



Documents may be obtained,  
free of charge, in electronic format,  
from the eTenders website.

Reference is to be made to  
Clause F.1.2 of the  
Tender Data.

## **WATER AND SANITATION ENGINEERING**

### **PROCUREMENT DOCUMENT INFRASTRUCTURE**

**CONTRACT No.: WS 7230**

**TITLE: The Rehabilitation of Glenwood Reservoir, Cato Ridge Reservoir, Illovo Water Tower, Mt Moriah Reservoir, KwaMakhutha Reservoir Complex, Rosetta Reservoir and Associated Works: Ward 33, 1, 97, 18, 27 & 35**

Issued by:

**WATER AND SANITATION**

**WATER DESIGN AND NON-REVENUE WATER**

Date of Issue: **October 2021**

**Document Version: 01/04/2021**

NAME OF TENDERER: .....

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**PART T1: TENDERING PROCEDURES**  
**T1.1: TENDER NOTICE AND INVITATION TO TENDER**

Tenders are hereby invited for the works to the Rehabilitation of Glenwood Reservoir, Cato Ridge Reservoir, Illovo Water Tower, Mt Moriah Reservoir, KwaMakhutha Reservoir Complex, Rosetta Reservoir and Associated Works: Ward 33, 1, 97, 18, 27 & 35.

(F.1.1.1) The Employer is the eThekweni Municipality as represented by [Deputy Head: Water and Sanitation](#)

It is estimated that tenderers should have a CIDB contractor grading designation of [5CE](#) (or higher).

(F.1.2) Tenders must be submitted on official tender documentation issued by the eThekweni Municipality. Electronically downloaded documentation, obtainable from the National Treasury's eTenders website, should be printed in its entirety, and suitably bound by the tenderer.

(F.2.2.2) Documents may be obtained, free of charge, in electronic format, from the National Treasury's eTenders website. Electronically downloaded documentation should be printed and suitably bound by the tenderer.

(F.2.6) Addenda will be published, in electronic format, on the National Treasury's eTenders website (see F.2.2.2 above). Tenderers are to ensure that the eTenders website is consulted for any published addenda pertaining to this tender until three days before the tender closing time as stated in the Tender Data.

Acknowledgement of receipt of the addenda will be by the return of the relevant completed, dated and signed portion of the addenda, to the physical address / email address as specified on the addenda. Failure of the tenderer to comply with the requirements of the addenda may result in the tender submission being made non-responsive.

(F.2.7) [A non-compulsory clarification meeting will be conducted via Microsoft Teams on 12 November 2021 at 10h00.](#)

[Tenderers are to email Josh.Petzer@naiduconsulting.com at least 3 working days prior to the non-compulsory tender briefing in order to obtain a meeting invitation link.](#)

[A recording of the compulsory clarification meeting and the tender briefing presentation video will be uploaded on 17 November 2021 at 16h00 to the following link: <https://youtu.be/scE8OgDvGiE>](#)

(F.2.8) Queries relating to these documents may be addressed to Josh Petzer, 031 265 6007 (t), [Josh.Petzer@naiduconsulting.com](mailto:Josh.Petzer@naiduconsulting.com)

Bidders shall submit email queries related to the bid. All email queries shall be submitted by 19 November 2021. Email questions and answers shall be consolidated and posted on eTenders/Municipal website for the benefit of all tenderers by 25 November 2021.

(F.2.13) Tender offers shall be delivered to [Engineering Unit, 166 K.E. Masinga Road and placed in the tender box located in the ground floor foyer.](#)

(F.2.15) Tender offers shall be delivered on or before [Friday, 03 December 2021](#) at or before [11:00](#)

**Requirements for sealing, addressing, delivery, opening and assessment of tenders are stated in the Tender Data**

## **PART T1: TENDERING PROCEDURES**

### **T1.2: TENDER DATA**

#### **T1.2.1 STANDARD CONDITIONS OF TENDER**

The conditions of tender are the Standard Conditions of Tender as contained in Annex F of the CIDB Standard for Uniformity in Construction Procurement (July 2015) as published in Government Gazette No 38960, Board Notice 136 of 2015 of 10 July 2015.

The Standard Conditions of Tender make several references to the Tender Data for details that apply specifically to this tender. The Tender Data shall have precedence in the interpretation of any ambiguity or inconsistency between it and the Standard Conditions of Tender.

#### **T1.2.2 TENDER DATA**

Each item of data given below is cross-referenced to the clause in the Standard Conditions of Tender to which it mainly applies.

### **F.1: GENERAL**

**F.1.1 The employer:** The Employer for this Contract is the eThekweni Municipality as represented by: **Deputy Head: Water and Sanitation**

**F.1.2 Tender documents:** The Tender Documents issued by the Employer comprise:

- 1) This procurement document.
- 2) Drawings, issued separately from this document (or alternately: Bound in Section C3.4 as an Annexure).
- 3) "General Conditions of Contract for Construction Works – 3<sup>rd</sup> Edition 2015" issued by the South African Institution of Civil Engineering (GCC 2015). This document is obtainable separately, and Tenderers shall obtain their own copies.
- 4) In addition, Tenderers are advised, in their own interest, to obtain their own copies of the following acts, regulations, and standards referred to in this document as they are essential for the Tenderer to get acquainted with the basics of construction management, the implementation of preferential construction procurement policies, and the participation of targeted enterprise and labour.
  - The Occupational Health and Safety Act No 85 and Amendment Act No 181 of 1993, and the Construction Regulations (2014).
  - The Construction Industry Development Board Act No 38 of 2000 and the Regulations issued in terms of the Act (July 2013).
  - The Preferential Procurement Policy Framework Act No 5 of 2000, and the Preferential Procurement Policy Framework Act Regulations (January 2017).
  - SANS 1921:2004 – Construction and Management Requirements for Works Contract, Parts 1-3.
  - The Employer's current Supply Chain Management Policy.
  - Any other eThekweni Policy documents referenced in the Tender Documents.

Electronically downloaded documentation is obtainable from the National Treasury's **eTenders Website** or the eThekweni Municipality's **Vendor Portal** at URLs:

- <https://ethekwinivendor.durban.gov.za/tenders/availabletenders/> ; or
- <https://etenders.treasury.gov.za/>

The entire downloaded document should be printed and suitably bound by the tenderer.

**F.1.4 The employer's agent:** The Employer's Agent is

- Josh Padayachee Pr. Eng
- Tel: 031-265-6007 (t)
- Email: Josh.Padayachee@naiduconsulting.com

**The employer's agent's representative:** The Employer's Agent's Representative is

- Shanil Gokal
- Tel: 031 311 8653 (t)
- Email: Shanil.Gokal@durban.gov.za

## F.2: TENDERER'S OBLIGATIONS

**F.2.1 Eligibility:** A Tenderer will not be eligible to submit a tender if:

- (a) the Tenderer does not comply with the legal requirements as stated in the Employer's current SCM Policy;
- (b) the Tenderer cannot provide proof that he is in good standing with respect to duties, taxes, levies and contributions required in terms of legislation applicable to the work in the contract;
- (c) In the event of a Compulsory Clarification Meeting:
  - i) the Tenderer fails to attend the Compulsory Clarification Meeting;
  - ii) the Tenderer fails to have form "Certificate of Attendance at Clarification Meeting / Site Inspection" (in Part T2.2) signed by the Employer's Agent or his representative.
- (d) in the case of JV submissions, two or more JV entities have common directors / shareholders or common entities tendering for the same works.
- (e) at the time of closing of tenders, the Tenderer is not registered on the National Treasury Central Supplier Database (CSD) as a service provider. In the case of a Joint Venture, this requirement will apply individually to each party in the Joint Venture.
- (f) If the tenderer is required by law to prepare annual financial statements for auditing, the tenderer must submit their audited annual financial statements:
  - i) for the past three years; or
  - ii) since their establishment if established during the past three years;If the tenderer is not required by law to prepare audited financial statements, then the tenderer must submit a Public Interest (PI) Score, whereby if the PI score is above 350 points then the bidder must submit audited financial statements.

**F.2.1.1 Eligibility:** Only those tenderers who are registered (as "Active") with the CIDB (at time of tender closing), in a contractor grading designation equal to or higher than a contractor grading designation determined in accordance with the sum tendered, or a value determined in accordance with Regulation 25 (1B) or 25(7A) of the Construction Industry Development Regulations, for a CE class of construction work, are eligible to have their tenders evaluated.

Joint ventures are eligible to submit tenders provided that:

- (a) Every member of the joint venture is registered (as "Active") with the CIDB (at time of tender closing);
- (b) The lead partner has a contractor grading designation in the CE class of construction work and has a grading designation of not lower than one level below the required grading designation; and
- (c) The combined contractor grading designation calculated in accordance with the Construction Industry Development Regulations (2013) is equal to or higher than a contractor grading designation determined in accordance with the sum tendered for a CE class of construction work or a value determined in accordance with Regulation 25 (1B) or 25(7A) of the Construction Industry Development Regulations.

#### **F.2.2.2 The cost of the tender documents:**

"Documents may be obtained, free of charge, in electronic format, from the National Treasury's eTenders website or the eThekweni Municipality's Vendor Portal. The entire electronically downloaded document should be printed and suitably bound by the tenderer".

#### **F.2.6 Acknowledge addenda:**

Addenda will be published, in electronic format, on the National Treasury's eTenders website (see F.2.2.2 above). Tenderers are to ensure that the eTenders website is consulted for any published addenda pertaining to this tender until three days before the tender closing time as stated in the Tender Data.

Acknowledgement of receipt of the addenda will be by the return of the relevant completed, dated and signed portion of the addenda, to the address / fax number / email address as specified on the addenda. Failure of the tenderer to comply with the requirements of the addenda may result in the tender submission being made non-responsive.

#### **F.2.7 Clarification meeting:** A non-compulsory clarification meeting will be conducted via Microsoft Teams on 12 November 2021 at 10h00.

Tenderers are to email Josh.Petzer@naiduconsulting.com at least 3 working days prior to the non-compulsory tender briefing in order to obtain a meeting invitation link.

A recording of the compulsory clarification meeting and the tender briefing presentation video will be uploaded on 17 November 2021 at 16h00 to the following link: <https://youtu.be/scE8OgDvGiE>

#### **F.2.8 Clarification:** Queries relating to these documents may be addressed to Josh Petzer, 031 265 6007 (t), Josh.Petzer@naiduconsulting.com

Bidders shall submit email queries related to the bid. All email queries shall be submitted by 19 November 2021. Email questions and answers shall be consolidated and posted on eTenders/Municipal website for the benefit of all tenderers by 25 November 2021.

#### **F.2.12 Alternative tender offers:** No alternative tender offers will be considered.

#### **F.2.13 Submitting a tender offer:** The Employer's address for delivery of tender offers is

- [Engineering Unit, 166 K.E. Masinga Road](#) and placed in the tender box located in the ground floor foyer. Returnable Documents to be submitted in a separate lever arch file.

Identification details to be shown on each tender offer package are:

- Contract No. : [WS 7230](#)
- Contract Title : [The Rehabilitation of Glenwood Reservoir, Cato Ridge Reservoir, Illovo Water Tower, Mt Moriah Reservoir, KwaMakhutha Reservoir Complex, Rosetta Reservoir and Associated Works: Ward 33, 1, 97, 18, 27 & 35](#)

Telephonic, telegraphic, telex, facsimile or e-mailed tender offers will not be accepted.

#### **F.2.15 Closing time:** The closing time for delivery of tender offers is:

- Date : [Friday, 03 December 2021](#)
- Time : [11:00](#)

Tenderers are to allow for adequate time under Level 1 Lockdown Regulations to drop off their tender documents with due cognisance to the COVID 19 health and safety procedure and protocol with

particular attention to social distancing. The person dropping off the tender document is required to use the required PPE and cloth masks when submitting their bid.

**F.2.16 Tender offer validity:** The Tender Offer validity period is 12 weeks (84 Days) from the closing time for submission of tenders.

**F2.20 Submit securities, bonds, policies:** The tenderer is required to submit with his tender a letter of intent from an approved insurer undertaking to provide the Performance Bond to the format included in Part T2.2 of this procurement document.

**F.2.23 Certificates:** Refer to **Part T2.1** for a listing of certificates that must be provided with the tender. All certificates must be valid at the time of tender closing.

### **CIDB Registration**

Tenderers are to include with their submission a printout of their registration with the CIDB, obtained from the CIDB website ( <https://registers.cidb.org.za/PublicContractors/ContractorSearch> ).

The Joint Venture Grading Designation Calculator should be used when submitting as a Joint Venture ( <https://registers.cidb.org.za/PublicContractors/JVGradingDesignationCalc> ). The date of obtaining the above printouts is to be indicated on the printout. Registration with the CIDB must be reflected as "Active" at time of tender closing.

### **Tax Clearance**

SARS has introduced a new Tax Compliance Status System. Tenderers can submit a Tax Compliance Status PIN (TCS PIN) instead of an original Tax Clearance Certificate. This TCS PIN can be used by third parties to certify the taxpayer's real-time compliance status. Separate Tax Clearance Certificates / TCS PINs are required for each entity in a Joint Venture.

### **B-BBEE Status Level of Contribution**

The Amended Construction Sector Code (Government Gazette No.41287) is applicable to the B-BBEE compliance measurement of all entities that fall within the Construction Sector.

The requirements for measurement and verification of entities are contained in the "Amended Code Series CSC000: Framework for Measuring Broad Based Black Economic Empowerment in the Construction Sector", as published in Notice 931 of 2017, Government Gazette No.41287 of 01/12/2017.

The requirements are summarised in the following table:

Enterprise Type	Total Annual Revenue (R million)	Ownership and Annual Turnover
EME: Built Environment Professional	< R1.8m	May present an <b>affidavit</b> OR a <b>certificate</b> issued by the CIPC
EME: Contractor	< R3.0m	OR authorised <b>B-BBEE verification certificate</b> (as below)
Reference should be made to Cl.3.6.2.4.1 of the Amended Construction Sector Code regarding the above exceptions.		
EME: Built Environment Professional	< R6m	Must present an authorised <b>B-BBEE verification certificate</b> by a SANAS accredited Verification Agency
EME: Contractor	< R10m	
QSE: Built Environment Professional	≥ R6.0m and < R25m	
QSE: Contractor	≥ R10.0m and < R50m	
Large Enterprise	>R50m	

The requirements for measurement of Joint Ventures is described in Cl.2.8 of the Amended Construction Sector Code. The compilation of a consolidated verification certificate is required.

B-BBEE Verification Certificates must be from a Verification Agency accredited by the South African National Accreditation System (SANAS).

**Central Supplier Database (CSD)**

The entities (full) Registration Report, obtained from the National Treasury Central Supplier Database, is to be included in the tender submission ( <https://secure.csd.gov.za> ).

Separate CSD Registration Reports are required for each entity in a Joint Venture.

### F.3: THE EMPLOYER'S UNDERTAKINGS

**F.3.1.1 Respond to requests from the tenderer:** Replace the words “five working days” with “three working days”.

**F.3.2 Issue addenda:** Add the following paragraph: “Addenda will be published, in electronic format, on the National Treasury’s eTenders website. In the event that the Clarification Meeting is compulsory, Addenda will only be issued to those tendering entities appearing on the Clarification Meeting Register.”

**F.3.4 Opening of Tender Submissions:** Tenders will be opened immediately after the closing time for tenders and will not be open to the public.

**F.3.11 Evaluation of Tender Offers:** The procedure for evaluation of responsive Tender Offers will be in accordance with the Employer’s current SCM Policy, the Preferential Procurement Policy Framework Act (5 of 2000), and the Preferential Procurement Policy Framework Act Regulations (January 2017).

The procedure for the evaluation of responsive tenders is **Method 2 (Price and Preference with functionality)**.

The **80/20** preference points system will be used where the financial value (incl. VAT) of one or more responsive tender offers have a value that equals or is less than R 50,000,000. The Formula used to calculate the **Price Points**, and the **Preference Points** that will be allocated, will be according to the specified PPPFA Regulations.

The **90/10** preference points system will be used where the financial value (incl. VAT) of all responsive tenders received have a value in excess of R 50,000,000. The Formula used to calculate the **Price Points**, and the **Preference Points** that will be allocated, will be according to the specified PPPFA Regulations.

Only locally produced goods, services, or works, or locally manufactured goods, with a stipulated minimum threshold for Local Production and Content will be considered.

**F.3.11.9 The Functionality criteria (and sub criteria if applicable) and maximum score in respect of each of the criteria are as follows:**



Functionality Criteria / Sub Criteria		Maximum Points Score
Tenderer's Experience		25
Project Organogram and Experience of Key Staff	Site Agent	20
	Concrete (Lead) Foreman	20
Preliminary Programme		20
Construction Methodology		5
Quality Control		10
<b>Maximum possible score for Functionality</b>		<b>100</b>

The minimum number of evaluation points for Functionality is **60**. Only those tenderers who achieve the minimum number of Functionality evaluation points (or greater) will be eligible to have their tenders further evaluated.

Functionality shall be scored by not less than three evaluators and the scores of each of the evaluators will be averaged, weighted and then totalled to obtain the final score for Functionality. Each evaluation criteria will be assessed in terms of six indicators and scores allocated according to the following table:

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
0	20	40	60	80	100

Evaluation criteria will be adjudicated according to submissions made in accordance with the following schedules, which are found in Part T2.2: Returnable Schedules:

Functionality criteria / Subcriteria	Returnable Schedules
Tenderer's Experience	<ul style="list-style-type: none"> <li>Experience of Tenderer: <ul style="list-style-type: none"> <li>Including a description of works undertaken. The tenderer's experience can be in the construction of reinforced concrete water retaining structures and/or in the rehabilitation of reinforced concrete structures.</li> <li>The minimum size (capacity) of the water retaining structure that will be considered applicable will be 1 ML.</li> <li>The scope of works on past reinforced concrete rehabilitation projects is to be detailed in fill in the returnable's section and is to be on projects of a similar scope of works to the scope of works stated in part C3.2: Project Specification.</li> </ul> </li> </ul>
Project Organogram and Experience of Key Staff	<ul style="list-style-type: none"> <li>Proposed Organisation and Staffing</li> <li>Key Personnel</li> <li>Experience of Key Personnel</li> </ul>
Preliminary Programme	<ul style="list-style-type: none"> <li>Preliminary Programme</li> </ul>
Construction Methodology	<ul style="list-style-type: none"> <li>Construction Approach, Methodology,</li> <li>Schedule of Proposed Subcontractors</li> <li>Plant and Equipment</li> </ul>
Quality Control	<ul style="list-style-type: none"> <li>Quality Control Statement</li> </ul>

Unless otherwise stated, evaluation criteria will be adjudicated with respect to the contract specific Scope of Work, as specified in Part C.3. In this regard the following definitions apply to the evaluation criteria prompts for judgement:

- “**successfully completed**” implies a project has been completed on time and to specification;
- “**similar nature**” implies projects that had a comparable Scope of Work in terms of technical requirements and operations where the scope of works was in reinforced concrete rehabilitation and/or in the construction of water retaining structures of atleast 1 ML in capacity;
- “**experience**” implies experience on projects of a similar nature (reinforced concrete rehabilitation and/or construction of reinforced concrete water retaining structures);
- “**accredited degree / diploma**” implies a minimum 3-year qualification within the built environment, from a registered national University or Institute of Technology.

<b>Criterion: Tenderer’s Experience (Construction of Reinforced Concrete Water Retaining Structures (=<math>&lt;1</math> ML) and/or Reinforced Concrete Rehabilitation)</b> Note: “successfully completed” implies a project has been completed on time and to specification	
Level 0	No information provided; OR submission of no substance / irrelevant information provided
Level 1 (20)	To have successfully completed <u>1 project</u> of a reinforced concrete water retaining structure or reinforced concrete rehabilitation within the past 15 years with a scope of works similar to the scope of works for this contract.
Level 2 (40)	To have successfully completed <u>2 projects</u> of a reinforced concrete water retaining structure or reinforced concrete rehabilitation within the past 15 years with a scope of works similar to the scope of works for this contract.
Level 3 (60)	To have successfully completed <u>3 projects</u> of a reinforced concrete water retaining structure or reinforced concrete rehabilitation within the past 15 years with a scope of works similar to the scope of works for this contract.
Level 4 (80)	To have successfully completed <u>4 to 5 projects</u> of a reinforced concrete water retaining structure or reinforced concrete rehabilitation within the past 15 years with a scope of works similar to the scope of works for this contract.
Level 5 (100)	To have successfully completed <u>6+ projects</u> of a reinforced concrete water retaining structure or reinforced concrete rehabilitation within the past 15 years with a scope of works similar to the scope of works for this contract.

<b>Criterion: Project Organogram and Experience of Key Staff</b>	
<b>Note:</b> Projects of a similar nature that will be considered shall be one, or a combination of, reinforced concrete rehabilitation.	
<b>SITE AGENT</b>	
Level 0	No information provided OR submission of no substance / irrelevant information provided OR Relevant accredited diploma / degree and less than 1 year's experience.
Level 1 (20)	Relevant accredited diploma / degree and minimum 2 year's experience.
Level 2 (40)	Relevant accredited diploma / degree and minimum 3 year's experience.
Level 3 (60)	Relevant accredited diploma / degree and minimum 5 year's experience.
Level 4 (80)	Relevant accredited diploma / degree and minimum 8 year's experience.
Level 5 (100)	Relevant accredited diploma / degree and minimum 10 year's experience.
<b>CONCRETE (LEAD) FOREMAN</b>	
Level 0	No information provided OR submission of no substance / irrelevant information OR Less than 2 year's experience.
Level 1 (20)	Minimum 2 year's experience.
Level 2 (40)	Minimum 3 year's experience.
Level 3 (60)	Minimum 5 year's experience.
Level 4 (80)	Minimum 8 year's experience.
Level 5 (100)	Minimum 10 year's experience.

Criterion: Preliminary Programme	
Level 0	No information provided OR submission of no substance / irrelevant information provided
Level 1 (20)	Programme <u>does not cover</u> all the applicable individual activities which are in an acceptable sequence, with appropriate durations, and is in accordance with generally accepted construction practice, and not in line with Clause 1.1.1.14 of the Conditions of Contract (time for achieving Practical Completion).
Level 2 (40)	Programme <u>covering</u> all the applicable individual activities which are in an acceptable sequence, with appropriate durations, and is in accordance with generally accepted construction practice, and is in line with Clause 1.1.1.14 of the Conditions of Contract (time for achieving Practical Completion).
Level 3 (60)	Programme <u>covering</u> all the applicable individual activities which are in an acceptable sequence, with appropriate durations, and is in accordance with generally accepted construction practice, and is in line with Clause 1.1.1.14 of the Conditions of Contract (time for achieving Practical Completion). <b>Plus:</b> Shows critical path with logical linking of tasks/activities
Level 4 (80)	Programme <u>covering</u> all the applicable individual activities which are in an acceptable sequence, with appropriate durations, and is in accordance with generally accepted construction practice, and is in line with Clause 1.1.1.14 of the Conditions of Contract (time for achieving Practical Completion). <b>Plus:</b> <ul style="list-style-type: none"> <li>Shows critical path with logical linking of tasks/activities, and</li> <li>Detailed activity and resources breakdown.</li> <li>Cashflow included</li> </ul>
Level 5 (100)	Programme <u>covering</u> all the applicable individual activities which are in an acceptable sequence, with appropriate durations, and is in accordance with generally accepted construction practice, and is in line with Clause 1.1.1.14 of the Conditions of Contract (time for achieving Practical Completion). <b>Plus:</b> <ul style="list-style-type: none"> <li>Shows critical path with logical linking of tasks/activities, and</li> <li>Detailed activity and resources breakdown.</li> <li>Cashflow included</li> <li>Detailed Plant and equipment resource breakdown</li> </ul>

Criterion: Construction Methodology	
Level 0	No information provided OR submission of no substance / irrelevant information provided
Level 1 (20)	Brief overview of a <u>generic</u> methodology which encompasses all programmed activities in appropriate order.
Level 2 (40)	Brief overview of a <u>site-specific</u> methodology which encompasses all programmed activities in appropriate and logical order.
Level 3 (60)	Brief overview of a <u>site-specific</u> methodology which encompasses all programmed activities in an appropriate order; <b>Plus:</b> <ul style="list-style-type: none"> <li>Including staff, plant and equipment resources,</li> <li>Including subcontractors if applicable.</li> </ul>
Level 4 (80)	Brief overview of <u>site-specific</u> methodology which encompasses all programmed activities in an appropriate order; <b>Plus:</b> <ul style="list-style-type: none"> <li>Including staff, plant and equipment resources,</li> <li>Including subcontractors if applicable,</li> <li>A brief description of preparatory work, construction processes including finishing works for each activity.</li> </ul>
Level 5 (100)	Brief overview of <u>site-specific</u> methodology which encompasses all programmed activities in an appropriate order; <b>Plus:</b> <ul style="list-style-type: none"> <li>Including staff, plant and equipment resources,</li> <li>Including subcontractors if applicable,</li> <li>A brief description of preparatory work, construction processes including finishing works for each activity,</li> <li>Demonstrates how the important issues are approached in an innovative and efficient way, indicating that the tenderer has excellent knowledge of working in the projects environment and producing the required final product.</li> </ul>

Criterion: Quality Control	
Level 0	No information provided OR submission of no substance / irrelevant information provided
Level 1 (20)	<u>A generic statement</u> covering required sampling and testing requirements for preparatory works, process monitoring and finishing works, for all programmed activities.
Level 2 (40)	<u>Activity/Site specific statement</u> covering required sampling and testing requirements for preparatory works, process monitoring and finishing works, for all programmed activities.
Level 3 (60)	<u>Activity/Site specific statement</u> covering required sampling and testing requirements for preparatory works, process monitoring and finishing works, for all programmed activities; <b>Plus:</b> <ul style="list-style-type: none"> <li>• Including site specific quality control check-sheet for programmed activities.</li> </ul>
Level 4 (80)	Activity/Site specific statement covering required sampling and testing requirements for preparatory works, process monitoring and finishing works, for all programmed activities; <b>Plus:</b> <ul style="list-style-type: none"> <li>• Including site specific quality control check-sheet for programmed activities, and</li> <li>• Resources to be assigned to quality control, and</li> <li>• List of subcontractor /service providers to be assigned for quality control, and</li> <li>• Statement on remedial action to quality control.</li> </ul>
Level 5 (100)	Activity/Site specific statement covering required sampling and testing requirements for preparatory works, process monitoring and finishing works, for all programmed activities; <b>Plus:</b> <ul style="list-style-type: none"> <li>• Including site specific quality control check-sheet for programmed activities, and</li> <li>• Resources to be assigned to quality control, and</li> <li>• List of subcontractor /service providers to be assigned for quality control, and</li> <li>• Statement on remedial action to quality control, and</li> <li>• ISO Accreditation.</li> </ul>

**F.3.13 Acceptance of tender offer:** In addition to the requirements of Clause F.3.13 of the Standard Conditions of Tender, tender offers will only be accepted if:

- (a) The tenderer submits a valid Tax Clearance Certificate OR Tax Compliance Status PIN, issued by the TCS System of the South African Revenue Services, or has made arrangements to meet outstanding tax obligations;
- (b) The tenderer is registered, and “Active”, with the Construction Industry Development Board, at time of tender closing, in an appropriate contractor grading designation;
- (c) The tenderer or any of its directors/shareholders is not listed on the Register of Tender Defaulters in terms of the Prevention and Combating of Corrupt Activities Act of 2004 as a person prohibited from doing business with the public sector;
- (d) The tenderer has not:
  - Abused the Employer’s Supply Chain Management System; or
  - Failed to perform on any previous contract and has been given a written notice to this effect;
- (e) The tenderer has completed the Compulsory Enterprise Questionnaire and there are no conflicts of interest which may impact on the tenderer’s ability to perform the contract in the best interests of the employer or potentially compromise the tender process;
- (f) The tenderer is registered and in good standing with the compensation fund or with a licensed compensation insurer;
- (g) The employer is reasonably satisfied that the tenderer has in terms of the Construction Regulations, 2014, issued in terms of the Occupational Health and Safety Act, 1993, the necessary competencies and resources to carry out the work safely.
- (h) If this tender is subject to “Local Content and Production”, the tenderer must complete and sign MBD 6.2 and attach Annexure C (of SATS 1286:2011).
- (i) The Municipality does not bind itself to accept the lowest or any tender. It reserves the right to accept the whole or any part of a tender to place orders. Bidders shall not bind the Municipality to any minimum quantity per order. The successful Tenderer (s) shall be bound to provide any quantities stipulated in the specification.

**F.3.15 Complete adjudicator’s contract:** Refer to the **General Conditions of Contract** and the **Contract Data**.

**F.3.17 Copies of contract:** The number of paper copies of the signed contract to be provided by the Employer is **ONE (1)**.

**The additional conditions of tender are:**

**ACT.1 Appeals**

In terms of Regulation 49 of the Municipal Supply Chain Management Regulations persons aggrieved by decisions or actions taken by the Municipality, may lodge an appeal within 14 days of the decision or action, in writing to the Municipality. All appeals (clearly setting out the reasons for the appeal) and queries with regard to the decision of award are to be directed to:

The City Manager

Attention Ms S. Pillay

eMail: [Simone.Pillay@durban.gov.za](mailto:Simone.Pillay@durban.gov.za)

P O Box 1394

DURBAN, 4000

**ACT.2 Prohibition on awards to persons in the service of the state**

Clause 44 of the Supply Chain Management Regulations states that the Municipality or Municipal Entity may not make any award to a person:

- (a) Who is in the service of the State;
- (b) If that person is not a natural person, of which a director, manager, principal shareholder or stakeholder is a person in the service of the state; or
- (c) Who is an advisor or consultant contracted with the municipality or a municipal entity.

Should a contract be awarded, and it is subsequently established that Clause 44 has been breached, the Employer shall have the right to terminate the contract with immediate effect.

**ACT.3 Code of Conduct and Local Labour**

The Tenderers shall make themselves familiar with the requirements of the following policies that are available on web address: <ftp://ftp.durban.gov.za/cesu/StdContractDocs/>:

- Code of Conduct;
- The Use of CLOs and Local Labour.

**ACT.4 Empowerment Strategies**

For contracts above R30m, the 2017 PPPFA Regulations require organs of State to identify tenders, where feasible, to subcontract a minimum of 30% of the value of the contract to the following designated groups:

- (a) an EME or QSE;
- (b) an EME or QSE which is at least 51% owned by black people;
- (c) an EME or QSE which is at least 51% owned by black people who are youth;
- (d) an EME or QSE which is at least 51% owned by black people who are women;
- (e) an EME or QSE which is at least 51% owned by black people with disabilities;
- (f) an EME or QSE which is 51% owned by black people living in rural or underdeveloped areas or townships;
- (g) a cooperative which is at least 51% owned by black people;
- (h) an EME or QSE which is at least 51% owned by black people who are military veterans; or
- (i) more than one of the categories referred to in paragraphs (a) to (h).

In addition to the above, Water and Sanitation Unit have adopted a minimum requirement of 30% of the contract value (excluding PC Sum and Fixed Cost items), for contracts  $\geq$ R5mil, to be subcontracted to the designated groups listed in (a) to (h) above.

## **PART T2: RETURNABLE DOCUMENTS**

### **T2.1: LIST OF RETURNABLE DOCUMENTS**

#### **T2.1.1 General**

The Tender Document must be submitted as a whole. All forms must be properly completed as required, and the document shall not be taken apart or altered in any way whatsoever.

The Tenderer is required to complete each and every Schedule and Form listed below to the best of his ability as the evaluation of tenders and the eventual contract will be based on the information provided by the Tenderer. Failure of a Tenderer to complete the Schedules and Forms to the satisfaction of the Employer will inevitably prejudice the tender and may lead to rejection on the grounds that the tender is not responsive.

#### **T2.1.2 Returnable Schedules, Forms and Certificates**

##### **Company Specific**

Certificate of Attendance at Clarification Meeting	18
Certificate of Authority	19
Declaration of Municipal Fees	20
Compulsory Enterprise Questionnaire	21
Tax Compliance Status PIN / Tax Clearance Certificate	23
B-BBEE Status Level of Contribution	24
Verification of CIDB Registration and Status	25
CSD Registration Report	26

##### **Consolidated MBD Documents**

MBD2: Tax Clearance Certificate Requirements	27
MBD4: Declaration of Interest	
MBD5: Declaration for Procurement Above R10 Million (if applicable)	
MBD6.1: Preference Points Claim Form ITO the Preferential Regulations	
MBD6.2: Declaration Certificate for Local Production and Content (if applicable)	
MBD8: Declaration of Bidder's Past SCM Practices	
MBD9: Certificate of Independent Bid Determination	

##### **Technical and Evaluation**

Experience of Tenderer	35
Proposed Organisation and Staffing	36
Key Personnel	37
Experience of Key Personnel	38
Preliminary Programme	39
Construction Approach, Methodology, and Quality Control	40
Schedule of Proposed Subcontractors	41
Plant and Equipment	42
Contractor's Health and Safety Plan	43
Contractor's Health and Safety Declaration	44

##### **Contractual**

Joint Venture Agreements (if applicable)	46
Record of Addenda to Tender Documents	47
Amendments, Qualifications and Alternatives	48
Form of Offer	49
Bill of Quantities	63



### **T2.1.3 Preferential Procurement Schedules and Affidavits**

In the event of the Tenderer not being registered with the eThekweni Municipality, the following must be completed and submitted prior to the submission of tenders:

- Application for Registration on the eThekweni Municipality Procurement Database.
- Application for Targeted Enterprise Status.

These documents are available from **Room 614, 6<sup>th</sup> Floor, 166 KE Masinga Road, Durban** or on the internet at [www.durban.gov.za](http://www.durban.gov.za). Follow the following links: eThekweni Municipality / City Government / Administration / Administrative Clusters / Finance / Supply Chain Management / Application for the City's Accredited Supplier and Contractor's Database / Documents you need.

#### **NOTES**

- (a) The information for registration as in the possession of the eThekweni Municipality will apply.
- (b) It is the Tenderer's responsibility to ensure that the details as submitted to the Municipality are correct.
- (c) Tenderers are to submit the above forms prior to the submission of tenders.

## **T2.2: RETURNABLE SCHEDULES, FORMS, AND CERTIFICATES**

The returnable schedules, forms, and certificates as listed in T2.1.2 can be found on the pages [18](#) to [65](#).

**CERTIFICATE OF ATTENDANCE AT CLARIFICATION MEETING / SITE INSPECTION**

This is to certify that:

(tenderer name) .....

of (address) .....

was represented by the person(s) named below at the Clarification Meeting, the details  
of which are stated in the Tender Data (F.2.7).

I / We acknowledge that the purpose of the meeting was to ..... with the site of the  
works and / or matters incidental to doing the work specified in the tender documents in order for me / us to  
take account of everything necessary when compiling the tender included in the tender.

**Particulars of person(s) attending the**

Name: ..... Name: .....

Signature: ..... Signature: .....

Capacity: ..... Capacity: .....

Attendance of person(s) at the meeting is confirmed by the Employer's Agent's  
Representative:

Name: .....

Signature: .....

Date: .....

## **CERTIFICATE OF AUTHORITY**

Indicate the status of the tenderer by ticking the appropriate box hereunder.

<b>COMPANY</b>		<b>CLOSE CORPORATION</b>		<b>PARTNERSHIP</b>		<b>JOINT VENTURE</b>		<b>SOLE PROPRIETOR</b>	
Refer to Notes at the bottom of the page									

I / We, the undersigned, being the Chairperson (Company), Member(s) (Close Corporation), Partners (Partnership), Sole Owner (Sole Proprietor), Lead Partner (JV), in the company / business trading as:

.....

hereby authorise Mr/Mrs/Ms .....

acting in the capacity of .....

to sign all documents in connection with the tender for **Contract No. WS 7230** and any contract resulting from it on our behalf.

NAME	ADDRESS	SIGNATURE	DATE

## **Notes**

The following documents must be attached to the back inside cover to this procurement document:

If a Company : a "Resolution of the Board" in this regard.

If a Joint Venture : a "Power of Attorney" signed by the legally authorised signatories of all the partners to the Joint venture.

## **DECLARATION OF MUNICIPAL FEES**

I, the undersigned, do hereby declare that the Municipal fees of

.....  
(full name of Company / Close Corporation / partnership / sole proprietary/Joint Venture)  
(hereinafter referred to as the TENDERER) are, as at the date hereunder, fully paid or an Acknowledgement of Debt has been concluded with the Municipality to pay the said charges in instalments.

The following account details relate to property of the said TENDERER:

Account

Account Number: to be completed by tenderer.

Consolidated Account No.

--	--	--	--	--	--	--	--	--	--	--	--	--

Electricity

--	--	--	--	--	--	--	--	--	--	--	--	--

Water

--	--	--	--	--	--	--	--	--	--	--	--	--

Rates

--	--	--	--	--	--	--	--	--	--	--	--	--

JSB Levies

--	--	--	--	--	--	--	--	--	--	--	--	--

Other

--	--	--	--	--	--	--	--	--	--	--	--	--

Other

--	--	--	--	--	--	--	--	--	--	--	--	--

I acknowledge that should the aforesaid Municipal charges fall into arrears, the Municipality may take such remedial action as is required, including termination of any contract, and any payments due to the Contractor by the Municipality shall be first set off against such arrears. ATTACHED, to the back inside cover of this document, please find copies of the above account's and or agreements signed with the municipality.

- Where the TENDERER'S place of business or business interests are outside the jurisdiction of eThekweni municipality, a copy of the accounts/agreements from the relevant municipality must be attached (to the back inside cover of this document).
- Where the tenderer's Municipal Accounts are part of their lease agreement, then a copy of the agreement, or official letter to that effect is to be attached (to the back inside cover of this document).

NAME : .....

(Block Capitals)

SIGNATURE : .....  
(of person authorised to sign on behalf of the Tenderer)

DATE: .....

## **COMPULSORY ENTERPRISE QUESTIONNAIRE**

The following particulars must be furnished. In the case of a joint venture, a separate questionnaire in respect of each partner must be completed and submitted.

- 1) **Name of enterprise:** .....
- 2) **VAT registration number, if any:** .....
- 3) **CIDB registration number, if any:** .....
- 4) **Particulars of sole proprietors and partners in partnerships**

Full Name	Identity number*	Personal income tax number *

\* Complete only if a sole proprietor or partnership and attach separate page if more than 3 partners

- 5) **Particulars of companies and close corporations**

Company registration number, if applicable: .....

Close corporation number, if applicable: .....

Tax Reference number, if any: .....

- 6) **Record in the service of the state**

Indicate by marking the relevant boxes with a cross, if any sole proprietor, partner in a partnership or director, manager, principal shareholder or stakeholder in a company or close corporation is currently or has been within the last 12 months in the service of any of the following:

- |  |   |
|--|---|
| <input type="checkbox"/> a member of any municipal council                                     | <input type="checkbox"/> an employee of any provincial department, national or provincial public entity or constitutional institution within the meaning of the Public Finance Management Act, 1999 (Act 1 of 1999) |
| <input type="checkbox"/> a member of any provincial legislature                                | <input type="checkbox"/> a member of an accounting authority of any national or provincial public entity  |
| <input type="checkbox"/> a member of the National Assembly or the National Council of Province | <input type="checkbox"/> an employee of Parliament or a provincial legislature  |
| <input type="checkbox"/> a member of the board of directors of any municipal entity            |   |
| <input type="checkbox"/> an official of any municipality or municipal entity                   |   |

Name of sole proprietor, partner, director, manager, principal shareholder or stakeholder	Name of institution, public office, board or organ of state and position held	Status of service (tick appropriate column)	
		Current	Within last 12 months

Insert separate page if necessary

7) **Record of spouses, children and parents in the service of the state**

Indicate by marking the relevant boxes with a cross, if any spouse, child or parent of a sole proprietor, partner in a partnership or director, manager, principal shareholder or stakeholder in a company or close corporation is currently or has been within the last 12 months in the service of any of the following:

- |  |   |
|--|---|
| <input type="checkbox"/> a member of any municipal council                                     | <input type="checkbox"/> an employee of any provincial department, national or provincial public entity or constitutional institution within the meaning of the Public Finance Management Act, 1999 (Act 1 of 1999) |
| <input type="checkbox"/> a member of any provincial legislature                                | <input type="checkbox"/> a member of an accounting authority of any national or provincial public entity  |
| <input type="checkbox"/> a member of the National Assembly or the National Council of Province | <input type="checkbox"/> an employee of Parliament or a provincial legislature  |
| <input type="checkbox"/> a member of the board of directors of any municipal entity            |   |
| <input type="checkbox"/> an official of any municipality or municipal entity                   |   |

Name of spouse, child or parent	Name of institution, public office, board or organ of state and position held	Status of service (tick appropriate column)	
		Current	Within last 12 months

Insert separate page if necessary

The undersigned, who warrant that he/she is duly authorised to do so on behalf of the enterprise:

- i) authorizes the Employer to obtain a tax clearance certificate from the South African Revenue Services that my/our tax matters are in order;
- ii) confirms that neither the name of the enterprise or the name of any partner, manager, director or other person, who wholly or partly exercise, or may exercise, control over the enterprise appears on the Register of Tender Defaulters established in terms of the Prevention and Combating of Corrupt Activities Act of 2004;
- iii) confirms that no partner, member, director or other person, who wholly or partly exercise, control over the enterprise appears, has within the last five years been convicted of fraud or corruption;
- iv) confirms that I/we are not associated, linked or involved with any other tendering entities submitting tender offers and have no other relationship with any of the bidders or those responsible for compiling the scope of work that could cause or be interpreted as a conflict of interest;
- v) confirms that the contents of this questionnaire are within my personal knowledge and are to the best of my belief both true and correct.

Signed ..... Date .....

Name ..... Position .....

Enterprise Name .....

---

**TAX COMPLIANCE STATUS PIN / TAX CLEARANCE CERTIFICATE**

Reference is made to F.2.23 of the Conditions of Tender.

SARS has introduced a new Tax Compliance Status System. Tenderers can submit a Tax Compliance Status PIN (TCS PIN) instead of an original Tax Clearance Certificate. This TCS PIN can be used by third parties to certify the taxpayer's real-time compliance status.

Separate Tax Clearance Certificates / TCS PINs are required for each entity in a Joint Venture.

Tenderers are to attach to this page a printout of their Tax Compliance Status PIN (TCS PIN) OR an original Tax Clearance Certificate.

NAME : ..... (Block Capitals)

SIGNATURE : ..... DATE: .....  
(of person authorised to sign on behalf of the Tenderer)



## **B-BBEE STATUS LEVEL OF CONTRIBUTION**

Reference is made to F.2.23 of the Conditions of Tender.

The Amended Construction Sector Code (Government Gazette No.41287) is applicable to the B-BBEE compliance measurement of all entities that fall within the Construction Sector.

The requirements for measurement and verification of entities are contained in the "Amended Code Series CSC000: Framework for Measuring Broad Based Black Economic Empowerment in the Construction Sector", as published in Notice 931 of 2017, Government Gazette No.41287 of 01/12/2017.

The requirements are summarised in the following table:

Enterprise Type	Total Annual Revenue (R million)	Ownership and Annual Turnover
EME: Built Environment Professional	< R1.8m	May present an <b>affidavit</b> OR a <b>certificate</b> issued by the CIPC
EME: Contractor	< R3.0m	OR authorised <b>B-BBEE verification certificate</b> (as below)
Reference should be made to Cl.3.6.2.4.1 of the Amended Construction Sector Code regarding the above exceptions.		
EME: Built Environment Professional	< R6m	Must present an authorised <b>B-BBEE verification certificate</b> by a SANAS accredited Verification Agency
EME: Contractor	< R10m	
QSE: Built Environment Professional	≥ R6.0m and < R25m	
QSE: Contractor	≥ R10.0m and < R50m	
Large Enterprise	>R50m	

The requirements for measurement of Joint Ventures is described in Cl.2.8 of the Amended Construction Sector Code. The compilation of a consolidated verification certificate is required.

**Tenderers are to attach to this page an affidavit, or a B-BBEE certificate issued by an authorised SANAS accredited Verification Agency.**

NAME : ..... (Block Capitals)

SIGNATURE : ..... DATE: .....  
(of person authorised to sign on behalf of the Tenderer)

## **VERIFICATION OF CIDB REGISTRATION AND STATUS**

Reference is made to F.2.23 of the Conditions of Tender.

Clause F.2.1.1 of the Conditions of Tender – “Eligibility”, requires a tenderer to be registered, as “Active”, with the CIDB (at time of tender closing), in a contractor grading designation equal to or higher than a contractor grading designation determined in accordance with the sum tendered, or a value determined in accordance with Regulation 25 (1B) or 25(7A) of the Construction Industry Development Regulations, for a 5CE class of construction work.

Tenderers are to attach to this page a printout of their registration with the CIDB, as obtained from the CIDB website <https://registers.cidb.org.za/PublicContractors/ContractorSearch>. The date of obtaining the printout is to be indicated on the printout.

The following is an example of a printout obtained from the above website.

**cidb**  
Construction Industry Development Board  
DEVELOPMENT THROUGH PARTNERSHIP

construction industry development board

Home

Contractor Detail Print

Contractor Detail

CRS Number: Type of Enterprise:

Contractor Name: Registration Date:

Trading Name: Expiry Date:

Status:

Contractor Grades

Grade:

Back

Copyright © cidb 2011. All rights reserved  
[Website technical enquires contact](#)

01/01/2017

NAME : ..... (Block Capitals)

SIGNATURE : ..... DATE: .....  
(of person authorised to sign on behalf of the Tenderer)


## **CSD REGISTRATION REPORT**

Reference is made to F.2.23 of the Conditions of Tender.

Clause F.2.1 of the Conditions of Tender – “Eligibility”, requires a tenderer to be registered at the time of tender closing on the National Treasury Central Supplier Database (CSD) as a service provider.

Tenderers are to attach to this page a printout of their CSD Registration Report, as obtained from the National Treasury’s CSD website <https://secure.csd.gov.za/Account/Login>. The date of obtaining the printout is to be indicated on the printout.

The following is an example of the beginning of the printout obtained from the above website.

 <b>CENTRAL SUPPLIER DATABASE</b> FOR GOVERNMENT	Report Date:
	Report Ran By:

<b>CSD REGISTRATION REPORT</b>	
<b>SUPPLIER IDENTIFICATION</b>	
Supplier number	
Is supplier active?	
Supplier type	
Supplier sub-type	
Legal name	
Trading name	
Identification type	
Government breakdown	
Business status	
Country of origin	
South African company/CC registration number	
Have Bank Account	
Total annual turnover	
Financial year start date	
Registration date	
Created by	
Created date	
Edit by	
Edit date	
Restricted Supplier	
Restriction Last Verification Date	

NAME : .....

(Block Capitals)

SIGNATURE : .....  
(of person authorised to sign on behalf of the Tenderer)

DATE: .....

## **CONSOLIDATED MUNICIPAL BIDDING DOCUMENTS**

**The following SECTIONS are required to be completed as part of this procurement document**

<b><u>Section</u></b>	<b><u>Description</u></b>	<b><u>Required?</u></b>
<b>A</b>	General Enterprise Information .....	<b>Yes</b>
<b>B</b>	MBD2: Tax Clearance Certificate Requirements .....	<b>Yes</b>
<b>C</b>	MBD4: Declaration of Interest .....	<b>Yes</b>
<b>D</b>	MBD5: Declaration for Procurement Above R10 Million .....	<b>No</b>
<b>E</b>	MBD6.1: Preference Points Claim Form ITO the Preferential Regulations .....	<b>Yes</b>
<b>F</b>	MBD6.2: Declaration Certificate for Local Production and Content for Designated Sectors .....	<b>No</b>
<b>G</b>	MBD8: Declaration of Bidder's Past SCM Practices .....	<b>Yes</b>
<b>H</b>	MBD9: Certificate of Independent Bid Determination .....	<b>Yes</b>
<b>I</b>	Confirmations, Authorities, Certifications, Acknowledgements and Signatures .....	<b>Yes</b>

### **NOTES**

- MBD4. MSCM 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 enterprise;
  - (c) an official of any municipality or municipal enterprise;
  - (d) an employee of any national or provincial department, national or provincial public enterprise 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 enterprise; or
  - (f) an employee of Parliament or a provincial legislature.
- "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.
- MBD9. 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.

<u>Ref</u>	<u>Description</u>	<u>Complete or Circle Applicable</u>
------------	--------------------	--

**SECTION A: GENERAL ENTERPRISE INFORMATION**

1.0	Full Name of bidder or his or her representative	
1.1	ID Number of bidder or his or her representative	
1.2	Position occupied in the enterprise	
2.0	Name of enterprise:	
2.1	Tax Reference number, if any:	
2.2	VAT registration number, if any:	
2.3	CIDB registration number, if any:	
2.4	Company registration number, if applicable:	
2.5	Close corporation number, if applicable:	
2.6	Supplier reference number (PR), if any:	
2.7	South African Revenue Service Tax Compliance Status PIN:	
2.8	National Treasury Central Supplier Database registration number	

3.0 The names of all directors / trustees / shareholders / members / sole proprietors / partners in partnerships, their individual identity numbers and state employee numbers must be indicated below. In the case of a joint venture, information in respect of each partnering enterprise must be completed and submitted

Full Name	Identity No.	State Employee No.	Personal income tax No. *
Use additional pages if necessary			

Ref	Description	Complete or Circle Applicable
-----	-------------	-------------------------------

## **SECTION B: MBD 2: TAX CLEARANCE CERTIFICATE REQUIREMENTS**

It is a condition of bid that the taxes of the successful bidder must be in order, or that satisfactory arrangements have been made with South African Revenue Service (SARS) to meet the bidder's tax obligations.

- 1.0 In order to meet this requirement bidders are required to complete the TCC 001: "Application for a Tax Clearance Certificate" form and submit it to any SARS branch office nationally. The Tax Clearance Certificate Requirements are also applicable to foreign bidders / individuals who wish to submit bids.
- 2.0 SARS will then furnish the bidder with a Tax Clearance Certificate that will be valid for a period of 1 (one) year from the date of approval.
- 3.0 The original Tax Clearance Certificate must be submitted together with the bid (attached to the inside back cover of this procurement document). Failure to submit the original and valid Tax Clearance Certificate will result in the invalidation of the bid. Certified copies of the Tax Clearance Certificate will not be acceptable.
- 4.0 In bids where Consortia / Joint Ventures / Sub-contractors are involved, each party must submit a separate Tax Clearance Certificate.
- 5.0 Copies of the TCC 001: "Application for a Tax Clearance Certificate" form are available from any SARS branch office nationally or on the website [www.sars.gov.za](http://www.sars.gov.za).
- 6.0 Applications for the Tax Clearance Certificates may also be made via eFiling. In order to use this provision, taxpayers will need to register with SARS as eFilers through the website [www.sars.gov.za](http://www.sars.gov.za).
- 7.0 Notwithstanding Clauses 1.0 to 6.0 above: Since 18 April 2016, SARS has introduced a new Tax Compliance Status System (TCS). As part of this enhanced system, tenderers can now submit a Tax Compliance Status PIN instead of an original Tax Clearance Certificate (TCC). This TCS PIN can be used by third parties to certify the taxpayer's real-time compliance status. This number, if available, is to be entered in Item 2.7 of Section A of these consolidated Municipal Bidding Documents.  
For further particulars please contact your nearest SARS branch, or call the SARS Contact Centre on 0800 00 7277, or log onto SARS eFiling.

## **SECTION C: MBD 4: DECLARATION OF INTEREST**

**No bid will be accepted from persons "in the service of the state"**. 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 and/or take an oath declaring his/her interest. In order to give effect to the above, the following questionnaire must be completed and submitted with the bid.

1.0	Are you presently in the service of the state?	YES	NO
	If yes, furnish particulars: .....		
2.0	Have you been in the service of the state for the past twelve months?	YES	NO
	If yes, furnish particulars: .....		
3.0	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
	If yes, furnish particulars: .....		
4.0	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
	If yes, furnish particulars: .....		
5.0	Are any of the company's directors, trustees, managers, principle shareholders or stakeholders in service of the state?	YES	NO
	If yes, furnish particulars: .....		
6.0	Are any spouse, child or parent of the company's directors, trustees, managers, principle shareholders or stakeholders in service of the state?	YES	NO
	If yes, furnish particulars: .....		
7.0	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
	If yes, furnish particulars: .....		
8.0	The names of all directors / trustees / shareholders / members / sole proprietors / partners in partnerships, their individual identity numbers and state employee numbers are indicated in <b>SECTION A</b> of these <b>Consolidated Municipal Bidding documents</b> .		

Ref	Description	Complete or Circle Applicable	
<b>SECTION D: MBD 5: DECLARATION FOR PROCUREMENT ABOVE R10 MILLION (ALL APPLICABLE TAXES INCLUDED)</b>			
For all procurement expected to exceed R10 million (all applicable taxes included), bidders must complete the following questionnaire.			
1.0	Are you by law required to prepare annual financial statements for auditing? If YES, you will be required to submit audited annual financial statements (on request during the tender evaluation period) for the past three years or since the date of establishment if established during the past three years.	YES	NO
2.0	Do you have any outstanding undisputed commitments for municipal services towards any municipality for more than three months or any other service provider in respect of which payment is overdue for more than 30 days? If NO, this serves to certify that the bidder has no undisputed commitments for municipal services towards any municipality for more than three months or other service provider in respect of which payment is overdue for more than 30 days. If YES, provide particulars on a letterhead. (Attach this letter to the back inside cover of this procurement document).	YES	NO
3.0	Has any contract been awarded to you by an organ of state during the past five years, including particulars of any material non-compliance or dispute concerning the execution of such contract? If YES, provide particulars on a letterhead. (Attach this letter to the back inside cover of this procurement document).	YES	NO
4.0	Will any portion of goods or services be sourced from outside the Republic, and, if so, what portion and whether any portion of payment from the municipality / municipal entity is expected to be transferred out of the Republic? If YES, provide particulars on a letterhead. (Attach this letter to the back inside cover of this procurement document).	YES	NO
5.0	If the tenderer is not required by law to prepare audited financial statements, then the tenderer must submit a Public Interest (PI) Score, whereby if the PI score is above 350 points then the bidder must submit audited financial statements.		

<b>SECTION E: MBD 6.1: PREFERENCE POINTS CLAIM ITO THE PREFERENTIAL REGULATIONS</b>	
Preference points for this tender shall be awarded as per the Tender Data and the Preferential Procurement Regulations (2017). Failure on the part of a tenderer to submit a B-BBEE Verification Certificate from a Verification Agency accredited by the South African Accreditation System (SANAS), or a Sworn Affidavit for an EME, or sworn affidavit for a QSE (in line with the revised BBBEE codes of Good Practice), together with the bid will be interpreted to mean that preference points for B-BBEE status level of contribution are not claimed. The Employer reserves the right to require of a tenderer, either before a bid is adjudicated or at any time subsequently, to substantiate any claim in regard to preferences, in any manner required by the Employer.	
1.0	B-BBEE Status Level of Contribution claimed:
	Will any portion of the contract be sub-contracted?
	YES
	NO
	If YES, indicate:
	(i) what percentage of the contract will be subcontracted?
	(ii) the name of the sub-contractor?
	Name: .....
	(iii) the B-BBEE status level of the sub-contractor?
2.0	(iv) whether the sub-contractor is an EME?
	YES
	NO

The undersigned, certify that the B-BBEE status level of contribution indicated in paragraph 1.0 above qualifies the company / firm for preference points and acknowledges that the remedies as per Clause 14 of the Preferential Procurement Regulations (2017) shall apply.

<b>SECTION F: MBD 6.2: DECLARATION CERTIFICATE FOR LOCAL PRODUCTION AND CONTENT FOR DESIGNATED SECTORS</b>
This Municipal Bidding Document (MBD) must form part of all bids invited. It contains general information and serves as a declaration form for local content (local production and local content are used interchangeably). Before completing this declaration, bidders must study the General Conditions, Definitions, Directives applicable in respect of Local Content as prescribed in the Preferential Procurement Regulations, 2017 and the South African Bureau of Standards (SABS) approved technical specification number SATS 1286:2011 (Edition 1) and the Guidance on the Calculation of Local Content together with the Local Content Declaration Templates [Annex C (Local Content Declaration: Summary Schedule), D (Imported Content Declaration: Supporting Schedule to Annex C) and E (Local Content Declaration: Supporting Schedule to Annex C)].

- 1.0 General Conditions
- 1.1 Preferential Procurement Regulations, 2017 (Regulation 8) makes provision for the promotion of local production and content.
- 1.2 Regulation 8.(1) prescribes that in the case of designated sectors, where in the award of bids local production and content is of critical importance, such bids must be advertised with the specific bidding condition that only locally produced goods, services or works or locally manufactured goods, with a stipulated minimum threshold for local production and content will be considered.
- 1.3 Where necessary, for bids referred to in paragraph 1.2 above, a two-stage bidding process may be followed, where the first stage involves a minimum threshold for local production and content and the second stage price and B-BBEE.

Ref	Description	Complete or Circle Applicable								
1.4	A person awarded a contract in relation to a designated sector, may not sub-contract in such a manner that the local production and content of the overall value of the contract is reduced to below the stipulated minimum threshold.									
1.5	<p>The local content (LC) expressed as a percentage of the bid price must be calculated in accordance with the SABS approved technical specification number SATS 1286: 2011 as follows:</p> $LC = [1 - x / y] * 100$ <p>Where: x is the imported content in Rand y is the bid price in Rand excluding value added tax (VAT).</p> <p>Prices referred to in the determination of x must be converted to Rand (ZAR) by using the exchange rate published by the South African Reserve Bank (SARB) at 12:00 on the date of advertisement of the bid as required in paragraph 4.1 below.</p> <p>The SABS approved technical specification number SATS 1286:2011 is accessible on <a href="http://www.thedti.gov.za/industrial%20development/ip.jsp">http://www.thedti.gov.za/industrial development/ip.jsp</a> at no cost.</p>									
1.6	<p>A bid may be disqualified if –</p> <p>(a) this Declaration Certificate and the Annex C (Local Content Declaration: Summary Schedule) are not submitted as part of the bid documentation; and</p> <p>(b) the bidder fails to declare that the Local Content Declaration Templates (Annex C, D and E) have been audited and certified as correct.</p>									
2.0	Definitions									
2.1	“bid” includes written price quotations, advertised competitive bids or proposals;									
2.2	“bid price” price offered by the bidder, excluding value added tax (VAT);									
2.3	“contract” means the agreement that results from the acceptance of a bid by an organ of state;									
2.4	“designated sector” means a sector, sub-sector or industry that has been designated by the Department of Trade and Industry in line with national development and industrial policies for local production, where only locally produced services, works or goods or locally manufactured goods meet the stipulated minimum threshold for local production and content;									
2.5	“duly sign” means a Declaration Certificate for Local Content that has been signed by the Chief Financial Officer or other legally responsible person nominated in writing by the Chief Executive, or senior member / person with management responsibility (close corporation, partnership or individual).									
2.6	“imported content” means that portion of the bid price represented by the cost of components, parts or materials which have been or are still to be imported (whether by the supplier or its subcontractors) and which costs are inclusive of the costs abroad (this includes labour and intellectual property costs), plus freight and other direct importation costs, such as landing costs, dock duties, import duty, sales duty or other similar tax or duty at the South African port of entry;									
2.7	“local content” means that portion of the bid price which is not included in the imported content, provided that local manufacture does take place;									
2.8	“stipulated minimum threshold” means that portion of local production and content as determined by the Department of Trade and Industry; and									
2.9	“sub-contract” means the primary contractor’s assigning, leasing, making out work to, or employing another person to support such primary contractor in the execution of part of a project in terms of the contract.									
3.0	<p>The stipulated minimum threshold(s) for local production and content (refer to Annex A of SATS 1286:2011) for this bid is/are as follows:</p> <table border="1"> <thead> <tr> <th>Description of services, works or goods</th> <th>Stipulated minimum threshold</th> </tr> </thead> <tbody> <tr> <td>.....</td> <td>..... %</td> </tr> <tr> <td>.....</td> <td>..... %</td> </tr> <tr> <td>.....</td> <td>..... %</td> </tr> </tbody> </table>	Description of services, works or goods	Stipulated minimum threshold	.....	..... %	.....	..... %	.....	..... %	
Description of services, works or goods	Stipulated minimum threshold									
.....	..... %									
.....	..... %									
.....	..... %									
4.0	Does any portion of the services, works or goods offered have any imported content?	<table border="1"> <tr> <td>YES</td> <td>NO</td> </tr> </table>	YES	NO						
YES	NO									
4.1	<p>If yes, the rate(s) of exchange to be used in this bid to calculate the local content as prescribed in paragraph 1.5 of the general conditions must be the rate(s) published by the SARB for the specific currency at 12:00 on the date of advertisement of the bid.</p> <p>The relevant rates of exchange information is accessible on <a href="http://www.reservebank.co.za">www.reservebank.co.za</a>.</p> <p>Indicate the rate(s) of exchange against the appropriate currency in the table below (refer to Annex A of SATS 1286:2011):</p> <p>US Dollar: <input type="text"/> Pound Sterling: <input type="text"/> Euro: <input type="text"/> Yen: <input type="text"/> Other: <input type="text"/></p> <p>NB: Bidders must submit proof of the SARB rate (s) of exchange used.</p>									
5.0	Were the Local Content Declaration Templates (Annex C, D and E) audited and certified as correct?	<table border="1"> <tr> <td>YES</td> <td>NO</td> </tr> </table>	YES	NO						
YES	NO									
5.1	<p>If yes, provide the following particulars:</p> <p>(a) Full name of auditor: .....</p> <p>(b) Practice number: ..... (c) Telephone number: ..... Cell number: .....</p> <p>(d) Email address: .....</p> <p>(Documentary proof regarding the declaration will, when required, be submitted to the satisfaction of the Accounting Officer / Accounting Authority)</p>									
6.0	Where, after the award of a bid, challenges are experienced in meeting the stipulated minimum threshold for local content the dti must be informed accordingly in order for the dti to verify and in consultation with the Accounting Officer / Accounting Authority provide directives in this regard.									



