

# HARRY GWALA DISTRICT MUNICIPALITY



## GREATER SUMMERFIELD WATER SUPPLY SCHEME

CONTRACT NO: HGDM724/HGDM/2021

### SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION

CIDB CONTRACTOR GRADING:

**6CE OR HIGHER**

Harry Gwala District Municipality  
40 Main Street  
IXOPO  
3276

Contact Name: Mr D.B. Makwakwa  
Telephone: (039) 834 8700  
Fax: (039) 834 1517

Impande Consulting Engineers  
172 Bird Street,  
uMzimkhulu 3297

Contact Name: Mr P. Ntshangase  
Telephone: (039) 259 0113  
Fax: (039) 259 0114  
E-mail: [perfect@impande.co.za](mailto:perfect@impande.co.za)

NAME OF TENDERER	
ADDRESS OF TENDERER	
TELEPHONE	
FAX	
TENDER SUM	
TIME FOR COMPLETION	

**TENDER CLOSING DATE: 30 APRIL 2021 @ 12H00**



**EXPANDED PUBLIC WORKS PROGRAMME  
CONTRIBUTING TO A NATION AT WORK**

CONTRACT NO: HGDM724/HGDM/2021

SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL  
WORKS AT GREATER SUMMERFIELD PUMPSTATION

TABLE OF CONTENTS

NUMBER	DESCRIPTION	PAGE COLOUR	PAGE No.
<b>The Tender</b>			
<b>Part T1: Tendering procedures</b>			<b>T 3</b>
T1.1	Tender Notice and Invitation to Tender	White	T4
T1.2	Tender Data	Pink	TD1
<b>Part T2 Returnable documents</b>			<b>RD 1</b>
T2.1	List of Returnable Documents	Yellow	RD 1
T2.2	Returnable Schedules	Yellow	RD 1
<b>Part C1: Agreement and Contract Data</b>			<b>CD 1</b>
C1.1	Form of Offer and Acceptance	White	CD 3
C1.2	Contract Data	Yellow	CD 7
C1.3	Form of Guarantee	White	CD 13
C1.4	Agreement in terms of Section 37(2) of the Occupational Health and Safety Act No. 85 of 1993	White	CD 15
C1.5	Retention Money Guarantee	White	CD 17
C1.6	Transfer of Rights	White	CD 20
<b>Part C2: Pricing Data</b>			<b>PD 1</b>
C2.1	Pricing Instructions	Yellow	PD 1
C2.2	Bill of Quantities / Schedule of Quantities	Yellow	PD 6
<b>Part C3: Scope of Works</b>			<b>C3.1</b>
C3.1	Standard Specifications	Blue	C3.1
C3.2	Project Specifications	Blue	C3.2
C3.3	Particular Specifications	Blue	C3.14
C3.4	Particular Specifications	Blue	C3.14
<b>Part C4: Site Information</b>			<b>C4.1</b>
C4.1	Geotechnical	Green	C4.3
C4.2	Atmospheric/Climatic	Green	C4.3
C4.3	Environmental	Green	C4.4
C4.5	Locality Plan	Green	C4.5
C4.6	Drawings	Green	C4.6

**DOCUMENT CHECKLIST**

This document checklist is provided to assist the tenderer.

	<b>ITEMS</b>	<b>CHECKED</b>
1	Returnable Schedules in Section T2.2	<input type="checkbox"/>
2	Correct Tender Offer carried forward to <b>Form of Offer and Acceptance</b> and the Form of Offer duly completed and signed.....	<input type="checkbox"/>
3	Schedule of Quantities:	
	i) Completed in <b>BLACK INK</b> only .....	<input type="checkbox"/>
	ii) Corrections crossed out and initialled .....	<input type="checkbox"/>
4	Contract specific data provided by the Contractor .....	<input type="checkbox"/>

## T1 TENDERING PROCEDURES

### T1.1 TENDER NOTICE AND INVITATION TO TENDER



#### HARRY GWALA DISTRICT MUNICIPALITY INFRASTRUCTURE SERVICES DEPARTMENT

##### BID NOTICE

Bids are hereby invited from qualified and experienced Bidders for the construction of the following Infrastructure projects within the Harry Gwala District municipality

