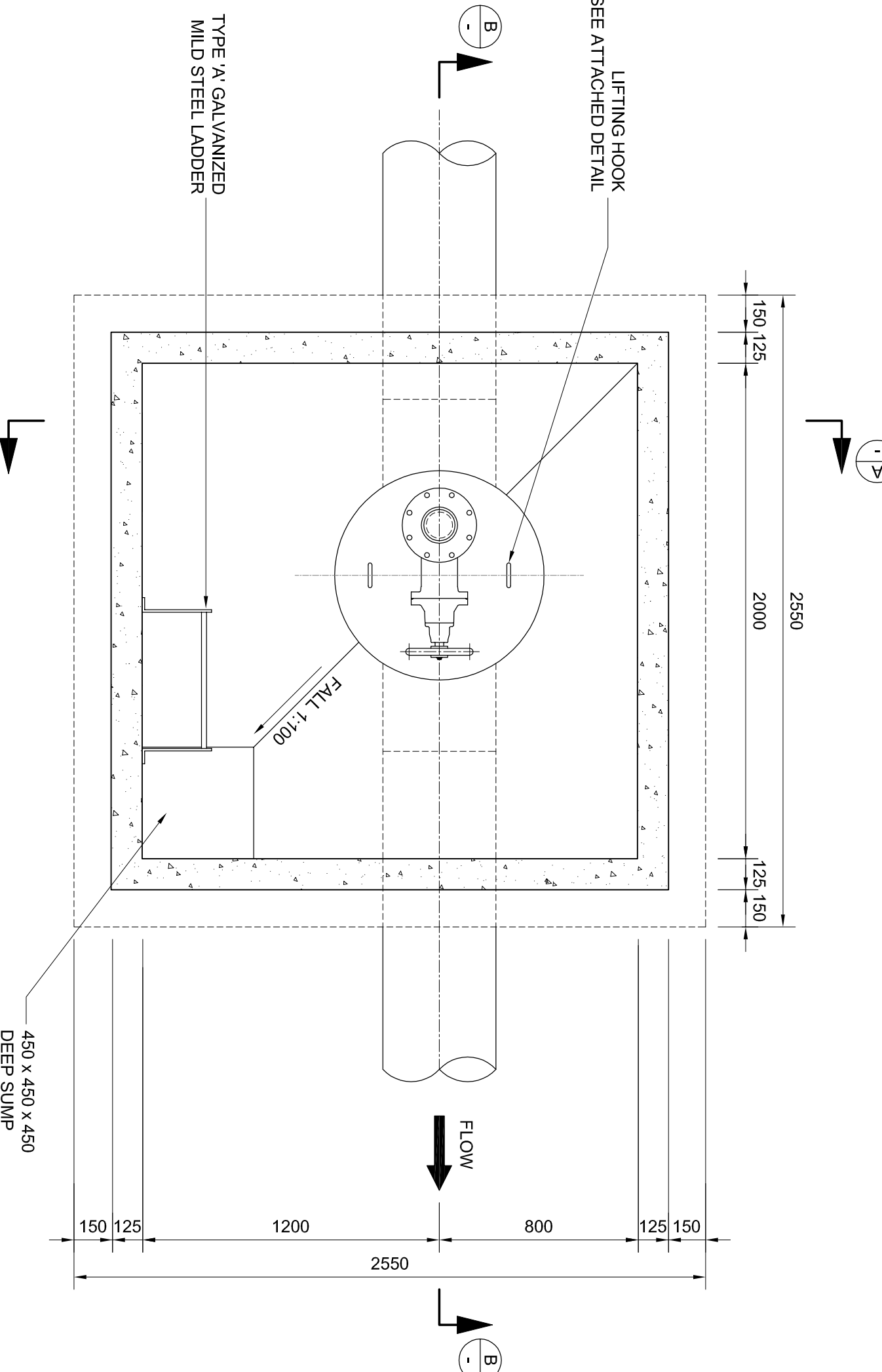
0 500m
Scale 1:14598



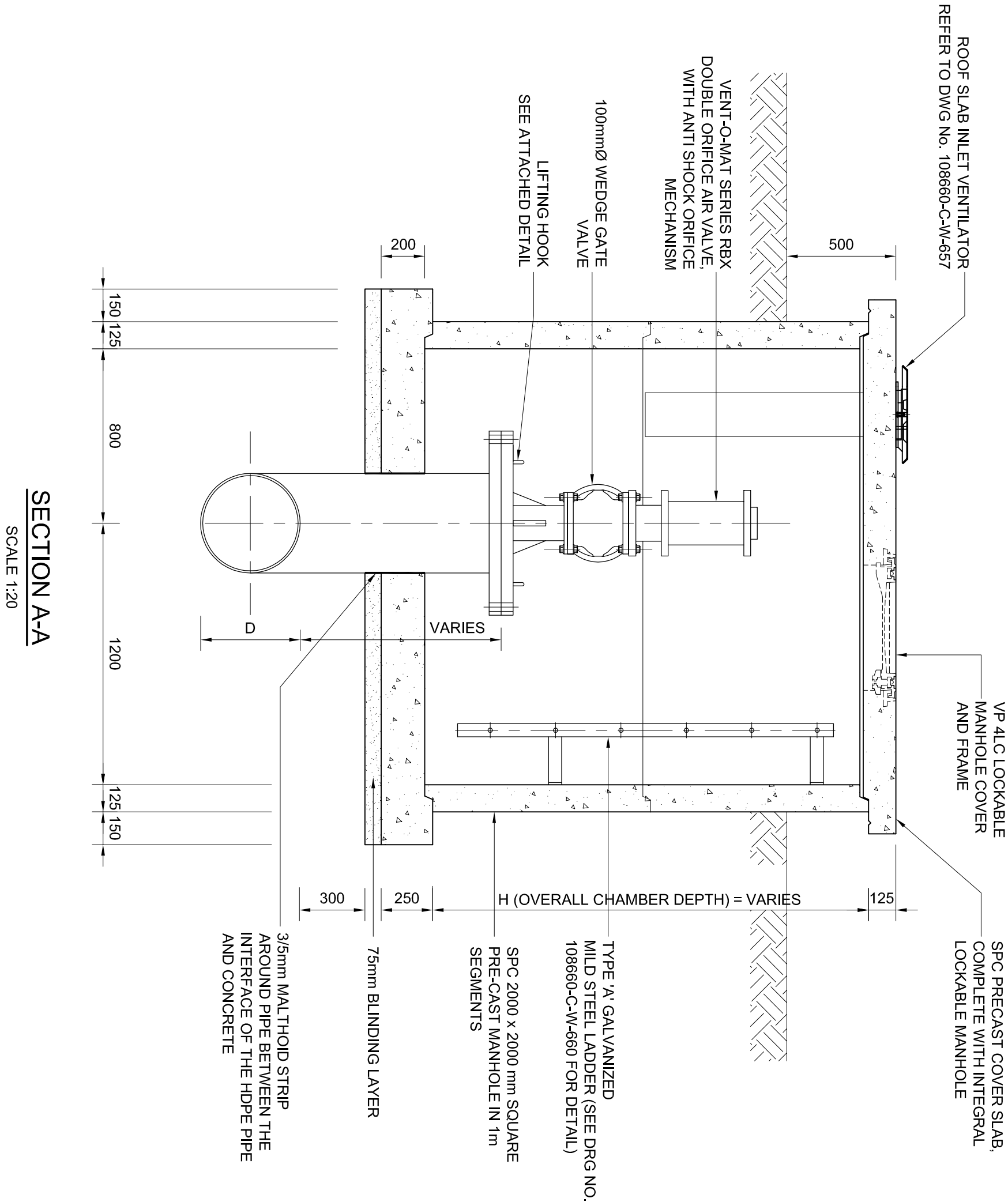
ROOF PLAN: AIR VALVE CHAMBER
SCALE 1:20



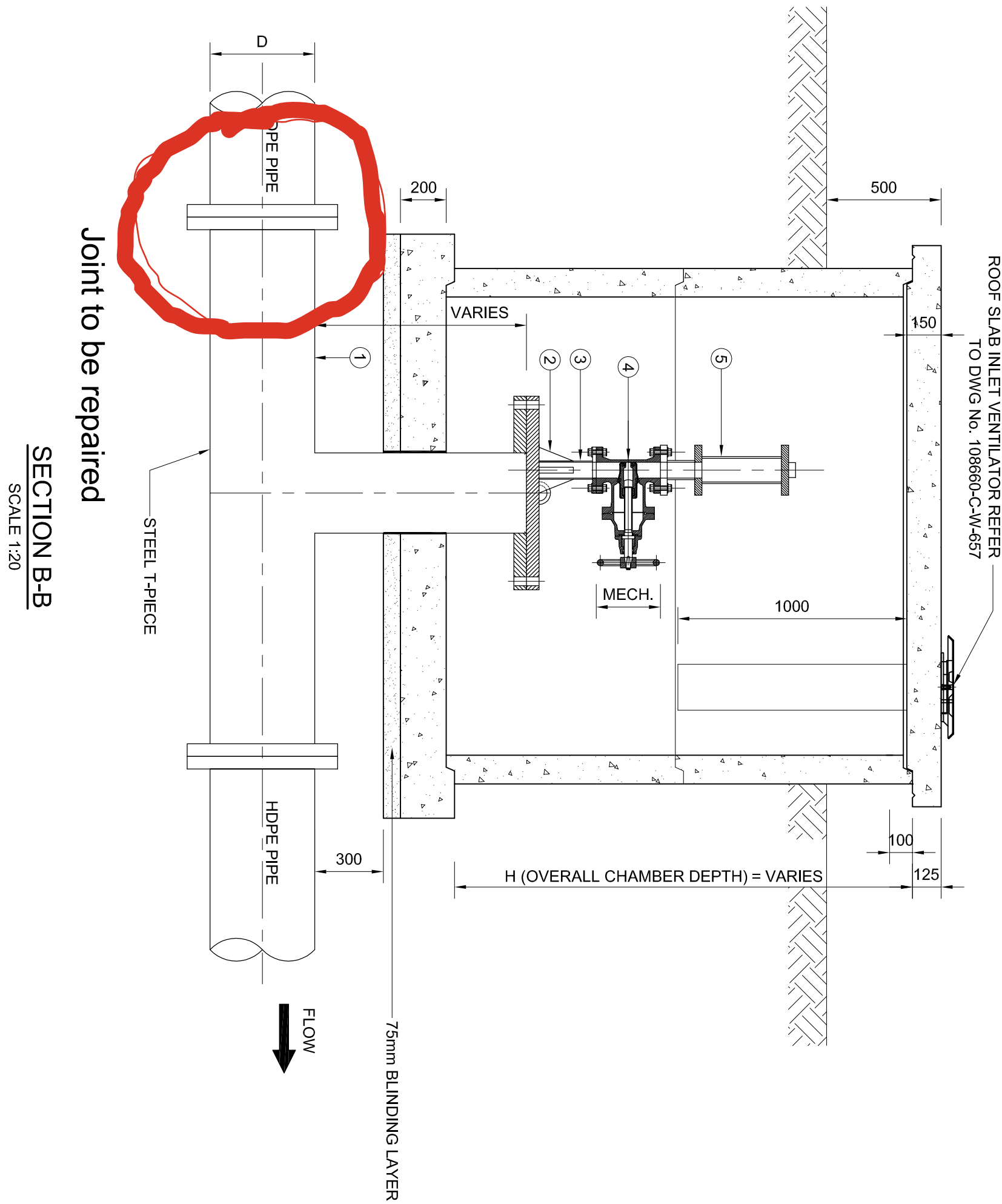
LIFTING HOOK DETAIL
SCALE 1:2



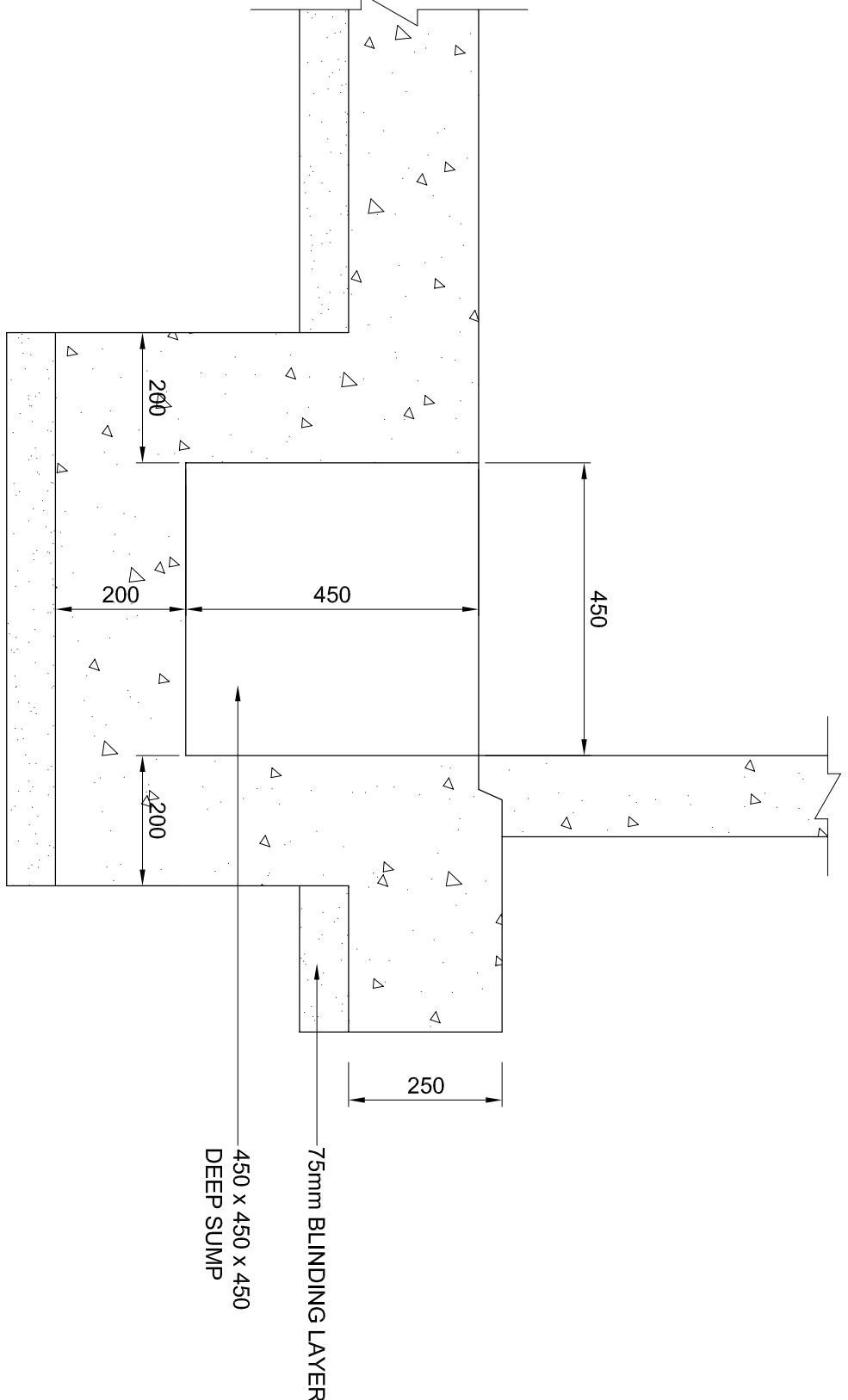
PLAN: AIR VALVE CHAMBER
SCALE 1:20



SECTION A-A
SCALE 1:20



SECTION B-B
SCALE 1:20



SUMP DETAIL
SCALE 1:20

- NOTES:**
1. REINFORCEMENT STEEL SHALL BE MINIMUM OF 5mm CLEAR OF PUDOLE PIPE AND FLANGES.