### **LOCAL CONTENT DECLARATION**

(REFER TO ANNEX B OF SATS 1286:2011)

LOCAL CONTENT DECLARATION BY CHIEF FINANCIAL OFFICER OR OTHER LEGALLY RESPONSIBLE PERSON NOMINATED IN WRITING BY THE CHIEF EXECUTIVE OR SENIOR MEMBER/PERSON WITH MANAGEMENT RESPONSIBILITY (Close Corporation, Partnership or Individual)

.....  
IN RESPECT OF BID No:

.....  
ISSUED BY: (Procurement Authority / Name of Municipality / Municipal Entity)

NB 1 - The obligation to complete, duly sign and submit this declaration cannot be transferred to an external authorized representative, auditor or any other third party acting on behalf of the bidder.

NB 2 - Guidance on the Calculation of Local Content together with Local Content Declaration Templates (Annex C, D and E) is accessible on [http://www.thedti.gov.za/industrial development/ip.jsp](http://www.thedti.gov.za/industrial%20development/ip.jsp). Bidders should first complete Declaration D. After completing Declaration D, bidders should complete Declaration E and then consolidate the information on Declaration C. Declaration C should be submitted with the bid documentation at the closing date and time of the bid in order to substantiate the declaration made in paragraph (c) below. Declarations D and E should be kept by the bidders for verification purposes for a period of at least 5 years. The successful bidder is required to continuously update Declarations C, D and E with the actual values for the duration of the contract.

I, the undersigned in Section H of these Consolidated MBD returnable questionnaires (comprising 8 pages), do hereby declare the following:

- (a) The facts contained herein fall within my own personal knowledge.
- (b) I have satisfied myself that:
- (i) the goods/services/works to be delivered in terms of the above-specified bid comply with the minimum local content requirements as specified in the bid, and as measured in terms of SATS 1286:2011; and
  - (ii) the declaration templates have been audited and certified to be correct.

- (c) The local content percentages (%) indicated below has been calculated using the formula given in clause 3 of SATS 1286:2011, the rates of exchange indicated in paragraph 4.1 above and the information contained in Declaration D and E which has been consolidated in Declaration C;

• Bid price, excluding VAT (y) .....	R
• Imported content (x), as calculated in terms of SATS 1286:2011 .....	R
• Stipulated minimum threshold for local content (paragraph 3 above) .....	%
• Local content %, as calculated in terms of SATS 1286:2011 .....	%

If the bid is for more than one product, the local content percentages for each product contained in Declaration C shall be used instead of the table above. The local content percentages for each product has been calculated using the formula given in clause 3 of SATS 1286:2011, the rates of exchange indicated in paragraph 4.1 above and the information contained in Declaration D and E.

- (d) I accept that the Procurement Authority / Municipality /Municipal Entity has the right to request that the local content be verified in terms of the requirements of SATS 1286:2011.
- (e) I understand that the awarding of the bid is dependent on the accuracy of the information furnished in this application. I also understand that the submission of incorrect data, or data that are not verifiable as described in SATS 1286:2011, may result in the Procurement Authority / Municipal / Municipal Entity imposing any or all of the remedies as provided for in Regulation 14 of the Preferential Procurement Regulations, 2017 promulgated under the Preferential Policy Framework Act (PPPFA), 2000 (Act No. 5 of 2000).

### **SECTION G: MBD8: DECLARATION OF BIDDER'S PAST SUPPLY CHAIN MANAGEMENT PRACTICES**

This Municipal Bidding Document must form part of all bids invited. 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.

The bid of any bidder may be rejected if that bidder, or any of its directors have:

- a) abused the 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) wilfully 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).

In order to give effect to the above, the following questions must be answered.

1.0	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 audi alteram partem rule was applied. The Database of Restricted Suppliers now resides on the National Treasury's website ( <a href="http://www.treasury.gov.za">www.treasury.gov.za</a> ) and can be accessed by clicking on its link at the bottom of the home page.	YES	NO
	If yes, furnish particulars: .....		
2.0	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 ( <a href="http://www.treasury.gov.za">www.treasury.gov.za</a> ) by clicking on its link at the bottom of the home page.	YES	NO
	If yes, furnish particulars: .....		

3.0	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? If yes, furnish particulars: .....	YES	NO
4.0	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? If yes, furnish particulars: .....	YES	NO
5.0	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? If yes, furnish particulars: .....	YES	NO

#### SECTION H: MBD9: CERTIFICATE OF INDEPENDENT BID DETERMINATION

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).<sup>2</sup> Collusive bidding is a *pe se* prohibition meaning that it cannot be justified under any grounds.

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:

- take all reasonable steps to prevent such abuse;
- 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
- 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.

The following 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.

In order to give effect to the above, the following Certificate of Bid Determination must be completed and submitted with the bid. The undersigned, in submitting the accompanying bid, in response to the invitation for the bid do hereby make the following statements that I certify to be true and complete in every respect:

- I have read and I understand the contents of this Certificate;
- I understand that the accompanying bid will be disqualified if this Certificate is found not to be true and complete in every respect;
- I am authorized by the bidder to sign this Certificate, and to submit the accompanying bid, on behalf of the bidder;
- 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;
- 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:
  - has been requested to submit a bid in response to this bid invitation;
  - could potentially submit a bid in response to this bid invitation, based on their qualifications, abilities or experience; and
  - provides the same goods and services as the bidder and/or is in the same line of business as the bidder.
- 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 consortium<sup>3</sup> will not be construed as collusive bidding. (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.
- In particular, without limiting the generality of paragraphs 6 above, there has been no consultation, communication, agreement or arrangement with any competitor regarding:
  - prices;
  - geographical area where product or service will be rendered (market allocation);
  - methods, factors or formulas used to calculate prices;
  - the intention or decision to submit or not to submit, a bid;
  - the submission of a bid which does not meet the specifications and conditions of the bid;
  - bidding with the intention not to win the bid.
- 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.
- 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.
- 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.

**SECTION I: CONFIRMATIONS, AUTHORITIES, CERTIFICATIONS, ACKNOWLEDGEMENTS and SIGNATURES**

The undersigned, who warrants that he/she is duly authorised to do so on behalf of the enterprise:

- 1.0 Confirms that the contents of these Consolidated MBD returnable questionnaires (comprising 8 pages) fall within my personal knowledge and are to the best of my Knowledge and belief, both true and correct;
- 2.0 Confirms that neither the name of the enterprise or the name of any partner, manager, director or other person, who wholly or partly exercise, or may exercise, control over the enterprise appears on the Register of Tender Defaulters established in terms of the Prevention and Combating of Corrupt Activities Act of 2004;
- 3.0 Confirms that no partner, member, director or other person, who wholly or partly exercise control over the enterprise, has within the last five years been convicted of fraud or corruption;
- 4.0 Confirms that I/we are not associated, linked or involved with any other tendering entities submitting tender offers and have no other relationship with any of the bidders or those responsible for compiling the scope of work that could cause or be interpreted as a conflict of interest;
- 5.0 Certify that the B-BBEE status level of contribution indicated in Section E.1: Item 1.0 qualifies the enterprise for preference points and acknowledges that the remedies as per Clause 14 of the Preferential Procurement Regulations (2017) shall apply. In the event of a contract being awarded as a result of points claimed, the enterprise may be required to furnish documentary proof to the satisfaction of the employer that the claims are correct;
- 6.0 Accept that, in addition to cancellation of a contract, action may be taken against me should these declarations prove to be false.

Signed ..... Date .....

Name ..... Position .....

Refer to Clause F3.11.9 for Functionality Points evaluation prompts.

Tenderers are to submit copies of signed completion certificates for all projects submitted.

[illegible]

SIGNATURE : ..... DATE: .....  
(of person authorised to sign on behalf of the Tenderer)

**EVALUATION SCHEDULE: PROPOSED ORGANISATION and STAFFING**

Refer to Clause F3.11.9 for Functionality Points evaluation prompts.

The tenderer should propose the structure and composition of their team i.e. the main disciplines involved, the key staff member / expert responsible for each discipline, and the proposed technical and support staff and site staff.

The roles and responsibilities of each key staff member / expert should be set out as job descriptions. In the case of an association / joint venture / consortium, it should, indicate how the duties and responsibilities are to be shared.

The tenderer must attach his / her organization and staffing proposals to this page. (this is to include both the on-site and off-site staffing resources used for this project)

In addition to any lists, this information should also be shown in an organogram format (flow chart) clearly indicating the staff hierarchy and reporting lines, again for on- and off-site resources.

The undersigned, who warrants that he / she is duly authorised to do so on behalf of the enterprise, confirms that the contents of this schedule are within my personal knowledge and are to the best of my belief both true and correct.

NAME : ..... (Block Capitals)

SIGNATURE : ..... DATE: .....  
(of person authorised to sign on behalf of the Tenderer)

### **EVALUATION SCHEDULE: KEY PERSONNEL**

Refer to Clause F3.11.9 for Functionality Points evaluation prompts.

The Tenderer shall list below the personnel which he intends to utilize on the Works, including key personnel (Contract's Manager, Site Agent, and Foremen) which may have to be brought in from outside if not available locally.

CATEGORY OF EMPLOYEE	NUMBER OF PERSONS	
	KEY PERSONNEL, PART OF THE CONTRACTOR'S ORGANISATION	KEY PERSONNEL TO BE IMPORTED IF NOT AVAILABLE LOCALLY
Site Agent		
Concrete (Lead) Foremen		
Health and Safety Officer		

Note: CVs of key personnel may be requested during the contract period.

NAME : ..... (Block Capitals)

SIGNATURE : ..... DATE: .....  
(of person authorised to sign on behalf of the Tenderer)

## **EVALUATION SCHEDULE: EXPERIENCE OF KEY PERSONNEL**

Refer to Clause F3.11.9 for Functionality Points evaluation prompts.

The experience of assigned staff member in relation to the Scope of Work will be evaluated from three different points of view:

- 1) General experience (total duration of professional activity), level of education and training and positions held of each discipline specific team leader.
- 2) The education, training, skills and experience of the Assigned Staff in the specific sector, field, subject, etc which is directly linked to the scope of work.
- 3) The key staff members' / experts' knowledge of issues which the tenderer considers pertinent to the project e.g. local conditions, affected communities, legislation, techniques etc.

**A CV of the contract manager/site agent, concrete (lead) foreman and health and safety officer of not more than 2 pages should be attached to this schedule. The CV's of personnel submitted are to be signed by such individual and certified:**

Each CV should be structured under the following headings:

- a) Personal particulars
  - name
  - date and place of birth
  - place (s) of tertiary education and dates associated therewith
  - professional awards
- b) Qualifications (degrees, diplomas, grades of membership of professional societies and professional registrations)
- c) Skills
- d) Name of current employer and position in enterprise
- e) Overview of post graduate / diploma experience (year, organization and position)
- f) Outline of recent assignments / experience that has a bearing on the scope of work

NAME : ..... (Block Capitals)

SIGNATURE : ..... DATE: .....  
(of person authorised to sign on behalf of the Tenderer)

## **EVALUATION SCHEDULE: PRELIMINARY PROGRAMME**

Refer to Clause F3.11.9 for Functionality Points evaluation prompts.

The Tenderer shall detail below or attach a preliminary programme reflecting the proposed sequence and tempo of execution of the various activities comprising the work for this Contract. The programme shall be in accordance with the information supplied in the Contract, requirements of the Project Specifications and with all other aspects of his Tender.

PROGRAMME													
ACTIVITY	WEEKS / MONTHS												

Note: The programme must be based on the completion time as specified in the Contract Data. No other completion time that may be indicated on this programme will be regarded as an alternative offer, unless it is listed in **Table (b) of Form "Amendments, Qualifications, and Alternatives"** hereafter and supported by a detailed statement to that effect, all as specified in the Tender Data.

NAME : ..... (Block Capitals)

SIGNATURE : ..... DATE: .....  
(of person authorised to sign on behalf of the Tenderer)



---

**EVALUATION SCHEDULE: CONSTRUCTION APPROACH, METHODOLOGY, AND QUALITY CONTROL**

Refer to Clause F3.11.9 for Functionality Points evaluation prompts.

Construction Approach and Methodology

The construction approach and methodology must respond to the Scope of Work and outline the proposed approach to undertake the work showing a detailed programme including health and safety aspects, the use of plant and resources for this Project.

Quality Control

The quality control statement must discuss what tests and control measures are to be employed on site to attain the specified results and is to cover the program associated activities.

**The tenderer must attach his / her Construction Methodology and Quality Control information to this page.**

NAME : ..... (Block Capitals)

SIGNATURE : ..... DATE: .....  
(of person authorised to sign on behalf of the Tenderer)

The following firms have been identified as possible subcontractors for work in this contract.

[illegible]

SIGNATURE : ..... DATE: .....  
(of person authorised to sign on behalf of the Tenderer)

## **PLANT and EQUIPMENT**

Refer to Clause F3.11.9 for Functionality Points evaluation prompts.

The following are lists of major items of relevant equipment that I / we presently own or lease and will have available for this contract if my / our tender is accepted.

**(a) Details of major equipment that is owned by me / us and immediately available for this contract.**

DESCRIPTION (type, size, capacity etc)	QUANTITY	YEAR OF MANUFACTURE

*Attach additional pages if more space is required*

**(b) Details of major equipment that will be hired, or acquired for this contract if my / our tender is accepted**

DESCRIPTION (type, size, capacity etc)	QUANTITY	HOW ACQUIRED	
		HIRE/ BUY	SOURCE

*Attach additional pages if more space is required*

The Tenderer undertakes to bring onto site without additional cost to the Employer any additional plant not listed but which may be necessary to complete the contract within the specified contract period.

NAME : ..... (Block Capitals)

SIGNATURE : ..... DATE: .....  
(of person authorised to sign on behalf of the Tenderer)

## **CONTRACTOR'S HEALTH AND SAFETY PLAN**

Refer to Clause F3.11.9 for Functionality Points evaluation prompts.

At tender stage only a brief overview (**to be attached to this page**) of the tenderer's attention on the safety requirements for this contract will be adequate.

Only the successful Tenderer shall submit separately the Contractor's Health and Safety Plan as required in terms of Regulation 7 of the Occupational Health and Safety Act and Regulations 2014.

The detailed safety plan will take into consideration the risks mentioned under **Part C.3: Project Specification**. A generic plan will not be accepted.

NAME : ..... (Block Capitals)

SIGNATURE : ..... DATE: .....  
(sign on behalf of the Tenderer)

## **CONTRACTOR'S HEALTH AND SAFETY DECLARATION**

Refer to Clause F3.11.9 for Functionality Points evaluation prompts.

In terms of Clause 5(1)(h) of the OHSA 1993 Construction Regulations 2014 (referred to as "the Regulations" hereafter), a Principal Contractor may only be appointed to perform construction work if the Client is satisfied that the Principal Contractor has the necessary competencies and resources to carry out the work safely in accordance with the Occupational Health and Safety Act No 85 of 1993 and the OHSA 1993 Construction Regulations 2014.

To that effect a person duly authorised by the tenderer must complete and sign the declaration hereafter in detail.

### **Declaration by Tenderer**

1. I the undersigned hereby declare and confirm that I am fully conversant with the Occupational Health and Safety Act No 85 of 1993 (as amended by the Occupational Health and Safety Amendment Act No 181 of 1993), and the OHSA 1993 Construction Regulations 2014.
2. I hereby declare that my company has the competence and the necessary resources to safely carry out the construction work under this contract in compliance with the Construction Regulations and the Employer's Health and Safety Specifications.
3. I propose to achieve compliance with the Regulations by one of the following:

Tenderers are  
to Circle Applicable

(a) From my own competent resources as detailed in 4(a) hereafter:

**YES NO**

(b) From my own resources still to be appointed or trained until competency is achieved, as detailed in 4(b) hereafter:

**YES NO**

(c) From outside sources by appointment of competent specialist Subcontractors as detailed in 4(c) hereafter:

**YES NO**

4. Details of resources I propose:

*(Note: Competent resources shall include safety personnel such as a construction supervisor and construction safety officer as defined in Regulation 8, and competent persons as defined in Regulations 9, 10, 11, 12, 13, 14, 16, 17, 20, 21, 22, 23(1), 24, 25, 26, 27, 28 and 29, as applicable).*

(a) Details of the competent and qualified key persons from my company's own resources, who will form part of the contract team:

<b>NAMES OF COMPETENT PERSONS</b>	<b>POSITIONS TO BE FILLED BY COMPETENT PERSONS</b>

(b) Details of training of persons from my company's own resources (or to be hired) who still have to be trained to achieve the necessary competency:

(i) By whom will training be provided? .....

(ii) When will training be undertaken? .....

(iii) List the positions to be filled by persons to be trained or hired:

.....  
.....

(c) Details of competent resources to be appointed as subcontractors if competent persons cannot be supplied from own company:

Name of proposed subcontractor: .....

Qualifications or details of competency of the subcontractor:

.....

.....

5. I hereby undertake, if my tender is accepted, to provide, before commencement of the works under the contract, a suitable and sufficiently documented Health and Safety Plan in accordance with Regulation 7(1) of the Construction Regulations, which plan shall be subject to approval by the Client.
6. I confirm that copies of my company's approved Health and Safety Plan, the Client's Safety Specifications as well as the OHSA 1993 Construction Regulations 2014 will be provided on site and will at all times be available for inspection by the Principal Contractor's personnel, the Client's personnel, the Employer's Agent, visitors, and officials and inspectors of the Department of Labour.
7. I hereby confirm that adequate provision has been made in my tendered rates and prices in the Bill of Quantities to cover the cost of all resources, actions, training and all health and safety measures envisaged in the OHSA 1993 Construction Regulations 2014, and that I will be liable for any penalties that may be applied by the Client in terms of the said Regulations (Regulation 33) for failure on the Principal Contractor's part to comply with the provisions of the Act and the Regulations.
8. I agree that my failure to complete and execute this declaration to the satisfaction of the Client will mean that I am unable to comply with the requirements of the OHSA 1993 Construction Regulations 2014, and accept that my tender will be prejudiced and may be rejected at the discretion of the Client.

NAME : .....

(Block Capitals)

SIGNATURE : .....  
(of person authorised to sign on behalf of the Tenderer)

DATE: .....

### **JOINT VENTURES AGREEMENTS**

Joint Venture agreement and Power of Attorney Agreements to be attached here (if applicable).

## **RECORD OF ADDENDA TO TENDER DOCUMENTS**

I / We confirm that the following communications received from the Employer or his representative before the date of submission of this tender offer, amending the tender documents, have been taken into account in this tender offer.

<b>ADD.No</b>	<b>DATE</b>	<b>TITLE OR DETAILS</b>
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

NAME : ..... (Block Capitals)

SIGNATURE : ..... DATE: .....  
(of person authorised to sign on behalf of the Tenderer)



## **AMENDMENTS, QUALIFICATIONS AND ALTERNATIVES**

**(This is not an invitation for amendments, deviations or alternatives** but should the Tenderer desire to make any departures from the provisions of this contract he shall set out his proposals clearly hereunder. The Employer will not consider any amendment, alternative offers or discounts unless forms (a), (b) and (c) have been completed to the satisfaction of the Employer).

I / We herewith propose the amendments, alternatives and discounts as set out in the tables below:

### **(a) AMENDMENTS**

<b>PAGE, CLAUSE OR ITEM NO</b>	<b>PROPOSED AMENDMENT</b>

- (1) *Amendments to the General and Special Conditions of Contract are not acceptable;*  
 (2) *The Tenderer must give full details of all the financial implications of the amendments and qualifications in a covering letter attached to his tender.*

### **(b) ALTERNATIVES**

<b>PROPOSED ALTERNATIVE</b>	<b>DESCRIPTION OF ALTERNATIVE</b>

- (1) *Individual alternative items that do not justify an alternative tender, and an alternative offer for time for completion should be listed here.*  
 (2) *In the case of a major alternative to any part of the work, a separate Bill of Quantities, programme, etc, and a detailed statement setting out the salient features of the proposed alternatives must accompany the tender.*  
 (3) *Alternative tenders involving technical modifications to the design of the works and methods of construction shall be treated separately from the main tender offer.*

### **(c) DISCOUNTS**

<b>ITEM ON WHICH DISCOUNT IS OFFERED</b>	<b>DESCRIPTION OF DISCOUNT OFFERED</b>

- (1) *The Tenderer must give full details of the discounts offered in a covering letter attached to his tender, failing which, the offer will be prejudiced.*

NAME : ..... (Block Capitals)

SIGNATURE : ..... DATE: .....  
 (of person authorised to sign on behalf of the Tenderer)

**PART C1: AGREEMENT AND CONTRACT DATA**

**C1.1: FORM OF OFFER AND ACCEPTANCE**

**C1.1.1: OFFER**

The Employer, identified in the Acceptance signature block, has solicited offers to enter into a contract in respect of the following works:

Contract No: **WS 7230**

Contract Title: **The Rehabilitation of Glenwood Reservoir, Cato Ridge Reservoir, Illovo Water Tower, Mt Moriah Reservoir, KwaMakhutha Reservoir Complex, Rosetta Reservoir and Associated Works: Ward 33, 1, 97, 18, 27 & 35**

The Tenderer, identified in the Offer signature block below, has examined the documents listed in the Tender Data and addenda thereto as listed in the Tender Schedules, and by submitting this Offer has accepted the Conditions of Tender.

By the representative of the Tenderer, deemed to be duly authorised, signing this part of this Form of Offer and Acceptance, the Tenderer offers to perform all of the obligations and liabilities of the Contractor under the Contract including compliance with all its terms and conditions according to their true intent and meaning for an amount to be determined in accordance with the Conditions of Contract identified in the Contract Data.

**\* The offered total of the prices inclusive of Value Added Tax is:**

R..... (In words .....)  
.....)

This Offer may be accepted by the Employer by signing the Acceptance part of this Form of Offer and Acceptance and returning one copy of this document to the Tenderer before the end of the period of validity stated in the Tender Data, whereupon the Tenderer becomes the party named as the Contractor in the Conditions of Contract identified in the Contract Data.

**For the Tenderer:**

**\* Name of Tenderer (organisation)** : .....

**\* Signature (of person authorized to sign the tender)** : .....

**\* Name (of signatory in capitals)** : .....

**Capacity (of Signatory)** : .....

**Address** : .....

: .....

**Witness:**

**Signature** : ..... **Date** : .....

**Name(in capitals)** : : .....

**Notes:**

**\* Indicates what information is mandatory.**

**Failure to complete the mandatory information and sign this form will invalidate the tender.**

## **C1.1: FORM OF OFFER AND ACCEPTANCE**

### **C1.1.2: FORM OF ACCEPTANCE**

**This Form will be completed by the Employer**

By signing this part of the Form of Offer and Acceptance, the Employer identified below accepts the Tenderer's Offer. In consideration thereof, the Employer shall pay the Contractor the amount due in accordance with the Conditions of Contract identified in the Contract Data. Acceptance of the Tenderer's Offer shall form an agreement between the Employer and the Tenderer upon the terms and conditions contained in this Agreement and in the Contract that is the subject of this Agreement.

The terms of the contract are contained in:

- Part C1 : Agreement and Contract Data, (which includes this Agreement)
- Part C2 : Pricing Data, including the Bill of Quantities
- Part C3 : Scope of Work
- Part C4 : Site Information

and the schedules, forms, drawings and documents or parts thereof, which may be incorporated by reference into Parts C1 to C4 above.

Deviations from and amendments to the documents listed in the Tender Data and any addenda thereto listed in the Tender Schedules as well as any changes to the terms of the Offer agreed by the Tenderer and the Employer during this process of offer and acceptance, are contained in the Schedule of Deviations attached to and forming part of this Agreement. No amendments to or deviations from said documents are valid unless contained in this Schedule, which must be duly signed by the authorised representatives of both parties.

The Tenderer shall within two weeks after receiving a completed copy of this Agreement, including the Schedule of Deviations (if any), contact the Employer's agent (whose details are given in the Contract Data) to arrange the delivery of any bonds, guarantees, proof of insurance and any other documentation to be provided in terms of the Conditions of Contract identified in the Contract Data at, or just after, the date this Agreement comes into effect. Failure to fulfill any of these obligations in accordance with those terms shall constitute a repudiation of this Agreement.

Notwithstanding anything contained herein, this Agreement comes into effect on the date when the Tenderer receives one fully completed original copy of this document, including the Schedule of Deviations (if any). Unless the Tenderer (now Contractor) within five days of the date of such receipt notifies the Employer in writing of any reason why he cannot accept the contents of this Agreement, this Agreement shall constitute a binding contract between the parties.

**Signature** (*person authorized to sign the acceptance*) : .....

**Name** (*of signatory in capitals*) : .....

**Capacity** (*of Signatory*) : .....

**Name of Employer** (*organisation*) : .....

**Address** : .....

: .....

**Witness:**

**Signature** : ..... **Date** : .....

**Name**(*in capitals*) : : .....

**C1.1: FORM OF OFFER AND ACCEPTANCE**

**C1.1.3: SCHEDULE OF DEVIATIONS**

This form will be completed by THE EMPLOYER and ONLY THE SUCCESSFUL TENDERER

1. **Subject** : .....
- Details** : .....
- : .....
2. **Subject** : .....
- Details** : .....
- : .....
3. **Subject** : .....
- Details** : .....
- : .....

By the duly authorised representatives signing this Schedule of Deviations, the Employer and the Tenderer agree to and accept the foregoing Schedule of Deviations as the only deviations from and amendments to the documents listed in the Tender Data and addenda thereto as listed in the Tender Schedules, as well as any confirmation, clarification or change to the terms of the offer agreed by the Tenderer and the Employer during this process of offer and acceptance.

**FOR THE TENDERER**

**FOR THE EMPLOYER**

.....	Signature	.....
.....	Name ( <i>in capitals</i> )	.....
.....	Capacity	.....
.....	Name and Address of	.....
.....	Organisation	.....
.....		.....
.....		.....
.....	Witness Signature	.....
.....	Witness Name	.....
.....	Date	.....

## **C1.2: CONTRACT DATA**

### **C1.2.1 CONDITIONS OF CONTRACT**

#### **C1.2.1.1 GENERAL CONDITIONS OF CONTRACT**

The Conditions of Contract are the **General Conditions of Contract for Construction Works (2015 3<sup>rd</sup> Edition)**, (**GCC 2015**) published by the South African Institution of Civil Engineering. Copies of these conditions of contract may be obtained from the South African Institution of Civil Engineering (Tel: 011-805-5947, Fax: 011-805-5971, E-mail: [civilinfo@saice.org.za](mailto:civilinfo@saice.org.za)).

The Contract Data (including variations and additions) shall amplify, modify or supersede, as the case may be, the GCC 2015 to the extent specified below, and shall take precedence and shall govern.

Each item of data given below is cross-referenced to the clause in the GCC 2015 to which it mainly applies.

### **C1.2.2 CONTRACT DATA**

#### **C1.2.2.1 DATA TO BE PROVIDED BY THE EMPLOYER**

1.1.1.13 The **Defects Liability Period**, from the date of the Certificate of Completion, is **1 Year**.

1.1.1.14 The **time for achieving Practical Completion**, from the Commencement Date is **12 months (365 Days)**. The period as stated in 5.3.2, and the 7 days referred to in 5.3.3, are included in the above time for achieving Practical Completion. The special non-working days as stated in 5.8.1 are excluded from the above time for achieving Practical Completion.

1.1.1.15 The Employer is the eThekweni Municipality as represented by:  
**WATER AND SANITATION** : Deputy Head: Water and Sanitation.

1.2.1.2 The address of the Employer is:  
Physical: **Engineering Unit, 166 K.E. Masinga Road, DURBAN, 4001**  
Postal: **Engineering Unit, P O Box 680, DURBAN, 4000**  
Telephone: **031-311-8656 (t)**  
Fax: **031-311-8549 (f)**  
E-Mail: **Bhavna.Soni@durban.gov.za**

1.1.1.16 The **name of the Employer's Agent** is **Josh Padayachee Pr. Eng**

1.2.1.2 The address of the Employer' Agent is:  
Physical: **No. 5 The Boulevard, Westway Office Park, Westville, DURBAN, 3630**  
Postal: **Engineering Unit, P O Box 680, DURBAN, 4000**  
Telephone: **031-265-6007 (t)**  
Fax: **031-265-6011 (f)**  
E-Mail: **Josh.Padayachee@naiduconsulting.com**

1.1.1.26 The **Pricing Strategy** is by **Re-measurement Contract**.

3.2.3 The Employer's Agent shall obtain the **specific approval of the Employer** before executing any of his functions or duties according to the following Clauses of the General Conditions of Contract:

- **6.3: Council approval in order to authorise any expenditure in excess of the Tender Sum plus 10% contingencies.**

5.3.1 The **documentation required** before commencement with Works execution are:

- **Health and Safety Plan (refer to Clause 4.3)**
- **Initial programme (refer to Clause 5.6)**
- **Security (refer to Clause 6.2)**
- **Insurance (refer to Clause 8.6)**

5.3.2 The **time to submit the documentation** required before commencement with Works is **14 Days**.

5.3.3 Add the following paragraph:

“If a construction work permit, in terms of Clause 3(1) of the Construction Regulations (2014), is applicable, the instruction to commence carrying out of the works may only be issued once the construction work permit has been obtained by the Employer’s Agent. If a construction work permit is applicable, the contractor shall allow for a minimum period of 37 days, after the submission (or re-submission) of the documentation referred to in Clause 5.3.1., for the issuing of the construction work permit.”

5.4.2 The access and possession of site shall not be exclusive to the contractor but as set out in the site information.

5.8.1 The **non-working days** are **Saturdays and Sundays**.

(5.1.1) The **special non-working** days are:

- All statutory holidays as declared by National or Regional Government.
- The year-end break:
  - Commencing on the first working day after 15 December.
  - Work resumes on the first working day after 5 January of the next year.

5.8.1 Delete the words “sunset and sunrise” and replace with “17:00 and 07:00”.

5.12.2.2 **Abnormal Climatic Conditions (Rain Delays)** - The numbers of days per month, on which work is expected not to be possible as a result of rainfall, for which the Contractor shall make provision, is given in the table below. During the execution of the Works, the Employer’s Agent’s Representative will certify a day lost due to rainfall only if at least 75% of the work force and plant on site could not work during that specific working day.

Extension of time as a result of rainfall shall be calculated monthly being equal to the number days certified by the Employer’s Agent’s Representative as lost due to rainfall, less the number of days allowed for as in table below, which could result in a negative figure for certain months. The total extension of time for which the Contractor may apply, shall be the cumulative algebraic sum of the monthly extensions. Should the sum thus obtained be negative, the extension of time shall be taken as NIL.

<u>Month</u>	<u>Days Lost</u>	<u>Average Rainfall</u>	<u>Month</u>	<u>Days Lost</u>	<u>Average Rainfall</u>
January	4*	134	July	1	39
February	3	113	August	2	62
March	3	120	September	2	73
April	2	73	October	3	98
May	2	59	November	3	108
June	1	28	December	1*	102
TOTAL	27	1009mm	* = The number of working days lost allows for the annual statutory Construction holiday in December and January of each year.		

5.13.1 The **penalty for delay** in failing to complete the Works is **R 10 000.00** (per Day).

5.14.1 The **requirements for achieving Practical Completion** will be determined by the Employer's Agent (in consultation with the Contractor) and recorded in the minutes of the first Site Meeting / Handover Meeting. (Refer to 1.1.1.24 for a generic definition.)

5.16.3 The **latent defect liability** period is **10 Years**.

6.2.1 **Security (Performance Guarantee)**: Delete the word "selected" and replace it with "stated".

The liability of the Performance Guarantee shall be as per the following table:

Value of Contract (incl. VAT)	Performance Guarantee Required
Less than or equal to R 1m	Nil
Greater than R 1m and less than or equal to R 10m	5% of the Contract Sum
Greater than R 10m	10% of the Contract Sum

6.5.1.2.3 The **percentage allowance** to cover overhead charges for daywork are as follows:

- **80%** of the gross remuneration of workmen and foremen actually engaged in the daywork;
- **20%** on the net cost of materials actually used in the completed work.

No allowance will be made for work done, or for materials and equipment for which daywork rates have been quoted at tender stage.

6.8.2 **Contract Price Adjustment Factor:** The value of the certificates issued shall be adjusted in accordance with the Contract Price Adjustment Schedule (GCC 2015 - page 86) with the following Indices / Descriptions / Coefficients:

- The proportion not subject to adjustment: **x = 0.10**.
- The base month will be the month prior to the month in which tenders close.
- The Index for Labour, Plant, and Materials shall be based on **December 2016 = 100**.
- The Index for Fuel shall be based on **December 2020 = 100**.
- The Index shall be based on **December 2020 = 100**.

	STATS SA Statistical Release	Table	Description	Coefficient
• "L" is the "Labour Index"	P0141	Table A	Geographic Indices; CPI per Province; Kwa-Zulu Natal	a = 0.28
• "P" is the "Contractor's Equipment Index"	P0151.1	Table 4	Plant and Equipment	b = 0.28
• "M" is the "Materials Index"	P0151.1	Table 6	Civil Engineering Material (excluding bitumen)	c = 0.38
• "F" is the "Fuel Index"	P0142.1	Table 1	Coke, petroleum, chemical, rubber and plastic products; Coal and petroleum products; Diesel	d = 0.06

6.10.1.5 The **percentage advance** on materials not yet built into the Permanent Works is **80%**.

The **percentage advance** on Plant not yet supplied to Site: **Not Required**

6.10.3 **Retention Money:** Delete the word "selected".

The percentage retention on the amounts due to the Contractor is 10%.

The limit of "retention money" is 5% of the Contract Sum.

Should the Contract Price exceed the Contract Sum then the limit of "retention money" is 5% of the Contract Price.

Interest will not be paid on retention withheld by the Employer.

8.6.1.1.2 The **value of Plant and materials** supplied by the Employer to be included in the insurance sum: **R 3,000,000**.

8.6.1.1.3 The **amount to cover professional fees** for repairing damage and loss to be included in the insurance sum: **Not Required**.

8.6.1.2 **SASRIA Coupon Policy** for Special Risks to be issued in joint names of Council and Contractor for the full value of the works (including VAT).

8.6.1.3 The limit of indemnity for **liability insurance**: **R 10 000 000.00**.

8.6.1.4 **Ground Support Insurance:**

- Minimum amount for any one occurrence, unlimited as to the number of occurrences, against any claim for damages or loss caused by vibration and / or removal of lateral support: **R 5 000 000.00**.
- Maximum first excess: **R 20 000.00**.



8.6.1.5 Furthermore, the insurance cover effected by the Contractor shall meet the following requirements:

**Third Party Insurance (Public Liability)**

- Minimum amount for any one occurrence, unlimited as to the number of occurrences, for the period of the contract, inclusive of the maintenance period: **R 10 000 000.00.**
- Consequential loss to be covered by policy: **Yes**
- Liability section of policy to be extended to cover blasting: **Nil.**
- Maximum excess per claim or series of claims arising out of any one occurrence: **R 25 000.00.**

**Principal's own surrounding Property Insurance**

- Minimum amount for any one occurrence unlimited as to the number of occurrences against any claim for damage which may occur to the Council's own surrounding property: **R 5 000 000.00.**
- Maximum first excess: **R 20 000.00.**

**Insurance of Works**

- Minimum amount for additional removal of debris (no damage): **R 3 000 000.00.**
- Minimum amount for temporary storage of materials off site, excluding Contractor's own premises: **R 10 000 000.00.**
- Minimum amount for transit of materials to site: **R 5 000 000.00.**

8.6.5 **Approval by Employer:** At the end of the sub-clause, add the following paragraph:

"Except where otherwise provided in the Special Conditions of Contract, the insurance cover effected by the Contractor in terms of this clause shall not carry a first loss amount greater than those set out below:

Contract Price	First Loss
Less than R 100,000	R 5,000
R 100,000 to R 500,000	R 10,000
R 500,000 to R 1,000,000	R 20,000
R 1,000,000 to R 2,000,000	R 30,000
R 2,000,000 to R 4,000,000	R 40,000
Greater than R 4,000,000	R 50,000

The insurance policy shall contain a specific provision whereby cancellation of the policy prior to the end of the period referred to in Cause 8.2.1 cannot take place without the prior written approval of the Employer."

10.7.1 Failing ad-hoc adjudication, the determination of disputes shall be by arbitration.

**C1.2.2.2 DATA TO BE PROVIDED BY CONTRACTOR**

1.1.1.9 The legal name of Contractor is:

.....

.....

.....

.....

1.2.1.2 The Physical address of the Contractor is:

.....

.....

.....

.....

The Postal address of the Contractor is:

.....

.....

.....

.....

The contact numbers of the Contractor are:

Telephone: .....

Fax: .....

The E-Mail address of the Contractor is:

.....

6.5.1.2.3 The **percentage allowance** to cover overhead charges for daywork are as follows:

- % of the gross remuneration of workmen and foremen actually engaged ..... %  
in the daywork;
- % on the net cost of materials actually used in the completed work. .... %

### **C1.2.3 ADDITIONAL CONDITIONS OF CONTRACT**

#### **C1.2.3.1 COMMUNITY LIAISON OFFICER**

The Ward Councillor(s) in whose ward(s) work is to be done will, collectively, identify a community liaison officer (CLO) for the project and make the person known to the Contractor within two days of being requested to do so. The Contractor will be required to enter a written contract with the CLO that specifies:

- The hours of work and the wage rate of the CLO (200% of the Civil Engineering Industry minimum wage).
- The duration of the appointment.
- The duties to be undertaken by the CLO which could include:
  - Assisting in all respects relating to the recruitment of local labour.
  - Acting as a source of information for the community and councillors on issues related to the contract.
  - Keeping the Contractor advised on community issues and issues pertaining to local security.
  - Assisting in setting up any meetings or negotiations with affected parties.
  - Keeping a written record of any labour or community issue that may arise.
  - Any other duties that may be required by the Contractor.

Responsibility for the identification of a pool of suitable labour shall rest with the CLO, although the Contractor shall have the right to choose from that pool. The Contractor shall have the right to determine the total number labourers required at any one time and this may vary during the contract.

The Contractor shall have the right to replace labour that is not performing adequately. Should such occasion arise, it must be done in conjunction with the CLO.

**Payment:** The CLO will be reimbursed from the Provisional Sum item in the Preliminary & General Section of the Bill of Quantities.

#### **C1.2.3.2 EMPLOYMENT OF LOCAL LABOUR**

It is a condition of contract that the contractor will be required to employ local labour as specified in eThekweni Council Policy "The use of CLOs and Local Labour". The contractor will be required to ensure that a minimum of 50% of the labour force is made up of local labour. For the purposes of this contract, "Local labour" will be deemed to be any **persons who reside within Wards 33, 97, 18, 27, 35 and 1**. The contractor will be required to provide proof of authenticity of local labour. Signed confirmation by the appointed CLO will suffice for this.

No additional costs will be entertained due to this Particular Specification. The contractor will remain responsible for providing proper supervision of all labour, and will be responsible for the quality of work produced.

#### **C1.2.3.3 CONTRACTOR PARTICIPATION GOAL (CPG)**

It is a condition of contract that the contractor must allow for a minimum of **30%** of the contract value (excluding Provisional Sum items and Fixed Cost allowances) to be subcontracted to contractors who are >76% PPG (Priority Population Group) owned. Proof of payment to the subcontractors will be required to verify that the minimum has been achieved.

The penalty for not achieving the specified CPG will be 0.5% of the contract value (excluding Provisional Sum items and Fixed Cost allowances) for every 1% of CPG not achieved.

#### C1.2.3.4 FTE (Full Time Equivalent) EMPLOYMENT INFORMATION

It is a condition of contract that the Contractor supplies the Employer's Agent's Representative with information in respect of the employment of all foremen, artisans and labour (skilled and unskilled) employed to work on this contract. The information required is:

- Initials (per ID doc)
- Last Name (per ID doc)
- ID Number
- Disability (y / n)
- Education Level

<b>Level 1</b> Unknown	<b>Level 2</b> No Schooling	<b>Level 3</b> Grade 1-3	<b>Level 4</b> Grade 4	<b>Level 5</b> Grade 5-6
<b>Level 6</b> Grade 7-8	<b>Level 7</b> Grade 9	<b>Level 8</b> Grade 10-11	<b>Level 9</b> Grade 12	<b>Level 10</b> Post Matric
<b>Category A:</b> Employed as Local Labour for this contract only <b>Category B:</b> Temporarily employed by the Contractor <b>Category C:</b> Permanently employed by the Contractor				

- Category of Employment

In addition, the following information is required in respect of each person listed above, on a monthly basis:

- Number of days worked during the month;
- Daily wage rate;
- Number of training days during the month.

The information is to be forwarded in a format acceptable to the Employer's Agent's Representative, but preferably in the form of an emailed EXCEL file (an original file, to be used as a template, will be issued to the Contractor). Contractors without computer facilities will be required to submit a hard copy of the information in a format as agreed to between the Contractor and the Employer's Agent's Representative.

In addition to the tax invoice, to be submitted by the Contractor with his monthly statement, mentioned in Clause 6.10.4 of GCC 2015, the Employer reserves the right to withhold payment until the monthly FTE information has been forwarded to the Employer's Agent's Representative. No additional payment for complying with the above will be made and the Contractor is to make allowance for complying through the time related P & G items (sum) under Part AA: Preliminaries, of the Bill of Quantities.

#### C1.2.3.5 PERFORMANCE MONITORING OF SERVICE PROVIDERS

The Contractor shall be subjected to "Performance Monitoring" assessments in terms of the applicable Section of the Employer's Supply Chain Management Policy.

Key Performance Indicators (KPIs) are specified in the Part C3: Scope of Works, or will be discussed and agreed with the Contractor before commencement of the contract.

#### **C1.2.3.6 EMPOWERMENT STRATEGIES**

For contracts above R30m, the 2017 PPPFA Regulations require organs of State to identify tenders, where it is feasible, to subcontract a minimum of 30% of the value of the contract to the following designated groups:

- (a) an EME or QSE;
- (b) an EME or QSE which is at least 51% owned by black people;
- (c) an EME or QSE which is at least 51% owned by black people who are youth;
- (d) an EME or QSE which is at least 51% owned by black people who are women;
- (e) an EME or QSE which is at least 51% owned by black people with disabilities;
- (f) an EME or QSE which is 51% owned by black people living in rural or underdeveloped areas or townships;
- (g) a cooperative which is at least 51% owned by black people;
- (h) an EME or QSE which is at least 51% owned by black people who are military veterans; or
- (i) more than one of the categories referred to in paragraphs (a) to (h).

In addition to the above, the eThekweni Municipal Council has adopted a framework for empowerment strategies for contracts between R5m and R30m.

#### **C1.2.3.7 EXCEPTED RISKS (Clause 8.3)**

Pursuant to Clause 8.3 of the Conditions of Contract (GCC 2015), the Employer shall not be liable for the payment of standing time costs as a result of the occurrence of any of the "Excepted Risks" as defined under Clause 8.3.

However, the Employer shall reimburse the Contractor in respect of plant de-establishment and re-establishment costs as a result of "Excepted risks" when a written instruction to de-establish is issued to the Contractor.

## **C2.1: PRICING ASSUMPTIONS / INSTRUCTIONS**

### **C2.1.1 GENERAL**

The Bill of Quantities forms part of the Contract Documents and must be read and priced in conjunction with all the other documents comprising the Contract Documents (refer to F.1.2 of the Tender Data).

### **C2.1.2 PRICING INSTRUCTIONS AND DESCRIPTION OF ITEMS IN THE SCHEDULE**

Measurement and payment shall be in accordance with the relevant provisions of Clause 8 of each of the Standard Engineering Specifications referred to in the Scope of Work. The Preliminary and General items shall be measured in accordance with the provisions of C2.1.8.

The descriptions of the items in the Bill of Quantities are for identification purposes only and comply generally with those in the Standard Engineering Specification.

Clause 8 of each Standard Engineering Specification, read together with the relevant clauses of the Scope of the works, set out what ancillary or associated work and activities are included in the rates for the operations specified. Should any requirements of the measurement and payment clause of the applicable Standard Engineering Specification, or the Scope of the works, conflict with the Bill of Quantities, the requirements of the Standard Engineering Specification or Scope of the work, as applicable, shall prevail.

### **C2.1.3 QUANTITIES REFLECTED IN THE SCHEDULE**

The quantities given in the Bill of Quantities are estimates only, and subject to re-measuring during the execution of the work. The Contractor shall obtain the Employer's Agent's detailed instructions for all work before ordering any materials or executing work or making arrangements for it.

The Works as finally completed in accordance with the Contract shall be measured and paid for as specified in the Bill of Quantities and in accordance

with the General and Special Conditions of Contract, the Specifications and Project Specifications and the Drawings. Unless otherwise stated, items are measured net in accordance with the Drawings, and no allowance has been made for waste.

The validity of the contract will in no way be affected by differences between the quantities in the Bill of Quantities and the quantities finally certified for payment.

### **C2.1.5 MONTHLY PAYMENTS**

Unless otherwise specified in the Specifications and Project Specifications, progress payments in Interim Certificates, referred to in Clause 6.10.1 of the General Conditions of Contract, in respect of "sum" items in the Bill of Quantities shall be by means of interim progress instalments assessed by the Employer's Agent and based on the measure in which the work actually carried out relates to the extent of the work to be done by the Contractor.

### **C2.1.4 PROVISIONAL SUMS / PRIME COST SUMS**

Where Provisional Sums or Prime Cost sums (PC Sum) are provided for items in the Bill of Quantities, payment for the work done under such items will be made in accordance with Clause 6.6 of the General Conditions of Contract. The Employer reserves the right, during the execution of the works, to adjust the stated amounts upwards or downwards according to the work actually done under the item, or the item may be omitted altogether, without affecting the validity of the Contract.

The Tenderer shall not under any circumstances whatsoever delete or amend any of the sums inserted in the "Amount" column of the Bill of Quantities and in the Summary of the Bill of Quantities unless ordered or authorized in writing by the Employer before closure of tenders. Any unauthorized changes made by the Tenderer to provisional items in the schedule, or to the provisional percentages and sums in the Summary of the Bill of Quantities, will be treated as arithmetical errors.

## C2.1.6 PRICING OF THE BILL OF QUANTITIES

The prices and rates to be inserted by the Tenderer in the Bill of Quantities shall be the full inclusive prices to be paid by the Employer for the work described under the several items, and shall include full compensation for all costs and expenses that may be required in and for the completion and maintenance during the defects liability period of all the work described and as shown on the drawings as well as all overheads, profits, incidentals and the cost of all general risks, liabilities and obligations set forth or implied in the documents on which the Tender is based.

Each item shall be priced and extended to the "Total" column by the Tenderer, with the exception of the items for which only rates are required (Rate Only), or items which already have Prime Cost or Provisional Sums affixed thereto. If the Contractor omits to price any items in the Bill of Quantities, then these items will be considered to have a nil rate or price.

All items for which terminology such as "inclusive" or "not applicable" have been added by the Tenderer will be regarded as having a nil rate which shall be valid irrespective of any change in quantities during the execution of the Contract.

All rates and amounts quoted in the Bill of Quantities shall be in Rands and Cents and shall include all levies and taxes (other than VAT). VAT will be added in the Summary of the Bill of Quantities.

### C2.1.7 "RATE ONLY" ITEMS

The Tenderer shall fill in rates for all items where the words "Rate Only" appear in the "Total" column. "Rate Only" items have been included where:

- (a) an alternative item or material is contemplated;
- (b) variations of specified components in the make-up of a pay item may be expected; and
- (c) no work under the item is foreseen at tender stage but the possibility that such work may be required is not excluded.

For "Rate Only" items no quantities are given in the "Quantity" column but the quoted rate shall apply in the event of work under this item being required. The Tenderer shall however note that in terms of the Tender Data the Tenderer may be asked to reconsider any such rates which the Employer may regard as unbalanced.

## C2.1.8 PRELIMINARY AND GENERAL

The Preliminary and General Section is provided to cover the Contractor's expenses incurred in complying with the requirements of the tender documents and consists of the following parts:

- Part AA: Preliminaries
- Part AB: General Specifications
- Part AH: Occupational Health and Safety

**Fixed Charge Items:** Each item should be priced separately and, subject to the Engineer certifying in terms of **Clause 6.7 of the General Conditions of Contract** that the work has been done, payment will be made as follows:

- (i) the total amount due when the certified value fixed charge items in this section is less than 5% of the net contract price;
- (ii) when the certified value of fixed charge items in this section is greater than 5% of the net contract price, payment will be limited to 5% of the net contract price. The remainder will be paid when the value of the work done under the contract, excluding the value of fixed charge items in this section, is greater than 50% of the net contract price, excluding the value of fixed charge items in this section.

**Time Related Items:** Any Time Related items not priced shall be deemed to be covered by the prices of other items in the section.

Payment of Time Related items in this section will be made throughout the contract period, the amount per month being the value of the item divided by the completion in months or, if specified in weeks, the equivalent number of months, in terms of **Clause 5.5 of the General Conditions of Contract**. The final monthly increment will only be paid upon the issue of a completion certificate.

## **C2.2: BILL OF QUANTITIES**

The Bill of Quantities follows and comprises of 64 pages.



## **PRELIMINARY AND GENERAL**

**RESERVOIR P&G's**

**SECTION: SABS 1200 AA**

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
<b>1</b>	<b>SABS 1200 AA</b>	<b>PRELIMINARY AND GENERAL</b>				
<b>1.1</b>	<b>8.3</b>	<b>FIXED-CHARGE AND VALUE RELATED ITEMS</b>				
1.1.1	8.3.1	Contractual Requirements	Sum	1.00		
	8.3.2.1	Establish facilities on the site for Engineer (SABS 1200 AB):				
1.1.2	8.3.2.1 (a) PSAB 3.2	Furnished offices (1 No.)	Sum	1.00		
1.1.3	PSAB 3.2	Meeting room facilities	Sum	1.00		
	8.3.2.2	Establish facilities on the site for Contractor:				
1.1.4	8.3.2.2 (a)	a) Offices & storage sheds	Sum	1.00		
1.1.5	8.3.2.2 (e)	b) Ablution & latrine facilities	Sum	1.00		
1.1.6	8.3.2.2 (f)	c) Tools & equipment	Sum	1.00		
1.1.7	8.3.2.2 (g)	d) Water supplies, electric power and communications	Sum	1.00		
1.1.8	8.3.2.2 (h)	e) Dealing with water	Sum	1.00		
1.1.9	8.3.3	Other fixed-charge obligations	Sum	1.00		
1.1.10	8.3.4	Removal of site establishment	Sum	1.00		
	<b>AH</b>	<b><u>Occupational Health and Safety</u></b>				
1.1.11		General safety (Fixed charges)	Sum	1.00		
1.1.12		Health & safety plan	Sum	1.00		
		Allow for the following additional items which the tenderer requires to be priced separately				
1.1.13		a)	Sum	1.00		
1.1.14		b)	Sum	1.00		
1.1.15		c)	Sum	1.00		
<b>1.2</b>	<b>8.4</b>	<b>TIME-RELATED ITEMS</b>				
1.2.1	8.4.1	Contractual requirements	Sum	1.00		
Total Carried Forward						

**RESERVOIR P&G's**

**SECTION: SABS 1200 AA**

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Brought Forward						
	8.4.2.1	Facilities for Engineer for duration of construction (SABS 1200 AB):				
1.2.2	8.4.2.1 (a) PSAB 3.2	Furnished offices (1 No.)	Sum	1.00		
1.2.3	PSAB 3.2	Meeting room facilities	Sum	1.00		
	8.4.2.2	Facilities for Contractor for duration of construction:				
1.2.4	8.4.2.2 (a)	a) Offices & storage sheds	Sum	1.00		
1.2.5	8.4.2.2 (e)	b) Ablution & latrine facilities	Sum	1.00		
1.2.6	8.4.2.2 (f)	c) Tools & equipment	Sum	1.00		
1.2.7	8.4.2.2 (g)	d) Water supplies, electric power and communications	Sum	1.00		
1.2.8	8.4.2.2 (h)	e) Dealing with water	Sum	1.00		
1.2.9	8.4.3	Supervision for duration of construction	Sum	1.00		
1.2.10	8.4.4	Company and head office overhead costs	Sum	1.00		
1.2.11	8.4.5	Other time-related obligations	Sum	1.00		
	<b>AH</b>	<b><u>Occupational Health and Safety</u></b>				
1.2.12		General safety (time related)	Sum	1.00		
1.2.13		Training (time related)	Sum	1.00		
		Allow for additional items which the tenderer requires to be priced separately				
1.2.14		a)	Sum	1.00		
1.2.15		b)	Sum	1.00		
1.2.16		c)	Sum	1.00		
<b>1.3</b>	<b>8.5</b>	<b>SUMS STATED PROVISIONALLY BY ENGINEER</b>				
1.3.1		Provisional sum for concrete cube strength and durability tests ordered by the Engineer	Prov Sum	1.00		20,000.00
1.3.2		Overheads, charges and profit on item 1.3.1	%	20,000.00		
Total Carried Forward						

**RESERVOIR P&G's**

**SECTION: SABS 1200 AA**

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Brought Forward						
1.3.3		Provisional sum for non-destructive testing of insitu concrete	Prov Sum	1.00		20,000.00
1.3.4		Overheads, charges and profit on item 1.3.3	%	20,000.00		
1.3.5	8.5 a	Provisional testing of non-destructive testing of steel pipelines	Prov Sum	1.0		40,000.00
1.3.6	PSA 5.4	Relocation of existing services where ordered by the Engineer	Prov Sum	1.0		50,000.00
1.3.7	PSA 8.5.2	Additional earthworks and density testing where ordered by the Engineer	Prov Sum	1.0		30,000.00
1.3.8	8.5 a	Repairs by the Contractor to pipes, coatings, welds and valves in the Municipal Depot, subsequent to the inspection by the Contractor and where ordered by the Engineer	Prov Sum	1.0		15,000.00
1.3.9		Removal of existing pump impellar and replacement by nominated subcontractor	Prov Sum	1.0		100,000.00
1.3.10		Purchase of materials if not available from EWS stores	Prov Sum	1.0		100,000.00
1.3.11		Provisional sum for the employment of a CLO per Ward	Prov Sum	1.00		650, 000.00
1.3.12		Overheads, charges and profit on item 1.3.11	%	650,000.00		
1.3.13	5.1.1	Setting out of the works	Sum	1.0		
<b>1.4</b>		<b>TEMPORARY WORKS</b>				
1.4.1	5.1.1	Setting out of the Works	Sum	1.0		
1.4.2	8.8.4 c	Excavate by hand in all materials to expose existing services as directed by the Engineer (such as storm water pipes, water mains, cables), protect, backfill and compact. Rate to include for measurement of levels.	m³	100.0		
1.4.3	8.8.5	Cost of survey in terms of the Land Survey Act including preparation of As-Built drawings for the pipeline.	Sum	1.0		
Total Carried Forward To Summary						

## **GLENWOOD RESERVOIR (COMPARTMENT 1)**

**GLENWOOD RESERVOIR (COMPARTMENT 1)**

**SECTION 1: PSR 1**

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
<b>1</b>	<b>PSR 1</b>	<b>ACCESS FOR RESERVOIR REHABILITATION</b>				
1.1	PSR 1.1	Temporary access structures and work platforms (by element):				
1.1.1	PSR 1.1.1	Access and platforms to locations as described as well as dismantling and removal at completion (heights assessed by contractor)				
		(a) Glenwood Reservoir				
		(i) Walls (max height 7m)	Lump sum	1		
		(ii) Roof slab soffit (max height 7m)	Lump sum	1		
Total Carried Forward To Summary						

**GLENWOOD RESERVOIR (COMPARTMENT 1)**

**SECTION: PSR 2**

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
<b>2</b>	<b>PSR 2</b>	<b>DEMOLITION AND REMOVAL OF STRUCTURAL CONCRETE AND STEELWORK</b>				
2.1	PSR 2.1	Demolition of concrete members or elements:				
2.1.1	PSR 2.1.1	Partial member or element (Western wall of compartment 1; approximately 3 m high)	m <sup>3</sup>	1.0		
Total Carried Forward To Summary						

**GLENWOOD RESERVOIR (COMPARTMENT 1)**

**SECTION: PSR 3**

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
<b>3</b>	<b>PSR 3</b>	<b>SURFACE AND STRUCTURAL REPAIR OF CONCRETE MEMBERS</b>				
3.1	PSR 3.1	Proprietary cementitious repair system (Class and description below) in positions as indicated in accordance with Table 3.5-1				
3.1.1	PSR 3.1.2	Class R3 - Structural Repairs				
		(a) Internal wall repairs				
		(i) Supplying the cementitious repair compound according to specification	ℓ	200.0		
		(ii) Installation of repair compound according to suppliers guidelines	ℓ	200.0		
		(c) Previous internal wall repairs				
		(i) Supplying the cementitious repair compound according to specification	ℓ	100.0		
		(ii) Installation of repair compound	ℓ	100.0		
		(e) Finishing the edges of the improvised access hatch cut into the roof slab (including cutting back of existing reinforcement)				
		(i) Supplying the cementitious repair compound according to specification	ℓ	50.0		
		(ii) Installation of repair compound according to suppliers guidelines	ℓ	50.0		
		(f) Column bases				
		(i) Supplying the cementitious repair compound according to specification	ℓ	75.0		
		(ii) Installation of repair compound according to suppliers guidelines	ℓ	75.0		
3.2	PSR 3.2	Curing of repair surfaces				
3.2.1		By coating the surface with SIKA Antisol (or similar approved) curing compound to repaired areas				
		(i) Supplying SIKA Antisol (or similar approved) curing compound	m <sup>2</sup>	2.0		
		(ii) Applying curing compound according to suppliers guidelines	m <sup>2</sup>	2.0		
Total Carried Forward						



**GLENWOOD RESERVOIR (COMPARTMENT 1)**

**SECTION: PSR 3**

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Brought Forward						
3.3	PSR 3.3	Removal and disposal of existing repairs (repair materials used for previous repairs on the internal walls, floor slab and columns, are to be removed by mechanical methods and disposed of in an environmentally friendly manner)	Lump sum	1		
Total Carried Forward To Summary						

**GLENWOOD RESERVOIR (COMPARTMENT 1)**

**SECTION: PSR 4**

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
<b>4</b>	<b>PSR 4</b>	<b>ANCHORING OF REINFORCEMENT, GROUTING AND CRACK INJECTION</b>				
4.1	PSR 4.1	Establishment on site for crack injection	Lump sum	1		
4.2	PSR 4.2	Surface preparation and surface sealing for crack injection to:				
		(a) Internal walls	m	35.0		
		(b) Roof slab soffit	m	55.0		
4.3	PSR 4.3	Crack injection adhesive to				
4.3.1	PSR 4.3.1	Roof slab soffit				
		(a) Supplying epoxy resin according to specification	m	50.0		
		(b) Injecting epoxy resin according to suppliers guidelines	m	50.0		
4.3.2	PSR 4.3.2	Internal walls				
		(a) Supplying epoxy resin according to specification	m	50.0		
		(b) Injecting epoxy resin according to suppliers guidelines	m	50.0		
4.3.3	PSR 4.3.6	Other areas identified by the engineer				
		(a) Supplying epoxy resin according to specification	m	30.0		
		(b) Injecting epoxy resin according to suppliers guidelines	m	30.0		
4.4	PSR 4.4	Crack filling				
		(a) Removal of existing crack seal (v-notches) in walls	m	40.0		
		(b) Supplying cementitious grout	m	40.0		
		(c) Repair of the cracks using the cementitious grout to areas identified by the engineer	m	40.0		
Total Carried Forward To Summary						

**GLENWOOD RESERVOIR (COMPARTMENT 1)**

**SANS1200G: CONCRETE (STRUCTURAL)**

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
<b>5</b>	<b>SANS 1200G</b>	<b>CONCRETE (STRUCTURAL)</b>				
5.1	PSG 8.4.3.1	Preparation of concrete surface	m <sup>2</sup>	50.0		
5.2	PSG 8.4.3.2	Removal of existing floor slab screed by mechanical methods to solid substrate	m <sup>2</sup>	50.0		
5.3	PSG 8.4.3.3	Surface to be primed with "ABE Screed PU" or similar approved prior to applying granolithic screed (application rate as per manufacturer's guidelines)				
		(a) Supplying ABE Screed PU or similar approved	m <sup>2</sup>	50.0		
		(b) Installation of ABE Screed PU or similar approved	m <sup>2</sup>	50.0		
5.4	PSG 8.4.3.4	20MPa Granolithic screed (1:4) to falls on reservoir floor slab (30 mm thickness)				
		(a) Supplying ABE Screed PU or similar approved	m <sup>2</sup>	50.0		
		(b) Installation of ABE Screed PU or similar approved	m <sup>2</sup>	50.0		
Total Carried Forward To Summary						