NO.	PROJECT NAME	CIDB GRADING	COMPULSORY BRIEFING DATE	TENDER NUMBER	CLOSING DATE
i.	SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION	6CE OR HIGHER	07 April 2021 at 10:30am Bidders to meet at Umzimkhulu Local Municipality Council Chamber and then drive to site.	Contract No. HGDM724/HGDM/2021	30 April 2021 @ 12h00

Only Bidders that have the required CIDB Grading listed on the table above per project. Joint Ventures are also eligible to submit Bids provided that every member of the Joint Venture is registered with the CIDB and a combined grade of Joint Venture calculated in accordance with the CIDB regulations is equal to or higher than the specified Contractor grading.

Only tenderers who employ staff which satisfy EPWP requirements are eligible to submit tenders.

**Invalid or non-submission of the following documents will lead to the disqualification.**

- Original Valid Tax Clearance Certificate from SARS;
- Certified Copies of Company or CC Documents together with certified copies of member/s ID;
- JV Agreement (if applicable);
- A signed MBD4 form must be submitted with all bids (available on our website or at reception)

**The following will apply in all the above bids:**

- Price(s) quoted must be firm and must be inclusive of VAT;
- A firm delivery period must be indicated;
- All tenders must be valid for 90 days after the tender closing date
- A Valid B-BBEE status level verification certificate for claiming preference points.
- 80/20 Preference point system will be used in Evaluation

### **COLLECTION OF BID DOCUMENTS**

Bid documents may be collected from the **29 March 2021** between **09h00 and 16h00** at Harry Gwala District Municipality Offices, Finance Services Department, situated at Ixopo 40 Main Street, Ixopo 3276. Tender documents will be issued upon payment of a non-refundable cash fee of **R 500 each**.

### **CLOSING DATE**

The closing date for the bids is as per the table above. Bids must be enclosed in **SEALED ENVELOPES** and clearly labelled with the contract number and project name on the outside of the envelopes addressed to **The Municipal Manager**.

Bids must be deposited in the Bid Box at the reception area of Harry Gwala District Municipal, 40 Main Street, IXOPO before the closing date. Telegraphic, telexed or faxed bids will not be considered, and late bids will not be accepted.

Harry Gwala District Municipality does not bind itself to accept the lowest or any Bid and reserves the right to accept the whole or any part of the bid.

### **BID ENQUIRIES**

All bid enquiries and other matters shall be directed to:

Executive Director: Water Services  
Mr D M Gqiba  
Harry Gwala District Municipality  
40 Main Street  
IXOPO  
3276  
Tel.: 039-834 8700  
Fax: 039 834 2259

**Mrs NA. Dlamini**  
**Municipal Manager**

## T1.2 TENDER DATA

### 1. GENERAL

The Tender Data shall be read with the Standard Conditions of Tender in order to expand on the Tenderer's obligations and the Employer's undertakings in administering the tender process in respect of the project under consideration.

The Tender Data hereafter shall have precedence in the interpretation of any ambiguity or inconsistency between it and the Standard Conditions of Tender.

Each item of Tender Data given below is cross-referenced to the relevant clause in the Standard Conditions of Tender. The Conditions of Tender are the Standard Conditions of Tender as contained As published in Annexure F of the cidb Standard for Uniformity for construction Procurement, Board Notice 136 Government Gazette No 38960 of 10 July 2015.

The Standard Conditions of Tender make several references to the Tender Data which specifically applies 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. Each item of Tender Data given below is cross-referenced to the relevant clause in the Standard Conditions of Tender.