 2. ALL FLANGES TO BE DRILLED OFF-CENTRE TO SANS 1123 TABLE 10003 OR 25003 AS SPECIFIED IN SCHEDULE OF FITTINGS. PUDOLE FLANGES SIMILAR TO SANS 1123 TABLE 10003 OR 25003, AS SPECIFIED, BUT DRILLED AND SHOT-FITTED AND COATED. CONNECTING FLANGE HOLES IN OPPOSITE FLANGES MUST BE IN LINE.
 3. ALL STEELWORK TO BE FINISHED ACCORDING TO PROJECT SPECIFICATIONS.
 4. ALL VALVES ACCORDING TO PROJECT SPECIFICATIONS.
 5. ALL SPECIALS ACCORDING TO PROJECT SPECIFICATIONS.
 6. ALL JOINTING BOLTS AND NUTS TO BE HOT-DIP GALVANIZED.
 7. THE QUANTITIES IN THE PIPE SPECIAL SCHEDULE ARE FOR ONE CHAMBER ONLY.
 8. A COMPLETE SET OF DETAILED SHOP DRAWINGS OF ALL FITTINGS MUST BE SUBMITTED FOR THE ENGINEER'S APPROVAL PRIOR TO FABRICATION.
 9. ALL HOPE FLANGES ARE TO BE MADE OF A 51818 AND BLACKING RING.
 10. STUB ARE TO BE WELDED TO THE HOPE PIPE.