**GLENWOOD RESERVOIR (COMPARTMENT 1)**

**SECTION: PSR 5**

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
<b>6</b>	<b>PSR 5</b>	<b>REPAIR AND REPLACEMENT OF ANCILLARY STRUCTURAL ELEMENTS</b>				
6.1	PSR 5.1	Removal and replacement of existing joint system				
6.1.1	PSR 5.1.1	(a) Reservoir floor slab				
		(i) Removal of existing joint sealant and cleaning of all joints by mechanical methods	m	1,370.0		
		(ii) Supplying new joint system (Sika Combiflex SG-20M or similar approved) including epoxy (Sikadur 31 DW or similar approved) and new silicone based sealant inside joint (Sikaflex Pro 3 or similar approved)	m	1,370.0		
		(iii) Installation of new joint system (Sika Combiflex SG-20M or similar approved) including epoxy (Sikadur 31 DW or similar approved) and new silicone based sealant inside joint (Sikaflex Pro 3 or similar approved)	m	1,370.0		
6.1.2	PSR 5.1.2	(b) Internal walls				
		(i) Removal of existing joint sealant and cleaning of all joints by mechanical methods	m	322.0		
		(ii) Supplying new joint system (Sika Combiflex SG-20M or similar approved) including epoxy (Sikadur 31 DW or similar approved) and new silicone based sealant inside joint (Sikaflex Pro 3 or similar approved)	m	322.0		
		(iii) Installation of new joint system (Sika Combiflex or similar approved) including epoxy (Sikadur 31 DW or similar approved) and new silicone based sealant inside joint (Sikaflex Pro 3 or similar approved)	m	322.0		
Total Carried Forward To Summary						

**GLENWOOD RESERVOIR (COMPARTMENT 1)**

**SECTION: PSR 6**

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
<b>7</b>	<b>PSR 6</b>	<b>REPAIR OF STEEL ELEMENTS</b>				
7.1	PSR 6.1	Repair pipework coating in accordance to the particular specification, complete inclusive of labour, materials, plant, supervision and QA/QC defects as directed by the Engineer, for:				
		(a) DN300 pipe	m	10.0		
		(b) DN450 pipe	m	10.0		
Total Carried Forward To Summary						

## **CATO RIDGE RESERVOIR (COMPARTMENT 1)**

**CATO RIDGE RESERVOIR (COMPARTMENT 1)**

**SECTION: PSR 1**

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
<b>8</b>	<b>PSR 1</b>	<b>ACCESS FOR RESERVOIR REHABILITATION</b>				
8.1	PSR 1.1	Temporary access structures and work platforms (by element):				
8.1.1	PSR 1.1.1	Access and platforms to locations as described as well as dismantling and removal at completion (heights assessed by contractor)				
		(a) Cato Ridge Reservoir - Compartment 1				
		(i) Internal walls (max height 7m)	Lump sum	1		
		(ii) Roof slab soffit (max height 7m)	Lump sum	1		
Total Carried Forward To Summary						

**CATO RIDGE RESERVOIR (COMPARTMENT 1)**

**SECTION: PSR 2**

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
<b>9</b>	<b>PSR 2</b>	<b>DEMOLITION AND REMOVAL OF STRUCTURAL CONCRETE AND STEELWORK</b>				
9.1	PSR 2.2	Removal of metal sections embedded in concrete (exposed tie rods in the Southern and Western walls)	No.	10		
Total Carried Forward To Summary						



**CATO RIDGE RESERVOIR (COMPARTMENT 1)**

**SECTION: PSR 3**

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
<b>10</b>	<b>PSR 3</b>	<b>SURFACE AND STRUCTURAL REPAIR OF CONCRETE MEMEBERS</b>				
10.1	PSR 3.1	Proprietary cementitious repair system in positions (Class and description below) as indicated accordance with Table 3.5-1:				
	PSR 3.1.2	Class R3 - Repairs				
10.1.1		(a) Internal wall				
		(i) Supplying the cementitious repair compound according to specification	ℓ	250.0		
		(ii) Installation of repair compound according to suppliers guidelines	ℓ	250.0		
10.1.2		(b) Floor slab				
		(i) Supplying the cementitious repair compound according to specification	ℓ	200.0		
		(ii) Installation of repair compound according to suppliers guidelines	ℓ	200.0		
10.1.3		(c) Previous internal wall repairs				
		(i) Supplying the cementitious repair compound according to specification	ℓ	250.0		
		(ii) Installation of repair compound according to suppliers guidelines.	ℓ	250.0		
10.1.4		(d) Previous column repairs				
		(i) Supplying the cementitious repair compound according to specification	ℓ	150.0		
		(ii) Installation of repair compound according to suppliers guidelines	ℓ	150.0		
10.2	PSR 3.2	Curing of repair surfaces				
10.2.1	PSR 3.2.1	By coating the surface with SIKA Antisol (or similar approved) curing compound to repaired areas				
		(i) Supplying SIKA Antisol (or similar approved) curing compound	m <sup>2</sup>	40.0		
		(ii) Applying curing compound according to suppliers guidelines	m <sup>2</sup>	40.0		
Total Carried Forward						

**CATO RIDGE RESERVOIR (COMPARTMENT 1)**

**SECTION: PSR 3**

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Brought Forward						
10.3	PSR 3.3	Removal and disposal of existing repairs (repair materials used for previous repairs on the internal walls, floor slab and columns, are to be removed by mechanical methods and disposed of in an environmentally friendly manner)	L/Sum	1		
Total Carried Forward To Summary						

**CATO RIDGE RESERVOIR (COMPARTMENT 1)**

**SECTION: PSR 4**

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
<b>11</b>	<b>PSR 4</b>	<b>ANCHORING OF REINFORCEMENT, GROUTING AND CRACK INJECTION</b>				
11.1	PSR 4.1	Establishment on site for crack injection	Lump sum	1		
11.2	PSR 4.2	Surface preparation and surface sealing for crack injection to:				
		(a) Internal walls	m	100.0		
		(b) Roof slab soffit	m	150.0		
11.3	PSR 4.3	Crack injection adhesive to				
11.3.1	PSR 4.3.1	Roof slab soffit				
		(a) Supplying epoxy resin according to specification	m	100.0		
		(b) Injecting epoxy resin according to suppliers guidelines	m	100.0		
11.3.2	PSR 4.3.2	Internal walls				
		(a) Supplying epoxy resin according to specification	m	100.0		
		(b) Injecting epoxy resin according to suppliers guidelines	m	100.0		
11.3.3	PSR 4.3.6	Other areas identified by the engineers				
		(a) Supplying epoxy resin according to specification	m	15.0		
		(b) Injecting epoxy resin according to suppliers guidelines	m	15.0		
11.4	PSR 4.4	Crack filling				
		(a) Removal of existing crack seal (v-notches) in internal walls	m	100.0		
		(b) Supplying cementitious grout	m	100.0		
		(c) Repair of the cracks using the cementitious grout to areas identified by the engineer	m	100.0		
Total Carried Forward To Summary						

**CATO RIDGE RESERVOIR (COMPARTMENT 1)**

**SECTION: PSR 5**

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
<b>12</b>	<b>PSR 5</b>	<b>REPAIR AND REPLACEMENT OF ANCILLARY STRUCTURAL ELEMENTS</b>				
12.1	PSR 5.1	Removal and replacement of existing joint system				
12.1.1	PSR 5.1.1	(a) Floor slab				
		(i) Removal of existing joint sealant and cleaning of all joints by mechanical methods	m	1,000.0		
		(ii) Supplying new joint system (Sika Combiflex SG-20M or similar approved) including epoxy (Sikadur 31 DW or similar approved) and new silicone based sealant inside joint (Sikaflex Pro 3 or similar approved)	m	1,000.0		
		(iii) Installation of new joint system (Sika Combiflex SG-20M or similar approved) including epoxy (Sikadur 31 DW or similar approved) and new silicone based sealant inside joint (Sikaflex Pro 3 or similar approved)	m	1,000.0		
12.1.2	PSR 5.1.2	(b) Internal walls				
		(i) Removal of existing joint sealant and cleaning of all joints by mechanical methods	m	300.0		
		(ii) Supplying new joint system (Sika Combiflex SG-20M or similar approved) including epoxy (Sikadur 31 DW or similar approved) and new silicone based sealant inside joint (Sikaflex Pro 3 or similar approved)	m	300.0		
		(iii) Installation of new joint system (Sika Combiflex or similar approved) including epoxy (Sikadur 31 DW or similar approved) and new silicone based sealant inside joint (Sikaflex Pro 3 or similar approved)	m	300.0		
12.1.3	PSR 5.1.3	(c) External roof slab joints				
		(i) Removal of existing joint sealant and cleaning of all joints by mechanical methods	m	150.0		
Total Carried Forward						

**CATO RIDGE RESERVOIR (COMPARTMENT 1)**

**SECTION: PSR 5**

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Brought Forward						
12.2	PSR 5.2	(ii) Supplying new joint system (Dow Corning 888 silicone joint sealant or similar approved) including backing chord	m	150.0		
		(iii) Installation of new joint system (Dow Corning 888 silicone joint sealant or similar approved) including backing chord	m	150.0		
		(a) Removal of brickwork (brick upstand around the perimeter of the exposed roof slab, 230mm wide, 3 courses high)	m	10.0		
	PSR 5.2.1	(b) Supplying new brickwork (brick upstand around the perimeter of the roof slab, 230mm wide, 3 courses high)	m	10.0		
	PSR 5.2.2	(c) Installation of new brickwork (brick upstand around the perimeter of the roof slab, 230mm wide, 3 courses high)	m	10.0		
Total Carried Forward To Summary						

**CATO RIDGE RESERVOIR (COMPARTMENT 1)**

**SECTION: PSR 6**

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
<b>13</b>	<b>PSR 6</b>	<b>REPAIR OF STEEL ELEMENTS</b>				
13.1	PSR 6.1	Repair pipework coating in accordance to the particular specification, complete inclusive of labour, materials, plant, supervision and QA/QC defects as directed by the Engineer, for:				
		(a) DN300 pipe	m	10.0		
		(b) DN450 pipe	m	10.0		
Total Carried Forward To Summary						

## **CATO RIDGE RESERVOIR (COMPARTMENT 2)**

**CATO RIDGE RESERVOIR (COMPARTMENT 2)**

**SECTION: PSR 1**

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
<b>14.1</b>	<b>PSR 1</b>	<b>ACCESS FOR RESERVOIR REHABILITATION</b>				
14.1	PSR 1.1	Temporary access structures and work platforms (by element):				
14.1.1	PSR 1.1.1	Access and platforms to locations as described as well as dismantling and removal at completion (heights assessed by contractor)				
		(a) Cato Ridge Reservoir - Compartment 2				
		(i) Internal walls (max height 7m)	Lump sum	1		
		(i) Roof slab soffit (max height 7m)	Lump sum	1		
Total Carried Forward To Summary						



**CATO RIDGE RESERVOIR (COMPARTMENT 2)**

**SECTION: PSR 2**

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
<b>15</b>	<b>PSR 2</b>	<b>DEMOLITION AND REMOVAL OF STRUCTURAL CONCRETE AND STEELWORK</b>				
15.1	PSR 2.2	Removal of metal sections embedded in concrete (exposed tie rods in the Southern and Western walls)	No.	40		
15.2	PSR 2.3	Demolition of structural steel elements (steel plate and frame, on internal wall, closing off compartment 2 from compartment 1):				
15.2.1	PSR 2.3.1	Full member or element (element to remain in place till access hole has been sealed off, using concrete, from compartment 1 side)	No.	1		
Total Carried Forward To Summary						

**CATO RIDGE RESERVOIR (COMPARTMENT 2)**

**SECTION: PSR 3**

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
<b>16</b>	<b>PSR 3</b>	<b>SURFACE AND STRUCTURAL REPAIR OF CONCRETE MEMEBERS</b>				
16.1	PSR 3.1	Proprietary cementitious repair system (Class and description below) in positions as indicated in accordance with Table 3.5-1:				
	PSR 3.1.2	Class R3 - (spall repair)				
16.1.1		(a) Wall (external)				
		(i) Supplying the cementitious repair compound according to specification	ℓ	150.0		
		(ii) Installation of repair compound according to suppliers guidelines	ℓ	150.0		
16.1.2		(b) Floor slab				
		(i) Supplying the cementitious repair compound according to specification	ℓ	150.0		
		(ii) Installation of repair compound according to suppliers guidelines	ℓ	150.0		
16.1.3		(c) Internal wall surfaces - replacement of existing spall repairs				
		(i) Supplying the cementitious repair compound according to specification	ℓ	150.0		
		(ii) Installation of repair compound according to suppliers guidelines	ℓ	150.0		
16.1.4		(d) Columns - replacement of existing repairs				
		(i) Supplying the cementitious repair compound according to specification	ℓ	100.0		
		(ii) Installation of repair compound according to suppliers guidelines	ℓ	100.0		
16.1.5		(e) Finishing the edges of the improvised access hatch cut into the roof slab (including cutting back of existing reinforcement)				
		(i) Supplying the cementitious grout according to specification	ℓ	350.0		
		(ii) Installation of repair compound according to suppliers guidelines	ℓ	350.0		
Total Carried Forward						

**CATO RIDGE RESERVOIR (COMPARTMENT 2)**

**SECTION: PSR 3**

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Brought Forward						
16.2	PSR 3.2	Curing of repair surfaces:				
16.2.1	PSR 3.2.1	By coating the surface with SIKA Antisol (or similar approved) curing compound to repaired areas				
		(i) Supplying SIKA Antisol (or similar approved) curing compound	m <sup>2</sup>	75.0		
		(ii) Applying curing compound according to suppliers guidelines	m <sup>2</sup>	75.0		
16.3	PSR 3.3	Removal and disposal existing repairs (repair materials used for previous repairs on the internal walls, floor slab and columns, are to be removed by mechanical methods and disposed of in an environmentally friendly manner)	Lump sum	1		
16.4	PSR 3.4	Concrete (Class 30/19 MPa) to seal hatch in wall				
16.4.1		(i) Supplying concrete according to specification	m <sup>3</sup>	2.0		
16.4.2		(ii) Sealing of existing opening using 30/19 MPa concrete	m <sup>3</sup>	2.0		
Total Carried Forward To Summary						

**CATO RIDGE RESERVOIR (COMPARTMENT 2)**

**SECTION: PSR 4**

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
<b>17</b>	<b>PSR 4</b>	<b>ANCHORING OF REINFORCEMENT, GROUTING AND CRACK INJECTION</b>				
17.1	PSR 4.1	Establishment on site for crack injection	Lump sum	1		
17.2	PSR 4.2	Surface preparation and surface sealing for crack injection to:				
17.2.1		(b) Roof slab soffit	m	100.0		
17.2.2		(c) Floor slab	m	75.0		
17.3	PSR 4.3	Crack injection adhesive to:				
17.3.1	PSR 4.3.1	Roof slab soffit				
		(a) Supplying epoxy resin according to specification	m	100.0		
		(b) Injecting epoxy resin according to suppliers guidelines	m	100.0		
17.3.2	PSR 4.3.2	Internal Walls				
		(a) Supplying epoxy resin according to specification	m	100.0		
		(b) Injecting epoxy resin according to suppliers guidelines	m	100.0		
17.3.3	PSR 4.3.6	Other areas identified by the engineer				
		(a) Supplying epoxy resin according to specification	m	55.0		
		(b) Injecting epoxy resin according to suppliers guidelines	m	55.0		
17.4	PSR 4.4	Crack filling				
17.4.1		(a) Removal of existing crack seal (v-notches) in walls	m	80.0		
17.4.2		(b) Supplying cementitious grout	m	80.0		
17.4.3		(c) Repair of the cracks using the cementitious grout to areas identified by the engineer.	m	80.0		
Total Carried Forward To Summary						

**CATO RIDGE RESERVOIR (COMPARTMENT 2)**

**SECTION: PSR 5**

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
<b>18</b>	<b>PSR 5</b>	<b>REPAIR AND REPLACEMENT OF ANCILLARY STRUCTURAL ELEMENTS</b>				
18.1	PSR 5.1	Removal and replacement of existing joint system				
18.1.1	PSR 5.1.2	(a) External roof slab joints				
		(i) Removal of existing joint sealant and cleaning of all joints by mechanical methods	m	150.0		
		(ii) Supplying new joint system (Dow Corning 888 silicone joint sealant or similar approved) including backing chord	m	150.0		
		(iii) Installation of new joint system (Dow Corning 888 silicone joint sealant or similar approved) including backing chord	m	150.0		
Total Carried Forward To Summary						

**CATO RIDGE RESERVOIR (COMPARTMENT 2)**

**SECTION: PSR 7**

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
<b>19</b>	<b>PSR 7</b>	<b>EXTERNAL BONDING OF STEEL AND CARBON FIBRE</b>				
19.1	PSR 7.1	Preparation of concrete surfaces:				
19.1.1		Slots in concrete for steel or carbon fibre bonding (25mm diameter holes, 400 mm deep, for dowel bars in access hatch to be sealed in compartment wall, near face and far face, vertical and horizontal)	m	50.0		
19.2	PSR 7.2	Adhesive				
		(a) Adhesive (Hilti HIT RE 500 or similar approved) to the drilled holes wall				
		(i) Supplying adhesive	ℓ	30.0		
		(ii) Injecting adhesive into drilled holes according to suppliers guidelines	ℓ	30.0		
19.3	PSR 7.3	Bonded plates, bars or sections:				
19.3.1		Bars				
		(a) Supplying reinforcement (High tensile Y20 dowel bars)	kg	350.0		
		(b) Installation of reinforcement	kg	350.0		
Total Carried Forward To Summary						

## ILLOVO WATER TOWER

**ILLOVO WATER TOWER**

**SECTION: PSR 1**

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
<b>20</b>	<b>PSR 1</b>	<b>ACCESS FOR BRIDGE REHABILITATION</b>				
20.1	PSR 1.1	Temporary access structures and work platforms (by element)				
20.2	PSR 1.1.1	Access and platforms to locations as described as well as dismantling and removal at completion (heights assessed by contractor)				
20.2.1		(a) Illovo Water Tower				
		(i) Support columns	Lump sum	1		
		(ii) Elevated tank soffit	Lump sum	1		
		(ii) Reinforced concrete support beams	Lump sum	1		
Total Carried Forward To Summary						



**ILLOVO WATER TOWER**

**SECTION: PSR 2**

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
<b>21</b>	<b>PSR 2</b>	<b>DEMOLITION AND REMOVAL OF STRUCTURAL CONCRETE AND STEELWORK</b>				
21.1	PSR 2.2	Removal of metal sections embedded in concrete (existing reinforcement)	m	1.0		
Total Carried Forward To Summary						

**ILLOVO WATER TOWER**

**SECTION: PSR 3**

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
<b>22</b>	<b>PSR 3</b>	<b>SURFACE AND STRUCTURAL REPAIR OF CONCRETE MEMEBERS</b>				
22.1	PSR 3.1	Proprietary cementitious repair system (Class and description below) in positions as indicated accordance with Table A14.4.5-1				
22.1.1	PSR 3.1.1	Class R4 - Spall repair				
		(a) Support columns				
		(i) Supplying the cementitious repair compound according to specification	ℓ	100.00		
		(ii) Installation of repair compound according to suppliers guidelines	ℓ	100.00		
		(b) Reinforced concrete beams				
		(i) Supplying the cementitious repair compound according to specification	ℓ	100.00		
		(ii) Installation of repair compound according to suppliers guidelines	ℓ	100.00		
		(c) Elevated tank soffit				
		(i) Supplying the cementitious repair compound according to specification	ℓ	100.00		
		(ii) Installation of repair compound according to suppliers guidelines	ℓ	100.00		
22.2	PSR 3.2	Curing of repair surfaces				
22.3	PSR 3.2.1	By coating the surface with SIKA Antisol (or similar approved) curing compound to repaired areas				
		(i) Suppling SIKA Antisol (or similar approved) curing compound	m²	20.0		
		(ii) Applying curing compound according to suppliers' guidelines	m²	20.0		
Total Carried Forward To Summary						

**ILLOVO WATER TOWER**

**SECTION: PSR 4**

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
<b>23</b>	<b>PSR 4</b>	<b>ANCHORING OF REINFORCEMENT, GROUTING AND CRACK INJECTION</b>				
23.1	PSR 4.1	Establishment on site for crack injection	L/Sum	1		
23.2	PSR 4.2	Surface preparation and surface sealing for crack injection to:				
23.2.1		(a) Support columns	m	10.0		
23.2.2		(b) Reinforced concrete beams	m	10.0		
23.2.3		(c) Elevated tank	m	10.0		
23.3	PSR 4.3	Crack injection adhesive to:				
23.3.1	PSR 4.3.3	Support columns				
		(a) Supplying epoxy resin according to specification	m	10.0		
		(b) Injecting epoxy resin according to suppliers' guidelines	m	10.0		
23.3.2	PSR 4.3.4	Reinforced concrete beams				
		(a) Supplying epoxy resin according to specification	m	10.0		
		(b) Injecting epoxy resin according to suppliers' guidelines	m	10.0		
23.3.3	PSR 4.3.5	Elevated tank				
		(a) Supplying epoxy resin according to specification	m	10.0		
		(b) Injecting epoxy resin according to suppliers' guidelines	m	10.0		
23.3.4	PSR 4.3.6	Other areas identified by the engineer				
		(a) Supplying epoxy resin according to specification	m	5.0		
		(b) Injecting epoxy resin according to suppliers' guidelines	m	5.0		
Total Carried Forward To Summary						

**ILLOVO WATER TOWER**

**SECTION: PSR 5**

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
<b>24</b>	<b>PSR 5</b>	<b>REPAIR AND REPLACEMENT OF ANCILLARY STRUCTURAL ELEMENTS</b>				
24.1	PSR 5.3	Supply and install new ancillary elements:				
24.1.1	PSR 5.3.1	(a) New external access ladder				
		(i) Supplying the access ladder	Prov Sum	1		45,000.00
		(ii) Installation of new access ladder	Prov Sum	1		5,000.00
Total Carried Forward To Summary						

**ILLOVO WATER TOWER**

**SECTION: PSR 7**

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
<b>25</b>	<b>PSR 7</b>	<b>EXTERNAL BONDING OF STEEL AND CARBON FIBRE</b>				
25.1	PSR 7.1	Preparation of concrete surfaces				
25.1.1		Slots in concrete (50 mm wide x 100 mm deep) for steel or carbon fibre bonding (area of corroded reinforcement to be replaced)	m	25.0		
25.2	PSR 7.2	Adhesive				
25.2.1		(a) Adhesive (Hilti HIT RE 500 or similar approved) to the drilled holes in the wall				
		(i) Supplying Adhesive	ℓ	15.0		
		(ii) Injecting adhesive drilled into holes according to suppliers' guidelines	ℓ	15.0		
25.3	PSR 7.3	Bonded plates, bars or sections				
25.3.1		Bars				
		(a) Supplying reinforcement (high tensile reinforcement bars matching the existing reinforcement characteristics)	kg	75.0		
		(b) Installation of reinforcement	kg	75.0		
Total Carried Forward To Summary						

## **MT MORIAH RESERVOIR**

**MT MORIAH RESERVOIR**

**SECTION: PSR 1**

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
<b>26</b>	<b>PSR 1</b>	<b>ACCESS FOR RESERVOIR REHABILITATION</b>				
26.1	PSR 1.1	Temporary access structures and work platforms (by element):				
26.1.1	PSR 1.1.1	Access and platforms to locations as described as well as dismantling and removal at completion (heights assessed by contractor)				
		(a) Mt Moriah Reservoir				
		(i) Internal walls (max height 7m)	Lump sum	1		
		(ii) Roof slab soffit (max height 7m)	Lump sum	1		
Total Carried Forward To Summary						

**MT MORIAH RESERVOIR**

**SECTION: PSR 2**

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
<b>27</b>	<b>PSR 2</b>	<b>DEMOLITION AND REMOVAL OF STRUCTURAL CONCRETE AND STEELWORK</b>				
27.1	PSR 2.1	Demolition of concrete members or elements				
	PSR 2.1.1	Partial member or element	m <sup>3</sup>	30.0		
	PSR 2.1.2	Full member or element	m <sup>3</sup>	20.0		
Total Carried Forward To Summary						



**MT MORIAH RESERVOIR**

**SECTION: PSR 3**

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
<b>28</b>	<b>PSR 3</b>	<b>SURFACE AND STRUCTURAL REPAIR OF CONCRETE MEMEBERS</b>				
28.1	PSR 3.1	Proprietary cementitious repair system (Class and description below) in positions as indicated accordance with Table 3.5-1				
28.1.1	PSR 3.1.2	Class R3 - Repairs				
		(a) Internal wall				
		(i) Supplying the cementitious repair compound according to specification	ℓ	500.0		
		(ii) Installation of repair compound according to suppliers guidelines	ℓ	500.0		
		(b) Floor slab				
		(i) Supplying the cementitious repair compound according to specification	ℓ	250.0		
		(ii) Installation of repair compound according to suppliers guidelines	ℓ	250.0		
		(c) Columns				
		(i) Supplying the cementitious repair compound according to specification	ℓ	250.0		
		(ii) Installation of repair compound according to suppliers guidelines.	ℓ	250.0		
28.2	PSR 3.2	Curing of repair surfaces				
28.2.1	PSR 3.2.1	By coating the surface with SIKA Antisol (or similar approved) curing compound to repaired areas				
		(i) Supplying SIKA Antisol (or similar approved) curing compound	m²	310.0		
		(ii) Applying curing compound according to suppliers guidelines	m²	310.0		
Total Carried Forward To Summary						

**MT MORIAH RESERVOIR**

**SECTION: PSR 4**

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
<b>29</b>	<b>PSR 4</b>	<b>ANCHORING OF REINFORCEMENT, GROUTING AND CRACK INJECTION</b>				
29.1	PSR 4.1	Establishment on site for crack injection	Lump sum	1		
29.2	PSR 4.2	Surface preparation and surface sealing for crack injection to:				
29.2.2		(b) Roof slab soffit	m	200.0		
29.3	PSR 4.3	Crack injection adhesive to				
29.3.1	PSR 4.3.1	Roof slab soffit				
		(a) Supplying epoxy resin according to specification	m	100.0		
		(b) Injecting epoxy resin according to suppliers guidelines	m	100.0		
29.3.3	PSR 4.3.6	Other areas identified by the engineers				
		(a) Supplying epoxy resin according to specification	m	200.0		
		(b) Injecting epoxy resin according to suppliers guidelines	m	200.0		
29.4	PSR 4.4	Crack filling				
		(b) Supplying cementitious grout	m	100.0		
		(c) Repair of the cracks using the cementitious grout to areas identified by the engineer	m	100.0		
Total Carried Forward To Summary						

**MT MORIAH RESERVOIR**

**SECTION: PSR 5**

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
<b>30</b>	<b>PSR 5</b>	<b>REPAIR AND REPLACEMENT OF ANCILLARY STRUCTURAL ELEMENTS</b>				
30.1	PSR 5.1	Removal and replacement of existing joint system				
30.1.1	PSR 5.1.1	(a) Floor slab				
		(i) Removal of existing joint sealant and cleaning of all joints by mechanical methods	m	260.0		
		(ii) Supplying new joint system (Sika Combiflex SG-20M or similar approved) including epoxy (Sikadur 31 DW or similar approved) and new silicone based sealant inside joint (Sikaflex Pro 3 or similar approved)	m	260.0		
		(iii) Installation of new joint system (Sika Combiflex SG-20M or similar approved) including epoxy (Sikadur 31 DW or similar approved) and new silicone based sealant inside joint (Sikaflex Pro 3 or similar approved)	m	260.0		
30.1.2		(b) Internal walls				
		(i) Removal of existing joint sealant and cleaning of all joints by mechanical methods	m	100.0		
		(ii) Supplying new joint system (Sika Combiflex SG-20M or similar approved) including epoxy (Sikadur 31 DW or similar approved) and new silicone based sealant inside joint (Sikaflex Pro 3 or similar approved)	m	100.0		
		(iii) Installation of new joint system (Sika Combiflex or similar approved) including epoxy (Sikadur 31 DW or similar approved) and new silicone based sealant inside joint (Sikaflex Pro 3 or similar approved)	m	100.0		
30.1.3	PSR 5.1.2	(a) External roof slab joints				
		(i) Removal of existing joint sealant and cleaning of all joints by mechanical methods	m	160.0		
Total Carried Forward						

**MT MORIAH RESERVOIR**

**SECTION: PSR 5**

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Brought Forward						
		(ii) Supplying new joint system (Dow Corning 888 silicone joint sealant or similar approved) including backing chord	m	160.0		
		(iii) Installation of new joint system (Dow Corning 888 silicone joint sealant or similar approved) including backing chord	m	160.0		
Total Carried Forward To Summary						

**MT MORIAH RESERVOIR**

**SECTION: PSR 8**

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
<b>31</b>	<b>PSR 8</b>	<b>PROTECTIVE COATINGS AND TREATMENTS FOR CONCRETE</b>				
31.1	PSR 8.1	Application of protective coatings and treatments (Two part polymer modified cementitious waterproof mortar slurry composed of a liquid polymer and a cement-based mix incorporating special admixtures and complies with the requirements of EN 1504-2. To give an equivalent 50mm concrete cover)	m <sup>2</sup>	2,050.0		
Total Carried Forward To Summary						

## **KWAMAKHUTHA RESERVOIR COMPLEX**

**KWAMAKHUTHA RESERVOIR COMPLEX**

**SECTION: SABS 1200 C**

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
<b>32</b>	<b>SABS 1200C</b>	<b>SITE CLEARANCE</b>				
32.1	8.2.10	Remove topsoil to nominal depth of 150mm and stockpile	m <sup>3</sup>	10.00		
32.2	8.2.7	Dismantle and remove existing 200mm Ø water mains within the excavated trench. Rate to include for the end capping of water mains with a concrete cork as per Engineer's Detail	m	60.00		
32.3	8.2.8	Demolish and remove above and underground structures/buildings /obstructions				
32.3.1		(a) Un-reinforced concrete	Lump sum	1		
32.3.2		(b) Reinforced Concrete	Lump sum	1		
32.4		Remove existing PC concrete valve markers and valve covers and store for re-use	No.	4		
Total Carried Forward To Summary						

**KWAMAKHUTHA RESERVOIR COMPLEX**

**SECTION: 1200DB**

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
<b>33</b>	<b>SABS 1200DB</b>	<b>EARTHWORKS (PIPE TRENCHES)</b>				
33.1	8.3.2 a	Excavate in all materials for trenches, backfill, compact and dispose of surplus/unsuitable material for 300mm Ø nominal diameter pipe for depths:  (a) 0 m up to and including 1.5 m	m³	60.0		
33.2	8.3.2 b	Extra over item 32.2 above for:  (a) Intermediate excavation	m³	10.0		
33.3	8.3.3.1 b	Make up deficiency in backfill material by importation from commercial or off-site sources selected by the Contractor	m³	5.0		
33.4	8.3.6  PSDB 8.3.6.2	Finishing:  Reinstate areas as directed by Engineer with Cynodon Dactylon (creeping grassing variety). Rate to include topsoil obtained from a commercial source to be covered at a depth of 75mm over the required area.	m²	60.0		
Total Carried Forward To Summary						



**KWAMAKHUTHA RESERVOIR COMPLEX**

**SECTION: 1200LB**

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
<b>34</b>	<b>SABS 1200LB</b>	<b>BEDDING (PIPES)</b>				
34.1	8.2.1	Provision of bedding from trench excavation				
34.1.1		(a) Selected Class C material bedding for fill blanket	m³	10.0		
34.2	8.2.2	Supply only of bedding by importation:				
34.2.1	8.2.2.3	From commercial sources:				
		(b) Selected granular Class C material for bedding cradle and fill blanket	m³	5.0		
Total Carried Forward To Summary						

**KWAMAKHUTHA RESERVOIR COMPLEX**

**SECTION: 1200L**

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
<b>35</b>	<b>SABS 1200L</b>	<b>MEDIUM PRESSURE PIPELINES</b>				
35.1	8.2.1*	Supply and install, bed, lay in Class B bedding and joint 300mm Ø x 4.5mm thick plate, Grade X42 steel mortar lined, 3LPE coated pipe x 9.144m length pipe. Rate to include the reinstatement of lining and coating. Note the pipes supplied are one end bell and the other plain.	m	60.0		
35.2	8.2.2*	Extra Over item 5.1 for fabrication and installation of the following SABS 719 Grade X42 steel pipe specials, inclusive of flanges, gaskets, washers and bolts where not supplied. Note: Bolts and washers to be galvanized and yellow passivated. Rate to include for drilling, welding, internal and external corrosion protection, and the supply and welding of joint sleeves as required.				
		(a) 300mm Ø 90° Bends	No.	2		
35.2.1		300 mm Ø Roof Inlet Details:				
		(a) Core a 450mm Ø hole into the reservoir roof. (see typical section E-E on drawing 19648_P_301_S01_R0_LR)	No.	2		
35.3		Supply and Install the following steel specials. Rate to include for the coating, lining and corrosion protection where required (Refer to Drawing 041700 sheet ½).				
		(i) 25mm Ø Thread-o-let Gas Socket and Plug	No.	2		
		(ii) 300mm Ø Blank Flange with 25mm Ø Pre-drilled hole in centre of flange	No.	2		
		(iii) 3mm thick Class 16 Gasket	No.	2		
		(iv) 300mm Ø Table 16 Slip on Flange	No.	8		
		(v) 300mm Ø spool piece 121mm long	No.	6		
		(vi) 8mm Ø S.S Lifting Handle	No.	2		
		(vii) 300mm Ø Equal Tee to ANSI.B16.9 Rilsan Lined and Coated	No.	2		
Total Carried Forward						

**KWAMAKHUTHA RESERVOIR COMPLEX**

**SECTION: 1200L**

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Brought Forward						
35.4	8.2.1	(viii) 10mm thick S.S Orifice Plate Detail	No.	2		
		(ix) 300mm Ø Diffuser Housing Unit. Schedule 40 API pipe Rilsan Lined and coated	No.	2		
		(x) 385 mm Ø x 3mm thick insertion rubber with 230mmØ opening	No.	2		
		(xi) 300mm Ø schedule 40 API pipe Rilsan lined and coated 750mm long with 2no. 25mmØ holes. Positions as indicated on drawing 041700 sheet 1/2	No.	2		
		(xii) 25mm Ø x 90° Elbow to ANSI B17.9 Rilsan lined and coated	No.	8		
		(xiii) 500 x 500mm support bracket, fixed onto reservoir roof with M16 bolts which are grouted into the concrete and Rilsan lined and coated	No.	4		
		(xiv) 120 x 120 x 8mm plate thickness web welded all-round the 300mmØ API pipe and support bracket	No.	8		
		(xv) 25mm Ø Schedule 40 API Air Suction Pipe Rilsan Lined and coated (Length to be determined on site)	No.	4		
		(xvi) 300mm Ø Steel Pipe Rilsan Lined and coated, F.B.E, 1110mm long	No.	2		
		(xvii) Pipe Support brackets	No.	4		
		(xviii) 300mm Ø x 45° bend. Rilsan lined and coated.	No.	2		
		Supply and install, handle, lay, joint, bed, test and disinfect the nominal ø steel fittings and specials including nuts, bolts and gaskets all steel fittings are to be "Rilson" coated with a min. coat of 300 micron.				
		(a) 300 × 200mm Ø Flanged Reducer	No.	1		
		(b) 300mm Ø Flanged Gate Valve	No.	1		
		(c) 300mm Ø Dirt Box (See Dwg 45484)	No.	1		
Total Carried Forward						

**KWAMAKHUTHA RESERVOIR COMPLEX**

**SECTION: 1200L**

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Brought Forward						
35.5		(d) 300mm Ø Spool Piece 900mm long F.B.E(PN16)	No.	1		
		(e) 300mm Ø Bulk Meter 500mm long F.B.E	No.	1		
		(f) 300mm Ø butterfly valve (supplied with matching flanges & bolt sets)	No.	2		
		(g) 25mm Ø Air valve. Refer to detail "C"	No.	2		
		Fabricate and install the following specials as detailed on drawing 53627 sheet 1				
		(a) 300mmØ Spool Piece 730mm Long. F.B.E(PN 16)	No.	2		
		(b) 300mm Ø Spool Piece 900mm long F.B.E.(PN16)	No.	1		
		(c) 300mm Ø ×90° Long Radius Bend With 100mm Spool Piece F.B.E( API B 16.9)	No.	2		
		(d) 300mm Ø spool piece, length to be determined once the depth of existing inlet main is known F.B.E (PN16)	No.	2		
		(e) 300mm Ø Spool Piece 400mm long F.B.E.(PN16)	No.	2		
		(f) 300mm Ø ×90° Long Radius Bend F.B.E(API B 16.9)	No.	7		
		(g) 300mm Ø Spool Piece 1065mm long F.B.E.(PN16) (API SH 40)-See Detail	No.	1		
		(h) 300mm Ø Hydraulic control valve	No.	1		
		(i) 300mm Ø Spool Piece cut to suit F.B.E (PN16)	No.	10		
		(j) Fabricated steel bends, bent & cut to suit new res. inlet pipework	No.	4		
		(k) 300mm Ø Isolating valve	No.	2		
Total Carried Forward						

**KWAMAKHUTHA RESERVOIR COMPLEX**

**SECTION: 1200L**

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
Brought Forward						
35.6		Reinstate around inlet pipe with approved high strength shrinkage compensated cementitious grout as a component, ready to mix, free flowing, low shrinkage, expansive grout	m <sup>3</sup>	0.4		
35.7		Fill existing 200mm Ø inlet main with concrete and seal with a 10mm thick plate. As directed by Engineer (Rate to include for the internal and external corrosion protection)	No.	4		
35.8		300mm Ø PRV Chamber				
35.8.1		Supply all materials for PRV Chamber, as detailed on drawing no.19648_P_301_S01_R0_LR. Rate to include, 2 No 75mm thick concrete lintels, two layers of 230mm wide 250-micron thick low-density polythene sheet, etc.	Sum	1		
35.8.2		Construct PRV Chamber, as detailed on drawing no.19648_P_301_S01_R0_LR. Rate to include for excavation, backfilling, grade 20/19 concrete footing, brickwork, 100mm reinforced concrete roof slab, 10mm drip mould on roof etc.	Sum	1		
35.8.3		Collect from EWS's stores 1800 x 900mm Steel door	Sum	1		
35.9	8.2.2	Supply and install the following steel flanged specials. Rate to include for the Rilsan coating and lining and corrosion protection.				
35.9.1		(a) 300mm x 300mm tee	No.	1		
35.10		Collect from Springfield Water Stores and lay the following:				
35.10.1		300mm Ø wedge gate valves PN16	No.	3		
35.11		Fabricate and install as detailed on drawing 53627 sheet 12 and weld a 200mm Ø stub 300mm long F.O.E onto existing 450mmØ inlet pipe. Rate to include for the internal and external corrosion protection and Rilsan lining and coating where applicable.	No.	2		
Total Carried Forward To Summary						

**KWAMAKHUTHA RESERVOIR COMPLEX**

**SECTION: 1300**

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
<b>36</b>	<b>PSR 9</b>	<b>MISCELLANEOUS WORK AND REINSTATEMENT</b>				
36.1	PSR 9.1	Return excess materials to Springfield Water Stores/relevant pipe yards	t	10.0		
36.2	PSR 9.2	Wrap steel pipeline with a cold applied tape designed for the long-term external corrosion protection, excellent adhesion to pipe and self of buried pipelines, welded joints, bends and fittings, 600mm long to manufacturer's specification where pipe is to be cast into R.C Chamber walls	m	2.0		
36.3	PSR 9.3	Replace palisade fence gate refer to (std. drawing 454642)	No.	1		
36.4	PSR 9.4	Construct Reinforced concrete upstand beams as per drawing no. 19648_P_300_S01_R0_LR	m	250.0		
Total Carried Forward To Summary						

## **ROSETTA RESERVOIR**

**ROSETTA RESERVOIR**

**SECTION: PSR 5**

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
<b>37</b>	<b>PSR 5</b>	<b>REPAIR AND REPLACEMENT OF ANCILLARY STRUCTURAL ELEMENTS</b>				
37.1	PSR 5.1	Removal and replacement of existing joint system				
37.1.1	PSR 5.1.1	(a) Floor slab				
		(i) Removal of existing joint sealant and cleaning of all joints by mechanical methods	m	600.0		
		(ii) Supplying new joint system (Sika Combiflex SG-20M or similar approved) including epoxy (Sikadur 31 DW or similar approved) and new silicone based sealant inside joint (Sikaflex Pro 3 or similar approved)	m	600.0		
		(iii) Installation of new joint system (Sika Combiflex SG-20M or similar approved) including epoxy (Sikadur 31 DW or similar approved) and new silicone based sealant inside joint (Sikaflex Pro 3 or similar approved)	m	600.0		
37.1.2	PSR 5.1.2	(a) External roof slab joints				
		(i) Removal of existing joint sealant and cleaning of all joints by mechanical methods	m	150.0		
		(ii) Supplying new joint system (Dow Corning 888 silicone joint sealant or similar approved) including backing chord	m	150.0		
		(iii) Installation of new joint system (Dow Corning 888 silicone joint sealant or similar approved) including backing chord	m	150.0		
Total Carried Forward						



**CONTRACT No. WS 7230**

**For**

**THE REHABILITATION OF GLENWOOD RESERVOIR, CATO RIDGE RESERVOIR, ILLOVO WATER TOWER, MT MORIAH RESERVOIR, KWAMAKHUTHA RESERVOIR COMPLEX, ROSETTA RESERVOIR AND ASSOCIATED WORKS: WARD 33, 1, 97, 18 & 35**

**SCHEDULE A: PRELIMINARY AND GENERAL**

**SUMMARY OF SECTIONS**

<b>SECTION</b>	<b>DESCRIPTION</b>	<b>AMOUNT</b>
1	PRELIMINARY AND GENERAL	R
	<b>TOTAL CARRIED FORWARD TO TENDER SUMMARY</b>	<b>R</b>

**CONTRACT No. WS 7230**

**For**

**THE REHABILITATION OF GLENWOOD RESERVOIR, CATO RIDGE RESERVOIR, ILLOVO WATER TOWER, MT MORIAH RESERVOIR, KWAMAKHUTHA RESERVOIR COMPLEX, ROSETTA RESERVOIR AND ASSOCIATED WORKS: WARD 33, 1, 97, 18 & 35**

**SCHEDULE B: GLENWOOD RESERVOIR (COMPARTMENT 1)**

**SUMMARY OF SECTIONS**

<b>SECTION</b>	<b>DESCRIPTION</b>	<b>AMOUNT</b>
1	ACCESS FOR RESERVOIR REHABILITATION	R
2	DEMOLITION AND REMOVAL OF STRUCTURAL CONCRETE AND STEELWORK	R
3	SURFACE AND STRUCTURAL REPAIR OF CONCRETE MEMBERS	R
4	ANCHORING OR REINFORCEMENT, GROUTING AND CRACK INJECTION	R
5	CONCRETE (STRUCTURAL)	R
6	REPAIR AND REPLACEMENT OF ANCILLARY STRUCTURAL ELEMENTS	R
7	REPAIR OF STEEL ELEMENTS	R
	<b>TOTAL CARRIED FORWARD TO TENDER SUMMARY</b>	<b>R</b>

**CONTRACT No. WS 7230**

**For**

**THE REHABILITATION OF GLENWOOD RESERVOIR, CATO RIDGE RESERVOIR, ILLOVO WATER TOWER, MT MORIAH RESERVOIR, KWAMAKHUTHA RESERVOIR COMPLEX, ROSETTA RESERVOIR AND ASSOCIATED WORKS: WARD 33, 1, 97, 18 & 35**

**SCHEDULE C: CATO RIDGE RESERVOIR (COMPARTMENT 1)**

**SUMMARY OF SECTIONS**

<b>SECTION</b>	<b>DESCRIPTION</b>	<b>AMOUNT</b>
8	ACCESS FOR RESERVOIR REHABILITATION	R
9	DEMOLITION AND REMOVAL OF STRUCTURAL CONCRETE AND STEELWORK	R
10	SURFACE AND STRUCTURAL REPAIR OF CONCRETE MEMBERS	R
11	ANCHORING OR REINFORCEMENT, GROUTING AND CRACK INJECTION	R
12	REPAIR AND REPLACEMENT OF ANCILLARY STRUCTURAL ELEMENTS	R
13	REPAIR OF STEEL ELEMENTS	R
	<b>TOTAL CARRIED FORWARD TO TENDER SUMMARY</b>	<b>R</b>

**CONTRACT No. WS 7230**

**For**

**THE REHABILITATION OF GLENWOOD RESERVOIR, CATO RIDGE RESERVOIR, ILLOVO WATER TOWER, MT MORIAH RESERVOIR, KWAMAKHUTHA RESERVOIR COMPLEX, ROSETTA RESERVOIR AND ASSOCIATED WORKS: WARD 33, 1, 97, 18 & 35**

**SCHEDULE D: CATO RIDGE RESERVOIR (COMPARTMENT 2)**

**SUMMARY OF SECTIONS**

<b>SECTION</b>	<b>DESCRIPTION</b>	<b>AMOUNT</b>
14	ACCESS FOR RESERVOIR REHABILITATION	R
15	DEMOLITION AND REMOVAL OF STRUCTURAL CONCRETE AND STEELWORK	R
16	SURFACE AND STRUCTURAL REPAIR OF CONCRETE MEMBERS	R
17	ANCHORING OR REINFORCEMENT, GROUTING AND CRACK INJECTION	R
18	REPAIR AND REPLACEMENT OF ANCILLARY STRUCTURAL ELEMENTS	R
19	EXTERNAL BONDING OF STEEL AND CARBON FIBRE	R
	<b>TOTAL CARRIED FORWARD TO TENDER SUMMARY</b>	<b>R</b>

**CONTRACT No. WS 7230**

**For**

**THE REHABILITATION OF GLENWOOD RESERVOIR, CATO RIDGE RESERVOIR, ILLOVO WATER TOWER, MT MORIAH RESERVOIR, KWAMAKHUTHA RESERVOIR COMPLEX, ROSETTA RESERVOIR AND ASSOCIATED WORKS: WARD 33, 1, 97, 18 & 35**

**SCHEDULE E: ILLOVO WATER TOWER**

**SUMMARY OF SECTIONS**

<b>SECTION</b>	<b>DESCRIPTION</b>	<b>AMOUNT</b>
20	ACCESS FOR RESERVOIR REHABILITATION	R
21	DEMOLITION AND REMOVAL OF STRUCTURAL CONCRETE AND STEELWORK	R
21	SURFACE AND STRUCTURAL REPAIR OF CONCRETE MEMBERS	R
23	ANCHORING OR REINFORCEMENT, GROUTING AND CRACK INJECTION	R
24	REPAIR AND REPLACEMENT OF ANCILLARY STRUCTURAL ELEMENTS	R
25	EXTERNAL BONDING OF STEEL AND CARBON FIBRE	R
	<b>TOTAL CARRIED FORWARD TO TENDER SUMMARY</b>	<b>R</b>

**CONTRACT No. WS 7230**

**For**

**THE REHABILITATION OF GLENWOOD RESERVOIR, CATO RIDGE RESERVOIR, ILLOVO WATER TOWER, MT MORIAH RESERVOIR, KWAMAKHUTHA RESERVOIR COMPLEX, ROSETTA RESERVOIR AND ASSOCIATED WORKS: WARD 33, 1, 97, 18 & 35**

**SCHEDULE F: MOUNT MORIAH RESERVOIR**

**SUMMARY OF SECTIONS**

<b>SECTION</b>	<b>DESCRIPTION</b>	<b>AMOUNT</b>
26	ACCESS FOR RESERVOIR REHABILITATION	R
27	DEMOLITION AND REMOVAL OF STRUCTURAL CONCRETE AND STEELWORK	R
28	SURFACE AND STRUCTURAL REPAIR OF CONCRETE MEMBERS	R
29	ANCHORING OR REINFORCEMENT, GROUTING AND CRACK INJECTION	R
30	REPAIR AND REPLACEMENT OF ANCILLARY STRUCTURAL ELEMENTS	R
31	PROTECTIVE COATINGS AND TREATMENTS FOR CONCRETE	R
	<b>TOTAL CARRIED FORWARD TO TENDER SUMMARY</b>	<b>R</b>

**CONTRACT No. WS 7230**

**For**

**THE REHABILITATION OF GLENWOOD RESERVOIR, CATO RIDGE RESERVOIR, ILLOVO WATER TOWER, MT MORIAH RESERVOIR, KWAMAKHUTHA RESERVOIR COMPLEX, ROSETTA RESERVOIR AND ASSOCIATED WORKS: WARD 33, 1, 97, 18 & 35**

**SCHEDULE G: KWAMAKHUTHA RESERVOIR COMPLEX**

**SUMMARY OF SECTIONS**

<b>SECTION</b>	<b>DESCRIPTION</b>	<b>AMOUNT</b>
32	SITE CLEARANCE	R
33	EARTHWORKS (PIPE TRENCHES)	R
34	BEDDING (PIPES)	R
35	MEDIUM PRESSURE PIPELINES	R
36	MISCELLANEOUS WORK AND REINSTATEMENT	R
	<b>TOTAL CARRIED FORWARD TO TENDER SUMMARY</b>	<b>R</b>

**CONTRACT No. WS 7230**

**For**

**THE REHABILITATION OF GLENWOOD RESERVOIR, CATO RIDGE RESERVOIR, ILLOVO WATER TOWER, MT MORIAH RESERVOIR, KWAMAKHUTHA RESERVOIR COMPLEX, ROSETTA RESERVOIR AND ASSOCIATED WORKS: WARD 33, 1, 97, 18 & 35**

**SCHEDULE H: ROSETTA RESERVOIR**

**SUMMARY OF SECTIONS**

<b>SECTION</b>	<b>DESCRIPTION</b>	<b>AMOUNT</b>
36	REPAIR AND REPLACEMENT OF ANCILLARY STRUCTURAL ELEMENTS	R
	<b>TOTAL CARRIED FORWARD TO TENDER SUMMARY</b>	<b>R</b>



### TENDER SUMMARY

DESCRIPTION	AMOUNT
Totals of Schedule of Quantities brought forward:	
Schedule A: Preliminary and General	R
Schedule B: Glenwood Reservoir (Compartment 1)	R
Schedule C: Cato Ridge Reservoir (Compartment 1)	R
Schedule D: Cato Ridge Reservoir (Compartment 2)	R
Schedule E: Illovo Water Tower	R
Schedule F: Mt Moriah Reservoir	R
Schedule G: KwaMakhutha Reservoir Complex	R
Schedule H: Rosetta Reservoir	R
<b>SUBTOTAL 1</b>	<b>R</b>
<b><u>Add:</u> Contract Price Adjustment (5% of SUBTOTAL 1)</b>	<b>R</b>
<b>SUBTOTAL 2</b>	<b>R</b>
<b><u>Add:</u> VAT (15% of SUBTOTAL 2)</b>	<b>R</b>
<b>TOTAL CARRIED FORWARD TO FORM OF OFFER</b>	<b>R</b>

Signed on behalf of the Tenderer: ..... (Signature)

Date: .....

Tenderer's Name: ..... (Company Name)

### **PART C3: SCOPE OF WORK**

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### **C3.1: STANDARD SPECIFICATIONS**

The Standard Specifications on which this contract is based are the **South African Bureau of Standards Standardized Specifications for Civil Engineering Construction SABS 1200**, also now referred to as SANS 1200. Although not bound in, nor issued with this document, the following sections of the Standardised Specifications of SANS 1200 shall form part of this Contract:

SABS 1200	A	1986	General
SABS 1200	AA	1986	General (Small Works)
SABS 1200	AB	1986	Engineer's Office
SABS 1200	C	1998	Site Clearance
SABS 1200	DB	1989	Earthworks
SABS 1200	G	1982	Concrete (Structural)
SABS 1200	L	1983	Medium – Pressure Pipelines
SABS 1200	LB	1983	Bedding (Pipes)

The following SANS specifications are also referred to in this document and the Contractor is advised to obtain them from Standards South Africa (a division of SABS) in Pretoria.

SANS 1117:2007	Plastic wrappings for the protection of steel pipelines
SANS 1914:2002	Targeted Construction Procurement. Part 1 – Participation of targeted enterprises
SANS 1914-1 to 6 (2002)	Targeted Construction Procurement
SANS 1921-1:2004	Construction and Management Requirements for Works Contracts Part 1: General Engineering and Construction Works and where accommodation of Traffic is involved.
SANS 1921-2:2004	Construction and Management Requirements for Works Contracts and Part 2: Accommodation of Traffic on Public Roads Occupied by the Contractor.
SANS 1921-3:2004	Construction and Management Requirements for Works Contracts Part 3: Structural Steelwork
SANS 1921-6:2004	Construction and Management Requirements for Works Contracts Part 6: HIV/AIDS Awareness
SANS 10396: 2003	Implementing Preferential Construction Procurement Policies using Targeted Procurement Procedures

In the event of any discrepancy between the Project Specifications and a part or parts of the SANS 1200 Standardised Specifications, the Schedule of Quantities or the Drawings, the Project Specifications shall take precedence and shall govern.

## **C3.2: PROJECT SPECIFICATION**

### **PREAMBLE**

The Project Specifications, consisting of two parts, form an integral part of the Contract and supplement the Standard Specifications.

In the event of any discrepancy between a part or parts of the Standard or Particular Specifications and the Project Specification, the Project Specification shall take precedence. In the event of a discrepancy between the Specifications, (including the Project Specifications) and the drawings and / or the Bill of Quantities, the discrepancy shall be resolved by the Employer's Agent before the execution of the work under the relevant item.

### **A GENERAL**

#### **PS 1 GENERAL DESCRIPTION OF WORKS**

Cato Ridge Reservoir, Glenwood Reservoir, Illovo Water Tower, KwaMakhutha Reservoir, Mount Moriah Reservoir and Rosetta Reservoir are located within eThekweni Municipality and have been identified for rehabilitation. Cato Ridge Reservoir consists of two compartments with the reservoir being majority buried with the top 1m of the walls exposed. Glenwood Reservoir consists of 2 compartments with compartment 1 needing rehabilitation. The reservoir is completely buried. Illovo Water Tower consists of a reinforced concrete rectangular tank supported on 4 braced, reinforced concrete columns. The tower is approximately 20m high. The Mt Moriah 2 is a circular reservoir of  $\Phi 43.57\text{m} \times 8.14\text{m}$  high and is buried. The KwaMakhutha Reservoir is made up of 3 compartments Tank 1 (3.5ML), Tank 2 (3.5ML), Tank 3 (15 ML) and an elevated tank (0.5ML). Rosetta reservoir is a fully buried rectangular reservoir.

The defects identified in **Cato Ridge Reservoir** which need to be repaired include the following:

- Compartment 1:
  - Repair spall on external wall surfaces;
  - Remove corroding reinforcement and patch;
  - Repair cracks in walls;
  - Replace joint sealant in walls and floor;
  - Redo previous repairs;
  - Repair cracking in roof slab;
  - Replace joint sealant used on roof slab;
  - Repair spalling on floor; and
  - Redo repairs on columns.
- Compartment 2:
  - Repair spall on external walls;
  - Repair damaged upstand beam;
  - Redo previous repairs;
  - Remove steel frame, plate and seal hole;
  - Finish off improvised access hatch;
  - Repair cracking in roof and floor slab;
  - Replace joints on roof slab;
  - Repair spall on floor slab; and

- Redo repairs on columns.

The defects identified in **Glenwood Reservoir (Compartment 1)** which need to be repaired include the following:

- Clean the corrosion off the outlet pipe;
- Repair cracks in the roof slab and the construction joints by crack injection;
- Re-screed floor panels affected by delamination;
- Remove and replace old wall joint sealant;
- Remove the roots growing through the walls;
- Remove wall bandages and patch using a cementitious mortar;
- Replace all the floor joint sealant;
- Finish off the improvised access hatch;
- Repair edge spall on the column bases; and
- Remove and replace the existing crack sealant on the walls.

The defects identified in **Illovo Water Tower** which need to be repaired include the following:

- Repair spall on columns, beams and external surfaces of the tank;
- Removal and replacement of corroding reinforcement; and
- Replacement of the external access ladder.

The defects identified in **KwaMakhutha Reservoir** which need to be repaired include the following:

- Removal of existing water mains
- Removal of structures
- Earthworks for pipe trenches
- Pipe bedding and medium pressure pipe mortar lined pipe lines
- $\Phi 300\text{mm}$  roof inlet into the reservoir
- $\Phi 300\text{mm}$  PRV chamber
- Replace palisade fence gate
- Replace kerbs on the reservoir roof

The defects identified in **Mount Moriah Reservoir** which need to be repaired include the following:

- Crack repairs
- Honeycombing repairs
- Spall repairs and additional rebar where necessary
- Curing of the repairs
- Crack injection
- Preparing and sealing of exposed aggregates of surfaces of walls and columns
- Joint filler, sealant and joint sealing bandage.

The defects identified in **Rosetta Reservoir** which need to be repaired include the following:

- Replace joint sealant used on roof slab; and
- Replace floor slab joint sealant.

## **PS 2 DESCRIPTION OF THE SITE AND ACCESS**

The location of the sites is shown in C4.1. The reservoirs are located within the eThekweni Municipality. Glenwood reservoir is located at 29°51'58.53"S and 30°59'10.80"E, Cato Ridge Reservoir is located at 29°42'26.38"S and 30°37'28.71"E and Illovo Water Tower is located at 30°06'52.34"S and 30°50'55.29"E. Access to Cato Ridge reservoir can be gained off Eddie Hagen Drive. Access to the Glenwood Reservoir can be gained off the corner of Bowes Lyon Road and Princess Alice Avenue. Access to Illovo Water Tower can be gained off Saville Lane. Access to Mount Moriah is from Methven RD, Pinetown, 30°53'7.420"E, 29°48'50.37"S. Access to KwaMakhutha is from Gugu Mkhize Dr, 30°50'5.65"E, 30°55'0.85"S. Access to Rosetta Reservoir is from Rosetta Road, 29°49'38.12"E; 31°0'59.99"S.

## **PS 3 NATURE OF GROUND AND SUBSOIL CONDITIONS**

Glenwood Reservoir is located within the Pigeon Valley Nature Reserve. No excavation or removal of vegetation will be permitted.

## **PS 4 DETAILS OF CONTRACT**

### **PS 4.1 MAIN COMPONENTS OF THE WORKS:**

This Contract comprises the rehabilitation of the Cato Ridge Reservoir (Compartment 1 and 2), Glenwood Reservoir (Compartment 1), Illovo Water Tower, Mt Moriah Reservoir, Rosetta Reservoir and KwaMakhutha Reservoir includes the following:

- Erecting scaffolding inside the reservoirs;
- Providing lighting inside the reservoirs;
- Removing sealants/bandages used on previous repairs;
- Repairing spalling, cracking and screed delamination on the floors, walls and roof slab;
- Removing the existing joints and installing a new joint sealant system on the internal joints and the external roof slab joints (on Cato Ridge only);
- Removing the corrosion on the existing outlet pipes and Applying a new protective coating;
- Removal and replacement of corroded reinforcement;
- Sealing or finishing off of all improvised access hatches;
- Demolition and removal of the steel frame and plate used to seal off the 2 compartments from each other in Cato Ridge;
- Compliance with Occupational Health and Safety Regulations and the Environmental Management Plan throughout the construction period; and
- De-establishment after all construction activities.

## **PS 5 CONSTRUCTION PROGRAMME**

The Contractor shall within 14 days of being awarded the contract, provide a detailed programme showing how he proposes to carry out the works and clearly indicating the programme critical path, together with monthly labour and plant requirements, proposed sub-contractors and anticipated expenditure. The programme shall detail separately the various construction activities involved with each of the elements of the contract and shall be subject to the approval of the Engineer or his representative.

During the course of construction the programme shall be monitored weekly and the Contractor shall provide daily records of actual labour and plant returns. Should the Contractor fail to keep to the submitted programme a revised programme accurately reflecting the phasing of the works to completion shall be submitted for the Engineer or his representative's approval. This re-submission shall be carried out promptly on the Engineer or his representative's instruction. The construction programme must take into account the procedures set out under PS 4.1 to ensure that this aspect is programmed accordingly.