### 2. TENDER DATA APPLICABLE TO THIS TENDER

Clause Number	Data / Wording
F.1.2	<p>The <b>Tender Documents</b> consist of the following:</p> <p>(a) This <b>Project Document</b>, which contains the following:</p> <p><b>PART T1: TENDERING PROCEDURES</b>                      T1.1 Tender Notice and Invitation to Tender                      T1.2 Tender Data</p> <p><b>PART T2: RETURNABLE DOCUMENTS</b>                      T2.1 List of Returnable Documents                      T2.2 Returnable Schedules</p> <p><b>PART C1: AGREEMENTS AND CONTRACT DATA</b>                      C1.1 Form of Offer and Acceptance                      C1.2 Contract Data                      C1.3 Form of Guarantee                      C1.4 Agreement in terms of Section 37(2) of the Occupational Health and Safety Act No. 85 of 1993                      C1.5 Retention Money Guarantee</p> <p><b>PART C2: PRICING DATA</b>                      C2.1 Pricing Instructions                      C2.2 Schedule of Quantities</p> <p><b>PART C3: SCOPE OF WORKS</b>                      C3.1 Standard Specifications                      C3.2 Project Specifications                      C3.3 Particular Specifications                      C3.4 Environmental Specification</p>

	<p><b>PART C4: SITE INFORMATION</b></p> <p>C4.1 Locality Plan                  C4.2 Example of Contract Signboard Details                  C4.3 Existing Services Report (if any)                  C4.4 Conditions on Site: Geotechnical Report (if any)                  C4.5 Traffic Information (if any)</p> <p>(b) <b>Drawings</b> (issued separately by the Employer)</p> <p>(c) <b>General Conditions of Contract for Construction Works – 3<sup>rd</sup> Edition 2015</b> issued by the South African Institution of Civil Engineering (abbreviated title 'General Conditions of Contract 2015'- GCC 2015). This document is obtainable separately and Tenderers shall obtain their own copy.</p> <p>(d) <b>'The Standards South Africa's Standardized Specifications for Civil Engineering Construction SABS 1200.'</b> This document is obtainable separately and Tenderers shall obtain their own copy.</p> <p>(e) <b>'The Occupational Health and Safety Act No 85 and Amendment Act No 181 of 1993, and the Construction Regulations 2003' (Government Gazette No 25207 of 18 July 2003, Notice No R1010).</b> This document is obtainable separately and Tenderers shall obtain their own copy.</p> <p>(f) The Construction Industry Development Board Act No. 38 of 2000 as amended and the Regulations in terms of the CIDB Act 38 of 2000, Government Notice No 692 of 9 June 2004.</p> <p>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 become acquainted with the basics of construction management, the implementation of preferential construction procurement policies, and participation of targeted enterprises and labour.</p>
<p><b>F.1.4</b></p>	<p>The employer's agent is:</p> <p>Name of the Firm: Impande Consulting Engineers (Pty) LTD                  Contact Person: Mr. P. Ntshangase                  Tel: (039) 259 0113                  Fax: (039) 259 0114                  E-mail: perfect@impande.co.za</p>
<p><b>F.2.1</b></p>	<p>A Tenderer will not be eligible to submit a tender if:</p> <p>(a) the Contractor submitting the tender is under restrictions or has principals who are under restriction to participate in the Employer's procurement due to corrupt or fraudulent practices;</p> <p>(b) the Tenderer does not have the legal capacity to enter into the contract;</p>

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION CONTRACT NO.: HGDM724/HGDM/2021**