REFERENCES:

DESCRIPTION	DWG NUMBER
ACCESS LADDER DETAILS	108660-C-W-469
FITTING SCHEDULE	108660-C-W-468
AIR VENTILATOR	108660-C-W-467

PIPE SCHEDULE FOR AIR VALVE ON 9000 HDPE PIPELINE X 2NO.

ITEM NO.	QTY	DESCRIPTION	PRESSURE RATING	WALL THICKNESS	PROTECTION	FLANGE DRILLING	DIMENSIONS (mm)
1	2	900 x 900 x 1150 mm (FLANGED ONE END)	16 BAR	-	FBE	SANS 1123 T160003	
2	8	150 x 60 x 25 mm SUPPORTING BRACKET	-	-	FBE	-	
3	2	1125mm STEEL FLANGE FITTED WITH 100mm Ø x 250mm STEEL SHOCK PIPE AND LIFTING HOOKS	-	HEAVY DUTY	FBE	SANS 1123 T160003	
4	2	100 mm Ø NON-RESILIENT SEAL GATE VALVE	16 BAR	-	FBE	SANS 1123 T160003	
5	2	100mm Ø VENT-CAMAT SERIES VALVE WITH ANTI SHOCK ORRICE MECHANISM	16 BAR	-	FBE	SANS 1123 T160003	

PIPE SCHEDULE FOR AIR VALVE ON 8000 HDPE PIPELINE X 1 NO.

ITEM NO.	QTY	DESCRIPTION	PRESSURE RATING	WALL THICKNESS	PROTECTION	FLANGE DRILLING	DIMENSIONS (mm)
1	1	800 x 800 x 1150 mm (FLANGED ONE END)	16 BAR	-	FBE	SANS 1123 T160003	
2	4	150 x 60 x 25 mm SUPPORTING BRACKET	-	-	FBE	-	
3	1	1025mm STEEL FLANGE FITTED WITH 100 mm Ø x 250 mm STEEL SHOCK PIPE AND LIFTING HOOKS	-	HEAVY DUTY	FBE	SANS 1123 T160003	
4	1	100 mm Ø NON-RESILIENT SEAL GATE VALVE	16 BAR	-	FBE	SANS 1123 T160003	
5	1	100mm Ø VENT-CAMAT SERIES VALVE WITH ANTI SHOCK ORRICE MECHANISM	16 BAR	-	FBE	SANS 1123 T160003	

PIPE SCHEDULE FOR AIR VALVE ON 7100 HDPE PIPELINE X 1 NO.

ITEM NO.	QTY	DESCRIPTION	PRESSURE RATING	WALL THICKNESS	PROTECTION	FLANGE DRILLING	DIMENSIONS (mm)
1	1	710 x 710 x 1150 mm (FLANGED ONE END)	16 BAR	-	FBE	SANS 1123 T160003	
2	4	150 x 60 x 25 mm SUPPORTING BRACKET	-	-	FBE	-	
3	1	910mm STEEL FLANGE FITTED WITH 100 mm Ø x 250 mm STEEL SHOCK PIPE AND LIFTING HOOKS	-	HEAVY DUTY	FBE	SANS 1123 T160003	
4	1	100 mm Ø NON-RESILIENT SEAL GATE VALVE	16 BAR	-	FBE	SANS 1123 T160003	
5	1	100mm Ø VENT-CAMAT SERIES VALVE WITH ANTI SHOCK ORRICE MECHANISM	16 BAR	-	FBE	SANS 1123 T160003	

PIPE SCHEDULE FOR AIR VALVE ON 6300 STEEL PIPELINE X 2 NO.

ITEM NO.	QTY	DESCRIPTION	PRESSURE RATING	WALL THICKNESS	PROTECTION	FLANGE DRILLING	DIMENSIONS (mm)
1	2	630 x 630 x 1150 mm (FLANGED ONE END)	16 BAR	-	FBE	SANS 1123 T160003	
2	8	150 x 60 x 25 mm SUPPORTING BRACKET	-	-	FBE	-	
3	2	910mm STEEL FLANGE FITTED WITH 100 mm Ø x 250 mm STEEL SHOCK PIPE AND LIFTING HOOKS	-	HEAVY DUTY	FBE	SANS 1123 T160003	
4	2	100 mm Ø NON-RESILIENT SEAL GATE VALVE	16 BAR	-	FBE	SANS 1123 T160003	
5	2	100mm Ø VENT-CAMAT SERIES VALVE WITH ANTI SHOCK ORRICE MECHANISM	16 BAR	-	FBE	SANS 1123 T160003	

STEEL FLANGES TO: SANS 1123

PIPE SIZE	ITEM	PRESSURE RATING	DIAMETER	THICKNESS	PCD	NO. OF BOLTS
100mm Ø	FLANGE	16 BAR	220mm	14mm	180mm	8 x M16
600mm Ø	FLANGE	16 BAR	640mm	50mm	770mm	20 x M30
700mm Ø	FLANGE	16 BAR	910mm	55mm	840mm	24 x M30
800mm Ø	FLANGE	16 BAR	1025mm	65mm	950mm	24 x M30
900mm Ø	FLANGE	16 BAR	1125mm	70mm	1025mm	28 x M30

AS BUILT DRAWINGS

For Aurecon: _____ **For Client:** _____

ESCA REG. NO. 98570 _____ Date: _____

THE MASTER FILED AT AURECON SANDTON OFFICES. BEARS THE ORIGINAL SIGNATURE OR APPROVAL

CONSULTING ENGINEERS

aurecon

www.aurecon.co.za

DESIGNED: T. SHABULALA APRIL 2014

DRAWN: T. SHABULALA APRIL 2014

CHECKED: C. KAN APRIL 2014

APPROVED BY: SIGNATURE DATE

ESCA REG. NO. 98570

CHECKED BY: SIGNATURE DATE

ESCA REG. NO.