In addition to any other restrictions accommodated by the Contractor in compiling the construction programme, the following constraints shall be taken into account in the preparation thereof:

- (1) The whole of the Works (and the portions of the Works if completion in portions is required) shall be completed within the time period(s) stated (refer to the Contract Data in section C1.2.2).
- (2) Working days lost due to abnormal rainfall shall be treated as set out in clause 5.12.2.2 of the Contract Data (C1.2).
- (3) Allowance shall be made for non-working days and special non-working days (refer to the Contract Data in section C1.2.2).
- (4) Construction activities must comply with all the specified environmental requirements including clause A1.2.3.3 and the requirements of the Environmental Management Specification contained in section C3.3 Particular Specifications.
- (5) Construction activities must comply with all the specified health and safety obligations including the requirements the OHSA 1993 Health and Safety Specification contained in section C3.3 Particular Specifications.
- (6) Strict control of access to and from local public roads shall be required when construction vehicles, plant or equipment leave or enter the site.
- (7) The Contractor's programme of work shall take due cognisance of risks by limiting the duration of the exposure of the various construction elements to natural phenomena.
- (8) The concrete mix designs and water quality test results must be submitted to the Engineer or his representative for approval before concrete work commences. The Contractor shall note that the necessary permission must be obtained from the Department of Water Affairs for the abstraction of water from streams and rivers.



## **PS 6 SITE FACILITIES AVAILABLE**

### **PS 6.1 SOURCE OF WATER AND POWER SUPPLY**

Water services may be available in the area and electricity services will not be available in the area. The Contractor is responsible for making all arrangements for the necessary connections to these services should they be available.

Should these services not be available, the Contractor shall make his own arrangements concerning the supply of electrical power and all other services. The cost thereof shall be deemed to be included in the rates and amounts tendered for the various items of work for which these services are required.

### **PS 6.2 LOCATION OF CAMP**

Possible locations for a campsite shall be pointed out at the clarification meeting.

The Contractor shall make his own arrangements for the provision of his campsite and housing for construction personnel but the chosen site shall be subject to the approval of the Engineer or his representative and the local authorities. The standard of the Contractor's camp, offices, accommodation, ablution, and other facilities must comply with the requirements of all local authority, environmental and industrial regulations concerned.

The Contractor is to fully familiarise himself with all local by laws and Government regulations for the employment, transport and accommodation of labour on site. The occupation and use of the land by the Contractor for a site office and storage areas are subject to the following conditions:

- The Employer is indemnified in all respects through the occupation and use of the land and buildings including any claims from third parties.
- The allocated land and buildings is to be used only for site offices and for storage of materials and strictly for work pertaining to this contract.
- The Contractor is fully responsible for any damage caused to the land and buildings, or improvements on it including services and for reinstating it to its former condition when vacated.
- The housing of labour on site is not permitted except for the necessary minimum of security personnel with the necessary ablution facilities being provided to the requirements of the City Medical Officer of Health.
- The land and buildings used for the Contractor's camp shall be cleared and vacated by the Contractor within 14 days of the date of completion of the contract unless written permission from the Engineer is obtained to occupy the site for a longer period.

## **PS 7 SITE FACILITIES REQUIRED**

### **PS 7.1 TEMPORARY OFFICES**

Possible locations for the site offices shall be pointed out at the clarification meeting.

#### **Engineer's Office**

An office is required for the use of the Engineer's representative on site (See Section 1 of the Bill of Quantities).

It will be a requirement of this contract that all work pertaining to the provision of the office of the Engineer's representative shall be completed in full prior to the Contractor being permitted to commence work on site.

#### **Contractor's Office**

The Contractor may erect an office for his own use and any temporary sheds for the workmen or materials as may be necessary. Should the Contractor choose to construct an office or temporary sheds, the construction and location of such offices shall be to the approval of the Engineer or his representative, and they shall be maintained in a satisfactory condition and removed on completion of the contract.

### **PS 7.2 TESTING OF MATERIALS**

#### **Process Control**

The Contractor shall arrange for all tests required for process control to be done by a laboratory acceptable to and approved by the Engineer or his representative. Whatever method is used, the Contractor must submit the results of tests carried out on materials and workmanship when submitting work for acceptance by the Engineer or his representative. The costs for these tests shall be deemed to be included in the relevant rates and no additional payment will be made for testing as required.

#### **Acceptance Control**

The process control test results submitted by the Contractor for approval of materials and workmanship may be used by the Engineer or his representative for acceptance control. However, before accepting any work, the Engineer or his representative may have further control tests carried out by a laboratory of his choice. The cost of such additional tests will be covered by a provisional sum provided in the Bill of quantities, but tests that failed to confirm compliance with the specifications, will be for the account of the Contractor.

A provisional sum has been allowed in Section 1.3 of the Bill of Quantities for all acceptance control testing laboratory work to be carried out by the Engineer using commercial laboratory facilities and for other special tests requested by the engineer. The Contractor shall carry out the required process control testing as specified in terms of the standard specifications SABS standard specifications.

### **PS 7.3      SANITARY FACILITIES**

Water-borne sewerage reticulation is not available to serve this site.

The Contractor shall provide in an approved location, adequate sanitary accommodation for the use of employees engaged in the works. Such conveniences, which shall comply with Municipal regulations, shall be maintained in a clean and hygienic condition and shall be properly secluded from public view and their use shall be strictly enforced. On removal of such conveniences the sites thereof shall be left in a clean, sanitary and tidy condition.

### **PS 7.4      SECURITY**

The Contractor may choose to provide security for all materials, equipment and partially completed works. Should the contractor choose not to provide security, this will be at the contractors own risk. No employees, other than those required for security purposes may be housed on site and the Contractor must make his own arrangements for the housing of staff.

## **PS 8      CONSTRUCTION REQUIREMENTS AND FEATURES REQUIRING SPECIAL ATTENTION**

### **PS 8.1      DEMOLITION WORK**

All demolition works shall be carried out in accordance with the terms specified in the standard specifications and SABS Standard Specifications. All rubble shall be removed from site and disposed of in an environmentally acceptable manner.

### **PS 8.2      EXISTING SERVICES**

The Contractor shall make himself acquainted with the position of all existing services before any excavation or other work likely to affect the existing services is commenced.

The Tenderer's attention is drawn to the numerous existing services in the area. Although every effort has been made to depict these services accurately the positions shown must be regarded as approximate.

The Contractor will be held responsible for any damage to known existing services caused by or arising out of his operations and any damage shall be made good at his own expense. Damage to unknown services shall be repaired as soon as possible and liability shall be determined on site when such damage should occur.

The contractor is responsible for the relocation of services, should relocation be required.

#### **PS 8.2.1      PROVING UNDERGROUND SERVICES**

This clause must be read in conjunction with Clause SABS 1200 DB.5.1.2, the requirements of which shall be extended to cover all earthworks operations whether for trenching or bulk earthworks, in the vicinity of underground services.

It is stressed that all services in a particular area must be proven before commencing work in that area.

Insofar as bulk earthworks are concerned, where services are indicated on the drawings or where from site observations can reasonably be expected that such services are likely to exist where excavations are to take place, the Contractor shall without instructions from the Employer's Agent carefully excavate by hand to expose and prove their positions.

The cost of the proving trenches is to be included in the work covered by Clause SABS 1200DA.8.3.

When a service is not located in its expected position the Contractor shall immediately report such circumstances to the Employer's Agent who will decide what further searching or other necessary action is to be carried out and shall instruct the Contractor accordingly. The cost of this additional searching shall be to the Council's cost and shall be paid for under SABS 1200 DB.8.19 - Proving Existing Services.

Should any service be damaged by the Contractor in carrying out the works and should it be found that the procedure as laid down in this clause has not been followed then all costs in connection with the repair of the service will be to the Contractor's account.

When electrical cables are not in the positions shown on drawings of eThekweni Electricity and cannot be found after proving trenches have been put down, assistance may be obtained by calling an official of the Works Branch on Telephone No. 311-1111 during office hours, or by contacting Control on Telephone No. 305-7171 after hours.

It should be noted that 33,000 Volt and 132,000 Volt cables may only be exposed by the eThekweni Electricity's personnel. The cables are usually protected by concrete covering slabs, and therefore if the slabs are inadvertently exposed, excavation work must stop, and the eThekweni Electricity shall be contacted immediately on the above telephone numbers.

Proving of services shall be completed at least two weeks in advance of the actual programmed date for commencing work in the area. The position of these services located must be co-ordinated and levelled by the Contractor, and the information given in writing to the Employer's Agent's Representative.

The requirements of this clause do not relieve the Contractor of any obligations as detailed in the Conditions of Contract or under Clause 4.17 of SANS 1921-1.

#### **PS 8.2.2 New Services and Relocation of Existing**

New services are either to be installed by the Contractor as part of the contract or by others during the contract period. In the latter case excavation and subsequent backfilling of the trench from the top of the bedding layer shall generally be carried out by the Contractor.

Relocation of services shall generally be carried out by the relevant services organisation. Generally, their work shall include the excavating and bedding the service which will include backfilling to a depth of approximately 300 mm above the service. The remainder of the backfilling shall be carried out by the Contractor.

Generally, work shall only commence on the installation of new services once the bulk earthworks have been completed and roughly trimmed to level along a substantial portion of the services route. In addition, no sidewalk, verge, median or island shall be surfaced or top soiled until all work on the services has been completed.

Services affected by the contract are described as follows:

- PS.4: Watermains;
- PS.6: Stormwater;
- PS.7: Electrical Cables / Lighting;

### **PS 8.3      IN AMPLIFICATION OF CLAUSE 4.12 OF GENERAL CONDITIONS OF CONTRACT 2015**

It shall be noted that the Contractor will be required to strictly observe his obligations regarding adequate full time superintendence of the works, with particular reference to correct steel fixing, properly constructed formwork, placing of concrete, etc. in order to achieve the high standard of workmanship required of him.

The Site Agent may not leave the works whilst work is in progress without the Engineer or his representative's written approval. Adequate facilities for superintendence of his work shall be provided by the Contractor and the Engineer's engineering staff is under no circumstances expected to act in this capacity on his behalf.

### **PS 8.4      ENGINEER'S SUPERVISION AND INSPECTION**

**PS 8.4.1**      The works will be supervised and inspected by the Engineer and / or his authorised representative. Except in cases of emergency, the Engineer's Representative's Agent shall give the Engineer or his representative at least 24 hours' notice if he requires his presence on site to discuss any particular matter or to give any particular approvals which may be required during the course of construction activities.

**PS 8.4.2**      The Contractor shall submit a daily report to the Engineer or his representative showing construction activities and progress, disposition of labour and plant, materials used and delivered to site and weather conditions and effects therefrom on progress. These daily reports shall be in a format approved by the Engineer or his representative.

**PS 8.4.3**      Daily reports shall be submitted to the Engineer or his representative's office on the Monday morning following the week to which they appertain and shall be signed by both the Engineer or his representative and the Engineer's Representative's Agent who may keep duplicate copies if he so wishes.

**PS 8.4.4**      Supervision and inspection by the Engineer or his representative shall in no way relieve the Contractor of his obligation and responsibility for performing the works in accordance with the Contract.

## **PS 8.5 SUBMISSION OF INSURANCES AND SURETIES**

In order that delays in acceptance by the Employer of insurances and sureties required in terms of this document be avoided, the Contractor is advised that the necessary documentation is to be submitted as follows:

Sureties and any bank guarantees to the Tenders Section, 6<sup>th</sup> Floor, Municipal Buildings, 166 K.E. Masinga Road (Formerly Old Fort Road) Durban.

Proof of the Contractor's good standing in terms of the Workman's Compensation Act to the Insurance Section of the City Treasurers Department, 6<sup>th</sup> Floor, Municipal Buildings, 166 K.E. Masinga Road (Formerly Old Fort Road) Durban (for attention Mr. C Mercer).

The complete insurance policy is to be submitted to the Engineer or his representative for approval by an independent insurance consultant appointed by the Employer. Once approved, this document will be forwarded to the Insurance Section of the City Treasurers Department by the Engineer or his representative.

## **PS 8.6 PERSONNEL**

It shall be a requirement of this contract that the assigned staff as per the tender CV's shall be assigned to this contract on a full-time basis, and that no change of assigned staff shall be allowed without prior consent from the Engineer or his representative. The Contractor shall keep unauthorized persons away from the Works at all times. Under no circumstances may the Contractor's personnel be accommodated on the site.

## **PS 8.7 WATERMAINS**

### **PS 8.7.1 General**

Tenderer's attention is drawn to the following points regarding the watermains to be installed as part of this contract.

### **PS 8.7.2 Water Main Valve Access**

Due to the dangerous situation occurring when water main valves are covered over, the Contractor shall maintain access to all water main valves at all times. During asphalt layer work, after each pass by the paving machine, the valves shall be exposed, and access maintained in a safe condition.

Whatever method the Contractor chooses to use for this work, the cost of raising the valves from existing level to ultimate level shall be paid only once, irrespective of the number of times the valve is uncovered. Spacer rings required for the height adjustment of valve covers shall be supplied by the Water and Sanitation Unit. Tolerances on valve cover levels shall be as specified in clause PH.6.5. Before final setting in position of valve covers the Contractor shall liaise with the Employer's Agent regarding the direction in which covers shall be placed.

### **PS 8.7.3    Restriction on Compaction Equipment**

The Contractor is to note that existing watermain traverse the site of the works and special care is to be taken in close proximity to these mains and connections. The existing mains and connections shall be proved on site by the Contractor prior to any construction work commencing in the vicinity of the watermain.

Under no circumstances will heavy road-making equipment, other heavy plant or vibratory compaction equipment be permitted to operate within 800 mm vertically or horizontally of the existing mains or connections. The permissible compaction plant within this restricted area shall be the equivalent of a "Bomag 90" under static compaction, or similar approved plant. When the roadworks are far enough advanced to provide a minimum of 800 mm cover to the existing mains, the above restriction will fall away.

The Contractor is to take cognisance of the above requirements when entering rates in the Bill of Quantities and in the programming of the works. No claim for additional payment based on the inability to use plant as a result of the requirements of this clause will be accepted. The Contractor will be held liable for any costs should the watermain or electrical cables be damaged during construction of the road.

## **PS 8.8    STORMWATER**

### **PS 8.8.1    Blockage Stormwater Sewers**

The Contractor shall be responsible for ensuring that cementitious sludge, sand and rubble from the works do not enter the stormwater reticulation system. The Contractor shall be liable for any costs incurred by the Council or others as a result of blockages in the reticulation system attributed to failure to comply with the above requirement.

## **PS 8.9    ELECTRICAL PLANT**

### **PS 8.9.1    General**

Various types of electrical cables including high voltage, low voltage, street lighting and domestic connection cables are affected by the contract. The laying, relocation and jointing of all cables will be carried out by eThekweni Electricity's work gangs, or agents appointed by them, whilst the excavation and backfilling forms part of this contract. Close liaison will therefore be necessary with eThekweni Electricity throughout the contract.

### **PS 8.9.2    MV / LV Cables**

Certain MV / LV cables are to be replaced within the contract area. The actual cable work associated with this relocation and / or replacement of these cables will be carried out by eThekweni Electricity.

## **PS 9            DRAWINGS**

The reduced drawings that form part of the Tender documents shall be used for Tender purposes only.

The Contractor shall be supplied with three sets only of unreduced A0 drawings. These prints are issued free of charge and the Contractor shall make any additional prints he may require at his own cost.

Any information in the possession of the Contractor which the Engineer or his representative requires to complete the as-built drawings shall be supplied to the Engineer or his representative before a certificate of completion shall be issued.

Only figured dimensions shall be used and drawings shall not be scaled unless so instructed by the Engineer or his representative. The Engineer or his representative shall supply all figures / dimensions omitted from the drawings.

The levels given on the drawings are subject to confirmation on site, and the Contractor shall submit all levels to the Engineer or his representative for confirmation before he commences any structural construction work. The Contractor shall also check all clearances given on the drawings and shall inform the Engineer or his representative of any discrepancies.

Any information in the possession of the Contractor which is necessary for the completion of the "as built" drawings must be submitted to the Engineer or his representative before he will issue a Completion Certificate.

Only figured dimensions shall be used in the execution of the works and drawings are not to be scaled by the Contractor unless so instructed by the Engineer or his representative who shall supply any figured dimensions which may have been omitted from the drawings.

## **PS 10          LABOUR**

The Contractor shall comply with the relevant laws governing the employment of labour. All arrangements affecting his labour force shall be the sole responsibility of the Contractor.

## **PS 11          COMPLIANCE WITH STATUTORY REQUIREMENTS**

The Contractor shall allow for all costs necessary to ensure that all work is undertaken in a safe manner and in compliance with the Occupational Health and Safety Act, Act No. 85 of 1993 and all statutory and local regulations and requirements.

The cost of complying with the requirements of the clause shall be deemed to be included in the rates.



## **PS 12 ATTENDANCE AT SITE MEETINGS**

Site meetings shall be convened as described in clause A1.2.3.14 'Site Meetings' of the 'Standard Specifications'. The Contractor shall keep on site a set of minutes of all site meetings, daily records of resources (people and equipment employed), a site memoranda book, a complete set of contract working drawings and a copy of the procurement document, and shall make these available at all reasonable times to all persons concerned with the contract.

The cost of attending such meetings shall be included in the Tendered Price and instructions given by the Engineer or his representative at such meetings and confirmed in the minutes shall be considered as a written instruction by the Engineer or his representative, as referred to in the General Conditions of Contract. Site Meetings will generally be held monthly.

## **PS 13 FINISHING, TIDYING AND SITE MAINTENANCE**

During the progress of the work and upon its completion, the site of the works shall be kept and left in a clean and orderly condition. The Contractor shall at all times store materials and equipment for which he is responsible in an orderly manner, and shall keep the site free from debris and obstruction.

Progressive and systematic finishing and tidying will form an essential part of this Contract. On no account must spoil, rubble, materials, equipment or unfinished operations be allowed to accumulate in such a manner as to unnecessarily impede the activities of others, and in the event of this occurring, the Employer shall have the right to withhold payment for as long as may be necessary in respect of the relevant Works in the area(s) concerned without thereby prejudicing the rights of others to institute claims against the Contractor on the ground of unnecessary obstruction.

Finishing and tidying must not be deferred to the end of the Contract. The works will not be certified as practically complete, until the whole of the works including all finishing and tidying, has been fully completed to the satisfaction of the Engineer or his representative. All finishing and tidying shall be carried out to the best advantage of the project as a whole and in the closest co-operation with other Contractors.

## **PS 14 EXTENSION OF TIME ARISING FROM ABNORMAL RAINFALL**

The numbers of days per month, on which work is expected not to be possible as a result of rainfall, for which the Contractor shall make provision, is set out in clause 5.12.2.2 of the Contract Data (C1.2).

Only external works will be affected by rainfall.

## **PS 15 CERTIFICATES OF PAYMENT**

The statement to be submitted by the Contractor in terms of the General Conditions of Contract shall be prepared in accordance with the standard payment certificate prescribed by the Engineer and shall consist of at least three sets of A4 - sized paper copies. Payment Certificates shall be submitted to the Engineer or his representative for approval by the 20<sup>th</sup> of each month. Details of measurements, proof of payment for items contained in provisional sums, proof of ownership of materials on site and documentation pertaining to contract price adjustment and special materials, are required as substantiation of claims for payment.

The Contractor's submission is to include all required backup documentation to substantiate his Targeted Procurement goals. All costs resulting from the preparation and submission of the statements shall be borne by the Contractor.

## **PS 16 CONSTRUCTION IN LIMITED AREAS**

It may be necessary for the Contractor to work within confined areas. Except where provided for in the specifications, no additional payment shall be made for work done in restricted areas. The method of construction in these confined areas largely depends on the Contractor's constructional plant. However, the Contractor shall note that, unless otherwise provided for in terms of the scheduled payment items in the Standard Specifications, measurement and payment shall be in accordance with the specified cross sections and dimensions only, irrespective of the method used for achieving these cross sections and dimensions, and that the tendered rates and amounts shall include full compensation for all special equipment and construction methods and for all difficulties encountered when working in confined areas and narrow widths, and at or around obstructions, and that no extra payment shall be made nor shall any claim for additional payment be considered in such cases.

The contractor shall ensure that all plant and equipment used for construction will be able to fit through the access hatches into the reservoir. These hatches are approximately 1000 mm x 1000 mm in size. The cost of all equipment used to lower the plant/materials into the reservoir shall be included in the tendered rates.

## **PS 17 SPOIL MATERIAL**

No indiscriminate spoiling of material will be allowed. All surplus or unsuitable material shall be disposed of in an environmentally friendly manner.

## **PS 18 APPLICABLE STANDARDIZED SPECIFICATIONS**

For the purposes of this Contract the applicable standardized specifications in C3.1 shall be deemed to form part of the Contract Document. The following SANS specifications are also referred to in this document and the Contractor is advised to obtain them from Standards South Africa (a division of SABS) in Pretoria:

SANS 10396: 2003: Implementing Preferential Construction Procurement Policies using Targeted Procurement Procedures;

SANS 1914-1 to 6 (2002): Targeted Construction Procurement;

SANS 1921 – 1 (2004): Construction and Management Requirements for Works Contracts

Part 1: General Engineering and Construction Works and where accommodation of traffic is involved: SANS 1921-2 (2004): Construction and Management Requirements for Works Contracts; and Part 2: Accommodation of Traffic on Public Roads Occupied by the

Contractor.

## **PS 20 SITE FACILITIES REQUIRED**

### **PS 20.1 LABORATORY AND TESTING OF MATERIALS**

The Contractor shall arrange for all tests required for process control to be done by a laboratory acceptable to and approved by the Employer's Representative.

The Contractor must submit the results of tests carried out on materials and workmanship when submitting work for acceptance by the Employer's Representative. The costs for these tests shall be deemed to be included in the relevant rates and no additional payment will be made for testing as required.

The tests required by the specifications which are to be carried out by the Employer's Representative will be conducted as expeditiously as possible, and the Employer shall not be liable for damages caused by any delays resulting from such tests.

The cost of carrying out these tests will be borne by the Employer, provided that the results are satisfactory, but the Contractor will be required to bear the costs of any tests which indicate a failure to comply with the requirements of this specification.

In addition, the Contractor shall supply, free of charge, quantities of all materials which are truly representative of the materials to be used in the works for testing when required to do so by the Employer's Representative. Each sample shall be labelled, stating the sources of supply and the purpose for which it will be used. The Employer's Representative may, from time to time, instruct the Contractor to supply a further sample or samples to ensure that the quality of materials supplied remains up to standard.

## **PS 21 CONSTRUCTION REQUIREMENTS AND FEATURES REQUIRING SPECIAL ATTENTION**

### **PS 21.1 PROTECTION OF EXISTING SERVICES**

Work is to take place alongside existing high pressure water pipelines, which is of regional strategic importance and must therefore remain in service at all times during the construction of this project.

Unless otherwise instructed by the Employer's Representative, no services shall be left exposed after its exact location has been determined and all excavations carried out for the purpose of exposing underground services shall be promptly backfilled and compacted. Services left exposed shall be suitably protected from damage and in such a manner as will eliminate any danger arising there from to the public and/or workmen.

Should damage occur to any existing services, the Contractor shall immediately inform the Employer's Representative, 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 and electrical powerlines and cables shall be attempted by the Contractor.

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<b>PS 22</b>	<b>ADDITIONAL CONSTRUCTION REQUIREMENTS REQUIRING ATTENTION</b>
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<b>PS 22.1</b>	<b>FINISHING, TIDYING AND SITE MAINTENANCE</b>
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During the progress of the work and upon its completion, the site of the works shall be kept and left in a clean and orderly condition. The Contractor shall at all times store materials and equipment for which he is responsible in an orderly manner, and shall keep the site free from debris and obstruction.

Progressive and systematic finishing and tidying will form an essential part of this Contract. On no account, must spoil, rubble, materials, equipment or unfinished operations be allowed to accumulate in such a manner as to unnecessarily impede the activities of others, and in the event of this occurring, the Employer shall have the right to withhold payment for as long as may be necessary in respect of the relevant Works in the area(s) concerned without thereby prejudicing the rights of others to institute claims against the Contractor on the ground of unnecessary obstruction.

Finishing and tidying must not be deferred to the end of the Contract. The works will not be certified as practically complete, until the whole of the works including all finishing and tidying, has been fully completed to the satisfaction of the Employer's Representative.

All finishing and tidying shall be carried out to the best advantage of the project as a whole and in the closest co-operation with other Contractors.

<b>PS 22.2</b>	<b>SPOIL MATERIAL</b>
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No indiscriminate spoiling of material will be allowed. All surplus or unsuitable material shall be disposed of in an environmentally friendly manner.

<b>PS 22.3</b>	<b>LEAVING EQUIPMENT INSIDE THE RESERVOIR</b>
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Should the Contractor leave plant/equipment and materials inside the reservoir, it shall be at the Contractor's risk. The reservoirs will be emptied, and the pumps turned off, but, in the event that the pumps are turned back on, the employer shall not be held liable for any damages or loss or equipment and or materials.

## **PS 23      METHOD STATEMENTS**

The Contractor shall furnish the Employer's Representative with a method statement for all construction activities and in particular, but not limited, method of repair of external coatings, method of repair of internal epoxy lining, method of repair of spall, method of repair of cracking, method of repair of screed delamination, method of repair of improvised access hatches and method of sealing opening in wall of compartment.

Method statements shall be submitted to the Employer's Representative with the programme for construction. Method statements shall be in sufficient detail for the Employer's Representative to determine their practicality and suitability and as a minimum shall include details of construction methods, work methods, plant and equipment particulars including details of critical standby equipment.

Method statements shall refer to Quality Control plans in order to assess suitability of same for the execution of the works in terms of the set Quality Control standards.

Method statements shall be cross referenced to the relevant Quality Control documentation and upon evaluation of the programme for construction, the method statements and quality Control documentation shall support the programme in order for the Employer's Representative to realistically evaluate the programme.

The Contractor is to provide EWS operations and the Employer's Representative a method statement and risk assessment per reservoir shutdown and meter installation, this is to be provided to EWS Operations with a minimum 14 day notice period.

## **PS 24      CIVILS DRAWINGS**

Refer to section C4.4 for the Drawings.

Only figured dimensions shall be used in the execution of the works and drawings are not to be scaled by the Contractor unless so instructed by the Employer's Representative who shall supply any figured dimensions which may have been omitted from the drawings.

It is the Contractors responsibility to clarify any drawings and dimensions should they not be shown.

## **PS 25      RECORD DRAWINGS AND AS-BUILT DATA**

Any information in the possession of the Contractor which is necessary for the completion of the "as built" drawings must be submitted and approved by the Employer's Representative before he will issue a Completion Certificate.

## **PS 26      STORAGE AREAS**

The Contractor shall store all items so that no damage occurs whilst awaiting installation and shall provide safe and secure storage facility. The storage facility location will be determined by the Contractor and approved by the engineer. The Contractor shall take full responsibility for the safety and security of equipment and materials.

**PS.27**

**SITE SECURITY**

The Contractor shall, for the duration of the contract, provide sufficient security and watchmen to adequately ensure the safety and protection of the works, the Contractor's staff, including local labour and subcontractors, and all site plant and construction equipment required for the works.

Site Security, in conjunction with the SAPS (where necessary), shall be responsible for removal of disruptive elements, that may interrupt the progress of the contract through acts such as, but not limited to, intimidation, threats of disruption, violent disruption, or criminal and illegal activity by the local community or independent organisations or entities that may result in slowing down or partial or total stoppage of the works.

Payment for this item is inclusive under Preliminary and General in the BOQ.

## **B: AMENDMENTS TO THE STANDARD SPECIFICATIONS**

### **PROJECT SPECIFICATIONS RELATING TO THE STANDARD SPECIFICATIONS AND OTHER ADDITIONAL SPECIFICATIONS**

In certain clauses in the Standard Specifications and the South African Bureau of Standards Standardized Specifications for Civil Engineering Construction (SABS 1200), allowance is made for a choice to be specified in the Project Specifications between alternative materials or methods of construction, and for additional requirements to be specified to suit a particular contract. Details of such alternatives or additional requirements applicable to this Contract are contained in this part of the Project Specifications. It also contains the necessary additional specifications required for this Contract.

New clauses and payment items not covered by clauses or items in the South African Bureau of Standards Standardized Specifications for Civil Engineering Construction (SABS 1200) has been included here.

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

- PS A            GENERAL (SABS 1200 A- 1986)
- PSAB          ENGINEERS OFFICE (SABS 1200AB – 1986)
- PS C            SITE CLEARANCE (SABS 1200 C- 1998)
- PS DB          EARTHWORKS (PIPE TRENCHES) (SABS 1200 DB- 1989)
- PSG            CONCRETE (STRUCTURAL) (SANS 1200 G-1982)
- PS L            MEDIUM – PRESSURE PIPELINES (SABS 1200 L- 1983)

## **PSA        GENERAL (SABS 1200 A – 1986)**

### **PSA 3        MATERIALS**

#### **PSA 3.1     Quality**

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

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

#### **PSA 3.3     Applicable Standards for Cement**

The standard cement specifications SABS 471, SABS 626, SABS 831 and SABS 1466 have been withdrawn and are replaced by the new SANS 50197-1 and -2: Common cements, and SANS 50413-1 and -2: Masonry Cement. These specifications will be applicable to this contract, and the descriptions and types of cements specified, will be based on the designations as defined in these specifications.

#### **PSA 3.4     Ordering of Material**

The quantities set out in the Schedule of Quantities have been carefully determined from calculations based on data available at the time and should therefore be considered to be only approximate quantities. The Contractor shall, before ordering materials of any kind, check with the Engineer or his representative whether or not the scope of work for which the materials are required is likely to change substantially. No liability or responsibility whatsoever shall be attached to the Employer for materials ordered by the Contractor except when ordered in accordance with the confirmation issued by the Engineer or his representative in writing.

### **PSA 4        PLANT**

#### **PSA 4.2     Contractor's Office Stores and Services**

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

##### **PSA 4.2.1   Site Diary**

The site diary, in triplicate format, which will be supplied by the Contractor, must be filled in on a daily basis and submitted to the Engineer or his representative on a daily basis. No claims will be considered without the site diary's schedules properly completed and submitted.

### **PSA 5        CONSTRUCTION**

#### **PSA 5.1     Survey**

##### **PSA 5.1.1   Setting out of the Works**

**Add the following:**

The Contractor will be responsible for the setting out of the works from the survey control provided by the Employer. It is the Contractor's responsibility to confirm the accuracy of the control prior to setting of the works.



### **PSA 5.1.3 As-Built Data**

#### ***Add the following new Sub-clause:***

The Contractor shall submit the following “As-Built” data to the Engineer or his representative to enable the Engineer to complete the required record drawings before a Certificate of Completion will be issued:-

- (a) x, y, and z co-ordinates of every pipe joint. Note; each joint to be named after two adjacent pipes forming the joint.
- (b) x, y and z co-ordinates of all scour valves, scour pipes and air valves.

The Contractor is required to tabulate this information in an electronic format that can be accessed on Microsoft Excel 2007 or higher. Authorisation by the Engineer or his representative for the payment of the Certificate of Completion shall be withheld until all the above mentioned As-Built information has been provided to his satisfaction.

### **PSA 5.8 Ground Access to Works**

- ***Add the following:***

Where necessary the Contractor will make provision for temporary gates, ramps and roads to obtain access to the site. Where it involves these activities the Contractor will obtain the necessary approvals from the landowners to do so.

On completion of operations the Contractor shall restore the ground surface, wherever it may have been disturbed, to its original condition by filling in ruts with material similar to the material within the rut and levelling the ground and, where necessary, planting grass and shrubs as may be required. Any boundary fence which have been removed or damaged by these operations and activities shall be repaired and/or replaced at the Contractor's expense.

## **PSA 8 MEASUREMENT AND PAYMENT**

### ***PSA 8.2.2 Time Related Items***

#### **Add the following:**

An extension of time granted will not necessarily or automatically entitle the Contractor to additional payments of time related items. Additional payments for specific time related items after the granting of an extension of time must be motivated and substantiated by the Contractor and shall be subject to approval by the Engineer.

### **PSA 8.5.2 Additional Earthworks and Density Testing.....Unit: Provisional Sum**

The provisional sum provided for additional authority tests shall cover the cost of acceptance control tests, carried out by a commercial laboratory, specifically ordered by the Engineer.

The Contractor will still be required to carry out his own process control testing.

### **PSA 8.7 Dayworks**

Dayworks are covered in a separate particular Specification and are therefore measured in that section.

**PSAB ENGINEERS OFFICE (SABS 1200AB – 1986)**

**PSAB 3 MATERIALS**

**PSAB 3.1 Name Boards**

Replace Clause 3.1 with:

A notice board as detailed in Section C4: Site Information is to be erected to the satisfaction of the Engineer or his representative.

**PSAB 3.2 Office Buildings**

Add the following:

In addition the offices shall be fitted with:

- a) a correctly sized air conditioning unit
- b) an approved stand and holders for 10 vertically-hung AO drawings
- c) an approved colour printer and scanner to print A3 documents

In addition to the above comfortable, air-conditioned accommodation shall be made available for holding regular site meetings. This accommodation must comfortably cater for up to 10 persons seated around a table.

**PSAB 5 CONSTRUCTION**

**PSAB 5.4 Telephones**

The terms of sub-clause 8.2 of SABS 1200AA shall apply.

Add to the Sub Clause:

The Tender is to include, under the Time-Related Charges, a sum of R1000.00 per month for a period of time equal to the Time of Completion of the Contract to cover the cost of the Engineer's and assistants telephone calls and other costs relating to the provision of a cellular telephone for the exclusive use by the Engineer or his representative.

A wireless internet service is also required for the duration of the contract.

**PSAB 5.5 Survey Assistants and Equipment**

This item is not required.

## **PSC SITE CLEARANCE (SABS 1200C – 1998)**

### **PSC 3 MATERIALS**

#### **PSC 3.1 Disposal of Materials**

- ***Replace the first paragraph with the following:***

“All materials, other than that suitable for re-use in the Works, shall be disposed of at an approved tip. No burning of vegetation will be permitted.

#### ***Add the following:***

The freehaul distance for this contract is unlimited. Contractors are to note that **no** overhaul will be paid.

The site is situated in a residential area and the Contractor shall ensure that all road are to be kept clean, free of debris and residents are have access to their properties at all times for the duration of the contract.

## **PSC -5 CONSTRUCTION**

### **PSC 5.3 Clearing**

- ***Add the following new Sub-clauses:***

#### **PSC 5.3.1 Sub-Clause 5.3.1**

Where the pipeline route crosses an existing fence, a section of the fencing not exceeding 10.0m in length may be removed temporarily during construction and thereafter reinstated to a condition not worse than the original as soon as the pipeline has been installed and backfilled in the immediate vicinity of the crossing. For the period while the existing fence is dismantled, the Contractor shall erect, at the end of each day's operations, a temporary fence to close the gap in the existing fence.

## **PSC 8 MEASUREMENT AND PAYMENT**

### **PSC 8.2 Scheduled Items**

#### **PSC 8.2.1 Clear and Grub**

- ***Replace the first line with the following:***

“The area designated by the Engineer to be cleared and grubbed will be measured in meters or to the nearest metre.”

#### **PSC 8.2.10 Topsoil**

- ***Add to the Sub-Clause:***

“The topsoil, where approved by the Engineer, shall be conserved for later use by stockpiling clear of the working area,”

#### **PSC 8.2.11 Fences**

- ***Add the following new Sub-Clause:***

Separate payment will be made for dealing with fences in the manner specified in PSC 5.3.1 above as scheduled.

**PSDB EARTHWORKS (PIPE TRENCHES) (SABS 1200 D-1989)**

**PSDB EARTHWORKS (Pipe Trenches)**

**PSDB 3 MATERIALS**

**PSDB 3.5(c) Cement Stabilised Backfill**

- **Add the following new sub-clause:**

“Where scheduled or directed by the Engineer or his representative, backfill shall be stabilised with 5% cement by mass. The backfill material shall have a plasticity index not exceeding 10 and all material must pass through a sieve of aperture size not exceeding that specified in SANS 1200 LB, subclause 3.2.

The dry materials shall first be mixed in a cement mixer; where after sufficient water shall be added to produce the stiffest consistency available for placing and compacting with vibrators.

**PSDB 3.7 SELECTION**

- **Add the following to the clause:**

Contractors are advised that the stockpiling of stock piling of excavated material suitable for use as backfilling alongside trench excavations is strictly prohibited. Once excavated this material is to be removed and stockpiled in a suitable area as agreed with by the Engineer or his representative. All other excavated material unsuitable for re-use, either as backfill or for the formation of embankments shall be disposed of at the spoil site. No overhaul will be paid.

**PSDB 5 CONSTRUCTION**

**PSDB-5.1 Precautions**

**PSDB 5.1.4 Existing Services that intersect or Adjoin Trenches**

- **Add the following to the clause:**

In all cases where underground power or telephone cables, watermain or other services are shown on the drawings, either crossing or adjacent to the pipe, or where from site observations it can reasonably be accepted that such services are likely to exist where excavations are to take place, the Contractor shall, without instructions from the Engineer or his representative, carefully excavate by hand, to expose and prove position of such prior to the commencement of the main trenching operations in the area. The cost of this pilot trenching shall be included under payment clause D 8.3.8 – Excavation and Backfilling in All Materials. However, here any buried service is not located by the excavation of pilot trenches in the expected position the Contractor shall immediately report such a circumstance to the Engineer who will decide what further searching or other necessary action is to be carried out and instruct the Contractor accordingly. The cost of this additional searching shall be to the Employer's cost and will be paid for under item D 8.3.8- Proving Existing Services.

Should any service be damaged by the Contractor in carrying out the works and should it be found that the procedure laid down in this clause has not been followed then all costs in connection with the repair of the service will be to the Contractor's account.

The trench width required for proving of services need only be of sufficient width to enable the service to be exposed.

### **PSDB-5.1.5 Trench Excavations**

- **Add the following additional sub clause:**

"The precautions for excavations as specified in Clause 5.1.1 of SANS 1200 D, 1200 DA, shall also apply to all trench excavations.

The Contractor shall take all the steps necessary to ensure that no person is required or allowed to work in a trench or any other unsupported overhanging excavation which is more than 1,5 m deep, and any excavation which has not been adequately supported, shored or braced if there is any danger whatsoever of the sides of the excavation collapsing. The support, shoring or bracing to be designed and constructed by the Contractor, shall be strong and sturdy enough to support the sides of the excavation in question."

### **PSDB 5.4 Excavation**

- **Add the following to the clause**

#### **General**

- Excavation shall be undertaken in whatever material is encountered and to such levels and widths as are indicated on the drawings, in the specification and as instructed by the Engineer. Trench excavation shall be undertaken in narrow trenching conditions with vertical sides necessitating the use of shoring and open battered trench excavation will not be permitted unless otherwise stated in Project Specification.
- Control of the dimensions of the excavations shall be by means of boning rods and sight rails, an acceptable base beam device or other approved method. If the first method is used the Contractor shall erect sight rails over the centre of each horizontal or vertical bend and along the length of the excavation with a maximum distance of 30m apart and with a minimum number of 3 for any one length of excavation being undertaken. The centre line of the pipeline shall be denoted on each sight rail both back and front by a single vertical line and either side of the centre line painted with contrasting colours.
- The Contractor shall place a reference peg alongside each sight rail, take the levels and give their values to the Engineer or his representative.
- Unless otherwise approved by the Engineer or his representative the excavation of trenches shall commence from the lower reaches of the trench system and proceed uphill. The total length of open trench in advance of the backfilled trench shall be restricted to a maximum of 200m.
- Should the Contractor excavate to a greater depth than specified he shall, at his own expense, replace the excess material so removed with selected fill compacted to 93% Mod. AASHTO density, or grade 10/26 concrete if the use of selected fill is not practical.
- Where site conditions permit, all materials excavated and required for backfilling shall be removed and neatly stacked where possible along the higher side of the trench, care being taken to restrict the area so occupied so as to cause the minimum of obstruction. Care shall be taken to protect existing structures such as walls, fences, gateways and also hedges, trees, gardens, etc., from damage by material so stacked.

### **PSDB 5.5 Trench bottom**

- **Add the following to the subclause:**

For welded steel pipes, the trench shall be widened and deepened over a suitable length at the joints to provide a minimum clearance of 500mm on each side of and beneath the pipe to allow working space for the jointing. The trench will also be widened and deepened over a suitable length at all air valve and scour valve installations to cater for the chamber. This additional excavation is to be included in the tendered rates.

In waterlogged conditions and/or where so instructed by the Engineer, a 150mm thick layer of imported single sized stone (19mm size unless otherwise instructed by the Engineer or his representative) with a geo- textile

fabric filter surround ("Bidim" Grade A4 or similar approved) shall be constructed under the bedding layer specified for the pipes.

#### **PSDB 5.6.3 Disposal of soft material**

#### **PSDB 5.6.3 Disposal of Soft Excavation Material**

▪ ***Add the following to the sub-clause:***

Material which the Engineer considers to be unsuitable for the bottom of the trench shall be excavated to depths as instructed and disposed of as surplus material. Surplus and/or unsuitable excavated material must be disposed of at the closest municipal dumpsite. The resultant space shall be refilled, as ordered, with approved material and compacted to a 93% Mod. AASHTO density.

#### **PSDB-5.6.4 Disposal of intermediate and hard rock material**

Surplus and/or unsuitable excavated material must be disposed of at the closest municipal dumpsite.

#### **PSDB-5.6.8 Transport for Earthworks for Trenches**

For this Contract all haul will be regarded as free-haul and the cost of transportation of all materials will be deemed to be included in the rates and prices tendered in the schedule of quantities.

No overhaul will be payable on this Contract.

#### **PSDB 5.7 Compaction**

***Add the following to DB 5.7:***

The unit rate for excavation and backfilling in all materials shall include for compacting backfill to 93% Mod. AASHTO density. Each trench shall be backfilled in layers not exceeding 300mm in thickness.

#### **PSDB 5.7.3**

***Add the following additional sub-clause***

Should any subsidence take place in any trench after filling and should the Contractor fail to attend to such settlement within 4 hours of being instructed to do so by the Engineer or his representative, then the Employer may take whatever steps are necessary such as erection of barricades, importing fill material, etc., at the Contractor's expense and without relieving him of any of his responsibilities under this contract.

#### **PSDB 7.1 TESTING**

Notwithstanding the contents of Clause 7.1, the Contractor shall bear the cost of all quality control tests regardless of whether the tests indicate acceptable compaction or not.

The following are the minimum frequencies for the process control tests to be executed by the CONTRACTOR at his own expense:

- Pipe bedding: one density test on each 25 m of pipe trench.
- Normal trench backfilling: one density test on every second layer for every 25 m of pipe trench.
- Backfilling in areas subject to vehicle loads: one test on each layer of 100 mm at each road crossing.

The positions of this minimum number of density tests shall be determined randomly by the Contractor and shall be clearly documented with the results. The results of the tests shall be submitted to the Engineer or his representative and shall prove to the Engineer that the work as a whole was done satisfactorily.

The Engineer could order additional tests, over and above the minimum tests. Payment for these tests will be made under Item 1.3.3 if the tests indicate that the density is as specified. If any tests fail, the cost of such

tests shall be for the account of the Contractor.

## **PSDB-8 MEASUREMENT AND PAYMENT**

### **PSDB-8.1 Basic Principles**

Disposal of surplus and/or unsuitable material will be as specified in PSDB-5.6.3 and PSDB-5.6.4. No additional payment other than the tendered scheduled rates will be made for such disposal of material.

### **PSDB-8.3 Scheduled Items**

#### **PSDB-8.3.3 Excavation Ancillaries**

#### **PSDB-8.3.5 b) Services that adjoin a trench**

- ***Add the following:***

“All existing pipelines that trenches are to be excavated above shall be regarded as a service that adjoins the trench.”

#### **PSDB-8.3.6 Finishing**

- ***Add the following additional subclause :***

“PSDB-8.3.6.2 Grassing ..... Unit: m<sup>2</sup>

Approved grass shall be planted after top-soiling has been completed. The work in grass planting shall be measured in square metres (m<sup>2</sup>) of area effectively covered with a satisfactory cover of living grass. A satisfactory cover of grass is defined as a cover of living grass in which no bare patches exist.

The rate shall cover the supply of the topsoil, grass and fertilizer, the preparation, application of fertilizer, planting and for the maintenance of the planted area (including cutting of grass) The planted area shall be neatly trimmed. Fertilized and watered and the Contractor shall ensure that the planted areas are not allowed to dry out. The Contractor shall, at his expense, replace any grass that fails to grow with fresh grass, until satisfactory cover is obtained. The rate shall include for supplying, planting and maintaining the grass, all in accordance with this specification.”

**PSG CONCRETE (STRUCTURAL) (SANS 1200 G-1982)**

**PSG 3 MATERIALS**

**PSG 3.2 Cement**

**PSG 3.2.1 Applicable Specifications**

Add the following:

The minimum content of cementitious material shall be not less than 325kg and not more than 400kg per cubic metre of concrete for ordinary Portland Cement.

The type of cement to be used in any concrete element shall take into account the environmental conditions and durability requirements at the location of the site of the works, and shall be approved by the engineer.

**PSG 3.2.3. Storage of Cement**

No cement shall be stored on the site for a longer period than 28 days. After this period the engineer may call for tests to be carried out in accordance with SANS 50197-1 and 2 and if the cement complies it may be used. Lumpy cement, broken pockets and sweepings shall not be used. The cement sacks shall be closely stocked, not more than 12 sacks high, and shall not be stacked against the walls. The arrangements of stacking shall be such as to facilitate the cement being used in the same order in which it is received.

**PSG 3.3 Water**

Add the following:

Water shall be obtained from the city water supply where possible and shall be taken from any other source only on the approval of the engineer or his representative. Where there is reason to suspect the presence of harmful impurities, the engineer may require the contractor to submit the results of approved tests.

Water for curing of concrete shall not contain impurities in sufficient amount to cause discoloration of the concrete or produce etching of the surface.

No sea water or water containing slats shall be used.

No water shall be added on site to ready mix concrete prior to placing to improve workability. All concrete delivered to site shall be checked for workability using the slump cone test and slump measured outside of the limit set from the design mix shall be rejected.



## **PSG 5 CONSTRUCTION**

### **PSG 5.2.1 Classification of Finishes**

#### **Classification**

Surface finishes to exposed (non-formed) concrete faces shall be classified as hereunder –

Class 3 – wood float finish

Class 4 – steel trowel finish

#### **Class 3 – Wood Float Finish**

Immediately after placing, the concrete shall be screeded as in Class 1. Thereafter, when the concrete has begun to dry, the surface shall be brought to a smooth and even finish using a wood float and including any additional 4:1 sand and cement as necessary.

#### **Class 4 – Steel Float Finish**

Immediately after placing, the concrete shall be screeded as in Class 1. Thereafter, when the concrete has begun to dry, the surface shall be brought to a smooth and even finish using a steel float and including any additional 4:1 sand and cement as necessary.

### **PSG 5.5 Concrete**

#### **PSG 5.5.1 Quality**

##### **PSG 5.5.1.1 General**

Add to G 5.5.1.1

The concrete shall also comply with the requirements for Durability stated in P.S.G 7.3.8

##### **PSG 5.5.1.4 Chloride Content**

Replace the entire contents of the clause with:

The chloride content, measured as  $\text{Cl}^-$  of all concrete in the structure as measured by BS 1881:124:1988 shall not exceed 0.2% mass cement.

The maximum chloride content of fine aggregate shall be 0.2 % by mass as  $\text{Cl}^-$  as measured by SANS Method 830:1976.

#### **PSG 5.5.1.7 Strength Concrete**

Add to G 5.5.1.7

The cubes from the trial concrete mix are to be tested at a nominated concrete design laboratory, and only the results of these tests will be considered for approval.

The minimum content of combined cementitious material shall not be less than 325kg/m<sup>3</sup> and the maximum water/cement ratio shall be 0,5. The Contractor shall also submit for approval the proposed slumps and the proportions in which he proposes to use the materials for each grade of concrete in each type of construction.

In addition he shall state the minimum cement / water ratio in terms of total water in the mix for each grade of concrete, and the use of any admixtures.

No structural concrete shall be placed on the job until the contractor has satisfied the engineer as to the suitability of the mixes concerned.

The Contractor shall be deemed to have satisfied himself, before tendering, of his ability to produce concrete of the required quality with available materials conforming to the specification.

#### **PSG 5.5.1.8 Water**

Replace entire contents with the following:

Dependable equipment shall be provided for measuring the mixing water either by mass or by volume to an accuracy within 3 per cent.

The accuracy of the measuring device provided shall be checked whenever required by the engineer or his representative by allowing it to discharge into vessels of accurately known capacity.

The total quantity of water allowed for shall include the free water present in the aggregates. The moisture content of the fine aggregate shall be determined at the beginning and half way through each concreting shift, after showers of rain or at such other intervals as may be required by the engineer.

#### **PSG 5.5.1.9 Aggregates**

Replace entire contents with the following:

Each size of aggregate shall be measured separately by weighing to an accuracy of 2% except where other methods are authorised or ordered by the engineer or his representative.

Where suitable volumetric methods of measuring proportions of aggregates are permitted, these shall be checked at regular intervals, and shall take full account of bulking of the fine aggregate as delivered to the mixer. These methods shall be designed in such a manner that the consistency of the mix shall be as readily controlled as for mechanical batching.

All measuring devices shall be maintained in good order and condition, and no build-up of material on any part of the equipment shall be permitted.

## **PSG 5.5.2     Mixing**

### **PSG 5.5.3.1   Mixing at Construction Site.**

Add the following:

Mixing shall continue until there is a uniform distribution of the materials and the mixture is uniform in colour. The minimum period of mixing shall be not less than that recommended by the manufacturers at the recommended speed and not more than 30 minutes. The entire contents of the mixer shall be removed from the drum before the materials for the succeeding batch are loaded.

Where hand mixing is permitted, the quantities of cement used shall be increased by not less than 10% over those determined for the appropriate mix design. The concrete shall be mixed on a clean and watertight platform.

## **PSG 5.5.4     Placing**

Add the following:

Where plums are permitted they shall be deposited by hand.

Freshly placed concrete shall be protected from rain damage.

No concrete shall be placed if the air temperature in the shade is falling and is below 8°C or is rising and is below 5°C. Concreting shall not commence if the air temperature in the shade is above 35°C. The temperature of the concrete at the point of placing shall not exceed 30°C unless otherwise specified.

## **PSG 5.5.8     Curing and Protection**

Replace entire contents of G 5.5.8e with:

Covering with an inner hessian membrane and an outer plastic membrane. The hessian membrane is to be kept continuously damp by an independent automatic sprinkler system. The hessian and plastic membranes are to be firmly secured and kept flush to the concrete surface at all times.

Add the following:

(f) retaining forms in place

(g) steam curing may be used on approval as specified by the engineer, provided that the rate of increase in temperature does not exceed more than 20°C per hour. Steam curing at higher than atmospheric pressure shall not be permitted if the concrete contains limestone aggregate. Humidity shall be kept between 90% and 100%.

(h) the use of curing compounds will not be permitted

Delete the last two sentences of G 5.5.8 and replace with:

The minimum period of curing various types of cement shall be as follows from the date and time of casting:

- |                                |   |                     |
|--------------------------------|---|---------------------|
| (a) CEM I                      | - | 7 days (168 hours)  |
| (b) CEM II (max. 29% extender) | - | 8 days (192 hours)  |
| (c) CEM II (30-35% extender);  | - | 10 days (240 hours) |

During periods of extreme temperatures, these periods may be increased at the discretion of the Engineer. The temperature of concrete shall be retained above 5°C for a period of 3 days after placement. Should the environment in which the concrete is placed be such that temperatures drop below 5°C in the concrete, then use shall be made of insulated formwork to retain the heat generated by cement hydration within the concrete.

Curing methods to be utilised for water retaining structures

Concrete Element	Curing Method
Reservoir water tank floor slab (including screed)	G 5.5.8, (a), (b) or (d)
Reservoir water tank walls	G 5.5.8. (e)*
Top surface reservoir roof slab	G 5.5.8 (d)
Soffit of the reservoir roof slab	G 5.5.8 (f)
Reservoir internal columns	G 5.5.8 (e)*

\* - As amended

The rates for "Curing of Concrete" in the Schedule of Quantities will be paid to the Contractor on the successful outcome of the durability tests.

## PSG 7 TESTS

### PSG 7.1 Facilities and Frequency of Sampling

#### PSG 7.1.2 Frequency of Sampling

##### PSG 7.1.2.2 *Replace the entire contents of the clause with:*

The Contractor shall provide the following number of sets of three standard metric 150mm metal cube moulds for the volume of concrete poured as per the table below:

Table 4 - Frequency of compressive strength tests

Volume of pour (m <sup>3</sup> )	Number of sets
0 – 25	2
26 – 50	4
51 – 100	6
101 – 200	8
+ 201	10 (or as required by the Engineer)

These sets of concrete cubes will be crushed when they are 7 and 28 days old.

Provide sufficient extra cube moulds for 3 days, 7 day, etc, crushing tests to be made as he so requires for his own purposes ie for shutter stripping, post-stressing cables.

Make and cure all cubes on site under the supervision of the engineer or his representative, in accordance with SANS Method 863.

Be represented at the crushing test if he so wishes. Transport all cubes to the nominated laboratory between 7:30am and 11am on the last working day prior to the date of test. Only the results from this laboratory will be considered and will be the sole basis on which concrete is accepted or rejected.

#### **PSG 7.3.7 Costs of Tests**

The costs of all tests required by the engineer or his representative shall be borne by the Employer except that costs of tests as set out hereunder shall be borne by the contractor –

- (a) preliminary tests on materials and of mix proportions;
- (b) all tests as may be made necessary by reason of the provisions of clause SANS 1200 G 7.3.5;
- (c) such tests, including concrete coring and load tests, as may in the opinion of the engineer be made necessary by failure on the part of the contractor to meet the requirements of this specification.

#### **PSG 7.3.8 Durability Index Tests**

To ensure that the concrete has been placed, compacted and cured correctly, a number of tests will be carried out by a nominated laboratory on the concrete after curing has been completed ie 26 to 30 days after placing of the concrete.

- 1) A set of four 68mm diameter cores, 75mm in length will be drilled at each test location through the covercrete (being the concrete layer between the outermost layer of steel reinforcement and the exposed outer surface of the concrete element) from the constructed concrete element when the concrete has reached 28 days of age. A slice (30mm thick) will then be cut from the outer surface of this core such that the slice is representative of the middle layer of the covercrete (ie the middle layer being a 30mm thick slice of concrete, 15mm from the exposed outer surface extending in towards the reinforcement) and tested for: -
  - 1.1) water sorptivity,
  - 1.2) oxygen permeability (tested in the Ballim apparatus), and
  - 1.3) chloride conductivity

The positions at which the cores will be extracted will be indicated by the Engineer.

The oxygen permeability and water sorptivity, and chloride conductivity test procedures shall be carried out in accordance with the following references:

- (1) Guide to the use of durability indexes for achieving durability in concrete structures. (Research Monograph No. 2)
  - (2) Concrete durability index testing manual (Research Monograph No. 4)
- 2) The depth of concrete cover achieved will be measured to ensure that the specified values have been achieved.

The cost of these tests will be borne by the Employer if the results are equal to or exceed the specified value. The Contractor will pay for the tests if the results fall below the conditional acceptance range.

**Table 7 - Acceptance criteria for durability testing structural element**

Acceptance Category	Oxygen permeability index (log scale)	Water sorptivity (mm h)	Chloride Conductivity
Full acceptance	$O_p \geq 9.15$	$W_s \leq 8$	$C_c \leq 0.75$
Conditional acceptance	$9.15 \geq O_p > 9.0$	$8 < W_s \leq 12$	$0.75 < C_c \leq 1.50$
Acceptance with remedial measures	$9.0 \geq O_p > 8.75$	$12 < W_s \leq 15$	$1.50 < C_c \leq 2.50$
Rejection	$O_p < 8.75$	$W_s > 15$	$C_c > 2.50$

The descriptions given in the "Acceptance Categories" column above shall have the following meanings.

- Full acceptance - Concrete shall be accepted unconditionally, subject to the concrete meeting the strength and cover criteria.
- Conditional acceptance - Concrete will be accepted with a warning that construction methods should be examined to improve the durability. A financial penalty of up to R75/m<sup>3</sup> will be applied on a pro rata sliding scale for each structural element where the average test results fall within the conditional acceptable range.
- Acceptance with remedial - Concrete will be accepted if the Contractor measures undertakes remedial work at his expense, as approved by the Engineer to improve the durability of the concrete to the criterion described as "full acceptance",
- Rejection - At the discretion of the Engineer, the concrete shall be removed and replaced at the expense of the Contractor.

## PSG 8 MEASUREMENT AND PAYMENT

### PSG 8.4 Scheduled Concrete Items

Payment Item	Description	Unit
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<b>PSG 8.4.3.1</b>	<b>Preparation of concrete surface</b>	<b>m<sup>2</sup></b>
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The tendered rates shall include full compensation for the supply of all labour, plant and materials.

<b>PSG 8.4.3.2</b>	<b>Removal of existing floor slab screed by mechanical methods to solid substrate</b>	<b>m<sup>2</sup></b>
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The tendered rates shall include full compensation for the supply of all labour, plant and materials.

<b>PSG 8.4.3.3</b>	<b>Surface to be primed with “ABE Screed PU” or similar approved prior to applying granolithic screed (application rate as per manufacturer’s guidelines)</b>	
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(a)	Supplying ABE Screed PU or similar approved	m <sup>2</sup>
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(b)	Installation of ABE Screed PU or similar approved	m <sup>2</sup>
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The tendered rates shall include full compensation for the supply of all labour, plant and materials.

<b>PSG 8.4.3.4</b>	<b>20 MPa Granolithic screed (1:4) to falls on reservoir floor slab (30 mm thickness)</b>	
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(a)	Supplying ABE Screed PU or similar approved	m <sup>2</sup>
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(b)	Installation of ABE Screed PU or similar approved	m <sup>2</sup>
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The tendered rates shall include full compensation for the supply of all labour, plant and materials.

## PSL MEDIUM PRESSURE PIPELINES (SABS 1200 L-1983)

### PSL 3 MATERIALS

The Contractor shall supply and install all pipes and fittings for the works except material which will be supplied by the Employer.

All butterfly, isolating, scour and air valves shall be supplied by the Employer at the Employer's stores in Springfield.

All valves, including matching flanges where supplied by the Employer shall be laid/installed by the Contractor on site.

All mPVC pipes shall be Class 12 in accordance with SANS 966-2:2006.

All above ground pipe shall be API Schedule 40 steel pipes. All steel pipes shall be coated internally and externally with "Rilsan" with a minimum Dry Film Thickness of 300 microns.

All flanges on flanged couplings shall be drilled in accordance with Table 16 of SANS 1123

All bends shall be minimum radius bends unless otherwise specified or indicated on drawings. The specials shall comply with the requirements of SANS Specification 719 unless otherwise specified and shall be manufactured with API schedule 40 pipes. Where specials have to be attached by welding the diameters of the specials shall exactly match those of the pipes supplied.

Except for the matching flanges supplied by the Employer in respect of the valves, the Contractor shall supply all other flanges on pipes and specials, suitable for the welding of the pipes and specials in accordance with Table 16 of BS 4504.

Bolts and Nuts shall be in accordance with SABS 1700 unless otherwise approved by the Engineer and shall project two threads beyond the run-out of the nuts. All bolts and nuts and washers shall be hot dip galvanised.

Electrolytic or other special corrosion protection methods are not required.

### PSL 3.4 Steel Pipes, Fittings and Specials

#### PSL 3.4.1 General

##### **Add the following to L 3.4.1:**

The pipe to be laid under this contract is 300 mm diameter steel pipe.

It is noted that certain special precautions need to be taken to avoid excessive deflections and over-stressing of the pipeline material during construction. Various physical properties as well as requirements and recommendations for construction of the pipeline are as follows:

Diameter (mm)	Length (m)	Grade	Plate Thickness (mm)	Mass kg/m	Coating	Lining	End Preparation
300	9.144	X42	4.5	38	3LPE	Cement Mortar	Plain/Plain



#### **PSL 3.4.4 Fittings and Specials**

##### ***Add the following to L 3.4.4:***

The lining and wrapping of specials, which are to be butt-welded, is to be terminated 100 mm from the end of the pipe. The lining of specials which are to be sleeve welded shall be taken to the end of the pipe and the wrapping is to be terminated 100 mm from the end. On flanged specials the wrapping and lining is to be taken to the end of the pipe.

Pipes up to and including 500 mm shall be sleeve welded with the sleeve having a width of 100 mm and the internal diameter being the measured outside diameter of pipe plus 3 mm. The ends of pipes shall be plain finished.

All specials shall be protected in accordance with clauses PSL 3.9.2.3. All electrodes used for welding of joints shall comply with SABS 455.

#### **PSL 3.8 Jointing Material**

##### ***Add the following as L 3.8.2:***

Where flexible couplings are called for they shall be the double flanged and sleeve type, manufactured from rolled steel, and fitted with rubber rings suitable for jointing plain-ended pipes. They shall be of the slip-on type coupling and couplings comprising bolt over arrangements shall not be acceptable.

The rubber jointing rings shall be manufactured from first grade natural rubber to B.S. 2494 Class D. All bolts and nuts shall comply with SABS 135 or SABS. 136. Each sleeve shall be fitted with a centre register unless stated otherwise in the Project Specification.

Each coupling shall permit a repeated movement of 10 mm to cater for thermal expansion and contraction of the pipe, and allow for the following angular deflections:

- 6° up to and including 600 mm diameter;
- 5° over 600 mm up to and including 750 mm diameter;
- 4° over 750 mm up to and including 900 mm diameter;
- 3° over 900 mm up to and including 1 200 mm diameter;
- 2° over 1200 mm diameter.