	<p>(c) the Contractor submitting the tender is insolvent, in receivership, bankrupt or being wound up, has his affairs administered by a court or a judicial officer, has suspended his business activities, or is subject to legal proceedings in respect of the foregoing.</p> <p>(d) The Tenderer does not comply with the legal requirements stated in the Employer's procurement policy;</p> <p>(e) The Tenderer cannot demonstrate that he possesses the necessary professional and technical qualifications and competence, financial resources, equipment and other physical facilities, managerial capability, personnel, experience and reputation to perform the contract;</p> <p>(f) 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.</p> <p>(g) Only those tenderers who have in their employ management and supervisory staff satisfying the requirements of the scope of work for labour-intensive competencies for supervisory and management staff are eligible to submit tenders.</p> <p>Only Tenderers meeting the Construction Industry Development Board (CIDB) contractor grading designation of <b>6CE OR HIGHER</b> as defined in the Regulations (09 June 2004 as amended) in terms of the CIDB Act 38 of 2000, are eligible to submit tenders for this contract:</p> <p>In terms of the KwaZulu-Natal Supply Chain Management Policy Guideline, all suppliers of goods and services to the Province of KwaZulu-Natal are required to register on the Provincial Suppliers Database.</p> <p>(1) Application forms may be downloaded from the website, <a href="http://www.kzntreasury.gov.za">http://www.kzntreasury.gov.za</a>, or obtained by phoning the toll-free number 0800 201 049.</p>
<p><b>F.2.7</b></p>	<p>The arrangements and venue for the compulsory Clarification Meeting are:  Venue: Harry Gwala District Municipality Council Chamber  Date: 07 April 2021  Time: 10:30am  Contact person: Mr P. Ntshangase  Tel: (039) 259 0113  Fax: (039) 259 0114  Email: <a href="mailto:perfect@impande.co.za">perfect@impande.co.za</a></p>
<p><b>F.2.8</b></p>	<p>Change 'five working days' to 'seven working days'. Working days shall be from Monday to Friday and shall exclude all gazetted public holidays.</p>
<p><b>F.2.10</b></p>	<p>All tenderers (all the partners in the case of a joint venture) must be registered for Value Added Tax (VAT) with the South African Revenue Services (SARS).</p>



**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION CONTRACT NO.: HGDM724/HGDM/2021**

<p><b>F.2.12</b></p>	<p>If tenderer wishes to submit an alternative offer, the only criteria permitted for such alternative tender offer is that it demonstrably satisfies the Employer's standards and requirements, the details of which may be obtained from the Employer's Agent. Calculations, drawings and all other pertinent technical information and characteristics as well as modified or proposed Pricing Data must be submitted with the alternative tender offer to enable the Employer to evaluate the efficacy of the alternative and its principal elements, to take a view on the degree to which the alternative complies with the Employer's standards and requirements and to evaluate the acceptability of the pricing proposals. Calculations must be set out in a clear and logical sequence and must clearly reflect all design assumptions in the development of the pricing proposal.</p> <p>Acceptance of an alternative tender offer will mean acceptance in principle of the offer. It will be an obligation of the contract for the tenderer, in the event that the alternative is accepted, to accept the full responsibility and liability that the alternative offer complies in all respects with the Employer's standards and requirements.</p> <p>The modified Pricing Data must include an amount equal to 5% of the amount tendered for the alternative offer to cover the Employer's costs of confirming the acceptability of the detailed design before it is constructed.</p>
<p><b>F.2.13</b></p>	<p><b>F.2.13.3</b> Tender offers shall be submitted as an original only. Under no circumstances whatsoever may the tender forms be retyped or redrafted. Photocopies of the original tender documentation may be used, but an original signature must appear on such photocopies.</p> <p><b>F.2.13.5</b> The Employer's address for delivery of tender offers and identification details to be shown on each tender offer package are:</p> <p><b>Location of Tender Box:</b> Harry Gwala District Municipality  <b>Physical Address:</b> 40 Main Street, Ixopo  <b>Identification Details:</b> HGDM724/HGDM/2021</p> <p><b>F.2.13.6</b> A two-envelope system will <u>not be followed</u>.</p>
<p><b>F.2.15</b></p>	<p>The closing time for submission of Tender Offers is: <b>12h00, 30 April 2021</b></p> <p>Telegraphic, telephonic, telex, facsimile, electronic, e-mailed and late tenders will not be accepted.</p>
<p><b>F.2.16</b></p>	<p>The tender offer validity period is <b>90 Days</b> from the closing time for submission of tenders.</p>
<p><b>F.2.19</b></p>	<p>Access shall be provided for inspections and testing by personnel acting on behalf of the Employer.</p>
<p><b>F.2.22</b></p>	<p>This is not applicable.</p>
<p><b>F.2.23</b></p>	<p>The certificates as required in the Returnable Schedules and Forms must be provided with the tender for each party to a consortium / joint venture.</p>
<p><b>F.3.1</b></p>	<p>Change 'five working days' to 'seven working days'. Working days shall be from</p>

SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION CONTRACT NO.: HGDM724/HGDM/2021