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JOHANNESBURG WATER SUPPLY

ESCA REG. NO.

Johannesburg Water

17 HARRISON STREET MARSHALLTOWN 2107

TEL: (011) 688-1400

FAX: (011) 688-1529

APPROVAL BY JW DEPOT

CHECKED: _____

APPROVED BY: SIGNATURE DATE

APPROVAL BY JW PLANNING

CHECKED: _____

APPROVED BY: SIGNATURE DATE

DRAWING No. JW/2016RDE/02M07

108660

C-W-661

A0 SHEET 1 OF 1

- NOTES:**
1. DRAWINGS MUST NOT BE SCALED.
 2. THIS DRAWING TO BE READ IN CONJUNCTION WITH THE GENERAL NOTES DRAWINGS AND ALL PROJECT SPECIFICATIONS.
 3. ACCORDING TO THE COPYRIGHT ACT (ACT No 98 of 1978) NO PART OF THIS DOCUMENT MAY BE REPRODUCED, STORED IN A RETRIEVAL SYSTEM OR TRANSMITTED IN ANY FORM OR BY ANY MEANS WITHOUT THE WRITTEN PERMISSION OF AURECON.

Guide: How to submit a response on the E-tender Portal

- Submit on E tender portal, following the below:
 1. (<https://www.etenders.gov.za/>)
 2. Search/Click Browse Opportunities by organ of state (Johannesburg Water)/search by RFQ reference number .
 3. Click the **+ sign** to expand the tender/ RFQ information.
 4. start the e submission process.
 5. Supplier login
 6. Use your CSD Credentials to Login. Contact CSD on (csd@treasury.gov.za) in case you forgot your login credentials. “My profile should show if you have logged in successfully”.
 7. select supplier.
 8. check the submission checklist and attached the compulsory documents.
 9. confirm and proceed .

If the application is not going through on the E-tender portal Contact:

eTenders Contact Centre

+27(0)12 406 9222 / 012 406-9229 / 012 312-5000

etenders@treasury.gov.za

<https://etenders.treasury.gov.za>

POPIA PRIVACY STATEMENT

Johannesburg Water SOC Limited

In terms of the Protection of Personal Information Act, 213 (Act 4 of 2013), also called the POPI Act or POPIA, Johannesburg Water SOC Limited, undertakes all reasonable measures to protect personal information and to keep it private and confidential.

1. Privacy Notice applies to:

Suppliers, vendors, contractors, service providers, etc whether appointed or prospective.

2. Definitions of personal information

According to the Act “personal information” means information relating to an identifiable living, natural person, and where it is applicable, an identifiable, existing juristic person. All addresses including residential, postal and email addresses.

3. About the Public Entity

Johannesburg Water (SOC) Limited, registration number 2000/029271/30

3.1 The information we collect

We collect information directly from you where you provide us with your personal details. Where possible, we will inform you what information you are required to provide to us and what information is optional.

3.2 How Johannesburg Water use your information

We will use your personal information only for the purposes for which it was collected and agreed with you. For example: to gather contact information, to confirm and verify your identity, for the evaluation and adjudication of bids and quotations for tenders, request for quotations, and other personal information for the procurement of goods and services by the Entity.

3.3 Disclosure of information

We may disclose your personal information to our Shareholder, the City of Johannesburg, and other Government agencies such as National Treasury, and the Auditor-General of South Africa. We have agreements in place to ensure that they comply with the privacy requirements as required by the Protection of Personal Information Act.

We may also disclose your information:

- Where we have a duty or a right to disclose in terms of law;
- Where we believe it is necessary to protect our rights.

3.4 Information Security

We are legally obliged to provide adequate protection for the personal information we hold and to stop unauthorised access and use of personal information. We will, on an ongoing basis, continue to review our security

POPIA PRIVACY STATEMENT

Johannesburg Water SOC Limited

controls and related processes to ensure that your personal information remains secure.

When we contract with third parties, we impose appropriate security, privacy and confidentiality obligations on them to ensure that personal information that we remain responsible for, is kept secure. We will ensure that anyone whom we pass your personal information agrees to treat your information with the same level of protection as we are obliged to.

3.5 Your rights: Access to Information

You have the right to request a copy of the personal information we hold about you. To do this, simply contact us at informationofficer@jwater.co.za, and specify what information you require.

3.6 Correction of your personal information

You have the right to ask us to update, correct or delete your personal information. We will require a copy of your identification document to confirm your identity before making changes to personal information we may hold about you. We would appreciate it if you would keep your personal information accurate and up to date.

3.7 How to contact us

If you have any queries about this document; you need further information about our privacy practices; wish to withdraw consent; exercise preferences or access or correct your personal information, please contact us at the numbers listed on our website or send an email to informationofficer@jwater.co.za.



a world class African city



City of Johannesburg

Johannesburg Water SOC Ltd

Turbine Hall
65 Ntengi Piliso Street
Newtown
Johannesburg

Johannesburg Water
PO Box 61542
Marshalltown
2107

Tel +27(0) 11 688 1400
Fax +27(0) 11 688 1528

www.johannesburgwater.co.za

PLEASE SUPPLY THE FOLLOWING DOCUMENTS TO ENABLE US TO EVALUATE YOUR SUBMISSION :

Returnable Documents	Description	Yes/No	
1	A, certified /original/valid, BBEE certificate /sworn affidavit (Please note that the Sworn Affidavit must be compliant as per B-BBEE Practice Guide 01 of 2018 , NON COMPLIANT AFFIDAVIT WILL BE SCORED ZERO)		COMPULSORY
2	Municipal rates and taxes (Must not be older than 90 days in arrears in line with regulation 38.		COMPULSORY
3	Signed Declaration of Interest form (MBD 4)		COMPULSORY
4	Declaration of Bidders past supply chain management practices (MBD 8)		COMPULSORY
5	Certificate of Independent Proposal Determination (MBD 9)		COMPULSORY
6	Proof of CSD registration /MAAA Supplier Number		COMPULSORY
7	Preference points claim form in terms of the preferential procurement regulations 2022 (MBD 6.1)		COMPULSORY

MBD 4

DECLARATION OF INTEREST

1. No bid will be accepted from persons in the service of the state¹.
2. Any person, having a kinship with persons in the service of the state, including a blood relationship, may make an offer or offers in terms of this invitation to bid. In view of possible allegations of favouritism, should the resulting bid, or part thereof, be awarded to persons connected with or related to persons in service of the state, it is required that the bidder or their authorised representative declare their position in relation to the evaluating/adjudicating authority.