##### ***Add the following to L 3.8.3:***

Gaskets shall be manufactured from "Klinger 200" or other approved material which complies with the requirements for Grade B of B.S. 2815.

All gaskets shall be 3 mm thick and cut so that the annular section is completely within the bolt circle, i.e. ring gaskets with no boltholes.

All gaskets shall be purpose made. Hand cutting and trimming of gaskets on site will not be acceptable.

Care should be taken to ensure that all gaskets are packed properly and are not damaged by bending. For larger sizes the gaskets shall be suitably supported by wooden frames during transit and while in store.

Any item of pipework that is found to have flanges that are incorrectly drilled shall be rejected. Reaming of boltholes to oversize dimensions in order to make a particular piece fit shall not be permitted.

## **PSL 3.9 Corrosion Protection**

### **PSL 3.9.2.3 Repairs to Coatings and Linings**

#### ***Replace the clause with the following:***

FBMDPE, fusion-bonded epoxy coated and solvent free liquid epoxy lined or cement-mortar lined pipe shall be repaired as specified in this clause.

#### **A. External Repairs**

##### **1. Detection of Defects in 3LPE and Epoxy Coating by Holiday Tests**

Each pipe length shall first be placed on suitable dunnage adjacent to the trench. The Contractor shall then arrange for Holiday tests to be undertaken on the accessible portion of the pipe coating surface by the non-destructive testing firm appointed in terms of this contract document or the Engineer's representative, whichever is applicable. It shall be a requirement of this contract that the Holiday testing device utilised by calibrated and approved by the Engineer prior to the conducting of any Holiday tests.

##### **2. Surface Preparation**

###### **a) Defects in epoxy coating detected by holiday testing**

At each pinhole detected by the Holiday test, the surrounding area shall be abraded to 25 mm beyond the defective area. It is noted that any cluster of pinholes within a radius of 25 mm shall be regarded as one defect. The abrasion shall be carried out with clean emery paper of 80 to 100 mesh so as to provide a suitably rough surface profile without causing the removal of excessive amounts of coating material.

###### **b) Damage to 3LPE and epoxy coating caused by welding, damage at joints and bends and damage at scour and air valve tees, crotch plates and buried valves.**

###### **i) All damaged and blistered 3LPE and epoxy coating caused by welding shall be removed back to sound epoxy coating by mechanical grinding or other approved means.**

###### **ii) The exposed steel surface shall be power or hand wire brushed to remove dirt, scale, rust and other foreign matter to a surface equivalent to a Class 2 finish. Weld spatter shall be removed by chipping or grinding to a smooth surface flush with the surrounding steel. Welds shall have a smooth contour free from sharp edges, protrusions and undercut. Sharp edges and protrusions shall be removed by grinding to a smooth radius of curvature of not less than 3 mm.**

###### **iii) The surrounding sound 3LPE and epoxy surface shall be abraded to a distance of 50 mm beyond the defective area. The abrasion shall be carried out with clean emery paper of profile without causing the removal of excessive amounts of protective material.**

##### **3. Cleaning of Area to be Repaired**

Grease and oil shall be removed with a non-volatile solvent (eg "Aquasolve", "Arc Nr.261 Safety Solvent Cleaner" or similar approved). The surface shall then be cleaned with potable water and allowed to dry completely.

##### **4. Methods of Repair to be Carried Out**

###### **a) Defects in epoxy coating detected by Holiday tests**

###### **i) The roughened area of coating and the defect shall be repaired by the application of a two part solventless epoxy repair kit (eg "Cupon Hycote 151", "Arc 982" or similar approved) to a minimum dry film thickness of 300, microns. The epoxy repair material shall be applied in accordance with the manufacturer's instructions and allowed to dry for 24 hours.**

- ii) 24 Hours after the application of the epoxy repair material described above, the pipes may be placed in the trench and rotated so that the underside of the pipe, which was not Holiday tested at the side of the trench, may be tested.
- iii) The pipe coating any defects detected on the now uppermost surface of the pipe shall be prepared in accordance with the requirements of A.2(a) and A.3 above.
- iv) The prepared surface shall then be primed and patched (or wrapped in the case of the coating reinstatement of joints) with Denso Ultraflex System, or similar approved. The following criteria shall be strictly in accordance with the manufacturer's instructions:
  - surface preparation
  - application of the primer
  - application of the tape
  - recommended minimum overlap width (where applicable)
  - capping of overlap joints (where applicable).
- v) Notwithstanding the above, the tape cover strip shall overlap the sound 3LPE and epoxy coating by at least 50 mm (in the case of patches) and 100 mm (in the case of joint wraps) and shall be applied in layers if necessary to form a final cover patch or strip at least 2,5 mm thick. The tape repair for 3LPE defects shall be continuously, spirally wrapped around the complete circumference of the pipe with a minimum overlap of 25 mm.
- vi) The dielectric resistance of the tape cover strip shall not be less than that of the 3LPE (10 000 V) or fusion-bonded epoxy coating (3 500 V).
- b) Defects in 3LPE coating detected by Holiday tests

Where the repair area is less than 650 mm<sup>2</sup>, the application of a hot spatula shall be used to repair the defect, provided there is a residual layer of polyethylene still adhering strongly to the steel surface.

- c) Defects in 3LPE coating other than those detected by Holiday tests

Any single repair area less than 0.1m<sup>2</sup> shall be carried out in accordance with A.4.b above. The number of repairs shall be limited to three per pipe or fitting. The length of such repair shall not exceed the nominal pipe diameter in the circumferential direction, nor twice the nominal pipe diameter in the longitudinal direction.

- d) Patch Repairs to Pipes Damaged by Welding

Patch repairs to pipes damaged by welding shall be carried out in accordance with the requirements of A.4.a(iv), A.4.a(v) and A.4.a(vi) above.

- e) Patch Repairs to Pipes that will be Exposed to Ultra-Violet Light

- i) Repairs shall be carried out in accordance with the requirements of A.4.a(i) above with due allowance being made for the 24-hour curing period.
- ii) The pipe surface shall then be coated with two coats of "ABE Silvakote" or similar approved bitumen base aluminium paint applied with brush or roller to a final minimum dry film thickness of 80 micrometers. The over coating time shall be as per the manufacturer's instructions.

- f) Joint repairs (including bends) on pipes that are to be buried

- i) Repairs shall be carried out in accordance with the requirements of A.4.a(iv), A.4.a(v) and A.4.a(vi) above.
- ii) No air-gap will be permitted between the tape and steel surface and tape width and application tension shall be such as to ensure that the tape "dresses down" over steel surface irregularities. This applies particularly on bell-end pipes.
- iii) Gusseted bends requiring two or more welded joints shall be fully externally wrapped extending 150 mm outside the two outermost welded joints.

- g) Scour and air valve tees and crotch plates
- i) Scour and air valve tees and crotch plates that are to be buried shall be protected in accordance with the requirements of A.4.a(i) above with due allowance being made for the 24-hour curing period.
- ii) Exposed specials in chambers including valves, flanges, crotch plates, flexible couplings etc shall be protected by the application of "Copon Hycote 151", "Arc 982" or similar approved epoxy coating to a minimum dry film thickness of 300 microns. Surface preparation and application shall be strictly in accordance with the manufacturer's instructions.
- iii) When coating valves, care shall be taken to prevent the epoxy coating covering the descriptive name plates and flow direction indicators on the valves by masking off these plates.

h) Buried Valves

Buried valves or other appurtenances with intricate shapes will be inappropriate for wrapping with a tape system. Such items shall be protected by the application of a zinc-rich epoxy primer such as "Berger Master", "Zinc Anode 304" followed by two coats of a pitch extended epoxy resin coating such as "Fosroc Nitocote ET550", "Epilux 5 Coal Tar Epoxy" or similar approved to a minimum dry film thickness of 250 microns.

Alternatively a petrolatum system "Denso" type or similar approved may be employed and then wrapped in polythene sheeting to the approval of the Engineer.

**B. Internal Repairs – Epoxy Lined Pipes**

1. Detection of Defects in Epoxy Lining by Holiday tests

Each pipe length shall be first placed in position in the trench, welded to the preceding pipe and the lining at the joint reinstated (see B.2.b of this Clause). Once all work is complete in a particular length of pipe, the Contractor shall arrange for the testing of the pipe with a "wet sponge" detector set at 90 Volts in order to detect any electrical insulation defects.

2. Surface Preparation

a) Defects in epoxy lining detected by holiday testing

At each pinhole detected by the Holiday test, the surrounding area shall be abraded to 25 mm beyond the defective area. It is to be noted that any cluster of pinholes within a radius of 25 mm shall be regarded as one defect. The abrasion shall be carried out with clean emery paper of 80 to 100 mesh so as to provide a suitably rough surface profile without causing the removal of excessive amounts of coating material.

b) Epoxy lining damaged by construction operations, joint repairs (including bends), lining to scour and air valve tees, access openings, stubs and valve bypasses

i) In order to avoid damage to the pipe lining occurring as a result of construction activities, all possible care shall be exercised during construction, the following procedures being required:

- Wet sacking or rubber matting shall be placed on the pipe invert at areas where welding or flame cutting operations are in progress to prevent damage to coating from weld spatter or molten metal. This requirement shall be strictly enforced.
- Foam shall be provided for the placing of tools etc on the internal pipe surface.
- Soft-soled shoes shall be worn by all personnel working inside the pipe.

ii) All damaged and blistered epoxy lining shall be removed back to sound epoxy by mechanical grinding or other approved means.

iii) The exposed steel surface shall then be prepared in accordance with the requirements of section A.2.b(ii) and 1.2.b(iii) of the clause.

3. Cleaning of Area to be Repaired

Grease and oil shall be removed with a non-volatile solvent (eg "Aquasolve", "Arc Nr.261 Safety Solvent Cleaner" or similar approved). The surface shall then be cleaned with potable water and allowed to dry completely. To this end adequate ventilation shall be provided.

4. Methods to Repair to be Carried Out

a) Defects in epoxy coating detected by Holiday tests

- i) The roughened area of lining and the defect shall then be repaired by the application of a solvent free epoxy repair material (such as "Copen Hycote 151", "Arc 982", "Arc 855", or similar approved) to a minimum dry thickness of 300 microns.

A "halo" of 1 to 2 mm of the abraded material shall be left uncovered around the repair.

The patch material shall be of a different colour to the pipe lining material.

- ii) In the application of the epoxy the following shall be strictly in compliance with the manufacturer's instructions:

- Method of application (type of brush or roller.)
- Over coating time
- Temperature range for application
- Mix proportions of activator to base. This shall be strictly enforced, and splitting of manufacturer-supplied packs shall be allowed only if subsequent bending is carried out strictly by mass to the correct proportions.
- Method of mixing base and activator.
- Number of coats to achieve the specified thickness.
- Safety aspects eg eye and hand protection, ventilation, fire precautions, etc.

- iii) After the repair has been adequately cured, the repair and the surrounding 250 mm of epoxy lining shall be tested for electrical insulation defects. No defects will be permitted.

b) Patch Repairs to Pipes Damaged by Construction Operations and Joint Repairs (including Bends)

- i) The roughened area of lining shall be repaired as described in B.4.a(i) above.
- ii) The requirements of Clauses B.4.a(ii) and (iii) above shall then be complied with.
- c) Lining to scour and air valve tees, access openings, stubs and valve bypasses
- i) The repair procedure shall be as described in B.4.a(i), (ii) and (iii) above.

The epoxy repair material shall be applied to overlap the existing sound cement mortar lining by 25 mm at access openings, valve bypasses and scour tees.

**C. Internal Repairs – Cement-mortar Lined Pipes**

1. The internal surface of the bellmouth is to be power or hand wire brushed from the pipe end to the cement mortar lining to remove dirt, scale, rust and other foreign matter.
2. Any grease and oil shall be removed from the pipe surface with a non-volatile solvent (eg "Aquasolve", "Arc Nr 261 Safety Solvent Cleaner" or similar approved). The surface shall then be cleaned with water and dried and a 50 mm wide x 20 mm thick band of "Epidermix 338" or similar approved shall be applied internally on the uncoated steel adjacent to the cement lining.
3. The plain end of the adjoining pipe shall be pushed into the bellmouth in such a way that the Epidermix band is compressed and makes contact with the transverse face of the concrete lining of both pipes. The excess lining material which is squeezed into the pipe shall be removed by drawing a plug which is

5 mm smaller in diameter than the bore of the pipe, across the joint. The plug shall be so shaped as to apply a smooth even surface to the lining material at the joint.

b) Pipes larger than 500 mm diameter

1. The exposed steel surface shall be power or hand wire brushed to remove dirt, scale, rust and other foreign matter. Burrs, weld spatter etc shall be filed away.
2. Any grease and oil shall be removed from the pipe surface with a non-volatile solvent (eg "Aquasolve", "Arc Nr 261 Safety Solvent Cleaner" or similar approved), flushed with potable water and completely dried.
3. The joint shall then be made good with "Epidermix 338" or similar approved, neatly formed to meet the adjacent cement mortar.
4. The requirements of Clause C (a).4 shall similarly apply to pipes larger than 500 mm diameter.

## **PSL 4 PLANT**

### **PSL 4.1 Handling and Rigging**

#### ***Add the following to L 4.1:***

The Contractor shall supply, operate and maintain an adequate fleet of vehicles including cranes to be used for the safe conveyance of the pipes, specials and fittings. The pipes and specials shall be handled with care at all times to avoid damage to them or to the protective coatings. The equipment for the purpose of loading, transporting, unloading and moving and the manner in which they are handled shall be subject to the approval of the Engineer.

During transport, the pipes and specials shall be supported on suitable pipe saddles such that all pipes and specials shall be separated so as not to bear against each other and shall be handled with care at all times to avoid damage to them or to the protective coatings. The equipment for the purpose of loading, transporting, unloading and moving and the manner in which they are handled shall be subject to the approval of the Engineer.

The use of bare cables, chains, hooks or narrow skids will not be permitted and the Contractor shall supply canvas slings and padded skids and ramps of a sufficient width to prevent damage to the protective coating. The dragging or skidding of pipes and specials in contact with the ground shall not be permitted.

When handling 12m pipe lengths the pipes shall be lifted with band slings (minimum 300 mm wide) placed centrally around pipe at two points 6 metres apart.

## **PSL 5 CONSTRUCTION**

### **PSL 5.1 Laying**

#### **PSL 5.1.1 General**

##### ***Add the following to L 5.1.1:***

It is of paramount importance that the right type and class of pipe be laid as shown on the longitudinal sections. Invert levels shown on the drawings are the levels of the interior surface of the pipes at the lowest point of cross section. However, levels at vertical curves shall be determined when the exact location of pipe joints within the influence of the curve is known.

Pipes and specials shall be lowered gently and carefully into the trench without jarring or bumping by crane, derrick or other approved lifting tackle and care shall be taken not to damage the pipe or its sheathing. Pipes and specials with soft sheathing shall be supported in stout wide canvas slings and no wooden blocks shall be used to support such pipes, either on the side or in the trench. Any supports required shall be formed with fine sand gravel.

The Contractor shall ensure that all pipe barrels are evenly supported over the whole of their length and that no weight is taken by the joints. The trench bottom, shall, where necessary, be accurately trimmed by hand and each pipe shall be firmly bedded down before backfilling is commenced.

The Contractor's special attention is drawn to the requirements for work in confined spaces and for shoring of trenches. It is noted that a through flow of air is required when work is to be carried out inside the pipeline. The necessary electrical equipment and fittings must be provided to produce this airflow. An Item in the Schedule of Quantities has been provided for complying with these requirements.

#### **PSL 5.1.2 Damage**

***Add the following to L 5.1.2:***

##### Inspection at the Laying Site

All pipes, specials, valves and fittings shall be carefully examined by the Contractor for internal and external damage at the following stages:

- (a) on arrival at laying site;
- (b) prior to laying;
- (c) after laying;
- (d) prior to backfilling; and
- (e) during backfilling.

All damage or defects of any kind shall be repaired by the Contractor in accordance with Clause 3.9.2.3 and to the satisfaction of the Engineer immediately after detection at any of the above inspections. Where, in the opinion of the Engineer, satisfactory repairs are practicable, the damaged materials shall be replaced by the Contractor at his own cost.

#### **PSL 5.1.3 Keeping Pipelines Clean**

***Add the following to L 5.1.3:***

Exposed ends of the pipe in the trench shall be tightly closed by a suitable mild steel end cap at all times when pipelaying is not in progress.

***Add the following as L 5.1.5:***

##### Stacking of Pipes and Specials

Where a pipeyard is provided, all pipes and specials shall be neatly and methodically arranged on the ground on delivery, as directed by the Engineer. They shall be segregated according to diameters and working pressures and the various stacks shall be arranged and separated in such a way that a pipe of any diameter and working pressure can be located from the stacked position for transportation to its laying position without necessity of moving other pipes.

#### **PSL 5.2 Jointing Methods**

### **PSL 5.2.2 Flanges (Steel Pipelines)**

#### ***Add the following to L 5.2.2:***

Flanges to fittings or joints will generally be to SABS 1123. It is possible, however, that the Employer may supply valves with flanges which have not been drilled according to these standards. The Contractor shall be responsible for checking the flange drilling of all fittings supplied by the Employer and for supplying flanges drilled to match. No additional payment is to be made for this work and the Contractor is to allow for such in his rates.

Contractors are to note that generally matching flanges or jointing material to gate and butterfly valves will be supplied by the Employer.

Contractors are to allow in the rates for the supply and installation of mild steel pressed washers (two per bolt) for all flanged fittings. The washers shall have an ID of 2 mm greater than that of the bolt. Tenderers are to ensure that the length of the bolt includes allowance for the washers.

All bolts, nuts and washers used are to be electro galvanised and yellow passivated.



### **PSL 5.3     Setting Of Valves, Specials And Fittings**

#### ***Add the following to L 5.3:***

Valves and fittings shall be installed in accordance with the manufacturer's instructions. Where valves are supplied by the Employer at Municipal depots they shall be collected by the Contractor at such depots and transported to the laying site. Valves shall be enclosed in chambers in accordance with the drawings and specifications and shall be installed with their operating spindles vertical. The Contractor shall supply the insertions and bolts necessary for the installation of the valves.

Jet dispersers shall be of the cone and splitter type cast in iron or steel with heavy zinc galvanising, to the Engineer's approval. Flanges and bolts shall be sealed in mastic after installation.

All air valves shall be set level.

All scour valves shall be installed in such a way that the spindle is vertical.

#### **The Storage, Commissioning And Installation Of Butterfly Valves**

Butterfly valves shall be stored, installed and commissioned so that the valve blade seal is protected at all times from oxidation, ozone attack and the ingress of dirt.

##### **Storage**

- i) It is preferable that the valve is stored in the vertical position.
- ii) The valve should be stored in the cracked position (i.e. not shut).
- iii) The valve should not be stored in the vicinity of electrical equipment.
- iv) The valve should be stored under cover and protected from temperature extremes.

##### **Installation and Commissioning**

- i) Prior to the installation of the valve, all dust and dirt should be washed off the valve, particularly the seal, seat and any tapped holes in the valve body.
- ii) The seals of all valves shall be checked for complete closure when the valve blade is in the fully closed position. (See seal adjustment below).
- iii) The valve must not be lifted by the hand lever, valve actuator or the handwheel.
- iv) The valve must not be used for lining up the pipework.
- v) The valve should be left in the fully open position after installation and prior to commissioning of the system.

##### **Seal Adjustment**

To adjust the seal, a 0,004" feeler gauge and an Allen key are required.

With the valve in the fully closed position, it should be possible only with difficulty to introduce the feeler gauge between the valve blade seal and the seat.

If, due to seal movement during storage the feeler gauge can easily pass between the seal and seat, then the clamp ring socket head cap screws in the vicinity of the gap should be finger tightened with the Allen key so as to push the seal out and close the gap.

##### **Payment**

All costs incurred for the seal adjustment as stipulated above shall be included in the respective rates for installation of the valves.

## **PSL 6 TOLERANCES**

*Add the following to L 6:*

The tolerances for the line and level of pipelines shall be as follows:

- (a) Positions of bends: within 150 mm of the locations shown on the drawings or as agreed with the Engineer;
- (b) level of pipe invert: within 25 mm of the level shown on the drawings;
- (c) location of pipe centre in plan; within 25 mm of the location shown on the drawings through the sleeves and culverts and elsewhere within 75 mm of position shown on the drawings.

## **PSL 7 TESTING**

### **PSL 7.1 General**

*Add the following to L 7.1:*

#### **Inspection**

Facilities shall be provided to the Engineer so that he may be able to inspect, during the process of welding, any layer of weld metal. He may require any defective welds either to be cut out and rewelded or repaired at his discretion. The Contractor shall clean thoroughly all welds prior to inspection. The Engineer may require a number of completed joints, selected at random, to be cut for mechanical tests or to be selected for visual inspection, micro examination or examination by other means. When the Engineer orders the Contractor in writing to cut out and test joints the Contractor shall be paid for such work at day work rates.

If as a result of inspection and testing, the work of any welder is found to be unsatisfactory, the welder shall not be permitted to continue welding under this contract.

#### **Standards of Acceptability**

The completed welds shall comply with the requirements of clause 6.0 of API 1104. Work on which unauthorised repairs have been carried out may be rejected.

#### **Repairs to Minor Faults**

Faulty welds shall be rectified in accordance with clause 7.0 of API 1104.

All costs relative to the repair of faulty joints, including removal and replacement of the backfill and making good the wrapping and lining shall be borne by the Contractor.

### **PSL 7.2 Initial Tests On Welded Steel Pipes**

#### **PSL 7.2.1 Dye-Penetrant Test**

*Add the following to L 7.2.1:*

All fillet welds shall be dye penetrant tested. Any reduction in the percentage of welds to be tested shall be at the sole discretion of the Engineer

#### **PSL 7.2.2 Radiographic Examination**

*Add the following to L 7.2.2:*

All butt welds shall be radiographically tested. Any reduction in the percentage of welds to be tested shall be at the sole discretion of the Engineer.

### **PSL 7.3 Standard Hydraulic Pipe Test**

#### **PSL 7.3.1 Test Pressure and Time of Test**

***Replace L 7.3.1.1, 7.3.1.2, 7.3.1.3 and 7.3.1.4 with the following:***

##### **Static Test**

When the pipeline is filled with water, all scours and hydrants shall be opened fully for one minute or until the water emerges clean.

##### **Pressure Test**

A suitable pump shall be connected to the pipeline at a mutually agreed point.

The pressure in the pipeline under test shall be raised slowly by means of the pump and measured by a pressure gauge connected to the pipeline.

**PSL 7.3.1.2** The required test pressure for all steel pipework shall be 1.5 times the working pressure measured at the lowest point.

The hydraulic testing of the pipelines is to be carried out in two stages:

- a) The pressure test as described above, is to be carried out with the pipeline fully blanked and all valves in the open position. All costs relating to this work inclusive of scouring, supplying and install blank flanges, spade pieces etc are to be included in the rate for testing. The minimum duration of this test will be 8 hours and 2 hours on non-steel pipelines.
- b) On successful completion of the pressure test as per (a) above, the Contractor is to remove all temporary blank flanges, spade pieces, etc. and pressurise the line to maximum working pressure against closed valves. Should any valve not be drop tight at this pressure the Contractor is to advise the Engineer in writing of all defects encountered? The duration of this test shall be 2 hours. (An item has been allowed for this work in the Schedule of Quantities).

All tests shall be carried out in the presence of the Engineer at such times and in such manner as he may direct.

The hydraulic testing of pipelines against closed valves shall not be allowed and provision shall therefore be made by the Contractor for the supply of all necessary bull-noses and blank flanges.

Water for testing shall be made available free of charge in the first instance but for the subsequent tests shall be charged to the Contractor's account.

A water connection will be provided by eThekweni Water for filling the pipeline for testing purposes.

The Contractor shall, at his own cost, provide a suitable means of conveying water from this connection to the mains to be tested, as well as a connection on the new pipeline in order that it may be filled. This connection shall be capped or removed to the satisfaction of the Engineer upon completion of the hydraulic test. Payment of this shall be allowed for under the rates for the hydraulic testing of the pipeline.

For hydraulic testing of the pipes sections after installations, as per Clause 7.3 of SABS 1200L, each test section shall be chosen such that it is subjected to a test pressure not exceeding 250m water head at the lowest point and not less than 200m at the highest point. This pressure shall be obtained by continuous pumping so as to ensure a gradual increase of pressure until the specified value is obtained.

After the entire piping system has been laid and all parts thereof have been tested to the satisfaction of the Engineers or the Engineers Representative and backfilled, the pipe system will be put into operation and the Contractor shall inspect and commission the same in the presence of the Engineer/his representative, to ensure that all valves and other equipment are operating satisfactory and to check that all pipe supports, brackets and the like are capable of withstanding the loads imposed on them.

Any faults or defects which are detected during this inspection shall be repaired by the Contractor, or where

necessary, the defective parts or materials shall be replaced by the Contractor, to the satisfaction of the Engineer, all at the Contractors expense.

All items of equipment not specifically mentioned in the Specifications, shall be inspected during the commissioning period for proper operation and to verify that these items comply with the requirements of the Specification.

#### **PSL 7.4 Tests on Epoxy Coatings**

##### ***Add the following to L 7.4:***

- e) Wet sponge test of SFE lining.

The Employer on submission of the originals of the test results and respective invoices to the Engineer will reimburse the Contractor for the cost of all successful tests.

Holiday testing of the tape wrapping and epoxy coating of the pipeline shall be carried out on site by the Contractor. However, at the Engineer's discretion, quotations may be called for holiday testing of the epoxy coating of the pipeline for quality assurance purposes, from a reputable non-destructive testing firm. The rate submitted shall be per linear metre.

- i) Notwithstanding the requirements of any other specification contained in or referred to in this document, the holiday testing of the epoxy coating shall be performed with the apparatus set at 10 000V for coating and 3500V for FBE and SFE coating.
- ii) The holiday testing of the tape wrap system shall be performed with the apparatus set at 3 500V.

The non-destructive testing firm approved by the Engineer shall be a nominated sub-contractor to the main Contractor.

It shall be the responsibility of the Contractor to ensure that all test points along the pipeline are individually referenced and that this reference be reflected on the reports. Each test point (e.g. pipeline joints, butt joints in pipe specials, etc.) shall be indelibly marked on the pipe and cross-referenced to the pipeline chainage.

A DCVG survey will be carried out by the Employer after the issue of the Completion Certificate and the Contractor will be required to repair all defects discovered by the survey at his own cost.

The cost shall include excavation, repair materials, bedding, backfill and reinstatement to the satisfaction of the Engineer.

The Contractor shall ensure that the full length of the pipe to be placed in the trench is patched and holiday-tested prior to the pipe being laid in the trench. Holiday testing of the joints in the trench shall be carried out on completion of the welding and the required non-destructive testing by the Contractor.

#### **PSL 8 MEASUREMENT AND PAYMENT**

##### **PSL 8.2 Scheduled Items**

##### **PSL 8.2.1 Supply, Lay and Bed Pipes Complete with Couplings**

##### ***Add the following to L 8.2.1:***

- (i) Taking delivery of the pipe at the Municipal depot, provision of craneage, transporting and lowering pipes into trench, cutting to closures and preparing ends for jointing, laying true to line and level on prepared trench bed and jointing, including the supply of joint sleeves where required;
- (ii) Bonding mechanical joints for electrical continuity;
- (iii) Completing both internal and external protection at joints and making good any damage to sheathing or lining, which has occurred after acceptance at the pipe yard; and

(iv) All other operations necessary to complete laying not separately scheduled.

**PSL 8.2.2** Extra-over 8.2.1 for the Supplying, Laying, and Bedding of Specials Complete with Couplings

**Add the following to L 8.2.2:**

The Contractor will only receive payment for a scarfed bend if the pipe is cut to fabricate the scarf bend.

**PSL 8.2.3** Extra-over 8.2.1 for the Supplying, Fixing and Bedding of Valves

**Add the following to L 8.2.3:**

The unit rate for the installation of scour and air valves when supplied by the Employer shall include for taking delivery of the valve at the Municipal depot, provision of craneage, transporting to site and installing the valve as specified and shall allow for the supply of all nuts, bolts and gaskets as required.

**PSL 8.2.11** Anchor blocks/Thrust blocks and pedestals

*INSERT "concrete" BEFORE "and" IN THE LAST LINE OF THE LAST PARAGRAPH.*

**Add the following:**

"The tendered rates shall also include the wrapping of uPVC pipes and fittings with Densopol 80 or a similar approved material where the pipes and fittings come into contact with concrete."

**PSL 8.2.16** Pipeline Marker Posts

Payment shall be per cost installed and shall include for the uplifting and transporting to site from the Municipal depot, handling, excavation, installation, backfilling and painting.

### **C3.3: PARTICULAR SPECIFICATIONS**

In addition to the Standardized and Project Specifications the following Particular Specifications / Policies shall apply to this contract and are available on web address:

<ftp://ftp.durban.gov.za/cesu/StdContractDocs/>:

PSR 1	Access for Reservoir Rehabilitation .....	184
PSR 2	Demolition and Removal of Structural Concrete and Steelwork.....	190
PSR 3	Surface and Structural Repair of Concrete Members .....	195
PSR 4	Anchoring of Reinforcement, Grouting and Crack Injection.....	212
PSR 5	Repair and Replacement of Ancillary Structural Elements .....	228
PSR 6	Repair of Steel Elements .....	232
PSR 7	External Bonding of Steel and Carbon Fibre .....	235
PSR 8	Protective Coatings and Treatments for Concrete.....	244
PSR 9	Miscellaneous Work and Reinstatement.....	256
C3.3.1	Part AH - OHSA 1993 Safety Specification .....	261
C3.3.2	Standard Environmental Management Plan for Civil Engineering Construction Works .....	299
C3.3.3	Community Liaison Officer .....	306
C3.3.4	EMC Code of Conduct .....	307

**PSR 1: ACCESS FOR RESERVOIR REHABILITATION**

**PSR 1.1 SCOPE**

**PSR 1.2 DEFINITIONS**

**PSR 1.3 GENERAL**

**PSR 1.4 DESIGN BY CONTRACTOR / PERFORMANCE BASED SYSTEMS**

**PSR 1.5 MATERIALS**

**PSR 1.6 CONSTRUCTION EQUIPMENT**

**PSR 1.7 EXECUTION OF THE WORKS**

**PSR 1.8 WORKMANSHIP**

**PSR 1.9 GUARANTEES AND COMPLIANCE CERTIFICATES**

**PSR 1.10 MEASUREMENT AND PAYMENT**

## PSR 1.1 SCOPE

This Section covers the requirements for the provision of suitable and safe access to all areas requiring concrete demolition, repair work or rehabilitation of structures in accordance with the contract, and for inspections by the Engineer. It shall also include for the protection of passing persons, animals and vehicles against injury or damage and prevention of damage and contamination of the environment.

## PSR 1.2 DEFINITIONS

**Temporary Works:** The *temporary works* shall be all necessary for access to the work area and includes all foundations, scaffolding and support structures, working platforms, cradles, fixtures to existing structural members, etc. required for the safe access to and execution of the work.

**Location:** *Location* means a specific structure as a whole where rehabilitation work has to be carried out.

**Structural Element:** *Structural elements* shall be that particular part or parts of a reservoir including but not limited to the following:

- Perimeter walls;
- Internal walls (dividing walls);
- Reinforced concrete columns including column heads and bases;
- Reinforced concrete floor slab; and
- Reinforced concrete roof slab.

Setting up at each structural element shall include all movement required from point to point on a particular element.

**Screening the Work:** Suitable metallic or non metallic grids, boarding or fabric membranes shall be used to screen the work area and to prevent falling debris from endangering the persons in the work area.

## PSR 1.3 GENERAL

The Contractor shall provide and will be responsible for safe access structures and work platforms to all areas or structural elements requiring remedial work. The access and temporary works shall be designed, constructed and maintained in accordance with the current relevant safety regulations, all in compliance with the Occupational Health and Safety Act and its applicable Regulations, and shall remain in place until removal is authorised by the Engineer. Appropriate allowances shall be made for screening of the work and other protective measures required by the various work activities. Access and work platforms may be provided from overhead mobile access gantries or vehicles, or from temporary works supported from the ground or fixed to structural elements.

Notwithstanding approval given by the Engineer for the design and drawings prepared by the Contractor and the acceptance of temporary works including the working platform(s) and access structure(s) as constructed, the Contractor shall be solely responsible for the safety and adequacy of the temporary works in terms of the occupation health and safety Act and shall indemnify and keep indemnified the Employer and Engineer against any losses, damage to persons or property, all claims, demands, proceedings, damages, costs, charges and expenses whatsoever, which may arise out of or in consequence of the design, construction, use and maintenance of the temporary works.

Roped access techniques shall not be permitted unless specified in the Contract Documentation. Where roped access is used, only persons who are specialists in roped access may be used in accordance with (Section18) of



the applicable construction regulations.

Complete method statements including Occupation Health and Safety, Environmental and risk assessments, shall be submitted to the Engineer of techniques to be adopted for execution of the work before any work commences.

The Contractor shall comply with any additional imposed or physical restraints upon the means of access to and from the structure as stated in the project specification and the drawings.

The Contractor shall provide access facilities for inspection and testing by the Engineer, including the inspection at the end of the defects liability period. Any specific access facility required for the inspection at the end of the defects liability period shall be as indicated in the pricing schedule.

## **PSR 1.4 DESIGN BY CONTRACTOR / PERFORMANCE BASED SYSTEMS**

### **PSR 1.4.1 General**

The Contractor's design and drawings of the falsework for access shall comply with all requirements of the Construction Regulations.

The Contractor's design of all falsework for access shall be carried out by an ECSA Registered Professional Engineer or Technologist with relevant experience. The drawings and calculations shall be submitted to the Engineer for approval at least 14 days prior to the commencement of the work. The design, erection and construction of such temporary works shall be certified by an ECSA Registered Professional Engineer or Technologist on behalf of the Contractor shall comply with the relevant safety regulations regarding strength and stability for all imposed loads that can be anticipated to arise from the specified work activities.

The Contractor shall submit to the Engineer at least 14 days before work on the existing structure is scheduled for construction a detailed analysis showing the effect of the stresses that will be induced on the permanent works by the Contractor's chosen method of construction. The cost of any additional work or material required as a result of the Contractor's chosen method of construction shall be to the Contractor's account. No construction shall commence until the Engineer has given his written approval.

The Contractors registered professional shall monitor at regular intervals and also sign off on the erection of the falsework and formwork after the erection thereof before the Engineer permits the work to proceed.

### **PSR 1.4.2 Falsework**

The Contractor shall make his own assessment of the allowable bearing pressure on the foundation material and shall design the footings and falsework to prevent overloading, differential settlement and unacceptable overall settlement. In assessing the allowable bearing pressure, due account shall be taken of the effect of wetting on the foundation material.

Particular attention shall be given to providing transverse and diagonal bracing as well as rib stiffeners on cross bearers.

## **PSR 1.5 MATERIALS**

All timber, structural steel and scaffolding used shall be free from defects that may prejudice the stability of the working platform(s) and access structures. All materials used for temporary access shall be certified and approved by the designer and copied to the Engineer. The jacks, devices, clamps and fittings shall all be in good working

order and of adequate design and strength.

The type, grade and condition of the material shall be subject to the designer's approval and submitted to the Engineer for the record.

## **PSR 1.6 CONSTRUCTION EQUIPMENT**

### **PSR 1.6.1 Scaffolds, Platforms and Cradles**

Temporary works entailing scaffolds, platforms and cradles providing access to the work area shall be assembled and constructed from materials and structural sections complying with the relevant material specifications. The temporary works shall be designed, erected, operated, maintained and dismantled so as to ensure safe working conditions for all site personnel, and where necessary the safety of the general public having access to the site. Traffic safety measures shall be in place before the work commences.

## **PSR 1.7 EXECUTION OF THE WORKS**

All temporary access structures and work platforms and associated works shall be erected, modified, maintained and dismantled under the direction of an experienced and competent supervisor and safety officer. Prior to using any temporary access structure or facility, and at regular intervals thereafter, or following unforeseen circumstances, the temporary works shall be inspected and certified by a suitably experienced and qualified person on behalf of the Contractor.

To ensure the safety of, and to prevent injury or damage to passing persons, vehicles, animals, etc. the temporary works shall be enclosed with a suitable screening membrane or boarding where necessary to contain material or work equipment within the limits of the restricted work area. Suitable debris containers and chutes shall be provided to assist in the removal of debris and unusable or rejected materials.

Where temporary works are to be fixed to, or supported from an existing permanent structure, the location shall be subject to the approval by the Engineer. Such temporary works shall be removed when the work is completed and any holes, surface damage or blemishes arising from the fixture thereof to the inspected structure shall be repaired to the surface finish of the adjacent surface to the satisfaction of the Engineer. The Contractor shall submit a Method Statement including Risk Assessments required in terms of the Occupation Health and Safety Act and also provide for all requirements required in terms of the Environmental Management Plan.

## **PSR 1.8 WORKMANSHIP**

The Contractor shall, prior to dispatching the mobile access unit to the site, provide certification from the manufacturer or the operating authority that the unit has been thoroughly inspected and serviced, that the unit is functioning properly and that it complies with the relevant safety regulations and that the operator has been certified to operate the unit. After the erection for access purposes and before usage by the workmen the works shall be certified by the designer in terms with compliance with the specifications and is suitable for its intended use. A copy of the certification shall be delivered to the Engineer.

## **PSR 1.9 GUARANTEES AND COMPLIANCE CERTIFICATES**

### **PSR 1.9.1 SCOPE**

The scope of this Section covers the following:

- Product conformance specifications
- Warranties for product or element design and installation of proprietary systems
- Performance specifications

Note that the requirements for performance specifications are not limited to that given in part A only but includes all of the requirements in the Contract Documentation.

### **PSR 1.9.2 GENERAL**

#### **PSR 1.9.3 Product Conformance Specifications**

The Contractor shall, within 28 days of entering into the contract with the Employer, submit to the Engineer conformance documentation related to the specifications.

Conformance documentation shall be provided for:

- a. Scaffolding members.
- b. Timber scaffolding members.
- c. Jacks, devices, clamps and fitting.

#### **PSR 1.9.3 PERFORMANCE GUARANTEE REQUIREMENTS**

##### **PSR 1.9.3.1 Warranties for Product or Element Design and Installation of Proprietary Systems**

Certification for all falsework for access by a suitable experience ESCA Registered Professional Engineer or Technologist shall be required.

##### **PSR 1.9.3.3 Performance Specifications**

Performance based specifications shall be contained in the Contract Documentation for the project if applicable. Method Statements shall be drawn up by the Contractor's designer and submitted to the Engineer for approval.

The Contractor shall accept full responsibility for the design, erection, usage and removal of the plant and equipment from site after completion.

## PSR 1.10: MEASUREMENT AND PAYMENT

### Preamble

The tendered rate for each item shall include full compensation for providing, maintaining and decommissioning upon completion, of all the plant, equipment, labour, tools, incidentals and supervision to carry out the activity or construct the works in the item, unless otherwise stated.

Any prime cost or provisional sums shall be paid in accordance with the provisions of the conditions of contract. The charge or mark-up tendered or allowed for is a percentage of the amount actually paid under the prime cost or provisional sum. This percentage shall cover all the Contractor's handling, supervision, profit and liability costs to provide the services in the prime cost or provisional sum item. The following payment items shall include full compensation for all the works items associated with the provision of suitable safe access to all areas on site.

Item	Description	Unit
<b>PSR 1.1</b>	<b>Temporary access structures and work platforms (by element)</b>	
PSR 1.1.1	Access and platforms to locations as described as well as dismantling and removal at completion (heights assessed by Contractor)	
	(a) (Description of structures)	
	(i) (Element of work requiring access described)	L/Sum
	(ii) (Etc. for other elements of work)	L/Sum
	(b) (Etc. for other structures)	
	(i) (Element of work requiring access described)	L/Sum
	(ii) (Etc. for other elements of work)	L/Sum

The unit of measurement for each subitem shall be the lump sum.

The height of the required access platforms can be estimated from the BOQ and confirmed on site. The heights must be assessed by the Contractor at the time of tender. The tendered amount shall include full compensation for design, supply, fabrication, erection, dismantling, movement and for all labour, materials, and equipment required for the above works including the inspections, supervision by the safety officer and the maintenance of the temporary access structure and work platform. Payment shall be made on the following basis:

- 70% of the lump sum on erection of access structures;
- 30% of the lump sum on removal of access structures;
- Payment shall not be made for re-erection of access structure

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**PSR 2: DEMOLITION AND REMOVAL OF STRUCTURAL CONCRETE AND STEELWORK**

**PSR 2.1 SCOPE**

**PSR 2.2 DEFINITIONS**

**PSR 2.3 GENERAL**

**PSR 2.4 DESIGN BY CONTRACTOR / PERFORMANCE BASED SYSTEMS**

**PSR 2.5 MATERIALS**

**PSR 2.6 CONSTRUCTION EQUIPMENT**

**PSR 2.7 EXECUTION OF THE WORKS**

**PSR 2.8 WORKMANSHIP**

**PSR 2.9 MEASUREMENT AND PAYMENT**

**PSR 2.1 SCOPE**

This Section covers the work in connection with the demolition of entire members of a concrete structure as well as cutting back concrete to expose reinforcement and the initial preparation of the exposed surface. Surface and structural repair of concrete members is covered in Section PSR 3. This Section also covers the demolition and removal of steel structures and members.

**PSR 2.2 DEFINITIONS**

**Concrete and Steel Members or Elements:**

- a) All references to concrete members shall include mass concrete, un-reinforced, reinforced and prestressed concrete members.
- b) References to steel members shall include all structural steel members in structures.

**Demolition of Concrete and Steel Members or Elements:**

Demolition means the breaking up and removal of an entire concrete member or portion of a member or demolition and removal of an entire structural steel member or element.

**Removal of Concrete and Steel Members or Elements:**

- a) Removal of concrete means cutting back into the surface or end of a concrete element and the removal of unsound, damaged or contaminated concrete, or the partial removal of concrete sections, to expose a sound surface for bonding new material for the repair or extension of the concrete element.
- b) Removal of steel members or elements means the cutting out of a steel member or element out of a steel structure.

**PSR 2.3 GENERAL**

**PSR 2.3.1 Concrete Members and Elements**

The work in this chapter includes the demolition of concrete members or elements either completely or partially. Complete demolition is usually carried out for the replacement of a member or element of a structure in its entirety and partial demolition of member or element is carried out for alterations or extensions to a structure.

Removal of small areas of concrete in partial demolitions is carried out for repairs of concrete members or elements.

### **PSR 2.3.2 Structural Steel**

The demolition of structural steel members or elements can also be full demolition of a structure, member or element and is also carried out for alterations, extensions or repairs on structural steel structures.

### **PSR 2.4 DESIGN BY CONTRACTOR / PERFORMANCE BASED SYSTEMS**

Where concrete members or elements are demolished or where concrete is removed from concrete sections, or where steel members or elements are removed, the Contractor shall submit complete method statements for the method of execution of the works. These method statements shall be submitted for approval by the Engineer at least 14 days prior to works being carried out.

### **PSR 2.5 MATERIALS**

All materials used in the demolition and removal of concrete elements, shall be handled, stored and used strictly in accordance with the manufacturer's instructions and the current Occupation Health and Safety Act and its regulations.

### **PSR 2.6 CONSTRUCTION EQUIPMENT**

#### **PSR 2.6.1 General**

All plant, equipment and tools used for the demolition of concrete elements or the removal of portions of existing concrete or the removal of steel members or elements shall be based on proven and accepted technology within the industry. The plant, equipment, tools and accessories shall be inspected and maintained on a regular basis to ensure that they remain in good working order, function efficiently, and that safety is not compromised. All cutting and breaking tools shall be kept sharp to reduce the force required to break out concrete to a minimum.

The plant, equipment and tools used for the demolition or removal process shall be of the accepted type and capacity for the relevant application. The suitability of the chosen method shall be demonstrated on a representative test section identified by the Engineer prior to the execution of any programmed work.

#### **PSR 2.6.2 Access Structures and Working Platforms**

Where necessary, the Contractor shall provide suitable and safe temporary access structures, working platforms, debris collection and removal chutes and bins, including protection screens where required, at each location where concrete has to be demolished or removed.

The temporary structures, platforms, chutes, etc. must be stable and of sufficient strength and rigidity to safely carry the imposed temporary loads arising from the work activity, all as described in Section PSR 1.

### **PSR 2.7 EXECUTION OF THE WORKS**

#### **PSR 2.7.1 Sequence of Execution**

The method and sequence of demolition or removal of concrete and structural steel shall be in accordance with the drawings or the approved method statement submitted by the Contractor to the Engineer for approval.

Any temporary propping specified in the approved method statement and the drawings shall be securely positioned in accordance with each stage of the demolition or removal sequence prior to commencement of

the following stage. Areas to be demolished shall be indicated by the Engineer or shown on the drawings.

#### **PSR 2.7.2 Site Preparation and Access**

The necessary access and temporary support structures shall be in place prior to the commencement of demolition or removal of concrete or structural steel. Screening and protective measures shall be established around the work area as necessary to ensure acceptable Environmental, Occupation, Health and Safety conditions.

#### **PSR 2.7.3 Demolition of Entire Structural Members**

##### **a) Steel Structures or Members**

The removal of entire structural steel structures or members shall be carried out using techniques which do not damage adjacent structures or members. The structural members to be demolished or removed completely shall be cut up into suitably sized sections and removed to suitable scrap metal yards for recycling.

#### **PSR 2.7.4 Removal of Concrete from Structural Elements**

##### **a) Cutting back concrete to a new finished surface**

The concrete and reinforcement shall be cut back adequately to provide the prescribed concrete cover to the new finished surface as indicated on the drawings or as directed by the Engineer. The technique used shall be suited to its intended purpose and shall not cause damage to the remaining concrete member.

Only techniques that do not damage the inherent structure, bond or strength of the remaining sound concrete shall be used. Heavy duty demolition equipment or thermal cutting techniques shall not be used closer than 100 mm from the final surface of the cut back as indicated on the drawings. The remaining concrete shall be removed using approved mechanical equipment or preferably hydro demolition. The fixed exposed contact surface shall be bounded by straight line edges cut at least 10 mm deep by a diamond cutting saw, angle grinder or other approved equipment.

##### **b) Cutting back concrete to expose reinforcement**

Where a concrete member has to be joined or extended or replaced by new concrete, the concrete shall be carefully cut or broken from the reinforcement bars to expose the bars to the dimensions and outline as shown on the drawings or as directed by the Engineer. Care shall be taken not to damage or reduce the strength of the exposed bars or concrete member thereby making them unfit for use. The remaining concrete contact surface shall be cut to a plane and even surface with exposed faces perpendicular to the horizontal face or side faces as applicable.

The bounding lines of the cut concrete shall be straight and neatly cut to at least a depth of 10 mm using a diamond cutting saw, angle grinder or other approved concrete cutting equipment.

#### **PSR 2.7.5 Removal of Structural Steel Elements from Existing Structures**

Where structural steel elements or members are removed from structures special cutting techniques shall be used to ensure the integrity of the remaining steel structure. Temporary bracing and or members shall be welded or bolted into place as indicated on the drawings before such a structural member or element is removed from the structure.

No work shall be carried out unless a complete method statement is submitted to the Engineer for approval and which shall include all Occupational Health and Safety requirements and a Risk Assessment.

#### **PSR 2.7.6 Removal of Metal Sections Embedded in Concrete**

Metal sections including steel reinforcement that are embedded in concrete members by means of grout pockets shall be removed by carefully chipping out the embedment grout filling the pocket. Care shall be taken not to damage the structural concrete surrounding the pocket. Suitable tools such as hand-held power tools with chisel bits or hand tools shall be used to carry out this work.

Following the removal of the metal section or steel reinforcement, all remaining grout shall be removed and the pocket cleaned out to expose only solid concrete surfaces. The pocket shall be finally cleaned using high-pressure water jetting or oil-free compressed air to remove all loose fragments of grout, or concrete aggregate before further work is carried out.

#### **PSR 2.7.7 Preparation of Exposed Contact Surfaces (for extension of existing concrete elements or construction of new concrete members)**

All loose and shattered concrete, as well as foreign material such as oil, paint, grease, etc. shall be removed from the contact surface of old concrete before new concrete is placed. The aggregate must be exposed to provide a good bonding surface.

The mechanically prepared concrete surface shall be cleaned by means of grit blasting or water jetting.

The breaking out and preparation of damaged, spalled and/or cracked concrete surfaces is described and measured under Sections PSR 2 and PSR 3.

#### **PSR 2.7.8 Disposal of Waste Material**

All waste materials, rubble, scrap and rubbish arising from the Contractor's presence on site and/or the execution of the works shall be disposed of weekly to a disposal site or scrap metal yard identified by the Contractor and approved by the Engineer.

### **PSR 2.8 WORKMANSHIP**

#### **PSR 2.8.1 Tolerances**

The Contractor shall remove concrete to a planar, uniform surface with 25 mm maximum deviation from the level or dimension indicated on the drawings unless otherwise approved by the Engineer. The outer edge of the contact surface shall consist of straight lines with maximum deviation of 5 mm from straight, measured with a 1 m long straight edge, and shall be within 5 mm of the position indicated on the drawings, or as instructed by the Engineer. Steel members to be removed shall be cut out and replaced to a tolerance of 1 mm and then be welded or bolted into position.

#### **PSR 2.8.2 Trials**

The Contractor shall carry out pre-construction trials with the proposed equipment to determine the suitability of the technique for the envisaged application. The results shall be reported to the Engineer and shall be subject to the Engineer's approval before the inclusion of such equipment into the method statement for the execution of the works.



## PSR 2.9: MEASUREMENT AND PAYMENT

### Preamble

The tendered rate for each item shall include full compensation for providing, maintaining and decommissioning upon completion, of all the plant, equipment, labour, tools, incidentals and supervision to carry out the activity or construct the works in the item, unless otherwise stated.

Any prime cost or provisional sums shall be paid in accordance with the provisions of the conditions of contract. The charge or mark-up tendered or allowed for is a percentage of the amount actually paid under the prime cost or provisional sum. This percentage shall cover all the Contractor's handling, supervision, profit and liability costs to provide the services in the prime cost or provisional sum item.

The following pay items shall include full compensation for all work associated with the demolition and removal of concrete structural elements including initial preparation of concrete surfaces or portions thereof. General access, work platforms and associated temporary works are covered in Section PSR 1.

The quantities indicated in the pricing schedule are based on the dimensions shown on the drawings and on inspections carried out and increased to allow for the quantity of work. It must, however, be accepted that the quantities of work actually done may vary significantly from the scheduled quantities, and that the Contractor shall be deemed to have allowed in his tendered rates for such variations in quantities which can be reasonably expected.

Item	Description	Unit
<b>PSR 2.1</b>	<b>Demolition of concrete members or elements</b>	
PSR 2.1.1	Partial member or element ( <i>location and description</i> )	m <sup>3</sup>
PSR 2.1.2	Full member or element ( <i>location and description</i> )	m <sup>3</sup>
<b>PSR 2.2</b>	<b>Removal of metal sections embedded in concrete (<i>location and description</i>)</b>	No.
<b>PSR 2.3</b>	<b>Demolition of structural steel structures, members or elements (<i>location and description</i>)</b>	
PSR 2.3.1	Full member or element ( <i>location and description</i> )	No.

The unit of measurement shall be the number of metal sections removed.

The tendered rate shall include full compensation for all labour, materials, equipment, screening of the structure and protective measures, required for the removal of the metal sections as described in Clause PSR 2.7.6 and disposal of all rubble at an approved waste disposal site including overhaul and any fees applicable at the site, and the cleaning of the pocket as specified in Clause PSR 2.7.6.

**PSR 3: SURFACE AND STRUCTURAL REPAIR OF CONCRETE MEMBERS**

**PSR 3.1 SCOPE**

**PSR 3.2 DEFINITIONS**

**PSR 3.3 GENERAL**

**PSR 3.4 DESIGN BY CONTRACTOR / PERFORMANCE BASED SYSTEMS**

**PSR 3.5 MATERIALS**

**PSR 3.6 CONSTRUCTION EQUIPMENT**

**PSR 3.7 EXECUTION OF THE WORKS**

**PSR 3.8 WORKMANSHIP**

**PSR 3.9: GUARANTEES AND COMPLIANCE CERTIFICATES**

**PSR 3.10: MEASUREMENT AND PAYMENT**

**PSR 3.1 SCOPE**

This Section covers the requirements for the surface and structural repair of structural concrete members. It covers the preparation of the exposed concrete surface and reinforcement for the rehabilitation of the member, and the repair or replacement of concrete with cementitious mortars, epoxy systems and proprietary concrete repair compounds.

The method for removal of defective or contaminated concrete, partial removal of concrete sections and the initial preparation of contact surfaces are covered in Section PSR 2.

**PSR 3.2 DEFINITIONS**

**Bonding Agent:** The component of a repair system used to promote adhesion of a repair mortar or concrete to a concrete substrate for the purpose of achieving a permanent bond, which is not affected by moisture and strong alkalis in service.

**Cementitious Repair Products and Systems:** Hydraulic or polymer mortars, concretes and grouts.

**High Flow Mortar or Concrete:** A repair product formulated to exhibit extremely high flow characteristics, outside the limits of normal methods of test, and which flows through narrow gaps and around areas of congested reinforcement, without bleeding or segregation.

**Smoothing Coat:** A fine mortar coating applied to a surface to fill voids, cracks, and cavities or to level an uneven surface. The purpose is to prepare the surface for the application of protection systems.

**PSR 3.3 GENERAL**

This Section includes all the work and materials required to carry out the surface and structural repair of concrete members. The proprietary repair materials which are specified are based on the EN 1504-3 specification which shall be used in conjunction with this specification.

## **PSR 3.4 DESIGN BY CONTRACTOR / PERFORMANCE BASED SYSTEMS**

Where the repair system comprises, in part, of a cementitious mortar or concrete, the material design and preconstruction laboratory results shall be recorded and submitted to the Engineer for approval prior to the commencement of the repair activities. The surface and structural repair activities shall only commence after the approval of the material design. The Contractor shall allow sufficient time in his programme for the material design, EN 1504 compliance verification and approval of the repair system.

## **PSR 3.5 MATERIALS**

### **PSR 3.5.1 General**

Both cementitious-based and epoxy-based repair systems are described in this specification. In particular, cementitious repair systems may comprise either of a proprietary system conforming to the specification or a site-based formulation and performance tested with the relevant requirements of this section.

### **PSR 3.5.2 Cementitious Mortar or Concrete**

The cementitious repair mortar shall comply with the strength requirements of the concrete in the structural member to be repaired. The water/cement (w/c) ratio shall not exceed 0,5 and guidelines for the composition of mortars and concretes consisting of different aggregate sizes shall be in accordance with the requirement of Section PSR 3.

The Contractor shall be responsible for the final design of the repair mix and shall submit a test report by an approved testing laboratory to the Engineer for approval prior to its use in the permanent works. All the test results shall be incorporated in the standard concrete mix design approval form.

Materials used in the cementitious mortar or concrete shall comply with the following requirements:

#### **a) Cement**

Cement shall comply with SANS 50197-1 (EN 197-1) with a strength class of 32,5 or greater, and a rate of strength gain N or greater. Cement shall hold valid certification in the form of a Letter of Authority issued as certified approval pursuant to the Compulsory Specification for cement published by Government Notice R.544. Masonry cement shall not be used.

#### **b) Aggregates**

Aggregates shall comply with the requirements of SANS 1083, subject to all amendments and additional project requirements described in A13.4.5.2 aggregates.

#### **c) Admixtures**

Admixtures shall comply with the requirements of SANS 50934 and shall be of an approved brand and type.

#### **d) Performance requirements for cementitious mortar or concrete**

Unless otherwise specified, the cementitious mortar or concrete shall conform to the performance requirements stipulated in Table PSR 3.5-1 for class R3 for structural repairs or class R2 for non-structural repairs.

### **PSR 3.5.3 Water**

The Contractor shall prove by way of laboratory test that all water used for mixing and curing repair materials complies with SANS 51008.

### **PSR 3.5.4 Epoxy Systems**

Epoxy systems shall consist of a solvent-free, two-part adhesive consisting of a resin and hardener curing at ambient temperatures. The hardener shall be amine based with a high resistance to moisture. The epoxy shall be supplied and used in accordance with the manufacturer's instructions and recommendations regarding the intended use thereof. Aggregate for epoxy mortars shall be kiln-dry when mixed with the epoxy system. The proprietary epoxy system used shall be approved by the Engineer and shall have a minimum compressive strength after 7 days of 50 Mpa.

The suitability of the epoxy mortar for a particular application shall be proved by testing or submission of an approved industry track record of usage under similar circumstances.

The epoxy mortar shall have a compressive strength equal to or greater than the adjacent concrete and it shall exhibit similar temperature expansion characteristics. The elastic modulus,  $E_e$ , shall not exceed that of the parent concrete. Aggregate (fine and coarse) shall be clean and dry and the size shall not exceed one third of the minimum patch thickness.

The Contractor shall be responsible for the final mix design and shall submit details to the Engineer for approval prior to its use in the permanent works.

### **PSR 3.5.5 Proprietary Cementitious Repair Systems**

The suitability of the repair compound for a particular application shall be proved by testing or submission of an approved industry track record of usage under similar circumstances.

The Contractor shall submit details of the proprietary cementitious compounds to the Engineer for approval prior to its use in the permanent works.

The repair systems shall consist of the following to be approved by the Engineer:

#### **a) Primer for Steel Surfaces**

The primer shall consist of a single component zinc rich primer as per Clause PSR 3.5.7 or cementitious epoxy resin compensated three component coating material with active corrosion inhibitor

#### **b) Adhesion promoter for concrete surfaces**

The products and measures deemed suitable for use as adhesion promoters in accordance with the proprietary repair compound and site conditions shall conform to the requirements stipulated in Clause PSR 3.5.6.

### **c) Concrete Repair products**

For structural repairs, only Class R3 and R4 repair products conforming to EN 1504 as specified shall be used. For non-structural repairs, Class R1, R2, or R3 repair products conforming to EN 1504 as specified shall be used.

Typical generic descriptions of suitable repair products may include:

- (i) High strength, expansive cementitious grout;
- (ii) Free flowing structural repair concrete;
- (iii) Fibre reinforced, polymer modified repair mortar;
- (iv) High build, polymer modified repair mortar;
- (v) Polymer modified pore sealer;
- (vi) Very rapid setting repair mortar; and
- (vii) Non-sag patching and repair mortar.

### **d) Curing of repaired surface**

The type and application of the curing compound shall be to the Engineer's approval.

Proprietary cementitious repair systems shall include all components and materials necessary to complete both non-structural and structural repair of concrete structures. The proprietary repair systems shall comply with EN 1504-3. The repair system shall be suitable for the following protective and remedial principles in accordance with EN 1504-9 as set out in Table PSR 3.5-1.

- (i) Applying mortar by hand (Principle 3 – Method 3.1)
- (ii) Recasting concrete (Principle 3 – Method 3.2)
- (iii) Adding Mortar or concrete (Principle 4 – Method 4.4)
- (iv) Increasing cover to reinforcement with mortar or concrete (Principle 7 - Method 7.1)
- (v) Replacing contaminated concrete (Principle 7 – Method 7.2)

The materials for proprietary cementitious repair products shall be supplied as a factory pre-packed dry premix of cements, aggregate and other proprietary products requiring only the addition of pre-packed liquid or a prescribed volume of water of an approved quality to produce the satisfactory repair product. The proprietary repair products shall compensate for shrinkage in both the plastic and hardened states and shall be suitable for use in the proposed mix and placing techniques. These products are suitable for both structural and non-structural applications.