F.3.2	Change 'seven days' to 'five working days'. Working days shall be from Monday to Friday and shall exclude all gazetted public holidays.																				
F.3.4	The time and location for opening of the tender offers are: Time: <b>12H00</b> Date: <b>30 April 2021</b>  Location / Venue: Harry Gwala District Municipality Offices, 40 Main Street, IXOPO, 3276																				
F.3.5	A two-envelope system will <b><u>not be followed</u></b> .																				
F.3.8.1	<p>(a) Tender offers will only be considered responsive if the minimum Quality requirement of 60% is achieved.</p> <p><u>Quality (100 points)</u></p> <p>Tenders are required to demonstrate their ability to undertake the work and provide proof of previous experience, expertise and capacity to undertake a project of this nature. Tenderers are therefore required to meet a minimum Quality Score of 60% (60 points out of 100 points) based on the criteria listed below. A score of less than 60 out of 100 points for Quality will render the tender non-responsive. The onus rests with the Tenderer to supply sufficient information to allow for evaluation and award of point detailed below. If insufficient information is provided, zero points will be awarded for that particular item.</p> <p>Note that Quality points are only used to determine responsiveness and will not be used further in the evaluation.</p> <p>Points selection will be allocated as shown below:</p> <table border="1"><thead><tr><th colspan="5">QUALITY CRITERIA</th></tr><tr><th>NO.</th><th>CRITERIA</th><th>WEIGH TING</th><th>INDICATE VALUE</th><th>TOTAL</th></tr></thead><tbody><tr><td>1</td><td><b>Successful completion of Mechanical Engineering Works projects of similar size (Attach completion certificates):</b> a) No projects (0) b) 1 project (10) c) 2 projects (15) d) 3 projects (20) e) 4 projects (25) f) 5 projects and above (30) <i>NOTE: Total score of 30 or less within this criterion will be considered as non-responsive.</i></td><td>30</td><td></td><td></td></tr><tr><td>2</td><td><b>Successful completion of Civil Engineering Works projects of similar size (Attach completion certificates):</b> a) No projects (0) b) 1 project (10) c) 2 projects (15) d) 3 projects (20) e) 4 projects (25) f) 5 projects and above (30) <i>NOTE: Total score of 30 or less within this criterion will be considered as non-responsive.</i></td><td>30</td><td></td><td></td></tr></tbody></table>	QUALITY CRITERIA					NO.	CRITERIA	WEIGH TING	INDICATE VALUE	TOTAL	1	<b>Successful completion of Mechanical Engineering Works projects of similar size (Attach completion certificates):</b> a) No projects (0) b) 1 project (10) c) 2 projects (15) d) 3 projects (20) e) 4 projects (25) f) 5 projects and above (30) <i>NOTE: Total score of 30 or less within this criterion will be considered as non-responsive.</i>	30			2	<b>Successful completion of Civil Engineering Works projects of similar size (Attach completion certificates):</b> a) No projects (0) b) 1 project (10) c) 2 projects (15) d) 3 projects (20) e) 4 projects (25) f) 5 projects and above (30) <i>NOTE: Total score of 30 or less within this criterion will be considered as non-responsive.</i>	30		
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SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT  
 GREATER SUMMERFIELD PUMPSTATION CONTRACT NO.: HGDM724/HGDM/2021