3 In order to give effect to the above, the following questionnaire must be completed and submitted with the bid.

3.1 Full Name of bidder or his or her representative:.....

3.2 Identity Number:

3.3 Position occupied in the Company (director, trustee, hareholder²):.....

3.4 Company Registration Number:

3.5 Tax Reference Number:.....

3.6 VAT Registration Number:

3.7 The names of all directors / trustees / shareholders members, their individual identity numbers and state employee numbers must be indicated in paragraph 4 below.

3.8 Are you presently in the service of the state? **YES / NO**

3.8.1 If yes, furnish particulars.

.....

¹MSCM Regulations: "in the service of the state" means to be –

(a) a member of –

- (i) any municipal council;
- (ii) any provincial legislature; or
- (iii) the national Assembly or the national Council of provinces;

(b) a member of the board of directors of any municipal entity;

(c) an official of any municipality or municipal entity;

(d) an employee of any national or provincial department, national or provincial public entity or constitutional institution within the meaning of the Public Finance Management Act, 1999 (Act No.1 of 1999);

(e) a member of the accounting authority of any national or provincial public entity; or

(f) an employee of Parliament or a provincial legislature.

² Shareholder" means a person who owns shares in the company and is actively involved in the management of the company or business and exercises control over the company.

3.9 Have you been in the service of the state for the past twelve months?**YES / NO**

3.9.1 If yes, furnish particulars.....

.....

3.10 Do you have any relationship (family, friend, other) with persons in the service of the state and who may be involved with the evaluation and or adjudication of this bid? **YES / NO**

3.10.1 If yes, furnish particulars.

.....

.....

3.11 Are you, aware of any relationship (family, friend, other) between any other bidder and any persons in the service of the state who may be involved with the evaluation and or adjudication of this bid? **YES / NO**

3.11.1 If yes, furnish particulars

.....

.....

3.12 Are any of the company's directors, trustees, managers, principle shareholders or stakeholders in service of the state? **YES / NO**

3.12.1 If yes, furnish particulars.

.....

.....

3.13 Are any spouse, child or parent of the company's directors trustees, managers, principle shareholders or stakeholders in service of the state? **YES / NO**

3.13.1 If yes, furnish particulars.

.....

.....

3.14 Do you or any of the directors, trustees, managers, principle shareholders, or stakeholders of this company have any interest in any other related companies or business whether or not they are bidding for this contract. **YES / NO**

3.14.1 If yes, furnish particulars:

.....

.....

4. Full details of directors / trustees / members / shareholders.

Full Name	Identity Number	State Employee Number

.....
Signature

.....
Date

.....
Capacity

.....
Name of Bidder

PREFERENCE POINTS CLAIM FORM IN TERMS OF THE PREFERENTIAL PROCUREMENT REGULATIONS 2022

This preference form must form part of all tenders invited. It contains general information and serves as a claim form for preference points for specific goals.

1. GENERAL CONDITIONS

1.1 The following preference point systems are applicable to invitations to tender:

- the 80/20 system for requirements with a Rand value of up to R50 000 000 (all applicable taxes included); and

1.2 **To be completed by the organ of state**

a) The applicable preference point system for this tender is the 80/20 preference point system.

1.3 Points for this tender (even in the case of a tender for income-generating contracts) shall be awarded for:

- (a) Price; and
- (b) Specific Goals.

1.4 **To be completed by the organ of state:**

The maximum points for this tender are allocated as follows:

	POINTS
PRICE	80
SPECIFIC GOALS	20
Total points for Price and SPECIFIC GOALS	100

1.5 Failure on the part of a tenderer to submit proof or documentation required in terms of this tender to claim points for specific goals with the tender, will be interpreted to mean that preference points for specific goals are not claimed.

1.6 The organ of state reserves the right to require of a tenderer, either before a tender is adjudicated or at any time subsequently, to substantiate any claim in regard to preferences, in any manner required by the organ of state.

2. DEFINITIONS

- (a) **“tender”** means a written offer in the form determined by an organ of state in response to an invitation to provide goods or services through price quotations, competitive tendering process or any other method envisaged in legislation;

- (b) **“price”** means an amount of money tendered for goods or services, and includes all applicable taxes less all unconditional discounts;
- (c) **“rand value”** means the total estimated value of a contract in Rand, calculated at the time of bid invitation, and includes all applicable taxes;
- (d) **“tender for income-generating contracts”** means a written offer in the form determined by an organ of state in response to an invitation for the origination of income-generating contracts through any method envisaged in legislation that will result in a legal agreement between the organ of state and a third party that produces revenue for the organ of state, and includes, but is not limited to, leasing and disposal of assets and concession contracts, excluding direct sales and disposal of assets through public auctions; and
- (e) **“the Act”** means the Preferential Procurement Policy Framework Act, 2000 (Act No. 5 of 2000).