Proprietary concrete shall be highly workable and self-compacting without the use of vibrators. The aggregate grading shall be designed to prevent segregation during transportation and placing. The concrete system shall have a low alkali content to ensure minimal risk of alkali- silica reaction and shall contain no chlorides. The proprietary concrete shall comply with the material properties as indicated on the detail drawings, alternatively the performance requirements defined in Table PSR 3.5-1 shall apply:

**Table PSR 3.5-1: Performance requirements for structural and non-structural repair products (Extract from Table 3, EN 1504-3)**

Item No.	Performance Requirements	Reference substrate (EN 1766)	Test Method	Requirement			
				Structural		Non-structural	
				Class R4	Class R3	Class R2	Class R1
1	Compressive strength	None	EN 12190	≥ 45 MPa	≥ 25 MPa	≥ 15 MPa	≥ 10 MPa
2	Chloride ion content	None	EN 1015-17	≤ 0.05 %		≤ 0.05 %	
3	Adhesive Bond	MC (0.40)	EN 1542	≥ 2.0 MPa	≥ 1.5 MPa	≥ 0.80 MPa	
4	Restrained shrinkage / expansion	MC (0.40)	EN 12617-4	Bond strength after test			No Requirement
				≥ 2.0 MPa	≥ 1.5 MPa	≥ 0.80 MPa	
5	Carbonation resistance	None	EN 13295	Dk ≤ control concrete (MC(0.45))		No requirement	
6	Elastic modulus	None	EN 13412	≥ 20 GPa	≥ 15 GPa	No Requirement	
7	Thermal compatibility Part 1: Freeze-thaw	MC (0.40)	EN 13687-1	Bond strength after 50 cycles			Visual inspection after 50 cycles
				≥ 2.0 MPa	≥ 1.5 MPa	≥ 0.80 MPa	
8	Thermal compatibility Part 2: Thunder shower	MC (0.40)	EN 13687-2	Bond strength after 30 cycles			Visual inspection after 30 cycles
				≥ 2.0 MPa	≥ 1.5 MPa	≥ 0.80 MPa	
9	Thermal combat ability: Part 4: Dry cycling	MC (0.40)	EN 13687-4	Bond strength after 30 cycles			Bond strength after 30 cycles
				≥ 2.0 MPa	≥ 2.0 MPa	≥ 2.0 MPa	
10	Skid resistance	None	EN 13036-4	Class I: >40 units wet tested Class II: >40 units dry tested Class II: > 55 units wet tested		Class I: >40 units wet tested Class II: >40 units dry tested Class II: > 55 units wet tested	
11	Coefficient of thermal expansion	None	EN 1770	Not required if tests 7, 8 or 9 are carried out, otherwise 9.0E-6 mm/mm/°C		Not required if tests 7, 8 or 9 are carried out, otherwise 9.0E-6 mm/mm/°C	
12	Capillary absorption	None	EN 13057	≤ 0.5 kg.m <sup>-2</sup> .h <sup>-0.5</sup>		≤ 0.5 kg.m <sup>-2</sup> .h <sup>-0.5</sup>	No requirement

In addition to the general occupation health and safety requirements of the works all the necessary health, safety and fire precautions stated by the manufacturer shall be complied with. Only material of which the shelf life has not expired shall be used.

### **PSR 3.5.6 Adhesion Promoting Techniques**

Adhesion of the repair material to the substrate is a priority requirement for all repair systems. Adhesion can be assisted by the use of bonding agents, prewetting the substrate, or sealing of the substrate, as appropriate to the particular requirements of the repair system.

Bonding agents shall be supplied, pre-packaged and ready for on-site mixing and application. Typical cementitious materials may include either a one component cementitious, polymer modified primer; or a cementitious, epoxy resin compensated three component coating material. The Contractor shall note the limitations given by the manufacturer to pot life, workable life and open time related to the materials used.

Where appropriate to the cementitious repair system, the concrete shall be well pre-wetted but free from water on the surface at the time of application. The surface should achieve a dark matt appearance without glistening and surface pores and pits should not contain water.

Some repair systems recommend the use of a substrate sealing compounds, this technique shall comply with the adhesion requirements of EN 1504. Typical materials include single-component emulsion based on modified acrylic type resins, but the use of wet-to-dry type epoxy materials shall not be permitted.

### **PSR 3.5.7 Anti-corrosion Primer for Reinforcement**

The anti-corrosion primer shall be a single component zinc rich primer with a minimum volume solids of 30% complying to a 700 hour salt spray resistance to exposure as per ASTM B-117 or a cementitious, epoxy resin compensated three component coating material with an active corrosion inhibitor meeting the requirement of EN 1504-7.

The primer shall be supplied and used in accordance with the manufacturer's instructions and recommendations regarding the intended application. All necessary health, safety and fire precautions stated by the manufacturer shall be complied with.

## **PSR 3.6 CONSTRUCTION EQUIPMENT**

All plant and equipment used for the preparation of concrete surfaces, batching of material and mixing operations shall be in good working order and suited for the intended use. The plant shall be inspected, serviced and calibrated at regular intervals and tested to ensure proper functioning, all to the satisfaction of the Engineer.

## **PSR 3.7 EXECUTION OF THE WORKS**

### **PSR 3.7.1 Preparation of repair surfaces**

#### **a) Preparation of concrete contact surface**

All surface laitance and damaged, loose and soft concrete, concrete containing aggressive ions e.g. chloride, as well as all foreign materials such as oil, paint, grease, etc. shall be removed from the contact surface using pneumatic chisels or other approved mechanical equipment or thermal/hydraulic techniques. The contact surface shall be treated to expose the aggregate by means of grit blasting or high-pressure water-jetting or where it can be shown to produce the required aggregate exposure, a hard brush may be used subject to the Engineer's approval.

The mechanically prepared concrete surface shall be cleaned of dust by means of oil-free compressed air or water-jetting.

The area to be repaired shall be bounded by straight line edges cut to the required depth using a diamond cutting saw, angle grinder or other approved equipment. The edges shall be recessed such that the patch has a thickness at the edge of at least twice the maximum aggregate size of the patching material, but in no case less than 10mm.

#### **b) Preparation and protection of embedded reinforcement**

All visible or embedded reinforcement bars showing signs of corrosion shall be exposed by cutting back the concrete around the bar with pneumatic chisels or other approved method. The corrosion shall be removed by grit blasting, or where this is not warranted, by wire-brushing with power tools to an acceptable surface. The treated steel surface shall be clean of all corrosion and foreign material likely to impair the bond of the anti-corrosion primer to the reinforcement. No chemical solvents shall be used without the approval of the Engineer.

Reinforcement that has experienced significant pitting or reduction in diameter shall be referred to the Engineer for acceptance. All rejected reinforcement shall be cut out and replaced with new bars of the same type and size, allowing for a minimum overlap of 45 diameters with the in situ bars.

All exposed and cleaned reinforcement shall receive one coat of a single-component anti-corrosion primer based on zinc and epoxy resins, which shall be evenly applied to achieve a minimum 40 µm dry film thickness. The primer shall contain at least 30% zinc solids by volume. The primed surface shall not be exposed to the atmosphere longer than specified by the manufacturer primer before the application of the repair mortar, but at least until the coating is fully dry.

Alternative proprietary anti-corrosion coatings shall be subject to the approval of the Engineer, based on submitted test documentation and proven performance within the industry.

In cases where the final concrete cover is deemed by the Engineer to be inadequate the following protection shall be applied at the Engineer's instruction:

- Cover 0 - 5mm



The reinforcement shall receive two coats of anti-corrosion zinc-based epoxy primer as described previously. In order to improve the bond to the covering epoxy mortar, kiln-dry quartzitic sand shall be applied onto the final wet coat.

- Cover >5mm

The outer surface mortar patch shall receive a surface coating based on an approved hydrophobic impregnants, sealers and pore blockers. Where an epoxy mortar is used as repair material, the reinforcement shall be coated as for the 0 - 5mm case.

### **PSR 3.7.2 Bonding layer**

#### **a) Cementitious mortar or concrete repair**

Concrete surfaces that exhibit a high moisture absorption shall be wetted prior to patching, the mortar being applied only when the surface has dried sufficiently to have a matt moist appearance, preferably saturated surface dry.

Generally, the cement paste shall consist of one part cement (same type as for patching mortar) and one part sand (<2mm) mixed with water to a thick, but fluid consistency.

The use of polymer dispersive additives to improve workability and bond characteristics shall be subject to the approval of the Engineer. Alternatively, an approved adhesive or bonding agent may be applied to the prepared surface so as to enhance the bond of the fresh mortar to the dry concrete in accordance with the manufacturer's instructions. Only compatible materials shall be used.

#### **b) Epoxy mortar repair**

The repair surfaces shall be covered with a thin compatible bonding layer of epoxy resin. Should the time interval between resin and mortar application exceed 24 hours, the wet bonding layer shall be sprayed with a kiln-dry quartzitic sand to achieve a sandpaper-like covering. All loose sand shall be brushed off before applying the epoxy mortar to the bonding layer.

#### **c) Proprietary cementitious repair compounds**

The contact surfaces shall be prepared and treated with a compatible bonding layer in accordance with the manufacturer's specification.

### **PSR 3.7.3 Batching and mixing**

#### **a) Cementitious mortar or concrete**

The constituent parts of the mortar or concrete, i.e. the cement, aggregate and water, shall be weigh-batched. Mixing of mortar shall be done with plant or equipment suited to the amount of mortar to be mixed.

The batched materials shall be mixed continuously for at least five minutes in a mechanical drum or table type mixer, or, for small amounts, with an electric drill with a mixing paddle.

**b) Epoxy mortar**

The epoxy base and activator shall be mixed strictly in accordance with the manufacturer's instructions.

The epoxy and aggregate shall be weigh-batched. The base and activator shall first be mixed thoroughly for at least 3 minutes and until a consistent uniform colour is maintained, whereafter the aggregate shall be added and mixed to a uniform consistency. The manufacturer's instructions shall be strictly adhered to.

**c) Proprietary cementitious repair compounds**

The repair compound shall be mixed strictly in accordance with the manufacturer's specifications. Unless otherwise specified the product shall be thoroughly mixed in a forced-action mixer of adequate capacity. Alternatively a suitably sized drum may be used with a slow speed (400/500 rpm) high-torque rotary drill fitted with an approved mixing paddle. The contents shall be properly mixed to ensure a smooth, uniform mix.

The mixing capacity and placing capacity of equipment and labour shall be adequate and matched to enable placing operations to be carried out continuously within the recommended placement time of the product, or within 20 minutes of mixing ensuring a smooth, uniform mix.

Tools and equipment shall be cleaned after each batch and all previously mixed material shall be removed from tools and equipment prior to charging and mixing a new batch of repair compound.

**PSR 3.7.4 Formwork for structural concrete repair**

All formwork shall conform to the Specifications contained in SANS 1200G and shall be used when the area to be patched will not allow for a trowelled finish.

Formwork shall be fixed in place as soon as possible after the substrate has been prepared as specified. Openings in the formwork shall be protected to prevent entry of debris or contaminants.

When casting high flow concrete or mortar, the formwork shall be water-tight and shall be free from obstructions to the free flow of cementitious repair product. Where required, a suitable provision for the drainage of pre-soaking water or access for the application of a surface bonding layer immediately prior to placing the repair concrete shall be provided.

All formwork surfaces which will be in contact with proprietary concrete repair compounds shall be treated with a suitable mould release agent. The formwork surfaces shall match the existing surface textures.

### **PSR 3.7.5 Application of the repair material**

#### **a) Cementitious mortar**

After the defective concrete surface and the embedded reinforcement have been prepared, the bonding layer shall be worked onto the concrete contact surface followed directly by the freshly mixed repair mortar. The mortar application shall follow the technique of plastering.

The mortar surface shall be trowelled when the mortar exhibits initial set to obtain a uniform plain surface true to line, matching the boundaries of the repair area, and shall then be finished to match the adjacent existing surface finish.

Local areas, where deep recesses have been cut out, or where concrete has been removed around reinforcement bars, shall be built up in layers as required.

#### **b) Concrete**

After the defective concrete surface or member has been prepared, an approved bonding layer shall be worked onto the concrete contact surface followed directly by the freshly mixed concrete. The concrete shall be properly compacted and where possible, vibrators shall be used.

#### **c) Epoxy mortar**

The epoxy mortar shall be applied in accordance with the manufacturer's recommendations and specifications.

Each layer of epoxy mortar shall be trowelled onto the prepared and primed surface in one work session. The rate at which the epoxy mortar can be applied shall determine the batch quantity such that the pot life of the epoxy is not exceeded. Unused mortar for which the pot life has been exceeded shall be discarded.

#### **d) Proprietary cementitious repair compound**

The proprietary compound shall be applied in accordance with the manufacturer's recommendations and specifications.

The minimum and maximum layer thickness shall be as specified by the manufacturer, depending on the orientation of the application. Each layer of repair compound shall be thoroughly worked and compacted into the repair zone ensuring that full contact with the primed contact surface is achieved and no air entrapment occurs. All sagging or slumping material shall be removed and the contact surface cleaned prior to re-application using a reduced layer thickness.

### **PSR 3.7.6 Protection and curing**

#### **a) Cementitious mortar or concrete**

The finished mortar surface shall be protected from drying out due to wind, direct sunlight or frost. The Contractor shall arrange such protection to the Engineer's approval who will assess each case on its merits.

The surfaces shall be cured over a period of at least 7 days by spraying a uniform, full coat of an approved resin-based curing membrane not later than 2 hours after placement of the mortar, but within 20 minutes after stripping the formwork, or by any other approved procedure.

#### **b) Epoxy mortar**

The mortar shall be protected from rain and frost for at least 24 hours and shall be cured in accordance with the epoxy supplier's recommendations, or as directed by the Engineer.

#### **c) Proprietary cementitious repair compounds**

Immediately after the proprietary compound has been applied or after formwork has been removed cure the compound as per the manufacturer's detailed instructions.

### **PSR 3.7.7 Reinstatement of concrete cover**

#### **a) Cementitious mortar**

The mortar shall consist of one part cement and two parts sand (0-2mm) by mass with a water/cement ratio not exceeding 0,42. Additives approved by the Engineer may be used to improve workability and durability of the mortar.

The mortar shall be applied to minimum thickness of 10mm and the finished surface shall be treated with an approved curing compound in accordance with Clause PSG 5.5.6.

#### **b) Epoxy Mortar**

Epoxy mortars shall not be applied to structural concrete surfaces with temperatures below +10°C.

The concrete and reinforcement shall be prepared as described in SANS 1200G and primed with the bonding layer before applying the approved epoxy mortar based on the size and depth of repair.

### **PSR 3.7.8 Partial Removal of Concrete to Expose Reinforcement**

Where a structural element contains embedded reinforcement which will be re-used in the rehabilitation process, the concrete shall be carefully chipped away without damaging the reinforcing bars. Damaged bars shall be replaced with new reinforcement of similar type and size, subject to the Engineer's approval.

### **PSR 3.7.9 Sounding Survey**

On instruction from the Engineer a sounding survey shall be carried out by striking the concrete with a hammer of approximately 500g mass and recording the location of hollow sounding areas. On plane areas of concrete the surface shall be sounded at approximately 300mm centres in each direction. On columns, beams or other similar members with faces less than 300mm wide, each face shall be sounded near each edge or corner at approximately 300mm centres along the member. Where a hollow sounding area is detected its extent shall be determined by local sounding and its periphery marked on the surface of the member for repair.

## **PSR 3.8 WORKMANSHIP**

### **PSR 3.8.1 Tolerances**

The Contractor shall apply the patching mortar or concrete and finish the surface to the line and level of the existing concrete and within the tolerances specified on the drawings, or if none is specified, to the tolerances specified in SANS 1200G.

### **PSR 3.8.2 Testing**

The Contractor shall ensure that only compatible materials are used for surface and structural repair of concrete members. All test results shall be reported to the Engineer and will be subject to the Engineer's approval.

The site weather conditions during the application of surface and structural repair of concrete members shall be monitored and recorded as follows:

- a) Ambient temperature shall be recorded using thermometers with accuracy of 1°C, in the direct vicinity of the Works, but not subject to direct solar radiation.
- b) Precipitation shall be recorded daily during product application. The following tests for the substrate and repair material are required:
  - The cleanliness of the substrate shall be visually inspected, after preparation and immediately before the application of repair materials.
  - The temperature of the substrate shall be recorded using thermometers with accuracy of 1°C, but not subject to direct solar radiation.
  - The consistency of repair materials shall be recorded for each batch: for concrete slump measured according to SANS 3001- CO1-3, or flow according to SANS 3001-CO1-6 and consistency for mortar determined in accordance with EN 13395 – parts 1, 2 or 4.
  - Colour, uniformity and texture of finished surfaces shall be assessed visually to ensure consistent aesthetic appearance.

c) Material

The Contractor shall ensure that only compatible materials are used as ingredients for the repair mixes.

The Contractor shall carry out pre-construction compatibility tests on the proposed repair system in accordance with EN 1504 to ensure that the strength and serviceability requirements of the structural rehabilitation are met. The test results shall be reported to the Engineer and shall be subject to the Engineer's approval.

Any patch material exhibiting signs of cracking at its perimeter shall be deemed to have failed and shall be removed and replaced.

d) Acceptance testing

The Engineer will assess cast repair concrete or proprietary cementitious compounds according to SANS 3001-C02-03 and the relevant sub-clauses and any applicable Contract Documentation.

Repair material for surface repair will be assessed for compliance based on the 28-day mean strength test result compared to the specified 28-day compressive strength for each class of repair material.

The criteria for compliance with the strength requirements shall be the mean strength result of three test cubes made from the repair material mix used, which are then prepared and tested in accordance with SANS 3001-C02-03.

Test cubes shall be stored and cured in a manner appropriate to the materials to be tested in accordance with the manufacturer's specifications and shall be properly identified.

The strength results shall represent the section of work executed in the period as agreed to by the Contractor and the Engineer in advance of sampling.

The work at risk due to non-compliance shall be that executed during the agreed period represented by the strength results that failed to achieve the specified strength.

As a consequence of non-compliance in terms of the acceptance criteria, the Contractor shall take such remedial action as the Engineer may consider necessary. Such action may include removal and replacement of material in repairs at risk and further testing. All such costs shall be borne by the Contractor.

## **PSR 3.9 GUARANTEES AND COMPLIANCE CERTIFICATES**

### **PSR 3.9.1 SCOPE**

The Scope of this Section covers the following:

- Product conformance specifications;
- Warranties for product or element design and installation of proprietary systems; and
- Performance specifications

Note that the requirements for performance specifications are not limited to that given in part PSR 3.10 only but includes all of the requirements in the contract documentation.

### **PSR 3.9.2 GENERAL**

#### **PSR 3.9.2.1 Product Conformance Specifications**

The Contractor shall, within 28 days before the work commences, submit to the Engineer conformance documentation related to the specifications. Conformance documentation shall be provided for:

- a) Cements CEM I or CEM II and Admixtures.
- b) Primer for steel surfaces.
- c) Adhesion promoter for concrete surfaces.
- d) Epoxy adhesives and repair mortars.
- e) Structural repair products types R1, R2, R3 and R4 (conforming to EN 1504-3)

### **PSR 3.9.3 PERFORMANCE GUARANTEE REQUIREMENTS**

#### **PSR 3.9.3.1 Performance Specifications**

The guarantee for proprietary products shall be 10 years or as contained in the contract documentation for the project.

## PSR 3.10: MEASUREMENT AND PAYMENT

### Preamble

The tendered rate for each item shall include full compensation for providing, maintaining and decommissioning upon completion, of all the plant, equipment, labour, tools, incidentals and supervision to carry out the activity or construct the works in the item, unless otherwise stated.

The following payment items shall include full compensation for all work associated with the repair of concrete structures such as procurement, transport, additional access and temporary works, plant and equipment required to undertake the work as specified. General access and work platforms and associated temporary works are covered in Section PSR 1.

The quantities indicated in the pricing schedule are based on inspections carried out increased to allow for defects that are not visible. The actual work done may vary significantly from the scheduled quantities and the Contractor shall be deemed to have allowed in his tendered rates for such variations as can be reasonably expected.

New reinforcement will be measured separately.

Item	Description	Unit
<b>PSR 3.1</b>	<b>Proprietary cementitious repair system (Class and generic description) in positions as indicated in accordance with Table PSR 3.5-1.</b>	
PSR 3.1.1	Class R4 – (Generic description)	
	(a) (Position indicated)	
	(i) Supplying the cementitious repair compound according to specification	litre (ℓ)
	(ii) Installation of repair compound according to suppliers' guidelines	litre (ℓ)
	(b) (Etc. for other positions)	
PSR 3.1.2	Class R3 – (Generic description)	
	(a) (Position indicated)	
	(i) Supplying the cementitious repair compound according to specification	litre (ℓ)
	(ii) Installation of repair compound according to suppliers' guidelines	litre (ℓ)
	(b) (Etc. for other positions)	

The unit of measurement is the litre of proprietary repair compound measured in place used for the repair of specified concrete defects.

The tendered rate shall include full compensation for all labour, materials, equipment and plant as well as for all work and incidentals required to break out, prepare, prime all concrete and reinforcement surfaces, repair and cure the designated areas (including for wastage) all in accordance with the Contract Documentation



and the repair material manufacture's procedures, methods and specifications.

In addition, the tendered rates shall make full provision for all efforts to remove existing concrete behind the reinforcement with inadequate cover, and to force the reinforcement deeper into the exiting member. The tendered rates shall cover all the cleaning and preparation of all surfaces in accordance with the supplier specifications, inclusive of the cleaning and treatment of existing reinforcement steel.

Item	Description	Unit
<b>PSR 3.2</b>	<b>Curing of repair surfaces</b>	
PSR 3.2.1	By coating the surface with (type indicated) to (description)	
	(i) Supplying SIKA Antisol (or similar approved) curing compound	m <sup>2</sup>
	(ii) Applying curing compound according to suppliers guidelines	m <sup>2</sup>

The unit of measurement is the square metre of concrete repair surface treated or coated by the method and curing compound indicated and accepted by the Engineer.

The tendered rates shall include full compensation for all labour, materials, plant, equipment and safety measures required to cure the repair work to the satisfaction of the Engineer.

In addition, the tendered rates shall make full provision for all efforts to remove existing concrete behind the reinforcement with inadequate cover, and to force the reinforcement deeper into the exiting member. The tendered rates shall cover all the cleaning and preparation of all surfaces in accordance with the supplier specifications, inclusive of the cleaning and treatment of existing reinforcement steel.

Item	Description	Unit
<b>PSR 3.3</b>	<b>Removal and disposal of existing repairs (description)</b>	L/Sum

The unit of measurement for the removal and disposal of existing repairs shall be a lump sum for the removal of all materials used on previous repairs in the compartment.

The tendered rate shall include full compensation for everything that is necessary to carry out the removal and disposal of the previous repair materials, mark out repair limits on the concrete surfaces and accompany the Engineer's representative during subsequent inspection to confirm the extent of concrete that is to be repaired once the material has been removed.

Item	Description	Unit
<b>PSR 3.4</b>	<b>Concrete (Class) to (description)</b>	
	(i) Supplying concrete according to specification	m <sup>3</sup>
	(ii) Sealing of existing opening using (class) concrete	m <sup>3</sup>

The unit of measurement is the litre of mortar or concrete measured in place, of specified class, used for the repair of specified concrete defects.

The tendered rate shall include full compensation for all labour, materials, equipment and plant as well as for all work and incidentals required to break out, prepare, prime all surfaces, apply repair mortars and cure the designated areas (include for wastage) all in accordance with the project specification and the repair material manufacture's procedures, methods and specifications.

In addition the tendered rates shall make full provision for all efforts to remove existing concrete behind the reinforcement with inadequate cover, and to force the reinforcement deeper into the exiting member. The tendered rates shall cover all the cleaning and preparation of all surfaces in accordance with the supplier specifications, inclusive of the cleaning and treatment of existing reinforcement steel.

## **PSR 4: ANCHORING OF REINFORCEMENT, GROUTING AND CRACK INJECTION**

### **PSR 4.1 SCOPE**

### **PSR 4.2 DEFINITIONS**

### **PSR 4.3 MATERIALS**

### **PSR 4.4 CONSTRUCTION EQUIPMENT**

### **PSR 4.5 EXECUTION OF THE WORKS**

### **PSR 4.6 WORKMANSHIP**

### **PSR 4.7 GUARANTEES AND COMPLIANCE CERTIFICATES**

### **PSR 4.8 MEASUREMENT AND PAYMENT**

### **PSR 4.1 SCOPE**

This specification covers the requirements for the filling of gaps, holes and pockets with grout systems and the injection of cracks and cavities with adhesive systems.

### **PSR 4.2 DEFINITIONS**

**Grouting:** Grouting means the filling of gaps between structural elements by using gravity techniques to fill holes or pockets in concrete members including the embedment of steel sections or other components. Grouting is generally done with a proprietary high-strength, non-shrink, cementitious compound or epoxy system.

**Crack injection:** Crack injection means the filling of cracks and internal cavities in concrete members with low-viscosity liquid epoxy adhesive by a low-pressure injection procedure.

**Epoxy adhesive:** Epoxy adhesive means the compound that serves to bond together two separate materials or contact faces resisting the interfacial stresses to ensure structural composite action of the joined materials.

### **PSR 4.3 MATERIALS**

#### **PSR 4.3.1 Anchoring adhesive**

The materials selected shall be suitable for anchoring reinforcement into concrete surfaces in accordance with EN 1504-9 Principle 4-Method 4.2. All anchoring adhesives shall have certified fire resistance and hold European Technical Approval for use in non-cracked concrete, or if specified on the drawings, certified approval for cracked concrete or seismic zones. All anchoring products shall be styrene-free and shall be compatible with European Technical Approval ETAG 001-5.

#### **PSR 4.3.2 Grout**

The materials selected shall be suitable as structural repair products for concrete in accordance with EN 1504-9 Principle 3-Method 3.2, Principle 4-Method 4.4 and Principle 7-Method 7.2.

##### **a) Cementitious grout**

Cementitious grout shall comply with the requirements of ASTM C1107 or EN 1504. The materials for the grout shall be supplied as a factory pre-packed dry premix of Portland cement powder, graded fillers and other proprietary products requiring only the addition of water to produce the required consistency ranging from a plastic to flowable. The proprietary grout shall compensate for shrinkage in both the plastic and hardened states whilst hardening free of bleeding, segregation and settlement, without gas-generating and air-releasing agents.

Flowable grouts shall be suitable for use by pumping and mix-and-pour placing techniques, and shall be highly workable, self-compacting and self-levelling without the use of vibrators. The cementitious grout shall have no deleterious effects on the reinforcement or embedments, and shall not contain harmful quantities of chloride, nitrate, nitrite, sulphide or sulphate.

**b) Epoxy resin grout**

The materials for the grout shall consist of a factory pre-packed, solvent-free, two-part epoxy adhesive consisting of resin and hardener components and specially prepared and graded aggregate. The epoxy shall be low viscosity modified aliphatics or amidoamines with a high resistance to moisture and low creep values under sustained loads. Polyester-based products shall not be permitted for grouting purposes.

The mixed adhesive shall have a smooth, free-flowing liquid consistency which, when mixed with the aggregate, will not separate or settle out prior to curing.

The epoxy resin grout shall be suited to the intended application and the toxicity of the chemicals in the components shall be low enough to enable safe usage in confined areas of the construction site and in a normal workshop environment.

**c) Working characteristics of grout**

*(i) Application*

The grout system shall be suitable for application by pouring into gaps, holes, pockets or formwork depending on the particular circumstances.

*(ii) Strength development, cure time and environmental conditions*

The grout shall be capable of curing to the required strength at ambient temperatures between 10°C and 40°C in relative humidity up to 95 percent.

The grout must cure sufficiently within 24 hours, to the compressive strength specified on the drawings, with negligible shrinkage on curing.

**PSR 4.3.3 Crack injection and crack filling**

The materials selected shall be suitable for crack injection filling and sealing in accordance with EN 1504-9 Principle 1-Method 1.5 and Principle 4-Methods 4.5 and 4.6.

**a) Adhesive**

*(i) Surface sealing for vertical and overhead surfaces*

The surface sealant shall be suitable for bonding the injection ports to the concrete substrate and for sealing the surface of the crack. The surface sealing adhesive shall be grey in colour, shall be compatible with the injectable adhesive and shall have sufficient strength and adhesion to contain the injectable adhesive at the maximum injection pressure within the crack during the injection and curing processes. The hardened surface sealant adhesive shall be capable of being easily removed without damage to the concrete surface and shall not leave a residue.

Acrylic compounds or car body repair-type compounds shall not be permitted.

(ii) Surface sealing for horizontal, top surfaces

The surface sealant shall be suitable for use in creating a ponding area along the crack for the filling by pouring method. The sealant shall be applied as a bead or dam onto the concrete surface, be capable of retaining the epoxy adhesive and maintain the sealant properties until the epoxy adhesive has hardened. The surface sealant shall be easily removed after hardening of the epoxy adhesive. Surface applied beads of thixotropic acrylic- or polyurethane-sealants are commonly used, but compliance with the epoxy adhesive manufacturer's instructions shall be enforced.

**b) Injection ports**

Injection ports shall consist of short lengths 75 mm to 130 mm of small diameter 3 mm to 5 mm ID, flexible, high-pressure tubing each fitted with a locating pin at the base for bonding in the crack sealant. The locating pin shall be supplied with a length of wire flattened at the end for accurate positioning of the tube over a crack.

Grease nipples or similar self-closing injection nipples shall not be used unless authorized by the Engineer. Sufficient field testing to demonstrate the satisfactory operation of such injection port shall precede any approval application.

**c) Injectable and pourable epoxy adhesive products**

The adhesive used for epoxy injection into cracks in concrete shall consist of an unfilled, solvent-free, two-part epoxy consisting of resin and hardener components. The epoxy shall be low viscosity modified aliphatics or amidoamines with a high resistance to moisture and low creep values under sustained loads. The injectable adhesive shall meet the requirements for force transmitting structural filling of cracks in accordance with EN 1504-5.

The adhesive components shall be supplied in liquid form and in separate sealed containers. Each component shall have a different identifiable colour which results in a distinctive homogeneous colour when thoroughly mixed. The adhesive shall mix readily to a smooth liquid consistency of low to medium viscosity and shall be suitable for injection into cracks on surfaces ranging from horizontal top to vertical, as well as inverted overhead, surfaces.

The mixed adhesive shall be free of lumps and the components shall not separate or settle out during the pot life of the adhesive.

**d) Working characteristics of adhesive**

(i) Surface sealing application

The surface sealing adhesive shall be suitable for trowelling application, shall be non-slump and shall have excellent gap filling properties.

(ii) Injectable and pourable application

The adhesive shall be suitable for injection into cracks and voids under low pressure and shall meet the requirements for Injectability Class P3 (as defined in EN 1504-5) when determined in accordance with EN 1771. The viscosity of the epoxy shall be matched to the crack width and material macroporosity surrounding the crack, generally between 200 cP and 400 cP at 25°C. The adhesive shall be capable of bonding to dry and moist surfaces where the injected adhesive

displaces moisture present in cracks and cavities.

(iii) Pot life

The workable time or pot life of the mixed adhesive shall be determined according to EN ISO 9514. The mixed adhesive shall exceed 60 minutes at 25°C and a relatively high humidity, unless special circumstances dictate a fast-setting adhesive.

(iv) Storage life

The storage life, or shelf life, in the original sealed containers of both the resin and hardener shall not be less than six months stored at temperatures between 5°C and 25°C. Only batches of material of which the shelf life has not expired shall be used.

(v) Cure time and temperature

The adhesive shall be capable of curing to the required strength at temperatures between 10°C and 40°C in relative humidity of up to 95 percent.

The adhesive must cure sufficiently to develop the specified mechanical properties within 7 days, with negligible shrinkage on curing.

**e) Mechanical properties of cured injectable adhesive**

(i) Moisture resistance

The adhesive shall comply with "Adhesion by tensile bond strength" Class F2 (as defined in EN 1504-5) when tested in accordance with EN 12618-2 for "Adhesion by tensile bond strength after thermal and wet-drying cycles". If specified on the drawings, the adhesive shall comply with "Adhesion by tensile bond strength after thermal and wet-drying cycles" Class F1 (as defined in EN 1504-5).

(ii) Temperature resistance

The glass transition temperature of the adhesive, measured in accordance with EN 12614, shall exceed 40°C and the adhesive shall have a heat distortion temperature (HDT) of at least 50°C measured in accordance with ISO 75.

(iii) Flexural modulus

The modulus of elasticity in flexure of the adhesive, determined in accordance with EN ISO 178, shall be between 2,0 GPa and 10,0 GPa at 20°C. The adhesive must have a consistent static behaviour for temperatures ranging between -20°C to 40°C under cyclic loading.

(iv) Modulus of elasticity in compression

The modulus of elasticity in compression of the adhesive, determined in accordance with EN 13412, shall be minimum 2,0 GPa.

(v) Shear strength

The bulk shear strength of the adhesive, determined in accordance with EN 12188, shall exceed 12 MPa at 20°C.

(vi) Tensile strength

The adhesion capacity shall be determined in accordance with EN 12188. The tensile stress carried by the bonded joint in a pull-off test shall not be less than 14 MPa. The slant shear strength of scarf-jointed prisms tested in compression at various interface angles:

1. for an interface angle of 50°, the minimum adhesion stress shall be 50 MPa
2. for an interface angle of 60°, the minimum adhesion stress shall be 60 MPa
3. for an interface angle of 70°, the minimum adhesion stress shall be 70 MPa.

(vii) Double lap shear strength

The average lap shear strength of a double overlap joint at failure using steel plates shall exceed 8 MPa at 20°C.

#### **PSR 4.3.4 Packaging and handling**

All adhesive components shall be supplied in separate sealed containers of suitable sizes to obtain a mixed quantity that can be fully utilized within the pot life of the adhesive. The components shall be packaged in the correct portions so that the entire contents of each container mixed together shall produce a mix of the correct proportions. The adhesive properties shall not vary significantly with minor variations in the mix proportions resulting from the container emptying process.

Each container shall be durably and legibly marked and complete records of stock acquired and issued for use, shall be kept. The containers shall be clearly marked with the following information:

- a) name of manufacturer;
- b) manufacturer's product identification;
- c) batch number and date of manufacture;
- d) date of expiry or shelf life;
- e) manufacturer's instructions for mixing; and
- f) detailed health and safety information, including precautionary physical, toxiological and environmental requirements.

#### **PSR 4.3.5 Storage**

The Contractor shall provide a lockable store with ventilation and observe all storage requirements and safety precautions recommended by the manufacturer's instructions and applicable Regulations.

#### **PSR 4.3.6 Manufacturer's instructions and documentary proof of compliance**

The material manufacturer's quality control conformance certificates and test results relevant for each batch of material supplied to site shall be made available to the Engineer upon request. The manufacturer shall provide a dated, coded and titled instruction sheet with each delivery of adhesive. The following information shall be contained on the sheet in a clear and unambiguous manner:

- a) the general chemical type of each component used in the adhesive;
- b) recommended storage conditions and shelf life when stored under these conditions;
- c) preparation instructions for steel and concrete surfaces;
- d) instructions for use of primers, including optimum dry film thickness and permissible ranges;
- e) mixing instructions, including allowable variations in mix ratio and any temperature control requirements during the mixing process;

- f) application instructions, including limits on pressure, temperature, open time and relative humidity before injection;
- g) safety precautions for all components of the adhesive; and
- h) curing conditions and temperature-related precautions.

#### **PSR 4.4 CONSTRUCTION EQUIPMENT**

##### **PSR 4.4.1 General**

All plant and equipment used for anchoring of reinforcing bar, grouting operations and pressure- and gravity-injection of epoxy resins shall be based on proven and accepted technology and practice within the industry. The plant, equipment, tools and accessories shall be inspected and maintained on a regular basis to ensure that they remain in good working order, are clean, function efficiently, and that safety is not compromised - all to the approval of the Engineer.

##### **PSR 4.4.2 Temporary access structures and working platforms**

Where necessary the Contractor shall provide temporary access structures and working platforms in accordance with Section PSR 1 at each location for anchoring, grouting or crack preparation and injection procedures.

##### **PSR 4.4.3 Forming holes for anchoring**

The Contractor shall form holes for anchoring utilizing equipment based on rotary drilling or wet coring techniques, appropriate to the size of the hole and the anchoring material utilized.

##### **PSR 4.4.4 Pressure injection equipment**

The type and capacity of the pressure injection equipment, delivery hoses and nozzles shall be such as to ensure the uniform supply of separate components to the mixing nozzle, thereby obtaining the correct consistency and a uniform discharge rate from the nozzle.

The pressure injection equipment shall be capable of continuously supplying the freshly mixed epoxy resin on demand. The equipment shall be fitted with properly calibrated positive displacement pumps and a pressure gauge capable of recording correct pressures applied up to 2,0 MPa with 0,1 MPa divisions.

The two components of the epoxy injection compound shall be fed separately to the extrusion gun and shall only be mixed together within the pressure chamber of the gun at the time of injection. On no account shall ready-mixed epoxy be fed to the extrusion gun.

#### **PSR 4.5 EXECUTION OF THE WORKS**

##### **PSR 4.5.1 Grouting**

###### **a) Preparation of contact surfaces**

Concrete contact surfaces shall be prepared by removing all surface laitance and damaged, loose and soft concrete, concrete containing aggressive ions, e.g. chloride, as well as cleaning the surfaces of all foreign adherents and impregnants such as oil, paint, grease, curing compounds, dirt, etc. The contact surface shall be treated to expose the sound substrate by means of chiselling, grit blasting or high-pressure water-jetting. Where concrete removal is achieved by mechanical means (for example. Chiselling), the surface shall receive treatment using high-pressure water-jetting to remove concrete



layer potentially containing micro-cracking. The prepared contact surfaces shall be finally cleaned of loose dirt and dust by means of oil-free compressed air, water-jetting or vacuum cleaning, as appropriate for the grouting material.

**b) Holes, recesses, and pockets for grouting.**

Holes, recesses, and pockets that are formed in concrete must be cleaned of all foreign material and prepared as for the contact surfaces in Clause PSR 4.5.1(a).

**c) Pre-soaking**

Cementitious grout usually requires the pre-soaking of the concrete substrate with water several hours prior to grouting. All surface pores and local depressions formed due to roughening should not contain standing water when the grouting takes place. All free water shall however be removed from the surface and holes or pockets immediately prior to grouting. The contact surface should present as dark matt, without glistening or shiny water films. A site test may be performed by introducing drops of water applied to the contact surface that must be soaked up, leaving the surface matt again after a short time. The surface should not be allowed to dry before the application of the grouting products.

The use of an epoxy resin grout usually requires a clean and substantially dry contact surface. No pre-soaking is required unless specified by the grout manufacturer.

**d) Formwork**

Temporary formwork may be required to place and contain the fluid grout. Reference shall be made to the manufacturer's instructions regarding flow distance based on the gap width and the fluid head at the pouring side. The formwork shall be constructed to be leakproof to prevent wastage and loss of material. For grouting applied proud of existing concrete surfaces, 45 degree chamfers may be used around the grout perimeter, if instructed by the Engineer. The Contractor shall apply suitable care in the selection of formwork release agents appropriate to the grouting product used.

**e) Batching and mixing**

The proprietary grout shall be batched and mixed strictly in accordance with the manufacturer's instructions.

Unless otherwise specified, the product shall be mixed thoroughly in a forced action mixer of adequate capacity. Alternatively a suitably sized container equipped with a slow-speed (typically 400-500 rpm), high-torque rotary drill fitted with an approved paddle may be used. The liquid components shall be properly mixed to ensure a smooth uniform mix prior to adding the aggregate. The premixed aggregate shall be added slowly to the liquid binder and mixed until an evenly coated and wet mix is obtained.

The mixing and placing capacity of equipment and labour shall be adequate and matched to enable placing operations to be carried out continuously within the recommended workable time, or pot life, of the product, generally within 15 minutes of mixing for cementitious grouts. The mixed product shall be passed through a suitable coarse metal screen prior to placing or pumping to remove any lumps of unmixed product.

The mixed product shall not be used after expiry of the pot life and all material unused after the workable time limit, shall be discarded at the Contractor's expense. All previously mixed material shall be removed from tools and equipment prior to charging and mixing a new batch of grout.

**f) Placement of grout for bedding or gap filling**

The mixed grout shall be placed within the workable life or pot life of the material in accordance with the manufacturer's instructions.

In general, continuous grout flow is essential, hence sufficient mixed grout shall be available prior to commencing placement, and the rate of placing a batch shall be matched to the time taken to batch and mix a new batch.

Placement shall take place at one end of a gap to ensure continuous flow through the gap expelling all air from the exit opening. A sufficient grout head shall be maintained at the inlet end to ensure a continuous grout front through the gap.

For an epoxy grout a single batch shall not exceed 30 litres of mixed material. For large batches of cementitious grout, placing by pump may be considered.

**g) Protection and curing**

The exposed cementitious grout surfaces shall be protected from wind, rain and low or high ambient temperatures that may lead to cracks caused by plastic or drying shrinkage. While the cementitious grout hardens and cures, the temperature gradient throughout the structure shall be managed to ensure it remains as uniform as possible to avoid thermal cracking.

Cementitious grouts shall be thoroughly cured by supplying excess water over the grout surface, the application of water using continuous mist sprays, or using saturated absorbent material covered with transparent plastic sheeting. In cold weather, grout may be cured by means of an approved curing compound.

**PSR 4.5.2 Crack injection**

All work related to the injection of cracks with epoxy shall be executed in accordance with the approved method statement as confirmed by site tests according to Clause PSR 4.5.2 (a).

**a) Extent and sequence of work**

The extent of work will be indicated by the Engineer and no work may commence unless instructed by the Engineer. The extent of the actual work may vary very significantly from that indicated in the pricing schedule and the Contractor is advised to discuss the extent of the work with the Engineer at the outset of the contract before establishing the necessary personnel, equipment or plant on site.

Following the erection of the necessary temporary access and working platforms at the work location and, if required, cleaning of the surface, the Engineer, assisted by the Contractor, shall undertake a detailed inspection of the existing concrete surfaces to identify cracks requiring epoxy injection. The Engineer shall then issue an instruction to the Contractor detailing the extent and nature of the work. In general, only cracks exhibiting a surface crack width of 0,4 mm or greater shall be injected unless instructed to the contrary by the Engineer.

**b) Crack preparation**

All surfaces within 50 mm of a crack line shall be thoroughly cleaned of all foreign material likely to impair the bond of the surface sealant to the concrete by high-pressure water-jetting, wet grit blasting or other approved chemical and mechanical means. All loose spalls and foreign materials within the crack shall be similarly removed followed by final cleaning with clean, oil-free compressed air. The concrete surface and crack shall be allowed to dry out completely and finally cleaned before commencing with crack sealing and injection.

## Surface sealing and injection port installation

The whole surface of the crack shall be temporarily sealed with a sag resistant fast setting epoxy surface sealant cured with a modified aliphatic amine. The type of temporary sealant used shall be such that it can be removed without causing damage to, or defacement of, the concrete surface.

All minor cracks branching out from the identified cracks by more than 50 mm shall be cut perpendicularly across the crack using an angle grinder to a depth of at least 25 mm and filled with epoxy surface sealant.

Approved injection ports shall be properly spaced along cracks, but shall not be drilled and fixed directly into the crack. The first and last injection ports must be established at either end of a crack in a member. The injection ports shall be located over the cracks using the locating wire and the locating end shall be firmly sealed and bonded to the concrete surface with a generous amount of epoxy sealant. Thereafter the crack surface between injection ports shall be sealed with an approved epoxy surface sealant band at least 3 mm thick and 30 mm wide.

While guidelines can be given for proper spacing, good judgement must be the final criterion.

(i) Guidelines for injection port spacing in partial depth cracks are as follows:

1. Spacing between injection ports should be equal to the desired depth of penetration since the resin generally travels as far into the crack as along the face of the crack. If port-to-port travel at this spacing is not obtained, intermediate injection ports must be established.
2. If the cracks are less than 0,4 mm wide, injection ports should not be spaced more than 150 mm apart. If the cracks are more than 600 mm in depth, full penetration may be difficult to achieve because of equipment limitations. Intermediate ports should be established to monitor the flow of epoxy.

(ii) Guidelines for injection port spacing in cracks extending the full depth of the member are as follows:

1. Members up to 300 mm thick

For members 300 mm or less in thickness, injection ports should be placed in the crack on one side only and spaced at the thickness of the member.

2. Members 300 mm to 600 mm thick

For members 300 mm to 600 mm in thickness, injection ports should be placed in the crack on all available sides and spaced no more than the thickness of the member.

3. Members over 600 mm thick

For members greater than 600 mm in thickness, injection ports should be placed in the crack on all available sides and spaced according to the guidelines set forth for the partial depth cracks in Clause PSR 4.5.2 (c)(i).

### **c) Epoxy resin injection**

Either the pressure injection or vacuum impregnation technique of crack injection shall be used. The epoxy surface sealant shall have cured fully before commencing with any crack injection.

All traces of cleaning solvent and air shall be expelled from the injection gun prior to commencing with crack injection.

Using an automatic epoxy mixing gun, the epoxy resin shall be injected in such a way that there is a steady displacement of air and moisture from within the crack. Starting from the lowest injection port at one end, the epoxy resin shall be injected until resin flows out of the next injection port. The upper injection port is closed and the process of injecting the epoxy resin is continued briefly. A steady injection pressure shall be maintained, however at no stage shall the pressure exceed 1,0 MPa.

The gun shall then be moved to the injection port where the resin has flowed out and the procedure is repeated for the length of the crack. After the crack is filled, and not longer than 30 minutes after the work has begun, another attempt shall be made to inject more resin, starting at the first port.

Before injection work starts, a rough calculation shall have been made as to the amount of resin required to fill the crack. If consumption exceeds the estimated quantity by more than three times, the matter shall be referred back to the Engineer for investigation.

At all cracks, contact surface or repaired cavities, epoxy injection shall commence at the lowest injection point and at one end, and shall in all cases be executed such that there is a steady displacement of air, residual moisture and fine material from the void being injected.

During the entire injection operation, the sealing lines (on both sides in the case of full depth cracks) and adjacent concrete surfaces shall be inspected for any signs of leakage of epoxy and, if observed, the injection shall be stopped and the leaking region sealed or resealed.

Further injection shall recommence only once the epoxy sealant repair has cured sufficiently. Accurate and complete records shall be kept of the amount of epoxy injected into each crack, contact surface or repaired cavity together with any leakage that may have occurred during the injection operation.

After satisfactory completion of the pressure injection at any particular location and the full curing period of the epoxy injection material, the injection points and all epoxy sealant shall be removed and the concrete surfaces and crack lines, as applicable, made good. Where the aesthetic appearance of the concrete surface is important, the surface sealant epoxy may be removed by careful heating using a propane torch, allowing the epoxy to soften, i.e. above 130°C in combination with gentle scraping. Alternatively for non-aesthetic surfaces and those that may receive protective coatings, grinding down the areas as necessary and finishing to a smooth and clean surface will be required. Where the crack is chased out, the chase should be filled with an approved repair material and finished flush with the concrete surface.

**d) Crack filling**

(iii) Extent and sequence of work

The extent of the work will be indicated by the Engineer and no work may commence unless instructed by the Engineer. The extent of the actual work may vary very significantly from that indicated in the pricing schedule and the Contractor is advised to discuss the extent of the work with the Engineer at the outset of the contract before establishing the necessary personnel, equipment or plant on site.

Following the erection of the necessary temporary access and working platforms at the work location, the Engineer, assisted by the Contractor shall undertake a detailed inspection of the existing concrete surfaces to identify cracks requiring filling. The Engineer shall then issue an instruction to the Contractor detailing the extent and nature of the work. In general, only cracks exhibiting a surface crack width exceeding 0,2 mm shall be filled unless instructed to the contrary.

(iv) Surface preparation

All surfaces within 50 mm of a crack line shall be thoroughly cleaned of all foreign material likely to impair the bond of the surface sealant to the concrete by high pressure water jetting, wet grit blasting or other approved mechanical means. All loose spalls and foreign materials within the crack shall be similarly removed followed by final cleaning with clean, oil free compressed air. The concrete surface and crack shall be allowed to dry out completely and finally cleaned before commencing with crack filling.

(v) Crack preparation

Create a vee notch in the concrete approximately 20 mm wide over the crack using a hammer and chisel or small power tools. Clear all debris, loose concrete and dust and prime the surface with the specialised materials.

(vi) Crack filling

Fill the vee notch with specified material and grind smooth with the surrounding surface when cured.

**PSR 4.5.3 Manufacturer's guidelines, and health and safety requirements**

Compliance with all health, safety, storage and fire precautions shall be in accordance with the manufacturer's instructions. The toxicity of the chemicals in the components shall be low enough to enable safe usage in confined areas on the construction site and in a normal workshop environment, including special ventilation if required. Wherever toxicity of the chemicals in the components is declared by the manufacturer, suitable personal protective equipment shall be utilized by all persons working with, transporting or storing that product.

## **PSR 4.6 WORKMANSHIP**

### **PSR 4.6.1 Grouting**

The Contractor shall through the application of careful methodology, ensure that the grouting has minimal entrapped air. Wherever possible, tapping or sounding on a grouted surface can be carried out with a light hammer or other impact echo equipment. The purpose of the sounding shall be to detect delaminated areas of the grout.

The compressive strength of grouting products shall be verified in accordance with EN 12190. The consistency of concrete mortar and grouts shall be determined in accordance with EN 13395-Parts 1 to 4.

### **PSR 4.6.2 Crack injection**

#### **a) Site tests**

The Contractor shall ensure that only approved materials for the proposed crack injection process are used. Preconstruction site tests to confirm proposed work procedures shall be undertaken in accordance with this specification and the approved preliminary method statement. Any variation to procedures or material usage arising from site test results shall be incorporated into the approved final method statement. Further site tests to confirm revised procedures or material use, and test coring to confirm crack penetration and sealing quality shall be at the discretion of the Engineer.

#### **b) Core tests**

Test coring from the actual crack injection areas shall be done at positions and at intervals as instructed by the Engineer to confirm satisfactory crack penetration and sealing quality. The core size shall be 30 mm to 60 mm nominal diameter and shall extend at least to the full depth of the crack or other dimension as instructed by the Engineer. Where conformance in accordance with EN1504-10 is verified, the degree of crack filling shall be minimum 80 %. Acceptance of the core results will be at the discretion of the Engineer.

## **PSR 4.7 GUARENTEES AND COMPLIANCE CERTIFICATES**

### **PSR 4.7.1 SCOPE**

The scope of this section covers the following:

- Product conformance specification; and
- Performance specifications.

## **PSR 4.7.2 GENERAL**

### **PSR 4.7.2.1 Product Conformance Specifications**

The Contractor shall within 28 days of entering into the contract with the Employer submit to the Engineer conformance documentation related to the specifications. All products used to anchor reinforcement, in grouting and in crack injection of reservoir elements shall be in compliance with the specifications continued in Section PSR 4.7.

Compliance documentation shall be provided for:

- a) Grout (Clause PSR 4.3.2)
- b) Crack injection and crack filling (Clause PSR 4.3.3)

## **PSR 4.7.3 PERFORMANCE GUARANTEE REQUIREMENTS**

### **PSR 4.7.3.1 Performance Specifications**

Performance based specifications shall be contained in the Contract Documentation for the project.

## **PSR 4.8 MEASUREMENT AND PAYMENT**

### **Preamble**

The tendered rate for each item shall include full compensation for providing, maintaining and decommissioning upon completion, of all the plant, equipment, labour, tools, incidentals and supervision to carry out the activity or construct the works in the item, unless otherwise stated.

Any prime cost or provisional sums shall be paid in accordance with the provisions of the conditions of contract. The charge or mark-up tendered or allowed for is a percentage of the amount actually paid under the prime cost or provisional sum. This percentage shall cover all the contractor's handling, supervision, profit and liability costs to provide the services in the prime cost or provisional sum item.

Payment for items in this Section shall include full compensation for all works associated with any additional temporary works, execution of the work and quality assurance procedures which are not separately covered by the measurement and payment items of the specification. All costs associated with general access, work platforms and temporary works not included under Section A14.1, shall be included in the tendered rates.

The quantities indicated in the pricing schedule Section A14.5 are based on visual inspections performed as part of the preliminary and detail design phases. The actual work done may vary significantly from the scheduled quantities and the Contractor shall be deemed to have allowed in his tendered rates for such variations as can be reasonably expected.

<b>Item</b>	<b>Description</b>	<b>Unit</b>
<b>PSR 4.1</b>	<b>Establishment on site for crack injection</b>	<b>L/Sum</b>

The unit of measurement shall be the lump sum.

The tendered sum shall include full compensation for the establishment on site and the subsequent removal of all special plant and equipment required for the pressure injection of epoxy resin into cracks and any additional plant, specialist access structures and work platforms required for the execution of the work.

The lump sum shall be paid as follows:

- i. 75 % when all equipment is established on site and the first crack injection work has been satisfactorily completed according to the approved method statement, and
- ii. 25 % after all crack injection work has been satisfactorily completed and the equipment is removed from site.



Item	Description	Unit
<b>PSR 4.2</b>	<b>Surface preparation and surface sealing for crack injection to</b>	
	(a) (location on structure)	metre (m)

The unit of measurement shall be the metre (m) of crack prepared for crack injection by pressure or gravity means.

The tendered rate shall include full compensation for all labour, materials, equipment and plant as well as for all work and incidentals required to prepare, clean and prime all surfaces, seal and cure the designated cracks (including for wastage), and install and operate injection ports, all in accordance with the project specification and the repair material manufacturer's instructions.

Item	Description	Unit
<b>PSR 4.3</b>	<b>Crack injection adhesive to</b>	
PSR 4.3.1	Roof slab soffit	
	(a) Supplying epoxy resin according to specification	metre (m)
	(b) Injecting epoxy resin according to suppliers' guidelines	metre (m)
PSR 4.3.2	Internal walls	
	(a) Supplying epoxy resin according to specification	metre (m)
	(b) Injecting epoxy resin according to suppliers' guidelines	metre (m)
PSR 4.3.3	Support Columns	
	(a) Supplying epoxy resin according to specification	metre (m)
	(b) Injecting epoxy resin according to suppliers' guidelines	metre (m)
PSR 4.3.4	Reinforced concrete beams	
	(a) Supplying epoxy resin according to specification	metre (m)
	(b) Injecting epoxy resin according to suppliers' guidelines	metre (m)
PSR 4.3.5	Elevated Tank	
	(a) Supplying epoxy resin according to specification	metre (m)
	(b) Injecting epoxy resin according to suppliers' guidelines	metre (m)
PSR 4.3.6	Other areas identified by the engineer	
	(a) Supplying epoxy resin according to specification	metre (m)
	(b) Injecting epoxy resin according to suppliers' guidelines	metre (m)

The unit of measurement shall be the litre of adhesive used as approved by the Engineer. The volume shall be determined from the dimensions indicated on the drawings or as authorized by the Engineer following the detailed inspection of the prepared surfaces. Any overcut or excessive preparation resulting in additional adhesive quantities shall not be measured.

The tendered rate shall include full compensation for all labour, materials, equipment, plant and incidentals required for the supply, mixing and application of the adhesive to the prepared concrete surface. It shall also include the certification testing and quality assurance monitoring and testing by the Contractor, as well as any wastage of the mixed or spilled materials and the disposal thereof. The tendered rate shall also include all costs arising from any clean-up and finishing actions required due to spillage or poor workmanship.

Item	Description	Unit
<b>PSR 4.4</b>	<b>Crack filling</b>	
	(a) Removal of existing crack seal (description) in (location)	metre (m)
	(b) Supplying cementitious grout	metre (m)
	(c) Repair of the cracks using the cementitious grout to areas identified by the engineer	metre (m)

The unit of measurement shall be the metre (m).

The tendered rate shall include full compensation for all labour, materials, equipment and plant as well as for all work and incidentals required to, prepare, clean and prime all surfaces, repair and cure the designated cracks (including for wastage), and finish the repaired surface all in accordance with the project specification and the manufacturer's instructions.

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**PSR 5 REPAIR AND REPLACEMENT OF ANCILLARY STRUCTURAL ELEMENTS**

**PSR 5.1 SCOPE**

**PSR 5.2 DEFINITIONS**

**PSR 5.3 MATERIALS**

**PSR 5.4 CONSTRUCTION EQUIPMENT**

**PSR 5.5 EXECUTION OF THE WORKS**

**PSR 5.6 MEASUREMENT AND PAYMENT**

**PSR 5.1 SCOPE**

This section covers the requirements for the removal of debris from repair of expansion joints, removal and rebuilding of brickwork.

**PSR 5.2 DEFINITIONS**

Elements are defined elsewhere in these specifications.

**PSR 5.3 MATERIALS**

All materials referred to in this section shall be in accordance with relevant sections in the Contract Documentation.

**PSR 5.4 CONSTRUCTION EQUIPMENT**

The Contractor shall before the construction commence, provide comprehensive details of all plant and equipment, which shall be appropriate for the intended use and in good working order.

**PSR 5.5 EXECUTION OF THE WORKS**

**PSR 5.5.1 Removal of debris from expansion gaps**

All debris in the expansion gaps and expansion joints between deck ends, walls and girder beds shall be removed and the gaps shall be cleaned out with high-pressure water or air jets or other suitable means. Solvents or fire shall not be used.

Protective measures such as screening shall be provided to contain flying debris, dust and water spray to ensure that passing traffic is not endangered and that the environment is not contaminated.

**PSR 5.5.2 Repair of expansion joints**

Remedial work on expansion joints and repairs to joint nosings shall be in accordance with the drawings. Refurbishment of proprietary joint systems shall entail the servicing of the joint in situ, or the removal and replacement of joint components.

Existing joint sealant shall be removed using mechanical methods. The joints then cleaned of all loose material. The joint system approved by the Engineer will then be installed according to the manufacturers guidelines.

### **PSR 5.5.3 Removal and rebuilding of brickwork**

Brickwork that needs to be rebuilt, shall be broken down and removed as instructed by the Engineer. Care shall be taken not to damage brickwork or concrete adjacent to the section to be removed. New brickwork shall be joined to existing brickwork using a stepped-back or keyed joint. Joints shall only be provided where shown on the drawings or as instructed by the Engineer. Rebuilt walls shall be plastered if instructed and the surfaces shall be treated as specified to provide a uniform texture and colour to match the existing work.

### **PS 5.5.4 Replacement and refurbishment of ancillary elements**

The replacement or refurbishment of ancillary elements such as access ladders, etc. shall be carried out as specified on the drawings or directed by the Engineer.

### **PSR 5.5.5 Disposal of waste material**

All waste materials, rubble, scrap and rubbish arising from the Contractors work on site and the execution of the works shall be disposed of to a disposal site identified by the Contractor and approved by the Engineer.

## PSR 5.6 MEASUREMENT AND PAYMENT

### Preamble

The tendered rate for each item shall include full compensation for providing, maintaining and decommissioning upon completion, of all the plant, equipment, labour, tools, incidentals and supervision to carry out the activity or construct the works in the item, unless otherwise stated.

Any prime cost or provisional sums shall be paid in accordance with the provisions of the conditions of contract. The charge or mark-up tendered or allowed for is a percentage of the amount actually paid under the prime cost or provisional sum. This percentage shall cover all the contractor's handling, supervision, profit and liability costs to provide the services in the prime cost or provisional sum item.

Item	Description	Unit
<b>PSR 5.1</b>	<b>Removal and replacement of existing joint system</b>	
PSR 5.1.1	(a) (Location of joints to be removed and replaced)	
	(i) Removal of existing joint sealant and cleaning of all joints by mechanical methods	metre (m)
	(ii) Supplying new joint system (Sika Combiflex SG-20M or similar approved) including epoxy (Sikadur 31 DW or similar approved) and new silicone-based sealant inside joint (Sikaflex Pro 3 or similar approved)	metre (m)
	(iii) Installation of new joint system (Sika Combiflex SG-20M or similar approved) including epoxy (Sikadur 31 DW or similar approved) and new silicone-based sealant inside joint (Sikaflex Pro 3 or similar approved)	metre (m)
PSR 5.1.2	(a) (Location of joints to be removed and replaced)	
	(i) Removal of existing joint sealant and cleaning of all joints by mechanical methods	metre (m)
	(ii) Supplying new joint system (Dow Corning 888 silicone joint sealant or similar approved) including backing chord	metre (m)
	(iii) Installation of new joint system (Dow Corning 888 silicone joint sealant or similar approved) including backing chord	metre (m)

The unit of measurement shall be the metre of specified expansion joint removed and replaced as detailed.

The tendered rate shall include full compensation for all plant, equipment, labour and material required to remove and replace, and to dispose of the existing joint system including and the preparation and installation of the new system as detailed. The rate shall also allow for the provision of special protective measures specified during each stage of the installation.

Item	Description	Unit
PSR 5.2	(a) Removal of brickwork (description of brickwork to be removed)	metre (m)
PSR5.2.1	(b) Supplying new brickwork (description of new brickwork)	metre (m)
PSR 5.2.2	(c) Installation of new brickwork (description of brickwork to be built)	metre (m)

The unit of measurement shall be the square metre of brickwork removed, disposed of, new brickwork supplied and subsequently rebuilt.

The tendered rate shall include full compensation for all labour, material, plant and equipment required for the removal of brickwork and subsequent rebuilding the brickwork complete with plaster finish (if instructed by the engineer).

Item	Description	Unit
PSR 5.3	Supply and install new ancillary elements:	
PSR5.3.1	(a) New external access ladder	
	(i) Supplying the access ladder	Prov Sum
	(ii) Installation of new access ladder	Prov Sum

The unit of measurement shall a provisional sum for the supply and installation of a new external access ladder.

The tendered rate shall include full compensation for all labour, material, plant and equipment required for the removal and replacement (including the supply and installation) of the external access ladder as detailed.

## **PSR 6 REPAIR OF STEEL ELEMENTS**

### **PSR 6.1 SCOPE**

### **PSR 6.2 DEFINITIONS**

### **PSR 6.3 GENERAL**

### **PSR 6.4 DESIGN BY CONTRACTOR / PERFORMANCE BASED SYSTEMS**

### **PSR 6.5 CONSTRUCTION EQUIPMENT**

### **PSR 6.6 EXECUTION OF THE WORKS**

### **PSR 6.7 REPAIRS TO COATINGS AND LININGS**

### **PSR 6.8 MEASUREMENT AND PAYMENT**

### **PSR 6.1 SCOPE**

This Section covers the requirements for removal, refurbishment and re-attachment of corroded or damaged steel items on the reservoirs.