	<p>3 <b>Financial Bank rating for business up to R 500 000.00:</b></p> <ul style="list-style-type: none"> <li>a) No submission (0)</li> <li>b) Less than D (2)</li> <li>c) D (4)</li> <li>d) C (6)</li> <li>e) B (8)</li> <li>f) A (10)</li> </ul>	10		
	<p>4 <b>Contracts Manager:</b></p> <ul style="list-style-type: none"> <li>a) No experience (0)</li> <li>b) Approved Degree / Diploma in the built environment with less than three years' experience in the position (4)</li> <li>c) No qualification with 5 - 7 years' experience in the position (6)</li> <li>d) No qualification with 7 - 10 years' experience in the position (6)</li> <li>e) Approved Degree / Diploma in the built environment with more than three years' experience in the position (10)</li> <li>f) More than 10 years' experience in the position (10)</li> </ul>	10		
	<p>5 <b>Site Agent:</b> No experience (0)</p> <ul style="list-style-type: none"> <li>a) No qualification with less than two years experience in the position (2)</li> <li>b) Approved Degree / Diploma in the built environment with less than two years experience in the position (4)</li> <li>c) No qualification with 2 - 5 years experience in the position (4)</li> <li>d) No qualification with 5 - 7 years experience in the position (6)</li> <li>e) No qualification with 7 - 10 years experience in the position (6)</li> <li>f) Approved Degree / Diploma in the built environment with more than two years experience in the position (10)</li> <li>g) More than 10 years experience in the position (10)</li> </ul>	10		
	<p>6 <b>Foreman:</b></p> <ul style="list-style-type: none"> <li>a) No Experience (0)</li> <li>b) Less than 2 years experience in the position (2)</li> <li>c) 2 - 4 years experience in the position (4)</li> <li>d) 5 - 6 years experience in the position (6)</li> <li>e) 7 - 8 years experience in the position (8)</li> <li>f) 9 years or more experience in the position (10)</li> </ul>	10		
	TOTAL			

The procedure for the evaluation of responsive tenders is **Method 2** which shall consist of a quality as a first stage and the 80/20 system as a second stage.

**Method 2: Quality, Financial Offer and Preferences**

**Stage 1: Quality**

a) Bidders must score a minimum of 60 points for quality in order to qualify for Stage 2.

**Stage 2: 80/20 System**

(b) Financial Offer

The financial offer will be scored using the following formula

$$P_s = 80 \times [1 - (P_t - P_m) / P_m]$$

where:

$P_s$  = points scored for price of tender under consideration

$P_m$  = the value of the lowest comparative offer of the most favorable tender;

$P_t$  = the value of the comparative offer under consideration

A maximum of 80 points may be awarded for price.

(c) The Other 20 points of the Scoring System

A maximum of 20 points may be awarded to a tenderer for preference points based on the Tenderer's BBBEE level of contribution allocated as follows:

BBBEE Status Level Contributor	Number of Points (80/20 Principle)
1	20
2	18
3	14
4	12
5	8
6	6
7	4
8	2
Non-Compliant Contributor	0

(d) Determination of Scores

Entities that meet the set target for a particular element will get a full score. For entities whose tendered and verified targets are less than the set ones, the score shall be on pro-rata basis.

The points scored for a tenderer in respect of a Price must be added to the points scored for the socio-economic preferences. Only the tender with the highest number of points may be selected, except in those instances identified in the CDC SCM Policy Framework.

F.3.13

F.3.13.1 The legal requirements for acceptance of the tender offer are:

- (a) **Tender Defaulters Register** - the Tenderer or any of its principals 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.