3. FORMULAE FOR PROCUREMENT OF GOODS AND SERVICES

3.1. POINTS AWARDED FOR PRICE

3.1.1 THE 80/20 PREFERENCE POINT SYSTEMS

A maximum of 80 points is allocated for price on the following basis:

80/20

$$Ps = 80 \left(1 - \frac{Pt - P_{min}}{P_{min}} \right)$$

Where

- Ps = Points scored for price of tender under consideration
- Pt = Price of tender under consideration
- Pmin = Price of lowest acceptable tender

3.1.1. POINTS AWARDED FOR PRICE

A maximum of 80 points is allocated for price on the following basis:

80/20

$$Ps = 80 \left(1 + \frac{Pt - P_{max}}{P_{max}} \right) \text{ o}$$

Where

- Ps = Points scored for price of tender under consideration
- Pt = Price of tender under consideration
- Pmax = Price of highest acceptable tender

4. POINTS AWARDED FOR SPECIFIC GOALS

- 4.1. In terms of Regulation 4(2); 5(2); 6(2) and 7(2) of the Preferential Procurement Regulations, preference points must be awarded for specific goals stated in the tender. For the purposes of this tender the tenderer will be allocated points based on the goals stated in table 1 below as may be supported by proof/ documentation stated in the conditions of this tender:

Table 1: Specific goals for the tender and points claimed are indicated per the table below.

Note to tenderers: The tenderer must indicate how they claim points for each preference point system.)

The specific goals allocated points in terms of this tender	Number of points allocated (80/20 system)	Number of points claimed (80/20 system)	Proof of documents per specific goals
Businesses owned by Women - 51% or more.	20		Valid BBBEE Certificate issued by SANAS accredited verification agency or DTI/CIPC BBBEE Certificate for Exempted Micro Enterprises or Affidavit sworn under oath.

DECLARATION WITH REGARD TO COMPANY/FIRM

4.2. Name of company/firm.....

4.3. Company registration number:

4.4. TYPE OF COMPANY/ FIRM

- ☐ Partnership/Joint Venture / Consortium
- ☐ One-person business/sole propriety
- ☐ Close corporation
- ☐ Public Company
- ☐ Personal Liability Company
- ☐ (Pty) Limited
- ☐ Non-Profit Company
- ☐ State Owned Company

[TICK APPLICABLE BOX]

4.5. I, the undersigned, who is duly authorised to do so on behalf of the company/firm,

- ☐ Close corporation
 - ☐ Public Company
 - ☐ Personal Liability Company
 - ☐ (Pty) Limited
 - ☐ Non-Profit Company
 - ☐ State Owned Company
- [TICK APPLICABLE BOX]

4.5. I, the undersigned, who is duly authorised to do so on behalf of the company/firm, certify that the points claimed, based on the specific goals as advised in the tender, qualifies the company/ firm for the preference(s) shown and I acknowledge that:

- i) The information furnished is true and correct;
- ii) The preference points claimed are in accordance with the General Conditions as indicated in paragraph 1 of this form;
- iii) In the event of a contract being awarded as a result of points claimed as shown in paragraphs 1.4 and 4.2, the contractor may be required to furnish documentary proof to the satisfaction of the organ of state that the claims are correct;
- iv) If the specific goals have been claimed or obtained on a fraudulent basis or any of the conditions of contract have not been fulfilled, the organ of state may, in addition to any other remedy it may have –
 - (a) disqualify the person from the tendering process;
 - (b) recover costs, losses or damages it has incurred or suffered as a result of that person's conduct;
 - (c) cancel the contract and claim any damages which it has suffered as a result of having to make less favourable arrangements due to such cancellation;
 - (d) recommend that the tenderer or contractor, its shareholders and directors, or only the shareholders and directors who acted on a fraudulent basis, be restricted from obtaining business from any organ of state for a period not exceeding 10 years, after the *audi alteram partem* (hear the other side) rule has been applied; and
 - (e) forward the matter for criminal prosecution, if deemed necessary.

..... SIGNATURE(S) OF TENDERER(S)	
SURNAME AND NAME:	
DATE:	
ADDRESS:	
	
	
	

DECLARATION OF BIDDER'S PAST SUPPLY CHAIN MANAGEMENT PRACTICES

- 1 This Municipal Bidding Document must form part of all bids invited.
- 2 It serves as a declaration to be used by municipalities and municipal entities in ensuring that when goods and services are being procured, all reasonable steps are taken to combat the abuse of the supply chain management system.
- 3 The bid of any bidder may be rejected if that bidder, or any of its directors have:
 - a. abused the municipality's / municipal entity's supply chain management system or committed any improper conduct in relation to such system;
 - b. been convicted for fraud or corruption during the past five years;
 - c. willfully neglected, reneged on or failed to comply with any government, municipal or other public sector contract during the past five years; or
 - d. been listed in the Register for Tender Defaulters in terms of section 29 of the Prevention and Combating of Corrupt Activities Act (No 12 of 2004).
- 4 **In order to give effect to the above, the following questionnaire must be completed and submitted with the bid.**

Item	Question	Yes	No
4.1	Is the bidder or any of its directors listed on the National Treasury's Database of Restricted Suppliers as companies or persons prohibited from doing business with the public sector? (Companies or persons who are listed on this Database were informed in writing of this restriction by the Accounting Officer/Authority of the institution that imposed the restriction after the <i>audi alteram partem</i> rule was applied). The Database of Restricted Suppliers now resides on the National Treasury's website(www.treasury.gov.za) and can be accessed by clicking on its link at the bottom of the home page.	Yes ☐	No ☐
4.1.1	If so, furnish particulars:		
4.2	Is the bidder or any of its directors listed on the Register for Tender Defaulters in terms of section 29 of the Prevention and Combating of Corrupt Activities Act (No 12 of 2004)? The Register for Tender Defaulters can be accessed on the National Treasury's website (www.treasury.gov.za) by clicking on its link at the bottom of the home page.	Yes ☐	No ☐
4.2.1	If so, furnish particulars:		
4.3	Was the bidder or any of its directors convicted by a court of law (including a court of law outside the Republic of South Africa) for fraud or corruption during the past five years?	Yes ☐	No ☐