### **PSR 6.2 DEFINITIONS**

**Ancillary items:** Non-structural items such as access ladders, access hatches and pipework.

**Structural items:** Load bearing structural items contributing to the strength of the structure.

### **PSR 6.3 GENERAL**

Steel items shall be refurbished such that they fulfill their original design intent in terms of strength, safety and durability.

### **PSR 6.4 DESIGN BY CONTRACTOR / PERFORMANCE BASED SYSTEMS**

Where a damaged or corroded steel item, or where the removal of a steel item may compromise the safety or stability of part of a structure, the Contractor shall design and install appropriate temporary works certified by an ECSA registered professional Engineer or Technologist. Details shall be submitted to the Engineer for approval.

### **PSR 6.5 CONSTRUCTION EQUIPMENT**

Corroded or badly fitting steel ancillary items shall be refurbished when instructed by the Engineer. The items to be refurbished shall be carefully removed from their installed positions without damaging the surrounding concrete or other steel items, removed from site and refurbished. Where a section of steel is cut out and replaced, the new steel shall be connected using full strength welds. The welds shall be ground flush with the steel surface.

Where steel members require straightening, this shall be done using jacking equipment. Items will then be prepared for painting or hot dip galvanising in accordance with the particular specifications. Steel ancillary items will be returned to site and re-installed in their original positions, utilizing new galvanized mild steel bolts to suit their application if necessary.

For structural items being refurbished, bolts and rivets removed shall not be reused but replaced with Class 10.9 HSFG bolts torqued using the method of turn. Where items cannot be removed from site for refurbishment such as refurbishment of local damage to a major welded steel item, the work shall be carried out on site in near-factory conditions.

All items shall be painted as specified on the drawings or instructed by the Engineer. Painting shall be done immediately after refurbishment in near-factory conditions. All paint damaged during installation shall be repaired after installation. Site welds, bolts and nuts shall be painted to the full paint specification after installation. All works, including fabrication and painting shall be done in accordance with the particular specifications.

#### **PSR 6.6 EXECUTION OF THE WORKS**

All hot dip galvanizing shall be done in accordance with SANS 121, and the minimum coating thickness for all elements shall be 85 microns. All items shall be sand blasted to ST2½ to remove all existing corrosion protection and corrosion.

The correct shape and size of ill-fitting items shall be requested from the Engineer who shall either issue drawings from which the dimensions shall be derived or provide such general dimensions in writing as are appropriate to the structure concerned. The Contractor shall then be fully responsible for ensuring that the item removed for refurbishment will fit to generally accepted tolerances onto the structure once it is reinstalled.

The Contractor shall ensure that the structure from which the steel element was removed, remains in a safe condition, specifically where the removal of the item may have a negative impact on the safety of the public. In this regard, any and all necessary supports, signage, danger tape etc. shall be utilized by the Contractor.

#### **PSR 6.7 REPAIRS TO COATINGS AND LININGS**

##### **a) External Repairs of pipeline coatings**

##### **1. Surface Preparation of coatings**

- i. All damaged and blistered coatings shall be removed back to sound epoxy coating or bare metal by mechanical power grinding or other approved means.
- ii. The exposed steel surface shall be power, or hand wire brushed to remove dirt, scale, rust and other foreign matter to a surface equivalent to a Class 2 finish.
- iii. The surrounding sound FBMDPE or epoxy surface shall be abraded to a distance of 50 mm beyond the defective area. The abrasion shall be carried out with clean emery paper of profile without causing the removal of excessive amounts of protective material.

##### **2. Cleaning of Area to be Repaired**

- i. Grease and oil shall be removed with a non-volatile solvent (e.g. "Aquasolve", "Arc Nr.261 Safety Solvent Cleaner" or similar approved). The surface shall then be cleaned with potable water and allowed to dry completely.



### 3. Methods of Repair to be Carried Out

#### a) Defects in coating

- i. The roughened area of coating and the defect shall be repaired by the application of a two-part solvent free epoxy repair kit ("Cupon Hycote 151", "Arc 982" or similar approved) to a minimum dry film thickness of 300 microns. The epoxy repair material shall be applied in accordance with the manufacturer's instructions and allowed to dry for 24 hours. Surface preparation and application shall be strictly in accordance with the manufacturer's instructions.
- ii) When coating valves, care shall be taken to prevent the epoxy coating covering the descriptive name plates and flow direction indicators on the valves by masking off these plates.

## PSR 6.8 MEASUREMENT AND PAYMENT

### Preamble

The tendered rate for each item shall include full compensation for providing, maintaining and decommissioning upon completion, of all the plant, equipment, labour, tools, incidentals and supervision to carry out the activity or construct the works in the item, unless otherwise stated.

Any prime cost or provisional sums shall be paid in accordance with the provisions of the conditions of contract. The charge or mark-up tendered or allowed for is a percentage of the amount actually paid under the prime cost or provisional sum. This percentage shall cover all the contractor's handling, supervision, profit and liability costs to provide the services in the prime cost or provisional sum item.

Item	Description	Unit
<b>PSR 6.1</b>	<b>Repair pipework coating in accordance to the particular specification, complete inclusive of labour, materials, plant, supervision and QA/QC defects as directed by the engineer, for:</b>	
	(a) DN300 pipe	metre (m)
	(b) DN450 pipe	metre (m)

The unit of measurement shall be the length of pipe (in meters) repaired according to specification.

The tendered rate shall include full compensation for all labour, equipment, plant and materials required to repair the pipework.

## **PSR 7      EXTERNAL BONDING OF STEEL AND CARBON FIBRE**

### **PSR 7.1      SCOPE**

### **PSR 7.2      DEFINITIONS**

### **PSR 7.3      GENERAL**

### **PSR 7.4      MATERIALS**

### **PSR 7.5      EXECUTION OF THE WORKS**

### **PSR 7.6      WORKMANSHIP**

### **PSR 7.7      MEASUREMENT AND PAYMENT**

### **PSR 7.1      SCOPE**

The specification covers the external bonding of steel plates, structural steel sections and reinforcement bars to structural concrete surfaces with adhesive.

### **PSR 7.2      DEFINITIONS**

The following definitions shall apply to these specifications:

**Adhesive:** An *adhesive* serves to bond together two separate materials, and resists the interfacial stresses necessary to ensure structural composite action between the two materials.

**Epoxy primer:** The *epoxy primer* is a very low viscosity resin, specifically designed for improving the bond to surfaces as part of a compatible, load transferring, bonded system.

**Workable life for structural bonding products:** The period of time the mixed bonding agent remains workable in the batch quantities used and at the limit of conditions that the material is fit for the purpose of use.

### **PSR 7.3      GENERAL**

The products and systems employed in the external bonding of steel shall comply with *EN 1504: Products and systems for the protection and repair of concrete structures. Definitions, requirements, quality control and evaluation of conformity*.

Part 4 of EN 1504 covers structural bonding.

### **PSR 7.4      MATERIALS**

#### **PSR 7.4.1      Adhesive**

The adhesive shall be a cured epoxy resin complying with EN1504-4. The adhesive shall be a thixotropic paste, specifically designed as part of a compatible load transferring bonded system. The adhesive shall be a solvent-free, two-part epoxy. The epoxy shall have high resistance to moisture and low creep values under sustained loads.

The adhesive components shall be supplied in liquid form and in separate sealed containers. Each component shall have a different identifiable colour, which results in a distinctive homogenous colour when thoroughly mixed.

The adhesive shall mix readily to a smooth paste-like (thixotropic) consistency and it shall be suitable for spreading on surfaces ranging from horizontal to vertical and on inverted overhead surfaces.

The mixed adhesive shall be free of lumps and the components shall not separate or settle out during the

workable life of the adhesive. The toxicity of the chemicals in the components shall be low enough to enable safe usage on the construction site and in a normal workshop environment. If special ventilation is necessary such requirements shall be clearly stated on the containers.

The adhesive shall be suitable for application to prepared steel and concrete surfaces in a layer thickness of between 1 mm and 20 mm.

The bond stress to concrete surfaces shall exceed 3.5 MPa with failure through the concrete. Workable life shall not be less than 20 minutes at temperatures up to 20°C.

The storage life (shelf life) in the original sealed containers of both the resin and hardener shall not be less than 6 months at temperatures between 5° and 25°C.

The adhesives shall be capable of curing to the required strength at temperatures between 10°C and 30°C in relative humidities of up to 95 %. The adhesive shall cure sufficiently within three days to confer the specified mechanical properties at 20°C and shall undergo a negligible shrinkage on curing (maximum linear shrinkage of 0,1 %).

The adhesive shall be formulated to minimize moisture transport through the adhesive itself. Water absorption shall not exceed 2 % by mass after immersion for 24 hours in distilled water at 20°C.

The instantaneous flexural modulus of the adhesive shall be between 2,0 GPa and 10,0 GPa at 20°C.

#### **PSR 7.4.2 Epoxy Primer**

The epoxy primer shall have the following properties:

- a) A viscosity of no more than 600 cps @ 25°C
- b) Bond to damp concrete surfaces of no less than 3.5 MPa (with concrete failure)
- c) A tensile strength of no less than 60 MPa
- d) A flexural strength of no less than 40 MPa
- e) A compressive strength of no less than 95 MPa
- f) Solvent free

#### **PSR 7.4.3 Structural steel**

Structural steel plates and sections shall comply with the following requirements:

Mild steel: SANS 50025 (EN 10025) Grade S275JR

High-yield steel: SANS 50025 (EN 10025) Grade S355JR

The dimensions and properties of the rolled steel plate and sections shall conform to the structural steel tables as issued by the SA Institute of Steel Construction, as amended.

#### **PSR 7.4.4 Anchors, nuts and washers**

Anchors shall consist of proprietary embedment type studs or bolts utilizing a chemical adhesive or mechanical expansion and locking systems to set the anchor in a concrete member. Certification and test results from a recognised approval authority or laboratory shall be made available at the request of the Engineer.

#### **PSR 7.4.5 Quality control**

The adhesive manufacturer's quality control and conformance certificates and test results for each batch of adhesive supplied on site shall be made available to the Engineer upon request.

The average test results shall meet the specification requirements and no single result shall deviate by more than 15% from the specified criteria.

#### **PSR 7.4.6 Packaging, handling and storage**

All adhesive components shall be supplied in separate sealed containers of suitable sizes to obtain a workable quantity within the workable life of the adhesive. The components shall be packaged in the correct proportions so that the entire contents of each container mixed together shall produce a mix of the correct proportions. The adhesive properties shall not vary significantly with minor variations in the mix proportions resulting from the container emptying process.

Each container shall be durably and legibly marked and complete records of stock acquired and issued for use, shall be kept. The containers shall be clearly marked with the following information:

- a) name of manufacturer
- b) manufacturer's product identification
- c) batch number and date of manufacture
- d) date of expiry and shelf life
- e) manufacturer's instructions for mixing
- f) safety precautions, warnings for handling and toxicity
- g) manufacturer's recommendations for storage

#### **PSR 7.4.7 Manufacturer's instructions**

The manufacturer shall provide a dated, coded and titled instruction sheet with each delivery of adhesive. The following information shall be contained on the sheet in a clear and unambiguous manner.

- a) the general chemical type of each component used in the adhesive;
- b) recommended storage conditions and shelf life when stored under these conditions;
- c) preparation instructions for the adherent and concrete surfaces;
- d) Instructions for use of primers, including optimum film thickness and permissible ranges;
- e) mixing instructions, including allowable variations in mix ratio and any temperature control requirements during the mixing process;
- f) application instructions, including limits on pressure, temperature, open time and relative humidity before mating the surfaces to be joined. It shall also be stated whether adhesive shall be applied to one or both of the surfaces to be bonded;
- g) maximum allowable interval between application of primer to coated steel or concrete, and application of adhesive and any primer reactivation procedure if applicable;
- h) safety precautions for all components of the adhesive and primer;
- i) curing conditions, including the amount of pressure to be applied, the period under pressure and the temperature of the assembly when under pressure. It shall be stated whether this temperature is that of the adhesive layer or of the atmosphere in which the assembly is to be maintained or both. A graph of cure time against temperature shall be supplied; and
- j) condition procedure before testing or use of the assembled product, including the time, temperature and relative humidity.

## **PSR 7.5 EXECUTION OF THE WORKS**

### **PSR 7.5.1 Sequence of execution**

The sequence of execution for the bonding of plates or reinforcement to the concrete surface shall be in accordance with the drawings and the method statement, as approved by the Engineer.

### **PSR 7.5.2 Site preparation and access**

The necessary access and temporary support structures shall be in place prior to the commencement of surface preparation. If deemed necessary to ensure acceptable environmental conditions and public safety, screening of the work area shall be established.

### **PSR 7.5.3 Preparation of concrete surfaces**

#### **a) Concrete surface for steel bonding**

The outline positions of the steel shall be clearly marked on the receiving concrete surface. For steel plates, a covermeter survey shall be carried out in all regions where anchor studs are to be installed in order to accurately locate the existing form reinforcement. The located bar positions shall be clearly marked which the stud positions can be determined.

The anchor stud positions shall be carefully measured up and transferred to the steel plate fabrication drawings. Particular care shall be taken with regard to the orientations and plate references during the survey and preparation of fabrication drawings.

Once the survey is completed the concrete surface shall be prepared.

Any cracks wider than 0,4 mm shall be pressure injected using a low viscosity epoxy resin system in accordance with the procedures specified in Section PSR 3.

Any concrete surface defects or deeper reinforcement corrosion within the plate outline and other areas considered defective shall be removed and repaired with suitable and compatible repair systems in accordance with Section PSR 3.

The marked concrete areas to be plated shall be grit-blasted to remove all concrete laitance, surface coatings and impregnants, organic growth, bituminous residues, oil, dirt and any other surface contamination. The surface shall be sound and shall exhibit the coarse sand and aggregate texture to present a rough key to the adhesive.

The prepared surface profile shall be checked using a 1 m long profile edge and any areas deviating by more than 4 mm from the profile edge shall be marked.

Any high areas shall be removed with light scabbling or grinding equipment and low areas can be filled with the adhesive to be used for the plate bonding. Normal grit-blasting preparation shall not remove more than 1 mm of the concrete surface.

The Engineer will inspect the prepared surface to identify areas that are defective or substandard which may require additional preparation or remedial work. Repairs shall not weaken the load transfer to the concrete.

#### **b) Concrete surfaces for bonding reinforcement or rods in slots**

The positions of the slots for reinforcement shall be clearly marked on the receiving concrete surface. A covermeter survey shall be carried out along each slot position to determine the position of existing reinforcement bars and the concrete cover thickness. The located bar positions shall be clearly marked and the depth of the slots shall be adjusted if necessary to avoid cutting reinforcement transverse to the direction of the slots. Where possible the slots shall be located midway between existing reinforcement bars.

A covermeter capable of measuring concrete cover to reinforcement within 3mm accuracy shall be used.

Once the survey is completed, the slots can be cut into the concrete surface. Any cracks wider than 0,4 mm and concrete surface defects and deeper reinforcement corrosion shall be treated as required in Clause PSR 7.5.3(a).

The slots for bonding the reinforcement shall be cut into the member at the positions and to the dimensions as indicated on the drawing or as directed by the Engineer following the covermeter survey. The sides of the slots shall be neatly cut along the required profile using a diamond saw or angle grinder to the required depth. Holes within a slot shall be carefully drilled using a diamond drill. Equipment that may damage the adjacent material structure, soundness or integrity shall not be used.

The surfaces of the slots shall be free of loose or unsound material, and any contaminant that may react with or impair the bond of the adhesive to the concrete surface, shall be cleaned off.

The cut surfaces shall be prepared to exhibit a coarse sandpaper-like texture by grit-blasting, water-jetting or other approved means.

The Engineer will inspect the concrete surface with prepared slots to identify areas that are defective or substandard and which may require additional preparation or remedial work.

#### **PSR 7.5.4 Preparation of reinforced steel bars**

The steel bar surface shall preferably be cleaned and grit-blasted immediately before bonding into the prepared slots in the concrete surface. Alternatively, approved measures shall be taken to prevent surface corrosion and maintain the clean surfaces free from dirt, oil, or any other deleterious contaminants.

The steel surface shall be prepared by removing all physically adhering contaminants and by grit-blasting to grade Sa 2 ½ medium profile surface finish to EN ISO 8501 – 1. No grit-blasting shall be done on site during rainy weather or when corrosive environmental conditions prevail.

#### **PSR 7.5.5 Inspection of concrete surface prior to adhesive bonding**

The prepared concrete surfaces or slots shall be carefully inspected immediately prior to application of the adhesive to ensure that the requirements of Clause PSR 7.5.3 are maintained. All bond surfaces shall be dry or have a moisture content less than that recommended by the manufacturer of the selected adhesive. Should the moisture content be excessive, the concrete surface shall be allowed to dry sufficiently to prevent the possibility of a moisture barrier forming between the concrete substrate and the adhesive. The surface temperature of the concrete shall be between the temperature limits recommended by the adhesive manufacturer.

#### **PSR 7.5.6 Mixing of adhesive system components**

The entire contents of the containers of a multi-component adhesive system shall be mixed together as recommended by the manufacturer and shall be used within the workable life of the adhesive.

The adhesive components shall be mixed in a clean container, free of harmful residue or foreign particles. The adhesive shall be carefully and thoroughly mixed to a uniform colour and a homogenous mixture. The temperature of the adhesive components shall be between 10°C to 30°C before mixing, unless specified otherwise by the manufacturer in writing.

Sufficient adhesive shall be mixed to cover the necessary bonding surfaces which can be comfortably handled within the available period to ensure the necessary quality and workmanship.

Once the adhesive has been thoroughly mixed, no re-mixing will be allowed.

In order to monitor the quality of the mixing process, flexural modulus tests on prisms made from the adhesive shall be undertaken prior to installation and at intervals during installation. The results shall be submitted to the Engineer for approval.

#### **PSR 7.5.7 Application of epoxy primer**

The work site shall be thoroughly ventilated. The primer shall not be applied if ambient temperature is less than dew-point plus 5°C. Only mix as much primer as can be applied within its workable life.

Mixed primer shall be applied with a roller or brush. Where required, a second coat can be applied when the surface is very porous. The primer shall be allowed to cure until tack-free

#### **PSR 7.5.8 Application of adhesive and placing of reinforcement bars to be bonded**

The concrete slot and reinforcing steel surfaces receiving the adhesive shall be primed with a compatible primer approved by the Engineer. While the primer is still tacky the slot shall be filled with adhesive to a thickness sufficient to fill, with a slight excess, the gap between the concrete substrate and the reinforcement bar.

The reinforcement bar shall be placed and fixed into position within the slot using an approved method. The minimum thickness of adhesive shall be 1 mm.

The remainder of the slot depth shall then be filled with adhesive to a slightly convex surface with respect to the surrounding concrete surface.

The elements being bonded shall not be disturbed during the curing period of the adhesive.

#### **PSR 7.5.9 Fixing and anchors**

Anchor studs shall normally be installed after the plate-bonding adhesive has cured and the support system is removed. The holes in the concrete are drilled through the holes in the steel plate using hand-held power drills with rotary hammer action.

The anchor studs shall be installed and set to the depth and detail as indicated on the drawings or the approved alternative anchor setting procedure approved by the Engineer.

The annular space between the stud and the plate shall be filled with the same adhesive as used for the plate bonding. Before the adhesive enters the curing phase, the hole shall be covered with a suitable washer and the

nut torqued to the specified value.

#### **PSR 7.5.10 Environmental protection and cleaning-up**

Care shall be taken during any work with adhesive components to avoid contamination of the subsoil and the environment. Any spillage, wastage and clean-up residues shall be collected, removed and disposed of in suitable containers at an approved waste disposal site.

The concrete surface adjacent to the prepared surfaces receiving adhesive shall be protected against spillage where necessary. Any adhesive applied or spilled on unwanted areas shall immediately be removed and cleaned with an approved clean-up agent and procedure recommended by the manufacturer for the required purpose.

#### **PSR 7.5.11 Tolerances**

The positional and level tolerances of the bonded steel elements shall comply with those specified on the detail drawings, or if none is specified, as follows:

Position & Alignment:	$\pm 5$ mm with maximum $1^\circ$ angular deviation
Level:	$\pm 1$ mm
Flatness:	$\pm 5$ mm deviation over a 2,0 m long straight-edge

#### **PSR 7.6 WORKMANSHIP**

The Contractor shall submit the following to the Engineer for approval:

- a) The adhesive manufacturer's certification verifying conformance to the specification of the material in Clause PSR 7.4 for each batch of product delivered on site. The certification shall include the relevant laboratory test results.
- b) A detailed method statement for the execution of the work covered in this section, including details of temporary works, work procedures and equipment to be used for mixing and placement of adhesive and bonding elements, as well as quality assurance procedures and tests that have to be followed to ensure that the correct quality of workmanship is achieved as part of his quality control testing procedure.

The Engineer may instruct that the on-site monitoring, sampling and testing be carried out by an independent test laboratory to ensure that the required standard of surface preparation, adhesive mixing, application and performance is achieved.

Detailed records of all operations and inspections carried out and materials received, issued and tested shall be kept by the Contractor and submitted to the Engineer for record purposes.



## PSR 7.7 MEASUREMENT AND PAYMENT

### Preamble

The tendered rate for each item shall include full compensation for providing, maintaining and decommissioning upon completion, of all the plant, equipment, labour, tools, incidentals and supervision to carry out the activity or construct the works in the item, unless otherwise stated.

Any prime cost or provisional sums shall be paid in accordance with the provisions of the conditions of contract. The charge or mark-up tendered or allowed for is a percentage of the amount actually paid under the prime cost or provisional sum. This percentage shall cover all the contractor's handling, supervision, profit and liability costs to provide the services in the prime cost or provisional sum item.

Item	Description	Unit
<b>PSR 7.1</b>	<b>Preparation of concrete surfaces</b>	
	Slots in concrete for steel or carbon fibre bonding (position, size and material indicated)	metre (m)

The unit of measurement shall be the total length in metre's of slots of the size specified.

The tendered rate shall include full compensation for all labour, materials, plant and equipment required for the cover and position survey of existing reinforcement, the measurement, recording and working on the concrete member, preparation of steel fabrication drawings, the surface preparation of the concrete surface and cutting of slots as required.

It shall also include the supply and application of an adhesive-compatible primer to the prepared concrete surfaced if required for the type of adhesive being used.

Item	Description	Unit
<b>PSR 7.2</b>	<b>Adhesive</b>	
	(a) Adhesive (description or type) to (location)	
	a. Supplying adhesive	Litre (ℓ)
	b. Injecting adhesive into drilled holes according to suppliers' guidelines	Litre (ℓ)

The unit of measurement shall be the litre of adhesive used as approved by the Engineer. The volume shall be determined from the dimensions indicated on the detail drawings or as authorized by the Engineer following the detailed inspection of the prepared surfaces. Any overcut or excessive preparation resulting in additional adhesive quantities shall not be measured.

The tendered rate shall include full compensation for all labour, material, equipment, etc., required for the supply, mixing and application of the adhesive to the prepared concrete and steel or carbon fibre surfaces, slots and holes. It shall also include the certification testing and quality assurance monitoring and testing by the Contractor, as well as any wastage of mixed or spilled materials and the disposal thereof.

The rate shall also include all costs arising from any clean-up and finishing actions required due to spillage or poor workmanship.

Item	Description	Unit
<b>PSR 7.3</b>	<b>Bonded plates, bars or sections</b>	
	Bars	
	(a) Supplying reinforcement (material, type and size indicated)	Kilogram (kg)
	(b) Installation of reinforcement	Kilogram (kg)

The unit of measurement shall be the total mass of reinforcement used in kilograms (kg).

The tendered rate shall include full compensation for all labour, materials, plant and equipment required for the installation of the required reinforcement.

## **PSR 8 PROTECTIVE COATINGS AND TREATMENTS FOR CONCRETE**

### **PSR8.1 SCOPE**

This Section covers the material, equipment and work required for applying protective coatings and treatments to concrete surfaces.

### **PSR 8.2 DEFINITIONS**

**Hydrophobic impregnation** - involves the surface treatment of concrete to produce a water-repellent surface. The pores and capillaries are internally coated, but they are not filled. There is no film on the surface of the concrete and there is little or no change in its appearance. Active compounds may be, for example, silanes or siloxanes.

**Sealers and pore blockers** - involve the treatment of concrete to reduce the surface porosity and to strengthen the surface. The pores and capillaries are partially or totally filled. This treatment usually leads to a discontinuous film on the concrete surface. Binders for sealer and pore blockers may be, for example, organic polymers. Typical pore blocker materials react with the concrete substrate, for example calcium hydroxide present in hydrated cement, to form crystals. Other fluids such as resins and drying oils penetrate and harden by chemical reaction. Characteristic examples are silicates, silicon fluorides, methacrylates and epoxy resins. Sealers are more viscous fluids which both penetrate the concrete and form a thin film on its surface. They are most often utilized as sealing coats or primers to a coating. The thin film of the sealer is vulnerable to weathering. Characteristic examples are epoxy resins, polyurethanes, and acrylics.

**Coatings** - result in a continuous protective layer on the surface of concrete. Binders for coating may be, for example, organic polymers, organic polymers with cement as a filler or hydraulic cement modified with polymer dispersion that produce a typical layer thickness from 0,1 mm to 5,0 mm.

**Renderings** - are thick film coatings, generally applied by trowel rather than by brush or spray. They work in a similar way as coatings, by providing a physical barrier but with mean layer thickness of at least 5,0 mm. Typical examples are cement mortar with various polymer additions or crystal growth systems.

**Corrosion inhibitor** - are emulsion type impregnating fluids that are applied to the outer surface of existing concrete members. Inhibitors migrate into concrete and are absorbed onto the surface of embedded reinforcing steel thus delaying the onset of corrosion and reducing the rate of corrosion that is in progress.

### **PSR 8.3 MATERIALS**

#### **(a) Hydrophobic impregnants**

Concrete surfaces shall be impregnated with silane in liquid form containing minimum 99 % active ingredient. When silane is used in cream form, it shall contain minimum 80 % active ingredient and the manufacturer's application rate shall be proportionally increased to account for the reduction in the active ingredient from 99 %. Silane impregnants shall comply with EN 1504-2. The hydrophobic impregnants shall be suitable for the following protective and remedial principles in accordance with EN 1504-9:

- (i) Protection against ingress (Principle 1-Method 1.1),
- (ii) Moisture control (Principle 2-Method 2.1), or
- (iii) Increasing resistivity (Principle 8-Method 8.1).

Materials incorporating siloxane shall not be used on concrete surfaces. Plastered and masonry surfaces may be impregnated with siloxane and blended materials incorporating

siloxane.

**(a) Sealers and pore blockers**

Concrete surfaces shall be treated with impregnation materials that comply with EN 1504-2. The surface impregnants shall be suitable for the following protective and remedial principles in accordance with EN 1504-9:

- (i) Protection against ingress (Principle 1-Method 1.2),
- (ii) Moisture control (Principle 2-Method 2.1),
- (iii) Increasing physical resistance (Principle 5-Method 5.2),
- (iv) Resistance to chemicals (Principle 6-Method 6.2),
- (v) Increasing resistivity (Principle 8-Method 8.2).

**(b) Coatings**

Coatings shall be applied to concrete surfaces according to EN 1504-2. Coatings shall be suitable for the following protective and remedial principles in accordance with EN 1504-9:

- (i) Protection against ingress (Principle 1-Method 1.3),
- (ii) Moisture control (Principle 2-Method 2.3),
- (iii) Increasing physical resistance (Principle 5-Method 5.1),
- (iv) Resistance to chemicals (Principle 6-Method 6.1), or
- (v) Increasing resistivity (Principle 8-Method 8.3).

**(c) Renderings**

Renderings shall be applied to concrete surfaces according to EN 1504-2. Rendering shall be suitable for the following protective and remedial principles in accordance with EN 1504-9:

- (i) Protection against ingress (Principle 1-Method 1.3),
- (ii) Moisture control (Principle 2-Method 2.3),
- (iii) Increasing physical resistance (Principle 5-Methods 5.1 or 5.3),
- (iv) Resistance to chemicals (Principle 6-Methods 6.1 or 6.3),
- (v) Preserving or restoring passivity (Principle 7-Method 7.1) or
- (vi) Increasing resistivity (Principle 8-Method 8.3).

**(d) Corrosion inhibitor**

Corrosion inhibitors shall consist of an aqueous solution of amino alcohols and salts of amino alcohols. Corrosion inhibitors that are applied to the concrete surface shall be capable of penetrating the concrete down to the depth of reinforcement. The effective migration of the inhibitor shall be assessed based on the manufacturer's standard qualitative or quantitative test method to confirm the depth and rate of penetration of the corrosion inhibitor.

The corrosion inhibitor shall be suitable to control anodic areas according to EN 1504-9 Principle 11-Method 11.3.

## **PSR 8.4 CONSTRUCTION EQUIPMENT**

**(a) General**

All plant and equipment used for cleaning, surface preparation and application of protective treatment shall be based on proven technology and practice and shall be maintained in a clean

and good working order. The equipment shall be inspected, serviced and calibrated at regular intervals and tested to ensure that the system functions efficiently and accurately, all to the satisfaction of the Engineer. All work shall be carried out in accordance with the EMP.

**(b) High-pressure water-jetting equipment**

The type and capacity of the water-jetting equipment, delivery hoses and nozzles shall be capable of delivering up to 35 MPa, or 350-bar, water pressure and maintaining a minimum flow rate of 300 litres per hour through nozzles.

**(c) Abrasive blasting equipment**

Abrasive methods are required when the removal of a significant amount of concrete surface is required.

**(i) Water blasting with abrasives**

Water blasting with abrasives is a cleaning system using a stream of water at pressure up to 35 MPa, or 350-bar, with an abrasive such as sand, aluminium oxide, garnet or other approved blast media, introduced into the stream.

**(ii) Dry grit blasting**

In dry grit blasting, abrasive particles are propelled at concrete and or steel surfaces in a stream of compressed air at a minimum pressure of 0,7 MPa, or 7-bar. The compressor size will vary to suit the size of the grit-blasting pot. The abrasive medium typically consists of angular particles with a maximum particle size of 4,0 mm.

The dry grit blasting technique is associated with many common nuisances and shall only be permitted if appropriate method statement is approved by the Engineer.

**(iii) Wet sandblasting**

In wet sandblasting, the free particulate rebound that results from the sand being projected at the concrete surface, similar to dry grit blasting, is confined within a shroud of water.

**(d) Low-pressure airless sprayer**

Low-pressure airless sprayers consist of knapsack sprayers which shall be capable of providing a uniform discharge rate and even spread over the spray area.

**(e) Access structures and working platforms**

Where necessary the Contractor shall provide suitable and safe measures at each location for pressure cleaning and surface coating. These provisions shall be deemed to form part of the access for structure rehabilitation as specified in Section PWA 100.

## **PSR 8.5 EXECUTION OF WORKS**

### **(a) Storing of materials**

The Contractor shall provide a lockable store for the repair materials and observe all storage requirements and safety precautions recommended by the manufacturer's instructions and applicable Regulations.

### **(b) Surface preparation**

#### **(i) Procedures**

All concrete surfaces that are to receive protective coatings or treatments shall be prepared strictly in accordance with the material manufacturer's instructions. The preparation shall include for everything that is necessary to prepare the surface to receive the protective coatings or treatments. In particular, all traces of curing compounds and formwork release agents shall be removed.

#### **(ii) Permitted techniques**

##### **a) High-pressure water-jetting**

This technique shall be utilized to remove curing compounds or membranes, shutter release compounds and water-soluble contaminants without inadvertently damaging the concrete appearance and without producing an exposed aggregate finish. This method generally should not produce any significant increase in texture, profile, or pattern in the concrete.

##### **b) Abrasive blasting**

Abrasive methods shall be required when the removal of a significant amount of concrete surface is required.

Water blasting with abrasives can be used to remove dirt or other foreign matter and concrete laitance, typically exposing the fine aggregates.

Where permitted by the Engineer, dry gritblasting has the ability to remove the concrete surface. This technique may produce large quantities of airbourne particulates, such as dust, and suitable precautions should be taken to protect labour, equipment and the environment.

Wet sandblasting generally produces less airbourne particulates than dry sandblasting, however some inefficiency results from the interaction of the water shroud with some of the abrasive agents. The process is generally limited to cleaning the concrete surface.

#### **(iii) Evaluation, inspection and approval of concrete surface**

Weak, micro-cracked, damaged, delaminated and deteriorated concrete, including that caused by the selection of inappropriate techniques of cleaning, roughening or removal that reduces bond or structural integrity, shall be subsequently removed or remedied. The finished surface shall be visually inspected and tested by tapping with a hammer to detect loose concrete.

Concrete removal shall be kept to a minimum and shall not reduce the structural integrity beyond the structure's ability to perform its function. Acceptable surfaces shall be free of oil, grease, loosely adhering concrete, and other contamination. Where

required, projections or voids in the concrete surface shall be corrected prior to surface preparation.

The Contractor shall ensure that technical representatives, appointed or employed by the material suppliers, carry out regular inspections of the preparation work and provide written confirmation that the work is in accordance with the material supplier's instructions. The reports shall be specific and definitive, and generalised statements will not be acceptable.

Where surface preparation is found by the technical representatives to be inadequate the report shall contain specific advice to enable the Contractor to attain a required standard.

The Contractor shall provide the Engineer with copies of all technical inspection reports before any surface treatment or protective coating is applied to a structural element.

Where the time between surface preparation and treatment exceeds two days, during windy and or wet weather the prepared surfaces shall be reinspected and approved by the technical representative prior to application of the surface treatment or protective coating.

The moisture content of patch repair areas must be specifically checked by the technical representative to ensure that coatings are not applied over surfaces that contain excessive moisture.

#### **(c) Batching and mixing**

Mixing equipment, mixing times, working life and overcoating times shall conform to the manufacturer's instructions taking into account the ambient temperature, relative humidity, dew point and wind speed at time of application.

Treatment materials shall be mixed, if applicable, and applied strictly in accordance with the manufacturer's instructions. Thinning or diluting shall not be permitted without the approval of the Engineer.

#### **(d) Protective surface treatment**

Surface treatment or coatings may consist of a system of several coats of more than one type of coating. Where such a system is applied, the various components shall be compatible and sourced from one manufacturer.

Anti-graffiti and protective treatments shall be applied to the entire exposed concrete surface as indicated. Items or areas which are not to be coated shall be suitably protected or masked before application of the treatment.

##### **(i) Application of surface coatings**

All protective coatings and treatments for concrete shall be stored, mixed and applied strictly in accordance with the product manufacturer's instructions and the specifications.

All surface coating materials shall be handled, mixed and applied strictly in accordance with the manufacturer's instructions.

##### **(ii) Application rate records**

Records of application rates shall be submitted by the Contractor to the Engineer on a daily basis indicating batch numbers, the area covered by each coat and the quantity

of coating material used. Only material from the same batch shall be used for any continuous, visible, unbroken surface to attain uniformity of colour, appearance and texture on the concrete surface.

**(iii) Trial sample panels**

Protective treatment shall not be applied until trial sample panels of the protective treatment have been prepared by the Contractor and approved by the Engineer and the material supplier's technical representative.

The Contractor shall prepare the sample panels using the same surface preparation mixing and batching equipment, application technique, application rate and under the same climatic conditions he intends to treat the whole structure. The position of the trial sample panels are subject to the Engineer's approval.

Product manufacturers of coating products are required to inspect, assist and finally approve all aspects of surface preparation and product application employed on the trial sample panel.

The trial sample shall be used as a standard against which the rest of the work will be judged and shall be maintained intact until all other coating work is complete.

**a) Establishment of quality benchmarks**

Trial panels shall be utilised to establish benchmarks for the evaluation of quality assurance parameters. The Engineer shall approve the set of relevant quality assurance indicators for the particular protective coating and treatment system, where no values are provided the values stated in Clause PWA 603 shall apply. The quality assurance parameters may, amongst others, include:

- Permeability to water vapour according to EN ISO 7783-1 and 2.
- Permeability of carbon dioxide according to EN 1062-6.
- Capillary absorption and permeability to water according to EN 1062-3, or EN 13580 or ASTM D6489 for hydrophobic impregnants.
- Adhesion strength by pull-off test according to ASTM D7234 or EN 1542.
- Determination of film thickness according to ISO 2808.
- Crack bridging ability according to EN 1062-7.
- Depth of penetration according to EN 14630.
- Soundness and cleanliness of substrate according to ASTM D4258.

**(iv) Proprietary protective surface coatings**

The suitability of the protective surface coating for a particular application shall be proved by testing and submission of an approved industry track record of usage under similar circumstances. All proprietary protective surface treatments and coatings shall be subject to the requirements of performance-based systems and shall conform to the requirements of Clause PWA 605.

The Contractor shall submit details of proprietary protective surface coatings and proposed performance guarantee documentation to the Engineer for approval prior to its use in the permanent works.



## **PSR 8.6 WORKMANSHIP**

The Contractor shall ensure that only compatible materials are used for the surface treatment or protective coatings. All test results shall be reported to the Engineer and will be subject to the Engineer's approval.

The site weather conditions during the application of coatings and surface treatments shall be monitored and recorded as follows:

- (a) Ambient temperature shall be recorded using thermometers with an accuracy of 1°C, in the direct vicinity of the works, but not subject to direct solar radiation.
- (b) Ambient humidity shall be measured according to ISO 4677-1 and 2.
- (c) Wind velocity shall be recorded using anemometers to record maximum values during application.
- (d) Dew point shall be calculated according to ISO 4467-1 and 2, and the coating application for dew point affected materials shall proceed when the ambient dry temperature is at least 3°C above the dew point.

The permeability to water vapour of a protective coating system shall be evaluated in accordance with EN ISO 7783-1 and EN ISO 7783-2. Where breathability of the coating is required, the permeability to water vapour shall meet the requirements of  $H_2O S_d < 5 \text{ m}$  (Class 1).

The permeability to carbon dioxide of a protective coating system shall be evaluated in accordance with EN 1062-6. Where the requirement for protection of the coating is required, the permeability to carbon dioxide shall meet the requirements of  $CO_2 S_d \geq 50 \text{ m}$ .

The capillary absorption and permeability to water shall be evaluated in accordance with EN 1062-3, except that hydrophobic impregnating compounds shall be assessed in accordance with EN 13580 or ASTM D6489. Where the requirement for resistance to capillary absorption and permeability to water is essential, the water uptake shall be limited to less than 0,1 kg per square metre per  $h^{0.5}$  in accordance with EN 1062-3, or less than 7,5 % in accordance with EN 13580 or ASTM D6489.

The adhesion strength by pull-off test shall be evaluated in accordance with ASTM D7234 or EN 1542. The test report shall include details on the particular failure mode for each individual reported pull-off test result and evaluation shall take cognisance of particular coating system properties, in particular highly elastomeric coatings.

The dry film thickness of coatings shall be evaluated in accordance with ISO 2808. The average film thickness shall exceed that stated by the manufacturer to ensure adequate protection of the concrete. Individual readings shall everywhere exceed 75 percent of the dry film thickness stated by manufacturer and all non-conforming areas shall be overcoated to increase the total dry film thickness to the desired levels. The wedge cut method (ISO 2808, method 5B) shall the preferred test method, and the test location, including an additional 30 mm around the perimeter of the test location, shall be treated or coated with sufficient product to ensure equivalent protection as specified. Alternatively, a profilometer method and determining the quantity of product used (Method 2) in accordance with ISO 2808 may be used.

The wet film thickness of coatings shall be evaluated during the application of the product in accordance with ISO 2808. The comb gauge (ISO 2808, Method 1) shall be used and minimum three readings are taken in different locations per member in a similar manner, but normal to the plane of the surface, to obtain representative results over the coated area.

The crack bridging ability of protective coatings shall be evaluated in accordance with EN 1062-7. All protective coating materials suitable for crack bridging shall meet the minimum requirement for Class A1.

The depth of penetration for hydrophobic impregnation materials shall be evaluated in accordance with EN 14630, except that water is substituted in place of the phenolphthalein indicator solution. All hydrophobic impregnation materials shall meet the requirement for Class 2, which means the dry zone is more than 10 mm.

Surface cleanliness for coating system that does not require alteration of the surface profile of the concrete shall conform to the requirements of EN 1504-9 and ASTM D4258. Soundness shall be verified by hammer test or visual inspection conducted by the manufacturer's technical representative, all to the satisfaction of the Engineer.

## **PSR 8.7 MEASUREMENT AND PAYMENT**

### **(i) Preamble**

The tendered rate for each item shall include full compensation for providing, maintaining and decommissioning upon completion, of all the plant, equipment, labour, tools, incidentals and supervision to carry out the activity or construct the works in the item, unless otherwise stated.

Any prime cost or provisional sums shall be paid in accordance with the provisions of the conditions of contract. The charge or mark-up tendered or allowed for is a percentage of the amount actually paid under the prime cost or provisional sum. This percentage shall cover all the contractor's handling, supervision, profit and liability costs to provide the services in the prime cost or provisional sum item.

Where pay item descriptions include any wording in brackets it is an indication that contract specific information is to be inserted in the Pricing Schedule included in the Contract Documentation.

### **(ii) Notes on measurement and pay items**

1. Payment for items in this Section shall include full compensation for all works associated with the execution of the work and quality assurance procedures. General access and work platforms and associated temporary works are covered in Section PWA 100.
2. All work and material for which no specific pay item is defined shall be deemed to be covered by the items in this Section.

### **(iii) Items that will not be measured separately**

The following activities, whether required to complete the specified work or not, will not be measured and paid for separately and the Contractor shall include the cost thereof in other pay items as he deems appropriate:

1. No separate payment will be made for setting out the works.
2. No separate payment will be made for the protection or repair as required of any existing or new road furniture, structures, buildings, infrastructure or services damaged by the Contractor's activities.
3. No additional payment shall be made, nor shall any claim for additional payment be considered, for any specified work in confined or restricted areas. Any additional costs associated with working in confined or restricted areas shall be deemed to be included in the standard applicable pay items.
4. No separate payment will be made for the loading of any materials.
5. No separate payment will be made for the hauling of any materials where the material is moved over a distance of less than, and up to 1,0 km and for labour enhanced construction, less than and up to 50 m.

6. No separate payment will be made for transporting materials from commercial sources irrespective of the haul distance.
7. No separate payment will be made for the removal or any surplus material imported to complete the works.
8. For all Works performed, precautionary measures required in terms of the Occupational Health and Safety Act (Act 85 of 1993) and the latest amendments thereof as well as the latest Construction Regulations shall be deemed included in the rates tendered for the relevant products.

(iv) **Items specifically for this Section of the specifications**

<b>Item</b>	<b>Description</b>	<b>Unit</b>
<b>PSR 8.1</b>	<b>Application of protective coatings and treatments</b> (type and application rate indicated)	Square metre (m <sup>2</sup> )

The unit of measurement shall be the square metre of surface area to be protected or treated as specified. For payment purposes, the surface area shall be measured once only irrespective of the number of layers of protective coatings or applications of surface treatment is required to achieve the specified application rate.

The tendered rate shall include full compensation for all surface preparations, labour, materials, equipment, additional safety measures, storage, mixing and applications of the protective coatings and treatments, cleaning and disposal of unused or rejected material and all incidentals necessary to execute the work, including wastage, as specified, all to the satisfaction of the Engineer.

## **PSR 8.8 GUARANTEES AND COMPLIANCE CERTIFICATES**

### **(a) SCOPE**

The scope of this Section covers the following:

- Product conformance specifications
- Warranties for product or element design and installation of proprietary systems
- Performance specifications

### **(b) GENERAL**

#### **(i) Product conformance specifications**

The Contractor shall within 28 days of entering into the contract with the Employer submit to the Engineer conformance documentation related to the specifications. All products used in the manufacture and application of protective coatings and treatments for concrete shall be in compliance with the specifications continued in Section PWA 400.

Compliance documentation shall be provided for:

- a) Hydrophobic impregnants (Clause PWA 603 (a))
- b) Sealers and pore blockers (Clause PWA 603 (b))
- c) Coatings (Clause PWA 603 (c))
- d) Renderings (Clause PWA 603 (d))
- e) Corrosion inhibitor (Clause PWA 603 (e))
- f) Testing necessary to prove the satisfactory execution of the works (Clause PWA 604)

### **(c) PERFORMANCE GUARANTEE REQUIREMENTS**

#### **(i) Warranties for product or element design and application of protective coatings.**

The design and application of protective coatings shall require a warranty of 10 years to be supplied by the Contractor. The format of this warranty shall be as per Form PWA 608-1 hereafter.

A full set of specifications for the protective coatings shall be submitted together with certificates of all tests carried out in accordance with the requirements of EN 1504. Certification of the application by a suitably experienced representative of the protective coating manufacturer is also required together with the warranty.

#### **(ii) Performance specifications**

The Contractor shall ensure that all material and construction requirements are fully satisfied such that enable the issuing of a performance guarantee on the protective coating and treatments without any reservation.

The performance guarantee shall include the continuous functioning of the protective coating system and treatments for a period of 10 years, of which the first 9 years shall be wholly free from any reductions in the protection afforded by the surface treatment or protective coatings. The subsequent maintenance, surface preparation and over coating requirements of the protective coating system shall form part of the performance guarantee documentation.

**Form PWA 608-1**

<b>WARRANTY FOR DESIGN, MANUFACTURE AND APPLICATION OF PROPRIETARY PROTECTIVE COATINGS AND TREATMENTS FOR CONCRETE SURFACES ON (CONTRACT NUMBER AND DESCRIPTION)</b>	
<b>DESCRIPTION</b>	<b>DETAILS</b>
Structure Name or Location	
Name and Address of Contractor	
Name of Contact Person	
Name and Address of Manufacturer	
Name of Contact Person	
Name and Address of Applicator	
Name of Contact Person	
Date of Manufacture	
Date of Application	
Duration of Warranty	
Start date of Warranty	
End date of Warranty	

The Contractor, Manufacturer and Applicator hereby warrant that the above protective coating will perform satisfactorily in terms of workmanship and durability, and that the protective coating has been applied in accordance with the patent holders requirements and as set out in the specifications and on the drawings for each particular protective coating.

This warranty is for 10 years from the completion date of the Main Contract for the project.

In the event that the performance of the coating is not in accordance with this warranty due to materials or workmanship defects, the Contractor undertakes to rectify the coating within 90 days of receiving the instruction to do so by the Employer.

The coating shall be completely replaced including, supply and application including all other costs associated thereto (i.e. Traffic Accommodation, jacking, closure of the road and bridge as agreed to by the Employer) to the satisfaction of the Engineer.

**SIGNED ON BEHALF OF CONTRACTOR:** \_\_\_\_\_

SIGNED ON THIS THE \_\_\_\_\_ DAY OF \_\_\_\_\_ IN THE YEAR \_\_\_\_\_

On behalf of: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Telephone No: \_\_\_\_\_

**SIGNED ON BEHALF OF APPLICATOR:** \_\_\_\_\_

SIGNED ON THIS THE \_\_\_\_\_ DAY OF \_\_\_\_\_ IN THE YEAR \_\_\_\_\_

On behalf of: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Telephone No: \_\_\_\_\_

**SIGNED ON BEHALF OF MANUFACTURER:** \_\_\_\_\_

SIGNED ON THIS THE \_\_\_\_\_ DAY OF \_\_\_\_\_ IN THE YEAR \_\_\_\_\_

On behalf of: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Telephone No: \_\_\_\_\_

**WITNESS:** \_\_\_\_\_

Signature: \_\_\_\_\_

Name: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Telephone No: \_\_\_\_\_

## **PSR 9 MISCELLANEOUS WORK AND REINSTATEMENT**

### **PSR 9.7 MEASUREMENT AND PAYMENT**

#### **Preamble**

The tendered rate for each item shall include full compensation for providing, maintaining and decommissioning upon completion, of all the plant, equipment, labour, tools, incidentals and supervision to carry out the activity or construct the works in the item, unless otherwise stated.

Any prime cost or provisional sums shall be paid in accordance with the provisions of the conditions of contract. The charge or mark-up tendered or allowed for is a percentage of the amount actually paid under the prime cost or provisional sum. This percentage shall cover all the contractor's handling, supervision, profit and liability costs to provide the services in the prime cost or provisional sum item.

<b>Item</b>	<b>Description</b>	<b>Unit</b>
PSR 9.1	Return excess materials to Springfield Water Stores/relevant pipe yards	t

The unit of measurement shall be the total mass in tons of material returned to the Springfield Store.

The tendered rate shall include full compensation for all labour, materials, plant and equipment required for the transportation of the materials.

<b>Item</b>	<b>Description</b>	<b>Unit</b>
PSR 9.2	Wrap steel pipeline with a cold applied tape designed for the long-term external corrosion protection, excellent adhesion to pipe and self of buried pipelines, welded joints, bends and fittings, 600mm long to manufacturer's specification where pipe is to be cast into R.C Chamber walls	m

The unit of measurement shall be the length of wrap in meters.

The tendered rate shall include full compensation for all labour, material, equipment, etc., required for the supply and installation of the wrap.

<b>Item</b>	<b>Description</b>	<b>Unit</b>
PSR 9.3	Replace palisade fence gate refer to (std. drawing 454642)	No.

The unit of measurement shall be the total number of palisade fence gates required.

The tendered rate shall include full compensation for all labour, materials, plant and equipment required for the supply and installation of the palisade fence gate.

Item	Description	Unit
PSR 9.4	Construct Reinforced concrete upstand beams as per drawing no. 19648_P_300_S01_R0_LR	m

The unit of measurement shall be the length of upstand beams in meters to be constructed.

The tendered rate shall include full compensation for all labour, materials, plant and equipment required for the construction of the reinforced concrete upstand beams.





# ETHEKWINI MUNICIPALITY

## HEALTH AND SAFETY SPECIFICATION


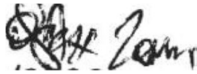
***Approved by Occupational Health & Safety Unit***

***Project Description: The Rehabilitation of Glenwood Reservoir, Cato Ridge Reservoir Illovo Water Tower, Mt Moriah Reservoir, KwaMakhutha Reservoir Complex and Rosetta Reservoir within the eThekwini Municipality***

## ETHEKWINI MUNICIPALITY

### Occupational Health and safety Unit

### Site Specific Health and Safety Specification in terms of 2014 Construction Regulations 5.1(b)

Document Title	Site Specific Health and Safety Specification
Client	eThekwini Municipality — Water and Sanitation
Project Name	The Rehabilitation of Glenwood Reservoir, Cato Ridge Reservoir, Illovo Water Tower, Mt Moriah Reservoir, KwaMakhutha Reservoir Complex, Rosetta Reservoir and Associated Works: Ward 33, 1, 97, 18, 27 & 35
Contract Number	WS7230
Compiled by (Safety Officer)	Name and Surname: Hlengiwe Njapha Signature:  Date: 13/09/2021
Approved by (Safety and Risk Manager)	Name and Surname: Arty Zondi Signature:  Date: 13/09/2021
Revision Number	SSHSS 133/09/2021

**PARTICULAR SPECIFICATION C3.3.1: OHS 2014 CONSTRUCTION REGULATIONS 5.1(b) HEALTH AND SAFETY SPECIFICATION**

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## **1.PROJECT DESCRIPTION**

The Rehabilitation of Glenwood Reservoir, Cato Ridge Reservoir, Illovo Water Tower, Mt Moriah Reservoir, KwaMakhutha Reservoir Complex, Rosetta Reservoir and Associated Works: Ward 33, 1, 97, 18, 27 & 35

## **2. LIMITATIONS OF LIABILITY**

The Principal Contractor shall enter into a Mandatory Agreement with the Client, as defined in Section 37(2) of the Occupational Health and Safety ACT.

The Principal Contractor shall ensure that each contractor appointed by the Principal Contractor and each sub-contractor appointed by a contractor also into a Mandatory Agreement with the Principal Contractor, as defined in Section 37(2) of the Occupational Health and Safety ACT. These agreements shall be included in the Principal Contractor's H&S File on site and be valid for the duration of the contractors' work on the construction site.

## **3. PURPOSE OF THE CONSTRUCTION H&S SPECIFICATION**

This document defines the minimum management requirement that is to be implemented by the Principal Contractor/Contractor for the management of Health and Safety on any eThekwin Municipality project. The aim of this document is to present the health and safety aspects that need to be controlled and managed on the project. This Health and Safety specification identifies and encompasses the working behaviours and safe work practices that are expected of all employees, Vendors and Contractors, Sub-Contractors and Visitors, engaged on construction site. Providing a guideline to comply with best Health & Safety practices and the Occupational Health and Safety Act 85/1993 as amended, including reference to applicable legislative requirement.

#### 4. PROJECT HEALTH AND SAFETY COST

The Client must ensure that potential Principal Contractor submitting tenders have made adequate provision for the cost of health and safety measures. The Principal Contractor shall allow in their cost provision for complying with the requirements of this Client Health and Safety Specification; resources for the following H&S controls shall be in place.

	H&S cost item	Description
1.	Full /Part time safety officer	Full/Part time attendance on site of a SACPCMP registered safety officer from the start of construction until the end of project handover
2.	First Aiders	First Aid training
3.	Competent inspectors (trained, certified, competent)	Statutory inspections of excavations, temporary works, fire extinguishers, lifting equipment, lifting machinery, construction vehicles and mobile plant, portable electrical equipment, Electrical Installation Controller etc.
4	Medical certificate of fitness	Medical examination of all employees and certification of fitness by an Occupational Medicine Practitioner Pre- employment and annual
5	PPE	Standards set for all employees Including community and environment
6	Dust mitigation	To reduce dust exposure to the employees and the public
7	Public protection and barricading	Barricading, shoring and notices
8	Employee facilities	Refer to the Facilities Regulations (drinking water, change facility, personal lockers, and wash facilities, eating facilities, ablution toilets)
9	Traffic management	Traffic controller's training and traffic signage
10	Signage	All construction safety signage required for the project
11	Other	Corona Virus

## 5. SCOPE OF WORK

The works will broadly include but not limited to:

- Erecting scaffolding inside the reservoirs;
- Providing lighting inside the reservoirs;
- Removing sealants/bandages used on previous repairs;
- Repairing spalling, cracking and screed delamination on the floors, walls and roof slab;
- Removing the existing joints and installing a new joint sealant system on the internal joints and the external roof slab joints (on Cato Ridge only);
- Removing the corrosion on the existing outlet pipes and Applying a new protective coating;
- Removal and replacement of corroded reinforcement;
- Sealing or finishing off of all improvised access hatches;
- Demolition and removal of the steel frame and plate used to seal off the 2 compartments from each other in Cato Ridge;
- Compliance with Occupational Health and Safety Regulations and the Environmental Management Plan throughout the construction period; and
- De-establishment after all construction activities.

## 6. COMPENSATION FOR OCCUPATIONAL INJURIES AND DISEASES ACT

The Principal Contractor, each contractor and each sub-contractor shall submit proof of Good Standing with COIDA Commissioner or a Mutual Association licensed in terms of Section 30 of COIDA, prior to starting any work on site.

A copy of the Letter of Good Standing with COIDA Commissioner must be included in the H&S Plan of each contractor working on the site and must remain updated for the duration of the construction work.

## 7. APPLICATION FOR CONSTRUCTION WORK PERMIT

The Principal Contractor shall assist the Client in compiling the evidence required by the Department of Labour for the issuing of the Construction Work Permit. The Principal Contractor shall ensure that the H&S Plan presented for approvals includes:

- Evidence that the Principal Contractor made adequate provision for the cost of H&S measures
- Evidence that the Principal Contractor has the necessary competencies and resources to carry out the construction work safely.
- A copy of the Letter of appointment of the Construction Manager in terms of CR 8(1) and proof of his qualification, competence and registration where applicable.
- Proof of the registration of the Principal Contractors Health & Safety officer with the SACPCMP.

The Principal Contractor shall display the work permit number at the main site entrance. This display must be conspicuous to the satisfaction of the Department of Labor. The permit must be noticeable.

The construction works can only commence once the construction work permit is issued by the Department of Labor.

## **8. MANAGEMENT AND SUPERVISION OF CONSTRUCTION WORK**

### **8.1 Construction Manager**

The Principal Contractor shall appoint a full-time competent person as the construction manager with the duty of managing all construction on the site including the duty of ensuring occupational health and safety compliance.

The Construction Manager must demonstrate competency in relation to work being performed and the ability to manage construction work which may include making all statutory appointments in terms of health and safety.

### **8.2 Construction Health and Safety Officer**

The Principal Contractor shall appoint a full-time competent Construction health and Safety Officer for the construction work. The Construction Safety Officer shall be full on the construction site for this project.

The Safety Officer shall be registered with the South African Council for the Projects and Construction Management Professions. Proof of competence and registration of the appointed Construction Safety Officer must be included in the H&S Plan.

### **8.3 Construction Supervisor**

A Construction Manager must in writing appoint construction supervisors responsible for construction activities and ensuring occupational health and safety compliance on the construction site. A contractor must, upon having considered the size of the project, in writing appoint one or more competent employees for different sections thereof to assist the construction supervisor contemplated in sub regulation (7), and every such employee has, to the extent clearly defined by the contractor in the letter of appointment, the same duties as the construction supervisor: Provided that the designation of any such employee does not relieve the construction supervisor of any personal accountability for failing in his or her supervisory duties in terms of this regulation.

## **9. PRINCIPAL CONTRACTOR'S HEALTH AND SAFETY PLAN**

The Principal Contractor shall submit a suitable, sufficiently documented and coherent specific health and safety plan based on the Client documented Health and Safety Specification. The health and safety plan shall include but not limited to the following:

- Objectives
- Scope of work
- Management of construction and supervision
- Monitoring and review plan
- Sub-contractor management
- Risk Assessment & Written Safe Working Procedures
- Roof work planning/ methodology
- Incident Management & First Aid
- Emergency procedures/ plan
- Fire Prevention & Protection
- Public Health and Safety
- PPE Provision
- Health & Safety Signage
- Excavations
- Structures
- Site establishment
- Soil poisoning
- Existing services
- Construction Vehicles and Mobile Plants
- Hand & Electrical Tool Management
- Construction Employees Facilities
- Health & Safety Policies
- Health and Safety Training & Competencies
- Housekeeping
- Hazardous Chemicals
- Inductions
- Medicals
- Site Security
- Stacking and Storage
- Internal and external Audit
- Inspection Registers
- Toolbox Talks
- Site Establishment
- Removal of Rubble and Large Trees
- Corona Virus



## **10. HAZARD IDENTIFICATION AND RISK ASSESSMENT**

The Principal Contractor shall before commencement of any construction and during such construction works have risk assessments performed by appointed competent person in writing which forms part of the health and safety plan to be applied.

**The provisions of Regulation 9 of the Construction Regulations shall be followed in every detail.**

## **11. HEALTH AND SAFETY FILE**

The Client must discuss and negotiate with a Principal Contractor the content of the Health and Safety Plan and thereafter finally approve the Health and Safety plan for implementation. The recommended Health and Safety file shall include the following:

- Client Health & Safety Specification
- Principal Contractor Health & Safety Plan
- Letter of good standing
- Section 37.2 Mandatory Agreement
- Contractor appointment letter in terms of CR 5.1(k)
- Legal appointments and competencies (Site manager, Site supervisor, Safety officer, Risk assessor, Incident investigator, Fall protection planner, Temporary work designer, Temporary work supervisor, Electrical installation supervisor)
- Risk Assessments as per scope of work
- Written Safe Working Procedures as per risk assessment
- Incident/Accident Management Procedures
- Award letter from SCM
- Organogram as per appointments
- Copy of OHS Act and COIDA Act
- Environmental Management Procedures (Dumpsite, Water provision, Ablution, Waste management, Concrete works, Refuelling and spillage management, Hazardous chemicals storage and disposal, Environmental awareness training, No Go Areas, Protection of animals, Site demarcation etc.)
- Health and Safety Induction programme
- Emergency Procedures/ Plan
- Medical Fitness Certificate (Safety Officer, Site manager and Supervisor)
- Toolbox Talks Programme/ Plan
- SHE Policy
- Corona Virus

## **12. HEALTH AND SAFETY REPRESENTATIVES AND COMMITTEE**

### **Health and Safety Representatives**

- The Principal Contractor shall ensure that Health and Safety Representatives are appointed in writing and exercise their functions as defined in OHSA.
- The Principal Contractor shall elect and appoint a health and safety representative regardless of the number of employees on the site.
- The H&S representative shall at all times be on site and report to the Health and Safety Officer and Construction Manager.

### **Health and Safety Committee**

- The Principal Contractor shall ensure that the H&S committee meets on a monthly basis
- The Principal Contractor's management and each contractor shall be represented at the H&S committee meeting; contractors with more than 20 employees shall have an H&S representative at each committee meeting and each contractor shall have a management member attending each H&S committee meeting.

## **13. CLOSE- OUT CONSOLIDATED HEALTH AND SAFETY FILE**

The Principal Contractor shall compile a consolidated H&S file and hand over to the Water and Sanitation Unit – Prior Road for attention: Liesel Bowles. OHS Unit will conduct a project close out using the appropriate checklist before the completion of the project.

## **14. HEALTH AND SAFETY TRAINING**

The Principal Contractor shall ensure that employees are trained on health and safety measures this shall include but not limited to:

- Written Safe Working Procedures
- Risk Assessments
- Health and Safety Plan
- Emergency Management Plan
- Induction
- Toolbox Talks
- MSDS

## **15. INCIDENTS MANAGEMENT & FIRST AID**

All incidents and accidents as per Section of the Act must be reported, recorded and investigated as per General Administration Regulation 8 & 9.