	<p>(b) <b>Abuse of the SCM System</b> - the Tenderer has <u>not</u> abused the Employer's Supply Chain Management System and has <u>not</u> been given a written notice to the effect that he has failed to perform on any previous contract.</p> <p>(c) <b>Declaration</b> - the Tenderer has indicated and declared whether or not a spouse, child or parent of the Tenderer is in the service of the State.</p> <p>(d) <b>Fraud and Corruption</b> - the Employer is satisfied that the Tenderer or any of his principals have <u>not influenced</u> the tender offer and acceptance by the following criteria:</p> <ul style="list-style-type: none"> <li>(i) having offered, promised or given a bribe or other gift or remuneration to any person in connection with the obtaining of this Contract;</li> <li>(ii) having acted in a fraudulent or corrupt manner in obtaining this Contract;</li> <li>(iii) having approached an officer or employee of the Employer or the Employer's Agent with the object of influencing the award of a Contract in the Tenderer's favour;</li> <li>(iv) having entered into any agreement or arrangement, whether legally binding or not, with any other person, firm or company to refrain from Tendering for this Contract or as to the amount of the Tender to be submitted by either party;</li> <li>(v) having disclosed to any other person, firm or company other than the Employer, the exact or approximate amount of his proposed Tender.</li> </ul> <p>The Employer may, in addition to using any other legal remedies, repudiate the Tender offer and acceptance and declare the Contract invalid should it have been concluded already.</p>
<p><b>F.3.18</b></p>	<p>The number of paper copies of the signed contract to be provided by the Employer is <b>one (1)</b>.</p>
<p><b>F.3.19</b></p>	<p><b>Pre-qualification criteria for preferential procurement</b></p> <p>4.(1) If an organ of state decides to apply pre-qualifying criteria to advance certain designated groups, that organ of state must advertise the tender with a specific tendering condition that only one or more of the following tenderers may respond-</p> <ul style="list-style-type: none"> <li>(a) a tenderer having a stipulated minimum B-BBEE status level of contributor;</li> <li>(b) an EME or QSE;</li> <li>(c) a tenderer subcontracting a minimum of 30% to-             <ul style="list-style-type: none"> <li>(i) an EME or QSE which is at least 51 % owned by black people;</li> <li>(ii) an EME or QSE which is at least 51 % owned by black people who are youth; (iii) an EME or QSE which is at least 51 % owned by black people who are women;</li> <li>(iv) an EME or QSE which is at least 51 % owned by black people with disabilities;</li> <li>(v) an EME or QSE which is 51 % owned by black people living in rural or underdeveloped areas or townships;</li> <li>(vi) a cooperative which is at least 51 % owned by black people;</li> <li>(vii) an EME or QSE which is at least 51 % owned by black people who</li> </ul> </li> </ul>

are military veterans;  
(viii) an EME or QSE.

(2) A tender that fails to meet any pre-qualifying criteria stipulated in the tender documents is an unacceptable tender.

**Subcontracting as condition of tender**

9.(1) If feasible to subcontract for a contract, an organ of state must apply subcontracting to advance designated groups.

(2) If an organ of state applies subcontracting as contemplated in sub regulation (1), the organ of state must advertise the tender with a specific tendering condition that the successful tenderer must subcontract a minimum of threshold of the value of the contract as follows:

- Subcontracting to start from R5 million to be 5%
- Appoint 2 sub-contractors between R10 million to R20 million at R1.5 million each
- Appoint 3 sub-contractors for R30 million at R3 million each
- Sub-contractors to be mentored and capacitated by main contractor

The subcontractors are to be from the following designated groups: an EME or QSE;

28 No. 40553 GOVERNMENT GAZETTE, 20 JANUARY 2017

- (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).

(3) The organ of state must make available the list of all suppliers registered on a database approved by the National Treasury to provide the required goods or services in respect of the applicable designated groups mentioned in sub regulation (2) from which the tenderer must select a supplier.

**THESE PPPFMA 2000: PREFERENTIAL PROCUREMENT REGULATIONS 2017, as gazetted are also available for free on [www.gpwonline.co.za](http://www.gpwonline.co.za)**

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

**HARRY GWALA DISTRICT MUNICIPALITY  
GREATER SUMMERFIELD WATER SUPPLY SCHEME**

**CONTRACT NO: HGDM724/HGDM/2021**

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL  
AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

**PART T2: RETURNABLE DOCUMENTS**

**(a) INDEX**

**Note:** Tenders must duly complete and sign all of the returnable documents, failing which the tender will be deemed non-responsive.

**T2.1 LIST OF RETURNABLE DOCUMENTS**

Item	Returnable Document	Page	Check <input type="checkbox"/>
T2.1.1 (MBD 4)	Declaration of Interest	RD2	
T2.1.2 (MBD6.1)	Preference Points Claim Form in Terms of the Preferential Procurement Regulations 2017	RD5	
T2.1.2.1 MBD 6.2	Declaration Certificate For Local Production And Content For Designated Sectors	RD12	
T2.1.3	Fulfilment of Construction Regulations	RD17	
T2.1.4	Medical Certificate (Permanent Disability Status)	RD19	
C1.1	Form of Offer and Acceptance	CD3	
C1.2	Tender and Contract Data	CD9	
C1.3	Form of Guarantee	C17	
C2.2	Bill of Quantities	PD6	