4.3.1	If so, furnish particulars:		
Item	Question	Yes	No
4.4	Does the bidder or any of its directors owe any municipal rates and taxes or municipal charges to the municipality / municipal entity, or to any other municipality / municipal entity, that is in arrears for more than three months?	Yes ☐	No ☐
4.4.1	If so, furnish particulars:		
4.5	Was any contract between the bidder and the municipality / municipal entity or any other organ of state terminated during the past five years on account of failure to perform on or comply with the contract?	Yes ☐	No ☐
4.7.1	If so, furnish particulars:		

CERTIFICATION

**I, THE UNDERSIGNED (FULL NAME)
CERTIFY THAT THE INFORMATION FURNISHED ON THIS
DECLARATION FORM TRUE AND CORRECT.**

**I ACCEPT THAT, IN ADDITION TO CANCELLATION OF A CONTRACT,
ACTION MAY BE TAKEN AGAINST ME SHOULD THIS DECLARATION
PROVE TO BE FALSE.**

.....
Signature

.....
Date

.....
Position

.....
Name of Bidder

CERTIFICATE OF INDEPENDENT BID DETERMINATION

- 1 This Municipal Bidding Document (MBD) must form part of all bids¹ invited.

- 2 Section 4 (1) (b) (iii) of the Competition Act No. 89 of 1998, as amended, prohibits an agreement between, or concerted practice by, firms, or a decision by an association of firms, if it is between parties in a horizontal relationship and if it involves collusive bidding (or bid rigging).² Collusive bidding is a *pe se* prohibition meaning that it cannot be justified under any grounds.

- 3 Municipal Supply Regulation 38 (1) prescribes that a supply chain management policy must provide measures for the combating of abuse of the supply chain management system, and must enable the accounting officer, among others, to:
 - a. take all reasonable steps to prevent such abuse;
 - b. reject the bid of any bidder if that bidder or any of its directors has abused the supply chain management system of the municipality or municipal entity or has committed any improper conduct in relation to such system; and
 - c. cancel a contract awarded to a person if the person committed any corrupt or fraudulent act during the bidding process or the execution of the contract.

- 4 This MBD serves as a certificate of declaration that would be used by institutions to ensure that, when bids are considered, reasonable steps are taken to prevent any form of bid-rigging.

- 5 In order to give effect to the above, the attached Certificate of Bid Determination (MBD 9) must be completed and submitted with the bid:

¹ Includes price quotations, advertised competitive bids, limited bids and proposals.

² Bid rigging (or collusive bidding) occurs when businesses, that would otherwise be expected to compete, secretly conspire to raise prices or lower the quality of goods and / or services for purchasers who wish to acquire goods and / or services through a bidding process. Bid rigging is, therefore, an agreement between competitors not to compete.

CERTIFICATE OF INDEPENDENT BID DETERMINATION

I, the undersigned, in submitting the accompanying bid:

(Bid Number and Description)

in response to the invitation for the bid made by:

(Name of Municipality / Municipal Entity)

do hereby make the following statements that I certify to be true and complete in every respect:

I certify, on behalf of:_____that:

(Name of Bidder)

1. I have read and I understand the contents of this Certificate;
2. I understand that the accompanying bid will be disqualified if this Certificate is found not to be true and complete in every respect;
3. I am authorized by the bidder to sign this Certificate, and to submit the accompanying bid, on behalf of the bidder;
4. Each person whose signature appears on the accompanying bid has been authorized by the bidder to determine the terms of, and to sign, the bid, on behalf of the bidder;
5. For the purposes of this Certificate and the accompanying bid, I understand that the word "competitor" shall include any individual or organization, other than the bidder, whether or not affiliated with the bidder, who:
 - (a) has been requested to submit a bid in response to this bid invitation;
 - (b) could potentially submit a bid in response to this bid invitation, based on their qualifications, abilities or experience; and
 - (c) provides the same goods and services as the bidder and/or is in the same line of business as the bidder

6. The bidder has arrived at the accompanying bid independently from, and without consultation, communication, agreement or arrangement with any competitor. However communication between partners in a joint venture or consortium³ will not be construed as collusive bidding.
7. In particular, without limiting the generality of paragraphs 6 above, there has been no consultation, communication, agreement or arrangement with any competitor regarding:
 - (a) prices;
 - (b) geographical area where product or service will be rendered (market allocation)
 - (c) methods, factors or formulas used to calculate prices;
 - (d) the intention or decision to submit or not to submit, a bid;
 - (e) the submission of a bid which does not meet the specifications and conditions of the bid; or
 - (f) bidding with the intention not to win the bid.
8. In addition, there have been no consultations, communications, agreements or arrangements with any competitor regarding the quality, quantity, specifications and conditions or delivery particulars of the products or services to which this bid invitation relates.
9. The terms of the accompanying bid have not been, and will not be, disclosed by the bidder, directly or indirectly, to any competitor, prior to the date and time of the official bid opening or of the awarding of the contract.

³ Joint venture or Consortium means an association of persons for the purpose of combining their expertise, property, capital, efforts, skill and knowledge in an activity for the execution of a contract.

10. I am aware that, in addition and without prejudice to any other remedy provided to combat any restrictive practices related to bids and contracts, bids that are suspicious will be reported to the Competition Commission for investigation and possible imposition of administrative penalties in terms of section 59 of the Competition Act No 89 of 1998 and or may be reported to the National Prosecuting Authority (NPA) for criminal investigation and or may be restricted from conducting business with the public sector for a period not exceeding ten (10) years in terms of the Prevention and Combating of Corrupt Activities Act No 12 of 2004 or any other applicable legislation.

.....
Signature

.....
Date

.....
Position

.....
Name of Bidder

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