Where a fatality or permanent disabling injury or incident occurs on the Construction site, the Client must ensure that the Principal Contractor provides the Provincial Director with a report contemplated in Section 24 of the Act and the report includes the measures that the Principal Contractor intends to implement to ensure a safe construction site.

## **16. HEALTH AND SAFETY AUDITS**

The Client must ensure that periodic health and safety audits are conducted at intervals mutually agreed upon between the Principal Contractor and the Client at least every 30 days, the copy of the health and safety audit report must be provided to the Principal Contractor within seven days after the audit.

## **17. FIRE PRECAUTIONS ON CONSTRUCTION SITE**

The Principal Contractor shall provide suitable fire extinguishers which shall be serviced regularly in accordance with the manufacture's recommendations.

Safety signage shall be prominently displayed in all areas where fire extinguishers are located. The Principal Contractor shall arrange for training of the relevant personnel, in the use of fire extinguishers.

**The provisions of Regulation 29 of the Construction Regulations as well as Regulation 9 of Environmental Regulation for Workplaces shall be followed in every detail.**

## **18. ELECTRICAL INSTALLATIONS AND MACHINERY ON CONSTRUCTION SITE.**

The Principal Contractor shall designate a competent electrician in writing who shall control all electrical installations.

All temporary electrical installations used by the contractor are inspected at least once a week by a competent person and the inspection findings are recorded in a register kept on the construction site.

All Electrical machinery is inspected by the authorized operator or user on daily basis using a relevant checklist prior to use and the inspection findings are recorded in a register kept on the construction site.

**The provisions of Regulation 5, 6 & 9 of the Electrical Installation Regulations shall be followed in every detail.**

## **19. PERSONAL PROTECTIVE EQUIPMENT AND CLOTHING.**

The Principal Contractor shall ensure that every employee is issued with, and wears SANS-approved P.P.E. as per the conducted risk assessment.

Failure to use protective equipment as per the risk assessment shall require disciplinary intervention and this process shall be documented in the induction.

No employer shall in respect of anything which he is in terms of this Act required to provide or to do in the interest of health or safety of an employee make any deductions from any employee's remuneration or require or permit any employee to make any payment to him or to any other person.

**The provisions of Regulation 2 of the General Safety Regulations shall be followed in every detail.**

## **20. OCCUPATIONAL HEALTH AND SAFETY SIGNAGE**

The Principal Contractor shall erect and maintain quality safety signage. The signage shall include but is not limited to:

- The construction work permit number displayed at the entrance
- Access restrictions
- A sign indicating that all visitors must report to the site office and must be accompanied by the Principal Contractor when accessing the site
- The name and telephone number of the responsible person(s)
- Emergency telephone number(s)
- PPE to be worn at the particular site
- When falling objects may occur, relevant barricading and warning signs must be erected
- Excavations, heights structures, temporary structures and all risk areas must be indicated as per the specific methods defined in the H&S Plan.

**The provisions of Regulation 7 of the Construction Regulations shall be followed in every detail.**

## **21. DUTIES OF PRINCIPAL CONTRACTORS AND CONTRACTORS**

Contractors and sub-contractors must be given a copy of the H&S specification and any additional specification issued by the Client and shall comply with these specifications integrally. All employers working on the site shall conform to the standard in the CHSS. All the duties of the Principal Contractor in this CHSS equally apply, in full, to contractors of such Principal Contractor and to sub-contractors of such contractors.

The Principal Contractor shall ensure that the comprehensive and updated list of all the contractors and sub-contractors on site includes:

- A reference to the agreements between the parties, including all contractors Section 37(2) agreements with the Principal Contractor
- The type of work being done
- The date of the approval of the H&S Plan
- The date of expiry of the COIDA certificate of good standing
- The date of the last monthly audit

**The provisions of Regulation 7 of the Construction Regulations shall be followed in every detail.**

## **22. FALL PROTECTION AND WORKING IN FALL RISK POSITIONS**

The Principal Contractor shall ensure that the fall protection plan include a risk assessment for all work carried out from the fall risk position and the safe work procedures.

All employees working from fall risk position are subject to medical examination. The Training Programme must be in place for employees working from a fall risk position. The procedures addressing the inspection, testing and maintenance of all fall risk protection equipment. The rescue plan detailing procedure, personnel and suitable equipment to be used to rescue a person. The Principal Contractor must that a competent person is designated to be responsible for the preparation of the fall protection plan.

**The provisions of Regulation 10 of the Construction Regulations shall be followed in every detail.**

## **23. EXCAVATION AND COMPACTION**

The Principal Contractor must ensure that all excavation and compaction work is carried out under the supervision of a competent person who has been appointed in writing for that purpose.

The Principal Contractor shall take cognizance of the geotechnical study pertaining to the conditions of the construction site and must plan all excavation work in accordance with the recommendations of the professional engineer.

The Principal Contractor must ensure that every excavation, including all bracing and shoring, is inspected daily, prior to the commencement of each shift and that no person enters the excavation or works in a risk zone until the excavation is assessed and declared safe.

All excavations must be left open for the minimum of time required and those that are left open on the site must be protected by a barrier or a fence of at least one meter in height as close to the excavation as is practicable. The protective barrier or fence must adequately prevent persons from falling into the excavation and barrier taping is not sufficient for this purpose.

Excavation shoring and bracing, if required shall be designed by a designer appointed in writing who shall inspect and approve the installed shoring and bracing.

Where persons work, inspect or test excavations, warning signs must be in place next to an excavation.

**The provisions of Regulation 13 of the Construction Regulations shall be followed in every detail.**

## **24. PUBLIC HEALTH AND SAFETY**

The site shall always be secured to prevent the unauthorized access of persons to construction risk areas. Appropriate health and safety signage shall be posted and access control to site must be exercised via a single access point.

All members entering the site must indicate in what capacity they are visiting the site.

The access point must be designed and constructed to allow for temporary parking, entry of construction vehicles, entry of personnel transport vehicles and entry of individual workers and other persons.

The principal Contractor shall ensure that each person visiting the site shall be inducted to the site and such abridged induction shall outline the hazards from on-site activities and the precautions to be observed to avoid or minimize those risks.

Visitors must only enter when accompanied by a responsible person designated by the Principal Contractor.

## **25. NIGHT; WEEK –END WORK**

No night or weekend work shall be performed unless authorized by the Principal Agent or Lead Engineers. Where weekend work is planned the Principal Contractor shall ensure that its construction supervisor is on site, this applies even if only contractors or sub-contractors are working on the site.

Where weekend work is planned each contractor or sub-contractor shall ensure that its construction supervisor is on site, this applies even if the Principal Contractor's manager or supervisor is on the site.

## **26. CONSTRUCTION EMPLOYEES FACILITIES**

The Principal Contractor shall provide at or within reasonable access of every construction site, the following clean, hygienic and maintained facilities:

- Shower facilities after consultation with the employees or employees representatives, or at least one shower facility for every 15 persons;
- at least one sanitary facility for each sex and for every 30 workers;
- changing facilities for each sex; and
- sheltered eating areas.

**The provisions of Regulation 2, 3, 4, 6, 7, 9 of the Facilities Regulations shall be followed in every detail.**

## **27. CRANES AND LIFTING OPERATIONS**

The Principal Contractor must ensure the cranes used are:

- Are designed and erected under the supervision of a competent person;
- A relevant risk assessment and method statement are developed and applied; The effects of wind forces on the crane are taken into consideration and that a wind speed device is fitted that provides the operator with an audible warning when the wind speed exceeds the design engineer's specification; The bases for tracks for rail-mounted tower cranes are firm, level and secured; The tower crane operators are competent to carry out the work safely; and The tower crane operators

have a medical certificate of fitness to work in such an environment, issued by an occupational health practitioner in the form of Annexure 3

## **28. STORAGE AND USE OF FLAMMABLE LIQUIDS**

No flammable substances must be stored on site unless these are stored in a flammable store or cabinet approved by the Municipal Chief Fire Officer, no other materials shall be stored in the flammable store or cabinet.

Where required the H&S Plan shall include a method statement detailing the safe use, storage, decanting and spill controls for all flammable liquids used and stored on site.

**The provisions of Regulation 25 of the Construction Regulations shall be followed in every detail.**

## **29. HAZARDOUS CHEMICAL SUBSTANCE**

With respect to hazardous chemical substances used, the contractor shall ensure that:

- All MSDS are included in the H&S File
- A HCS risk assessment is included in the H&S Plan
- The safe use, storage, emergency procedures and safe disposal of hazardous substances are addressed in a method statement(s) included in the H&S Plan.
- Proof of competency and signed letters of appointment of the person responsible for chemical handling is included in the H&S File.

Any hazardous chemical substance intended to be applied on site during the project (i.e. after approval of the H&S Plan) shall be subject to an issue-based risk assessment and method statement which must be presented to the Client Agent prior to the substance being introduced on site.

**The provisions of Regulation 3, 5, 7, 8, 9, 9A, 10, 11, 14, 15 of the Hazardous Chemical Substances Regulations shall be followed in every detail.**

## **30. DEMOLITION**

The Principal Contractor contractor must appoint a competent person in writing to supervise and control all demolition work on site.

A contractor must ensure that before any demolition work is carried out, and in order to ascertain the method of demolition to be used, a detailed structural engineering survey of the structure to be demolished is carried out by a competent person and that a method statement on the procedure to be followed in demolishing the structure is developed by that person.

During a demolition, the competent person contemplated in sub regulation (1) must check the structural integrity of the structure at intervals determined in the method statement contemplated in sub regulation (2), in order to avoid any premature collapses.

**The provisions of Regulation 14 of the Construction Regulations shall be followed in every detail.**

### **31. HOUSEKEEPING AND GENERAL SAFEGUARDING ON CONSTRUCTION SITE**

The Principal Contractor shall appoint a person responsible for general housekeeping and stacking and storage of materials and equipment on the entire site.

**The provisions of Regulation 27 of the Construction Regulations shall be followed in every detail.**

### **32. CONSTRUCTION MEDICALS**

A Principal Contractor must 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.

### **33. STACKING AND STORAGE ON CONSTRUCTION SITE**

A Principal Contractor must, in addition to compliance with the provisions for the stacking of articles in the General Safety Regulations, 2003, ensure that - *A competent person is appointed in writing with the duty of supervising all stacking* and storage on a construction site; Adequate storage areas are provided; There are demarcated storage areas; and storage areas are kept neat and under control.

### **34. INDUCTION AND TOOLBOX PROGRAMME**

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

A contractor must ensure that all visitors to a construction site undergo health and safety induction pertaining to the hazards prevalent on the site and must ensure that such visitors have the necessary personal protective equipment.

A contractor must at all times keep on his or her construction site records of the health and safety induction training contemplated in sub-regulation (6) and such records must be made available on request to an inspector, the client, the client's agent or the principal contractor. The Principal Contractor must ensure that the toolbox talks are conducted on weekly basis and the training records kept on the safety file.

### **35. STRUCTURES**

A contractor must ensure that all reasonably practicable steps are taken to prevent the uncontrolled collapse of any new or existing structure or any part thereof, which may become unstable or is in a temporary state of weakness or instability due to the carrying out of construction work; No structure or part



of a structure is loaded in a manner which would render it unsafe; All drawings pertaining to the design of the relevant structure are kept on site and are available on request to an inspector, other contractors, the client and the client's agent or employee.

### **36.CORONA VIRUS**

The Principal Contractor shall comply with the Covid-19 Risk Management Plan issued by Occupational Health and Safety Unit.

**DESIGNER COMMENTS ON HEALTH AND SAFETY SPECIFICATION**

Designer's Health and Safety Checklist

Name and address of Project:

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Item and Legal Reference	Y/N	Comment
CR 6(1) (a)  Has the designer familiarized himself with the Construction Regulations 2014 (particularly Regulation 6) and the Safety Standards incorporated into these Regulations?		
CR 6(1) (b)  During the design stage, was the Client's Health and Safety Specifications given due consideration?		
The structural design aspects that could have an effect on the pricing of construction work?		
The geotechnical-science aspects?		
The weight which the structure is designed to safely withstand?		
CR 6(1)(d)  Has the designer communicated all known and anticipated hazards and risks associated with the construction of the designed structure?  Furthermore, has the safe method statement been developed to ensure that construction work is safely executed?		
CR 6 (1) (e)  As far as is reasonably practicable, are the dangerous processes and materials been eliminated or replaced in the design?		

CR 6(1) (f)  Has due consideration been taken during the design stage, for the safe maintenance of the structure after its completion?		
CR 6 (g-i)  Is the designer aware of his/her responsibility to carry out periodic site inspections to ensure that the structure is constructed correctly in accordance with the design?		
CR 6(1) (j)  Have all ergonomic hazards been considered for the lifecycle of the structure (i.e. during construction and after completion)?		

(Please ensure that the checklist is completed in full particularly the comments column)

Name of Designer: \_\_\_\_\_

Designer's Title (e.g. Engineer, Architect): \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Received by (Principal contractor): \_\_\_\_\_

Signature: \_\_\_\_\_



Date: \_\_\_\_\_



# ETHEKWINI MUNICIPALITY

## Occupational Health a safety Unit

### BASELINE RISK ASSESSMENT

Document Title	Baseline Risk Assessment
Client	eThekwini Municipality — Water and Sanitation
Project Name	The Rehabilitation of Glenwood Reservoir, Cato Ridge Reservoir, Illovo Water Tower, Mt Moriah Reservoir, KwaMakhutha Reservoir Complex, Rosetta Reservoir and Associated Works: Ward 33, 1, 97, 18, 27 & 35.
Contract Number	WS7230
Compiled by (Safety Officer)	Name and Surname: Hlengiwe Njapha Signature:  Date: 14/09/2021
Approved by (Safety and Risk Manager)	Name and Surname: Arty Zondi Signature:  Date: 14/09/2021
Revision Number	BRA133/09/2021

## **BASELINE RISK ASSESSMENT**

**1. INTRODUCTION:** In accordance with the Occupational Health and Safety Act, (Act 85 of 1993) the Legislator places specific requirements on an Employer. One of these is prescribed in Section 8(i) of the Act where it requires the Employer to ascertain the risks and dangers which may occur within the workplace or section of the workplace and then goes on to establish working procedures or practices.

**2. PURPOSE:** This is conducted to create a benchmark of the potential risks that apply to the whole project or business operation.

**3. SCOPE:** This assessment could be approached on a site, regional or national level concerning any facet of the business operation or process or activity.

## **4. REVIEW AND MONITORING PLAN**

The risk assessment form part of the health and safety plan to be applied on the site and must include the following:

- (a) The identification of the risk and hazards to which persons may be exposed.
- (b) An analysis and evaluation of the risk and hazards identified based on a documented method,

## **5. REFERENCES**

- (a) Tender document number WS7230
- (b) Occupational Health & Safety Act and its Regulation

## **RISK ASSESSMENTS SCOPE OF WORK**

- Erecting scaffolding inside the reservoirs;
- Providing lighting inside the reservoirs;
- Removing sealants/bandages used on previous repairs;
- Repairing spalling, cracking and screed delamination on the floors, walls and roof slab;
- Removing the existing joints and installing a new joint sealant system on the internal joints and the external roof slab joints (on Cato Ridge only);
- Removing the corrosion on the existing outlet pipes and Applying a new protective coating;
- Removal and replacement of corroded reinforcement;
- Sealing or finishing off of all improvised access hatches;
- Demolition and removal of the steel frame and plate used to seal off the 2 compartments from each other in Cato Ridge;
- Compliance with Occupational Health and Safety Regulations and the Environmental Management Plan throughout the construction period; and
- De-establishment after all construction activities.

## 1. RISK ESTIMATION AND EVALUATION

### RISK CLASSIFICATION USING A RISK SCORE TECHNIQUE

<b>Exposure (E) How frequently does the hazardous event occur</b> Continuously..... Frequently (daily)..... Occasionally (weekly)..... Unusually (monthly)..... Rarely (few a year).....	<b>Risk Classification</b> 10 6 3 2 1
<b>Probability (P) The probability of a loss when the hazardous event does occur</b> Frequent (happens often)..... Probable (quite possible)..... Occasional (unusual, but possible )..... Remotely possible (has happened somewhere) ..... Improbable (practically impossible) .....	<b>Risk Classification</b> 10 6 3 1 0.5
<b>Severity (S) Consequences of the hazardous event</b> <b>Catastrophic</b> many fatalities; or interruption of longer than 2 weeks; or asset or environmental damage (or both) exceeding R100m ..... <b>Disaster</b> (few fatalities; or interruption between one and 2 weeks; or asset or environmental damage (or both) exceeding R10m) ..... <b>Very serious</b> (one fatality; or interruption of 6 days; or asset or environmental damage (or both) exceeding R100,000 ..... <b>Important</b> (temporary disability; or interruption between 6 and 24 hours; or damage exceeding R10,000..... <b>Noticeable</b> (first aid needed; or interruption of less than 6 hours; damage exceeding R1000) .....	<b>Risk Classification</b> 100 40 7 3 1
<b>Risk classification (Risk score = E x P x S )</b> <b>Risk score                      Risk Classification</b> Over 400----- 5 <b>Very high risk – discontinue operation or activity</b> 200 to 400 ----- 4 <b>High risk – immediate correction needed</b> 70 to 200----- 3 <b>Substantial risk – correction needed</b> 20 to 70----- 2 <b>Possible risk – attention needed</b> Under 20 ----- 1 <b>Risk accepted</b>	

	<b>BASELINE RISK ASSESSMENT WORKSHEET ACTIVITY</b>	<b>HAZARDS</b>
<b>1</b>	<b>Site establishment</b>	
	<ul style="list-style-type: none"> <li>Manual and mechanical clearing of the land</li> <li>Off-loading and positioning of containers by mobile crane</li> <li>Fencing</li> <li>Installation of temporary water supply, electricity, ablution facilities</li> </ul>	<ul style="list-style-type: none"> <li>Incompetent construction mobile plant operator</li> <li>Manual Handling of equipment and materials.</li> <li>Uneven surfaces</li> <li>Driving on dangerous and undulating terrain.</li> <li>Reckless driving.</li> <li>Electrocution</li> <li>Incorrect/ poor connection of temporary services</li> </ul>
<b>2</b>	<b>Site clearing</b>	
	<ul style="list-style-type: none"> <li>Manually and mechanical site clearing</li> </ul>	<ul style="list-style-type: none"> <li>Overgrown vegetation</li> <li>Incompetent driver/ operator</li> <li>Unsafe construction mobile plant</li> <li>Petrol and oil spillages</li> <li>Unsafe hand tools</li> <li>Manual handling</li> </ul>
<b>3</b>	<b>Excavation</b>	
	<ul style="list-style-type: none"> <li>Manual and mechanical excavation</li> </ul>	<ul style="list-style-type: none"> <li>Unforeseen underground services</li> <li>Unsafe hand tools</li> <li>Unsafe construction mobile plants</li> <li>Uneven surface/ ground condition</li> <li>Incompetent construction mobile plant operator</li> <li>Oil leak</li> </ul>

<b>5</b>	<b>Bulk Earthwork</b>	
	<ul style="list-style-type: none"> <li>• Mechanical excavation</li> <li>• Stockpiling</li> </ul>	<ul style="list-style-type: none"> <li>• Incompetent operator.</li> <li>• Machine running out of control.</li> <li>• Open excavation.</li> <li>• Dust</li> <li>• Poor stockpiling.</li> <li>• Operating mobile plant next to open excavation</li> </ul>
<b>6</b>	<b>Construction Mobile Plants</b>	
	<ul style="list-style-type: none"> <li>• Use of Plant &amp; Equipment on site</li> </ul>	<ul style="list-style-type: none"> <li>• Unsafe construction plants and equipment</li> <li>• Incompetent drivers/ operators</li> <li>• Uneven surface</li> <li>• Equipment/ machinery failure</li> <li>• Running out of control</li> <li>• Noise</li> <li>• Vibration</li> <li>• Oil leaks</li> <li>• Dust</li> </ul>
<b>7</b>	<b>Use of hand-tools</b>	
	<ul style="list-style-type: none"> <li>• Conducting activities using hand-tools</li> </ul>	<ul style="list-style-type: none"> <li>• Unsafe hand-tools</li> <li>• Possible of pinch</li> </ul>
<b>9</b>	<b>Existing services</b>	
	<ul style="list-style-type: none"> <li>• Existing roads, watermains, sewer lines, electricity</li> </ul>	<ul style="list-style-type: none"> <li>• Damage to existing services,</li> <li>• Destruction of services in the area,</li> <li>• Electrocution</li> <li>• Unforeseen existing hazards</li> </ul>



<b>10</b>	<b>Traffic Accommodation</b>	
	<ul style="list-style-type: none"> <li>• Installation of temporally signs</li> <li>• Traffic diverting/ Management</li> </ul>	<ul style="list-style-type: none"> <li>• Knocked down by moving vehicles, poor demarcation/displaying of signs.</li> <li>• Poor traffic management plan.</li> <li>• Incompetent traffic controllers</li> </ul>
<b>11</b>	<b>Concrete Work</b>	
	<ul style="list-style-type: none"> <li>• Pouring of concrete by ready mix truck.</li> </ul>	<ul style="list-style-type: none"> <li>• Unsafe access to site and reckless driving.</li> <li>• People fall into open excavation.</li> <li>• Sharp steel edges.</li> <li>• Concrete lodge into eyes, foot contact with cement</li> <li>• Over bending.</li> </ul>
<b>12</b>	<b>Demolition Work</b>	
	<ul style="list-style-type: none"> <li>• Demolition of a structure</li> </ul>	<ul style="list-style-type: none"> <li>• Inhalation of dust</li> <li>• Flying objects</li> </ul>
<b>13</b>	<b>Storm Water</b>	
	<ul style="list-style-type: none"> <li>• Lay, bed and joint of pipes</li> </ul>	<ul style="list-style-type: none"> <li>• Unsafe access to excavation</li> <li>• Manual handling of pipes</li> <li>• Possible pinch of fingers</li> <li>• Engulfment of excavation</li> </ul>
<b>14</b>	<b>Working at height</b>	
	<ul style="list-style-type: none"> <li>• Erection of Scaffolding by a Competent person</li> </ul>	<ul style="list-style-type: none"> <li>• Unsafe scaffolding could collapse resulting in critical injuries</li> <li>• Fatalities</li> </ul>

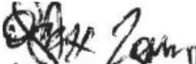
<b>15</b>	<b>Emergency Management</b>	
	<ul style="list-style-type: none"> <li>Development and Implementation of an Emergency Management Plan</li> </ul>	<ul style="list-style-type: none"> <li>Failure to have a basic, site specific emergency management plan.</li> <li>Workers not trained in the Emergency Plan.</li> <li>Insufficient or no emergency equipment or personnel.</li> </ul>
<b>16</b>	<b>Community Risk Management</b>	
	<ul style="list-style-type: none"> <li>Managing community risk</li> </ul>	<ul style="list-style-type: none"> <li>Failure to adequately monitor and manage the multi-faced social issues.</li> </ul>
<b>17</b>	<b>Subcontractor Management</b>	
	<ul style="list-style-type: none"> <li>Managing subcontractors</li> </ul>	<ul style="list-style-type: none"> <li>Failure to adequately assess subcontractors S.H.E Management System before work commences and at regular intervals.</li> <li>Inadequate Supervision.</li> <li>Utilizing incompetent Subcontractors.</li> </ul>



## ETHEKWINI MUNICIPALITY

### Occupational Health a safety Unit

### COVID 19 Health and Safety Specification

Document Title	COVID 19 Health & Safety Specification
Client	eThekwini Municipality
Project Name	The Rehabilitation of Glenwood Reservoir, Cato Ridge Reservoir, Illovo Water Tower, Mt Moriah Reservoir, KwaMakhutha Reservoir Complex, Rosetta Reservoir and Associated Works: Ward 33, 1, 97, 18, 27 & 35.
Contract Number	WS7230
Internal Reference No.	COVID19 - 42/09/2021
Compiled by (Safety Officer)	Name and Surname: Hlengiwe Njapha Signature:  Date: 14/09/2021
Reviewed by (Safety and Risk Manager)	Name and Surname: Arty Zondi Signature:  Date: 14/09/2021



## **ETHEKWINI MUNICIPALITY**

### **OCCUPATIONAL HEALTH AND SAFETY UNIT**

## **COVID 19 HEALTH AND SAFETY SPECIFICATION**

### **Background:**

Corona viruses are a large family of viruses that are found both in humans and animals. Some of these viruses are known to cause illnesses ranging from common cold to severe respiratory diseases. Corona virus (COVID-19) was identified in December 2019 in China. COVID-19 infections have spread to other countries in the world. Exposure to Covid-19 may cause flue like symptoms such as coughing, sneezing, headaches, fever, sore throat and at times affect the lungs and airways of employees. Symptoms can be mild, moderate, severe or fatal.

Coronavirus Disease 2019 (COVID-19) is a respiratory disease caused by the SARS-CoV-2 virus. To reduce the impact of COVID-19 outbreak conditions on businesses, workers, customers, and the public, it is important for all employers to plan now for COVID-19. For employers who have already planned for influenza outbreaks involving many staff members, planning for COVID-19 may involve updating plans to address the specific sources of exposure, routes of transmission, and other unique characteristics of SARS-CoV-2 (i.e. compared to influenza virus outbreaks).

### **Introduction:**

The legislation governing workplaces in relation to COVID-19 is the Occupational Health and Safety Act, Act 85 of 1993, as amended, read with the Hazardous Biological Agents Regulations. Section 8 (1) of the Occupational Health and Safety (OHS) Act, Act 85 of 1993, as amended, requires the employer to provide and maintain as far as is reasonably practicable a working environment that is safe and without risks to the health of employees. Specifically, section 8(2)(b) requires steps such as may be reasonably practicable to eliminate or mitigate any hazard or potential hazard before resorting to Personal Protective Equipment (PPE).

However, in the case of COVID-19, a combination of controls is required, although the main principle is to follow the hierarchy of controls.

While engineering and administrative controls are considered more effective in minimizing exposure to SARS-cov-2, PPE may also be needed to prevent certain exposures. While correctly using PPE can help prevent some exposures, it should not take the place of other prevention strategies.

This is a risk assessment for dealing with the current COVID-19 situation in the construction site. It may not likely to cover all scenarios therefore Construction Management should develop Standard Operating

Procedures as there may be unique circumstances and make a necessary call in the interest of the health and safety of employees.

This is a risk assessment for dealing with the current COVID-19 situation in the construction site. It may not likely to cover all scenarios therefore management should develop SOP's as there may be unique circumstances and make a necessary call in the interest of the health and safety of Contractor employees.

### **Definitions**

**"BCEA"** means the Basic Conditions of Employment Act, 1997 (Act No.75 of 1997)

**"COVID-19"** means Coronavirus Disease 2019

**"Disaster Management Act"** means the Disaster Management Act, 2002 (Act No.57 of 2002)

**"OHSA"** means the Occupational Health and Safety Act, 1993 (Act No.85 of 1993)

**"PPE"** means personal protective equipment

**"virus"** means SARS-Cov-2 virus

**"Worker"** means any person who works in an employer's workplace including an employee of the employer or contractor, a self-employed person or volunteer

**"workplace"** means any premises or place where a person performs work

**"NICD"** means National Institute for Communicable Diseases

**"OMP"** means Occupational Medical Practitioner

**COVID 19 Risk Assessment:**

- The Contractor must ensure that COVID 19 Risk Assessment (COVID 19 Health and Safety Plan) is conducted and submitted to the Client prior to the commencement of the construction work, it must be in line with the Client COVID 19 Health and Safety Specification.
- The Contractor must appoint COVID 19 Compliance Manager to ensure that all necessary COVID 19 safety precautions are implemented to prevent the spread.

**Training and awareness:**

- The Contractor must ensure that all employees are inducted on COVID19 contractor risk assessment to prevent the spread.
- The Contractor must ensure that the employees are trained on COVID 19 to prevent the spread of the virus, training records must be kept in the Safety File.
- COVID-19 Direction on Health and Safety in the Workplace Government Gazette dated 29 April 2020, must be used as guideline and be customized to specific construction site.
- The Contractor must provide workers with information that raises awareness in any form or manner, including where reasonably practicable leaflets and notices placed in conspicuous places in the workplace informing workers of the dangers of the virus, the manner of its transmission, the measures to prevent transmission such as personal hygiene, social distancing, use of cloth masks, cough etiquette and where to go for screening or testing if presenting with symptoms .

**Hand Hygiene:**

- The Contractor must provide adequate facilities for the washing of hands with soap and clean water on each construction site.
- The Contractor must provide 70% alcohol-based hand sanitizers at strategic points of the construction site.
- The Contractor must provide paper towels to dry hands after hand washing.

**Cleaning and Disinfecting surfaces:**

- The Contractor must take measures to ensure that all work surfaces and equipment are disinfected before work begins, regular during the working period and upon completion the work.
- The Contractor must ensure frequently cleaning and disinfecting objects and surfaces that are touched regularly particularly in areas of high use such as shared tools, taps, ablution facilities, hand rails light switches, eating and changeroom areas, shared construction vehicles, etc. using appropriate disinfecting solutions such clean water, soap and bleach

### **Social Distancing:**

- The Contractor must arrange the construction site to ensure minimal contact between workers and as far as practicable that there is a minimum of 1,5meter distance between workers while they are working. employees are aware to maintain social distance when working.
- The Contractor must ensure that social distancing measures are implemented through supervision of both the construction site and in the common areas outside the workplace, through queue control or within the workplace, these measures may include dividing the workers into groups or staggering break times to avoid the concentration of workers in common areas.
- The Contractor must ensure that where the minimum distance is impossible employees must always be instructed to wear cloth mask/FFP1/2 mask or reducing the number of workers present in the construction site at any time to achieve the required social distancing.
- The Contractor must ensure that employees working in offices are provided with physical barriers placed between work their workstations

### **Personal Protective Equipment (PPE)**

- The Contractor must ensure that every worker is provided with two cloth masks to be worn when in workplace or public which comply with the requirement set out in the guideline issued by Department of Trade, Industry and Competition.
- The main benefit of everyone wearing a cloth mask is to reduce the amount of virus droplets being coughed up by those with infection and transmitted to others and to surface that others may touch.
- Every Contractor must ensure that workers are informed, instructed, trained and informed as to the correct use of cloth mask.
- The Contractor must ensure to issue face shield/visors where applicable as double protection

### **Point of entry screening**

- The Contractor must identify the screening area for each construction site.
- The Contractor must ensure that the daily point of entry screening is conducted when entering construction site by a person nominated by the Contractor.
- The Contractor must ensure that all employees and visitors are screened and only those with all clear will be given clearance to carry on with construction work.
- The Contractor must ensure that during the screening a 1.5 m distance is maintained and FFP1/2 mask to be worn by a nominated person.
- The Contractor must ensure that the screening person is trained.
- The Contractor must ensure that a bottle of sanitiser is available at the screening area.
- The Contractor must ensure that the thermal device are provided during the screening process.
- The Contractor must ensure that all employees complete a COVID 19 Questionnaire which will be used to screen potential risk personnel entering the construction site.

### **Symptomatic employees**

- The Contractor must ensure that any person who ticks YES to one or more symptoms will be sent home and be advised to seek testing by a healthcare provider.
- The Contractor must ensure that employees who are sick with continuous cough, sore throat, difficulty breathing, or a high temperature in the workplace will be encouraged to stay home.
- The Contractor must ensure that the positive tested COVID 19 case, the employee is on paid sick leave in terms of section 22 of BCEA or if the employee's sick leave is exhausted, the Contractor shall apply for an illness benefit.
- The Contractor must ensure that employees confirmed to have COVID 19 will be managed in line with National Department of Health COVID 19 guidelines.
- The Contractor must isolate the worker with confirmed COVID case and issued him/her with FFP2 or surgical mask, arrange for the worker to be transported for further medical examination or testing, in a manner that does not place other workers or members of the public at risk
- The Contractor must ensure that the driver who is transporting the Person Under Investigation is provided with surgical mask or FFP2 mask.
- The Contractor must assess the risk of transmission, disinfect the work area and refer those workers who may be at risk for screening to prevent possible transmission.
- The Contractor must advise the Communicable Disease Centre (CDC) so that other contacts be identified and be investigated
- The Contractor must ensure that tested positive for COVID 19 is not discriminated in terms of Employment Equity Act no. 55 of 1998.
- The Contractor must ensure that if there is evidence that the worker contracted COVID 19 as a result of occupational exposure, lodge a claim for compensation in terms of the Compensation for Occupational Injuries and Diseases Act no. 130 of 1993.
- The Contractor must ensure that if a worker has been diagnosed with COVID 19 and isolated in accordance with the National Department of Health Guidelines, a Contractor may only allow a worker to return to work on the following conditions, the worker has undergone a medical evaluation confirming that the worker has been tested negative for COVID 19.



### **Emergency Numbers**

- Corona virus (COVID-19) 24-Hour Hotline number: 0800 029 999
- Corona virus (COVID-19) WhatsApp Number: 0600 12 3456
- COVID-19 National Crisis Helpline - 0861 322 322
- NICD (National Institute of Communicable Diseases) 24-Hour toll-free hotline number: 0800 029 999 or 0800 111 132
- SAPS gender-based violence service complaints (SAPS) - 0800 333 177
- GBV (Gender Based Violence) Command Centre -0800 428 428/ \*120\*7867# (free from any cell phone)/ SMS Line: 32312
- Women Abuse Helpline - 0800 150 150
- People Opposing Women Abuse (POWA) - Tel: 011 642 4345/ Afterhours cellphone: 0837651235
- Child Line - 0800 055 555
- Lifeline South Africa - 0800 012 322 (free on mobile networks including landlines)
- FAMSA - Advice on family relationships - 011 975 7107
- Human trafficking - Report cases of human trafficking - hotline operated by the Salvation Army and Be Heard - 08007 37283 (0 8000-rescue)
- National Human Trafficking Helpline - 0800 222 777
- Persons with Disabilities - SMS 'help' to 31531
- National AIDS Helpline - 0800 012 322
- Suicide Helpline - 0800 567 567
- Stop Gender Violence - Anonymous, confidential and accessible telephonic information, counselling and referrals, in all 11 official languages - 0800 150 15
- Substance Abuse Helpline - 0800 12 13 14

### **Recommended Best Practice**

- The Contractor must ensure that vulnerable and 60 years old workers are identified and received a special measure for their protection.
- The Contractor must ensure that for communication strategy Microsoft Team, ZOOM or Skype or cell phones are used to prevent the spread of COVID 19 virus.
- The Contractor must ensure to keep the workplace well ventilated by natural or mechanical means to reduce the SARS – CoV – 2 viral loads.

## References

- COVID-19 Disaster Management Act
- Occupational Health & Safety Act 85 of 1993
- The Department of Employment and Labour: Workplace Preparedness: COVID-19 (SARS-CoV-19 virus)
- COVID-19 Occupational Health and Safety Measures in Workplaces COVID-19 (C19 OHS), 2020
- Hazardous Biological Agents Regulations
- National Institute for Occupational Health (NIOH)

N.B. Please be aware that we are waiting for COVID 19 Construction Health and Safety Guideline issued by Department of Labour, which that they might be changes on this SPECIFICATION.

## COMPANY LOGO

### Covid-19 access into construction site, point of entry screening questionnaire

Company / Construction Site: \_\_\_\_\_

Name and Surname: \_\_\_\_\_ Co No: \_\_\_\_\_

Line Manager Name: \_\_\_\_\_

Question:	Yes	No
1. Have you had flu or symptoms of flu in the last few weeks?		
2. Do you have a persistent cough that has started in the last few days?		
3. Do you have symptoms of fever? (red, tearing or burning eyes, sweats, clammy hands)?		
4. Do you have any signs of a respiratory infection, shortness of breath, difficulty breathing? (Self-test: Hold in your breath for 10 seconds)		
5. In the last 14 to 21 days, have you travelled outside the borders of South Africa?		
6. In the last 14 to 21 days, have had contact with anybody that has travelled outside the Provincial or South African borders?		
7. Have you been near or in contact with anyone who has symptoms or tested positive for COVID-19?		
If you have answered yes to any of the above questions, please inform your supervisor immediately. Brief description of events (When, where and who else were you with: _____ _____ _____		
<b>Personal Commitment</b>		
✓ I further undertake to immediately report any change in my medical condition to my supervisor/manager!		
✓ I will always maintain excellent personal and company hygiene standards!		
✓ I will maintain and keep the minimum social distance of 1m between myself and other employees!		
✓ I will utilize PPE and sanitizers provided to me to prevent the spread of the virus!		
✓ I will ensure all equipment / materials handed over to another person has been cleaned and sanitized!		
✓ I will not abuse, misuse, share or lose the PPE and related materials / equipment issued to me!		
<b>Employee Signature</b>		
<b>Date</b>		

Temperature: \_\_\_\_\_ °C. (if temperature is at 38°C or higher refer to Process Flow Annexure 1 document then deny entry, isolate and start reporting process)

Entry Cleared Yes ☐ No ☐

Construction Manager/Supervisor: \_\_\_\_\_ Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

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## **PARTICULAR SPECIFICATION C3.3.2 ENVIRONMENTAL MANAGEMENT SPECIFICATION**

### **PEM1 PURPOSE**

The purpose of the EMP is to encourage good management practices through planning and commitment with respect to environmental issues, and to provide rational and practical environmental guidelines to minimise disturbance of the natural environment.

### **PEM2 RESPONSIBILITIES FOR ENVIRONMENTAL MANAGEMENT**

The contractor will be responsible for environmental control on site during construction and the maintenance period. The construction activities will be monitored by an independent environmental specialist and audited against the EMP.

### **PEM3 TRAINING AND INDUCTION OF EMPLOYEES**

The contractor has a responsibility to ensure that all those people involved in the project are aware of and familiar with the environmental requirements for the project (this includes sub-contractors, casual labour, etc.).

### **PEM4 COMPLAINTS REGISTER AND ENVIRONMENTAL INCIDENT BOOK**

Any complaints received by the project team from the community will be recorded. The complaint will be brought to the attention of the site manager.

All complaints received will be investigated and a response given to the complainant within 28 days.

All environmental incidents occurring on the site will also be recorded.

### **PEM 5 ENVIRONMENTAL SAFETY**

The management of impacts associated with various categories of concern is discussed as separate topics, indicated below.

#### **PEM 5.1 Soil**

- (a) Topsoil should be temporarily stockpiled, separately from (clay) subsoil and rocky material, when areas are cleared. If mixed with clay sub-soil the usefulness of the topsoil for rehabilitation of the site will be lost.
- (b) Note soil or flora may be disturbed at the Glenwood Reservoir Site and the reservoir is within a nature reserve.
- (c) Stockpiled topsoil should not be compacted and should be replaced as the final soil layer. No vehicles are allowed access onto the stockpiles after they have been placed.
- (d) Stockpiled soil should be protected by erosion-control berms if exposed for a period of greater than 14 days during the wet season. The need for such measures will be indicated in the site-specific report.
- (e) Topsoil stripped from different sites must be stockpiled separately and clearly identified as such. Topsoil obtained from sites with different soil types must not be mixed.
- (f) Topsoil stockpiles must not be contaminated with oil, diesel, petrol, waste or any other foreign matter, which may inhibit the later growth of vegetation and micro-organisms in the soil.

- (g) Soil must not be stockpiled on drainage lines or near watercourses without prior consent from the Project Manager.
- (h) Soil should be exposed for the minimum time possible once cleared of invasive vegetation, that is the timing of clearing and grubbing should be co-ordinated as much as possible to avoid prolonged exposure of soils to wind and water erosion. Stockpiled topsoil must be either vegetated with indigenous grasses or covered with a suitable fabric to prevent erosion and invasion by weeds.
- (i) Limited vehicular access is allowed across within the Glenwood Reservoir as it is a nature Reserve.
- (j) All equipment must be inspected regularly for oil or fuel leaks before it is operated. Leakages must be repaired on mobile equipment or containment trays placed underneath immobile equipment until such leakage has been repaired.
- (k) Soil contaminated with oil must be appropriately treated and disposed of at a permitted landfill site or the soil can be regenerated using bio-remediation methods.

PEM5.2 Water

- (a) All fuel, chemical, oil, etc spills must be confined to areas where the drainage of water can be controlled. Use appropriate structures and methods to confine spillages such as the construction of berms and pans, or through the application of surface treatments that neutralise the toxic effects prior to the entry into a water course.
- (b) Oil absorbent fibres must be used to contain oil spilt in water.
- (c) No fires or open flames are allowed.
- (d) No swimming or washing (including vehicles and equipment) is permitted in operational reservoirs.

PEM5.3 Air

- (a) Waste must be disposed of, as soon as possible at a municipal transfer station, skip or on a permitted landfill site. Waste must not be allowed to stand on site to decay, resulting in malodours.
- (b) Noise control measures must be implemented. All noise levels must be controlled at the source. All employees must be given the necessary ear protection gear. IAP's must be informed of the excessive noise factors.
- (c) The Contractor must inform all adjacent landowners of any after-hour construction activities and any other activity that could cause a nuisance e.g. the application of chemicals to the work surface. Normal working hours must be clearly indicated to adjacent land owners.
- (d) No loud music is allowed on site and in construction camps.
- (e) No fires are allowed if smoke from such fires will cause a nuisance to IAP's.

PEM5.4 Social and Cultural

- (a) Access by non-construction people onto any construction sites must be restricted. The Contractors activities and movement of staff must be restricted to designated construction areas only.
- (b) The Contractors crew must be easily identifiable due to clothing, identification cards or other methods.
- (c) Rapid migration of job seekers could lead to squatting and social conflict with resident communities and increase in social pathologies if not properly addressed. The Contractor must ensure that signs indicating the availability of jobs are installed.
- (d) Criteria for selection and appointment (by the Contractor) of construction labour must be established to allow for preferential employment of local communities. The Local Authority must be actively involved in the process of appointing temporary labourers.
- (e) Sub-Contractors and their employees must comply with all the requirements of this document and supporting documents e.g. the Contract document that applies to the Contractor. Absence of specific reference to the sub-contractor in any specification does not imply that the sub-contractor is not bound by this document.
- (f) No member of the construction workforce is allowed to wander around private property, except within the immediate surrounding of the site.
- (g) The Contractor must provide suitable sanitation facilities for site staff. Sanitation provided during the construction phase should be managed so that it does not cause environmental health problems. The use of the surrounding veld for toilet purposes is not permitted under any circumstance.
- (h) The Contractor must arrange for all his employees and those of his sub-contractors to be informed of the findings of the environmental report before the commencement of construction to ensure:
  - A basic understanding of the key environmental features of the work site and environments, and
  - Familiarity with the requirements of this document and the site specific report.
- (i) Supervisory staff of the Contractor or his sub-contractors must not direct any person to undertake any activities which would place such person in contravention of the specifications of this document, endanger his/her life or cause him/her to damage the environment.
- (j) The demand for construction materials and supplies will have an effect on the local economy. This impact can be optimised by sourcing and purchasing materials locally and regionally wherever possible, insofar as the material complies with the design specification.
- (k) The Contractor must maintain a detailed complaints register. This must be forwarded, together with solutions, to the authorities when requested.

PEM5.5     Aesthetics

(a)     Scenic Quality

Damage to the natural environment must be minimized.

Trees and tall woody shrubs must be protected from damage to provide a natural visual shield. Excavated material must not be placed on such plants and movement across them must not be allowed, as far as practical.

No painting or marking of natural features must be allowed.

(b)     Any complaints from interest groups regarding the appearance of the construction site must be recorded and addressed promptly by the Contractor.

PEM5.7     Flora

(a)     No flora may be disturbed at the Glenwood Reservoir site as the reservoir is within a nature reserve.

(b)     All suitable and rare flora and seeds must be rescued and removed from the site. They must be suitably stored, for future use in rehabilitation.

(c)     The felling and/or cutting of trees and clearing of bush must be minimised.

(d)     Bush must only be cleared to provide essential access for construction purposes.

(e)     The spread of alien vegetation must be minimized.

(f)     Any incident of unauthorised removal of plant material, as well as accidental damage to priority plants, must be documented by the Contractor.

(g)     Woody vegetative matter stripped during construction must either be spread randomly throughout the surrounding veld so as to provide biomass for other micro-organisms and habitats for small mammals and birds, or it may be stockpiled for later redistribution over the reinstated topsoiled surface. No vegetative matter must be burnt or removed for firewood other than those removed during the grubbing and clearing phase. Such vegetation can be made available to the local inhabitants to be used as firewood.

(h)     No tree outside the footprint of the Works area must be damaged.

PEM5.8     Fauna

(a)     No species of animal may be poached, snared, hunted, captured or willfully damaged or destroyed.

(b)     Snakes and other reptiles that may be encountered on the construction site must not be killed unless the animal endangers the life of an employee.

(c)     Anthills and/or termite nests that occur must not be disturbed unless it is unavoidable for construction purposes.

(d)     Disturbances to nesting sites of birds must be minimized.

(e)     The Contractor must ensure that the work site is kept clean and free from rubbish, which could attract pests.

PEM5.9 Infrastructure

- (a) The relevant authorities must be notified of any interruptions of services, especially the Local Municipality, National Road Agency, Spoornet, TELKOM and ESKOM. In addition, care must be taken to avoid damaging major and minor pipelines and other services.
- (b) The integrity of property fences must be maintained.
- (c) No telephone lines must be dropped during the construction operations, except where prior agreement by relevant parties is obtained. All crossings must be protected, raised or relocated as necessary.
- (d) All complaints and/or problems related to impacts on man-made facilities and activities must be promptly addressed by the Contractor and documented.
- (e) Storage Facilities
  - Proper storage facilities should be provided for the storage of oils, grease, fuels, chemicals and hazardous materials.
  - The Contractor must ensure that accidental spillage does not pollute soil and water resources.
  - Fuel stock reconciliation must be done on all underground tanks to ensure no loss of oil, which could pollute groundwater resources.
  - Cement must be stored and mixed on an impermeable substratum.
- (f) Batching Plants

Concrete must be mixed only in an area demarcated for this purpose. All concrete spilled outside this area, must be promptly removed by the Contractor and taken to a permitted waste disposal site. After all concrete mixing is complete, all waste concrete must be removed from the batching area and disposed of at an approved dumpsite. Stormwater must not be allowed to flow through the batching area. Water laden with cement must be collected in a retention area for evaporation and not allowed to escape the batching area. Operators must wear suitable safety clothing.
- (g) Chemical toilet facilities should be managed and serviced by a qualified company. No disposal or leakage of sewerage should occur on or near the site.

PEM5.10 Safety

- (a) Measures must be taken to prevent any interference that could result in flashover of power lines due to breaching of clearances or the collapse of power lines due to collisions by vehicles and equipment.
- (b) Measures must be taken during thunderstorms to protect workers and equipment from lightning strikes.
- (c) All tall structures must be properly earthed and protected against lightning strikes.
- (d) The process of excavation and back filling must be carried out as a sequential process following one another as quickly as possible. Excavations must only remain open for a minimum period of time and during this time they must be clearly demarcated. If excavations place the public at risk these sites must be fenced.
- (e) The residents directly affected by open trenches must be notified of the dangers. This will be done during the site-specific phase.



PEM5.11 Waste

Solid Waste

- (a) Littering on site and the surrounding areas is prohibited.
- (b) Clearly marked litterbins must be provided on site. The Contractor must monitor the presence of litter on the work sites as well as the construction campsite.
- (c) All bins must be cleaned of litter regularly.
- (d) All waste removed from site must be disposed at a municipal/permitted waste disposal site.
- (e) Excess concrete, building rubble or other material must be disposed of in areas designated specifically for this purpose and not indiscriminately over the construction site.
- (f) The entire works area and all construction sites must be swept of all pieces of wire, metal, wood or other material foreign to the natural environment.
- (g) Contaminated soil must be treated and disposed of at a permitted waste disposal site, or be removed and the area rehabilitated immediately.
- (h) Waste must be recycled wherever possible.

Liquid Waste

- (a) The Contractor must maintain mobile toilets on site.
- (b) The Contractor must provide adequate and approved facilities for the storage and recycling of used oil and contaminated hydrocarbons. Such facilities must be designed and sited with the intention of preventing pollution of the surrounding area and environment.
- (c) All chemical spills must be contained and cleaned up by the supplier or professional pollution control personnel. Run-off from wash bays must be intercepted.

Hazardous Waste

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

**PEM5.12 Rehabilitation and Site clearance**

- (a) When all major construction activities are completed, the site must be inspected to determine site-specific rehabilitation measures. This may be considered as unplanned work e.g. soil rehabilitation due to oil spills.
- (b) All temporary buildings and foundations, equipment, lumber, refuse, surplus materials, waste, construction rubble fencing and other materials foreign to the area must be removed.
- (c) If waste products cannot be recycled they must be disposed of at a permitted landfill site.
- (d) All drainage deficiencies including abandoned pit latrines and waste pits must be corrected.
- (e) Cut and fill areas must be restored and re-shaped.
- (f) The area must be restored to its natural vegetation condition using indigenous trees, shrubs and grasses as directed by a grassland and/or rehabilitation expert.
- (g) Borrow pits must be re-shaped into even slopes and surfaces to blend with the natural terrain and topsoil must be replaced.
- (h) The grass mix, shrubs and trees used for rehabilitation must be compatible with the species identified in the site-specific investigation.
- (i) Areas compacted by vehicles during construction must be scarified to allow penetration of plant roots and the regrowth of natural vegetation.

**PEM6 MEASUREMENT AND PAYMENT**

An item has been included in the Bill of Quantities to comply with the above actions.

## **PARTICULAR SPECIFICATION C3.3.3: COMMUNITY LIAISON OFFICER**

### **PCL.1 COMMUNITY LIAISON OFFICER & LOCAL LABOUR**

A Provisional Sum has been provided in the document for the employment of a community Liaison Officer (CLO) for the duration of the contract. The primary role of the CLO shall be liaison and facilitation of communication which shall include inter alia: -

- assist in all aspects related to the recruitment of local labour, and advise them of their rights
- act as a source of information for the community and Councillors on issues related to the contract
- keeping the contractor advised on community issues
- keeping the contractor advised on any issues pertaining to local security
- assisting in setting up any meetings/ negotiations with affected parties
- keeping a site diary and recording details of any labour/community issues that may arise
- monitoring and reporting on general Health & Safety issues on site
- assisting in HIV/AIDS awareness programmes
- it must be noted that the CLO has no authority to issue any instructions to the Contractor

The CLO needs to be seen as neutral by all parties, and therefore should endeavour not to take sides should conflict arise

The minimum skills for a CLO shall include: -

- An ability to work with others
- An ability to communicate in Zulu and English
- An ability to communicate in writing
- Sound interpersonal skills

The Ward Councillor shall be responsible for the selection of the CLO, however the selected CLO shall be accountable to the Contractor. Where a project traverses several different wards, the respective Ward Councillors shall collectively identify a single CLO. The Ward Councillor should consult with the local community and other affected Councillors when identifying the CLO.

The CLO shall be employed on a full day basis, for the duration of the contract, and shall be paid at a rate based on 200% of the Civil Engineering Industry minimum wage. In addition to this, all statutory conditions of employment in respect of UIF, Workmen's Compensation etc. should be met.

Responsibility for the identification of a pool of suitable labour shall rest with the CLO, although the contractor shall have the right to choose from that pool. The contractor and sub contractors shall have the right to determine the total number of labourers required at any time, and this will vary through the duration of the contract.

The contractor shall have the right to replace labour that is not performing adequately. The contractor should ensure that the replacement of any labour due to inadequate performance is done so in conjunction with the CLO.

Local labour shall be paid in accordance with the Civil Engineering Industry minimum wage, and all statutory conditions of employment shall be met.

## **PARTICULAR SPECIFICATION C3.3.4: EMC CODE OF CONDUCT**

### **Applicable to the Procurement of Goods, Services, Engineering and Construction Works**

#### **1. INTRODUCTION**

Section 217.(1) of the Constitution of the Republic of South Africa reads as follows:

“When an organ of state in the national, provincial or local sphere of governments, or any other institution identified in national legislation, contracts for goods or services, it must do so in accordance with a system which is fair, equitable, transparent, competitive and cost-effective”.

It goes without saying that, in addition to the foregoing requirements, it is essential that the procurement of goods and services, including engineering and construction works, by eThekweni Municipality should not be affected, or tainted, by illegal action, or default, at any stage of the process, by any party involved.

The foregoing serves to establish the broad framework within which an action, or default, by any party to the procurement process should be judged. Any action, or default, which conflicts with the objectives of section 217.(1) of the Constitution, or which is illegal, is unacceptable.

A party to the procurement process, who wittingly, commits an unacceptable action, or default, renders itself liable to the appropriate sanction, or even, in the case of an illegal action, or default, to prosecution.

This document contains examples of actions, or defaults, by parties to the public procurement process, which are unacceptable. The lists of examples are, however, not exhaustive and each party must, itself, assess whether an action, or default, would be unacceptable in the light of section 217.(1) of the Constitution, or be illegal.

#### **2. INVOLVEMENT OF PARTIES IN THE PROCUREMENT PROCESS**

The various parties that could be involved in the procurement of goods, services and engineering and construction works by a public process are the following, which are denoted by capital initial letters in this document.

**Employer:** Any Output Unit or Department within eThekweni Municipality procuring goods, services or engineering and construction works, including other public bodies/partners assisting in, or exercising control over, the procurement process e.g. Procurement and Tenders Sub-Committee etc.

**Official:** An employee of the Employer.

**Agent:** One who acts on behalf of the Employer.

**Consultant:** A professional service provider engaged by the Employer.

**Tenderer:** One who submits a competitive bid for the supply of goods, services, or engineering and construction works to the Employer.

**Contractor:** The successful Tenderer to whom the Employer awards the contract for the supply of goods, services, engineering or construction works.

**Subcontractor:** One who contracts to a Contractor to assist the latter in the execution of his/her contract by supplying certain goods, services, or works.

**Representative:** A political, or other, representative of the public, or of the private sector, who serves on the Procurement and Tenders Sub-committee responsible for policy, oversight of the appointment process or approving any aspect of procurement by eThekweni Municipality.

### **3. UNACCEPTABLE ACTIONS AND ESSENTIAL PRACTICES**

Examples of actions which are unacceptable and essential practices, which would constitute unacceptable defaults if not observed, are given below. The schedules are not exhaustive, but serve to highlight unacceptable actions and defaults which are more commonly encountered.

#### **3.1 The Employer**

The Employer should, himself, or through his officials, or agents:

- 3.1.1 Not invite tenders without having a firm intention to proceed with the procurement.
- 3.1.2 Ensure that the basis on which tenders will be adjudicated is clearly set out in the tender documents and that tenders are adjudicated and awarded accordingly.
- 3.1.3 Ensure that the tender documents are clear and comprehensive and set out the rights and obligation of all parties.
- 3.1.4 Not breach the confidentiality of information, particularly intellectual property, provided by Tenderers in support of their tenders.
- 3.1.5 Not attempt to "trade off" Tenderers against each other in an attempt to obtain better offers.
- 3.1.6 Ensure that all Tenderers are fairly treated and that tenders are adjudicated without bias.
- 3.1.7 Ensure that, except when extra ordinary circumstances dictate otherwise, transparency is maintained in the tendering process. This implies, *inter alia*, inviting tenders as widely and publicly as possible, opening tenders in public and reading out/ making available key information, such as tender prices, basic award criteria and times required for completion, and, in due course, making known to unsuccessful Tenderers the outcome of the adjudication process.
- 3.1.8 Ensure that his/her obligations in terms of contracts with Contractors and Consultants are scrupulously and timeously met, particularly in regard to making payments and giving decisions.

#### **3.2 Officials**

An Official should:-

- 3.2.1 Strictly observe all code of conduct laid down by the Employer.
- 3.2.2 Ensure that he is not responsible for an unacceptable action, or default, being attributed to the Employer.
- 3.2.3 Not allow himself/herself to be influenced in the execution of his/her duties by any consideration other than the legitimate and reasonable interests of the Employer.
- 3.2.4 Not accept any gifts, favours or other considerations, of anything more than token value from any other party to the procurement process.
- 3.2.5 Administer contracts in an even-handed manner.
- 3.2.6 Disclose any circumstance which may possibly be construed as constituting a conflict of interest and excuse himself/herself from deliberations in such matters

#### **3.3 Agents**

An Agent should, insofar as is relevant, act in the same way as the Official is expected to act in terms of Section 3.2.

### **3.4 Consultants**

A Consultant should:

- 3.4.1 Strictly observe the code of conduct laid down by the body governing his/her profession.
- 3.4.2 Act in an impartial manner towards all other parties in the procurement process and take account of the legitimate and reasonable interests of them all.
- 3.4.3 Not accept gifts, favours or other considerations, of anything more than token value from any other party to the procurement process.
- 3.4.4 Not undermine the development objectives of the Employer through tokenism, fronting or any other misrepresentation.
- 3.4.5 Disclose any circumstance which may possibly be construed as constituting a conflict of interest and excuse himself/herself from deliberations in such matters.

### **3.5 Tenderers**

A Tenderer should:

- 3.5.1 Not, except for the purpose of joint venture formation, become involved in collusion with other Tenderers, or potential Tenderers.
- 3.5.2 Not exchange information regarding tenders with any other Tenderer prior to the closing date for tenders.
- 3.5.3 Not knowingly price his/her tender in such a way as to gain an unfair advantage from an obvious error, or oversight, in the tender documents.
- 3.5.4 Not attempt, in any way, to influence the tender adjudication process.
- 3.5.5 Not approach any Representative or Official directly in connection with a tender, subsequent to the closing of all tenders.
- 3.5.6 Tenders only on projects for which they are capable of executing with the resources they are able to marshal in accordance with the terms and conditions of contracts.

### **3.6 The Contractor**

The Contractor should:

- 3.6.1 Undertake the contract with the objective of fulfilling it in accordance with the needs of and in the best interests of the Employer and, in pursuit of this objective, co-operate with all other parties in the procurement process.
- 3.6.2 Aim to meet all statutory and contractual obligations fully and timeously in regard to, inter alia, conditions of employment, occupational safety, training, employment of subcontractors and fiscal matters.
- 3.6.3 Not attempt to influence the judgement, or actions, of Consultants, Officials/Agents, or Representatives by inducements of any sort.
- 3.6.4 Employ Subcontractors only on the basis of fair, unbiased, written subcontracts.
- 3.6.5 Not engage in unfair, or unethical, practices in order to drive subcontract prices down.
- 3.6.6 Not make unwarranted claims for additional payment, or time, in the belief that "nothing venture, nothing gain".
- 3.6.7 Not approach any Representative directly in connection with a contract.
- 3.6.8 Not undermine the development objectives of the Employer through tokenism, fronting or any other misrepresentation.

### **3.7 Subcontractors**

A Subcontractor should, insofar as is relevant, act in the same way as the Contractor is expected to act in terms of Section 3.6.

### **3.8 Representatives**

A Representative should:

- 3.8.1 Perform his duties in an unbiased and conscientious manner, bearing in mind the legitimate interest of all parties to the procurement process and the public.
- 3.8.2 Not entertain representations, except through the Employer or such person as may be delegated by the Employer, from any Consultant, Tenderer, Contractor, or Subcontractor, in regard to a tender, or contract.
- 3.8.3 Not allow himself to be unduly influenced by, or accept any gifts, favours or other considerations from any party which might have an interest in the procurement process.
- 3.8.4 Disclose any circumstance which may possibly be construed as constituting a conflict of interest and excuse himself/herself from deliberations in such matters.

### **3.9 Penalties**

Where there is non-compliance with this code of conduct, sanctions and/penalties will be applied as follows:

#### **3.9.1 Officials and Representatives**

Reference to the Multi-Disciplinary Team in the first instance and thereafter, appropriate action by Management, if applicable.

#### **3.9.2 Contractors/suppliers**

Depending on the severity of the non-compliance, a contractor/supplier may be disqualified as a registered contractor/supplier for a period of not less than six months. Over and above that financial penalties may be imposed in terms of the Conditions of Contract.

### **PART C3.4: CONTRACT AND STANDARD DRAWINGS**

Drawings are included as **VOLUME 2** of the tender document and is on attached CD

#### **C3.5.1 Contract Drawings / Details**

NYELETI CONSULTING DRAWING NUMBER	TITLE	REV
		DATE
19648_P_200_S01_R0_LR	MOUNT MORIAH RESERVOIR: SKETCH OF FLOOR AND ROOF PLAN FOR INFORMATION	15/08/2019 - 0
19648_P_300_S01_R0_LR	KWAMAKHUTHA RESERVOIR: CONCRETE AND REINFORCEMENT LAYOUT AND SECTIONS FOR NEW 175X200 R.C. UPSTAND BEAM	15/08/2019 - 0
19648_P_301_S01_R0_LR	KWAMAKHUTHA RESERVOIR: NEW RESERVOIR INLET CONTROL VALVE AND KIOSK DETAIL	15/08/2019 - 0

#### **C3.5.2 Standard Drawings**

The Standard Drawings to which these Standard Engineering Specifications refer are listed below.

<b>Dwg No</b>	<b>Descriptions</b>	<b>Date of Issue</b>
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## **PART C4: SITE INFORMATION**

### **C4.1 LOCALITY PLAN**