**(b) T2.2 LIST OF RETURNABLE SCHEDULES**

Item	Returnable Schedule	Page	Check <input type="checkbox"/>
T2.2.1	Authority for signatory	RD20	
T2.2.2	Site attendance certificate	RD22	
T2.2.3	Schedule of Work carried out by Tenderer	RD23	
T2.2.4	Labour	RD24	
T2.2.5	Financial References	RD26	
T2.2.6	Estimated Monthly Expenditure	RD27	
T2.2.7	Alteration by Tenderer	RD28	
T2.2.8	Details of Plant and Equipment	RD29	
T2.2.9	Schedule of sub-contractors	RD30	
T2.2.10	Record of Addenda to Tender Document	RD31	
T2.2.11	Compulsory Enterprise Questionnaire	RD32	
T2.2.12	Joint Venture Disclosure Form	RD35	
T2.2.13	Certificate of Municipal Services	RD39	
T2.2.14	Registration on the Council Database	RD40	
T2.2.15	Information to be attached	RD41	

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

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**T2.1.1 DECLARATION OF INTEREST**

**MBD 4**

1. No bid will be accepted from persons in the service of the state<sup>1</sup>.
2. Any person, having a kinship with persons in the service of the state, including a blood relationship, may make an offer or offers in terms of this invitation to bid. In view of possible allegations of favouritism, should the resulting bid, or part thereof, be awarded to persons connected with or related to persons in service of the state, it is required that the bidder or their authorised representative declare their position in relation to the evaluating/adjudicating authority.
- 3 **In order to give effect to the above, the following questionnaire must be completed and submitted with the bid.**

3.1 Full Name of bidder or his or her representative:.....

3.2 Identity Number: .....

3.3 Position occupied in the Company (director, trustee, shareholder<sup>2</sup>):.....

3.4 Company Registration Number: .....

3.5 Tax Reference Number: .....

3.6 VAT Registration Number: .....

3.7 The names of all directors / trustees / shareholders members, their individual identity numbers and state employee numbers must be indicated in paragraph 4 below.

3.8 Are you presently in the service of the state? **YES / NO**

3.8.1 If yes, furnish particulars. ....

<sup>1</sup>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 entity;
- (c) an official of any municipality or municipal entity;
- (d) an employee of any national or provincial department, national or provincial public entity or constitutional institution within the meaning of the Public Finance Management Act, 1999 (Act No.1 of 1999);
- (e) a member of the accounting authority of any national or provincial public entity; or
- (f) an employee of Parliament or a provincial legislature.

<sup>2</sup> Shareholder<sup>2</sup> 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.



**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

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3.9 Have you been in the service of the state for the past twelve months? ..... **YES / NO**

3.9.1 If yes, furnish particulars.....

.....

3.10 Do you have any relationship (family, friend, other) with persons in the service of the state and who may be involved with the evaluation and or adjudication of this bid? ..... **YES / NO**

3.10.1 If yes, furnish particulars.

.....

.....

3.11 Are you, aware of any relationship (family, friend, other) between any other bidder and any persons in the service of the state who may be involved with the evaluation and or adjudication of this bid? **YES / NO**

3.11.1 If yes, furnish particulars

.....

.....

3.12 Are any of the company's directors, trustees, managers, principle shareholders or stakeholders in service of the state? **YES / NO**

3.12.1 If yes, furnish particulars.

.....

.....

3.13 Are any spouse, child or parent of the company's directors trustees, managers, principle shareholders or stakeholders in service of the state? **YES / NO**

3.13.1 If yes, furnish particulars.

.....

.....

3.14 Do you or any of the directors, trustees, managers, principle shareholders, or stakeholders of this company have any interest in any other related companies or business whether or not they are bidding for this contract. **YES / NO**

3.14.1 If yes, furnish particulars:

.....

.....

4. Full details of directors / trustees / members / shareholders.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

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<b>Full Name</b>	<b>Identity Number</b>	<b>State Employee Number</b>

.....  
**Signature**

.....  
**Date**

.....  
**Capacity**

.....  
**Name of Bidder**

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

**T2.1.2**

**MBD 6.1**

**PREFERENCE POINTS CLAIM FORM IN TERMS OF THE PREFERENTIAL PROCUREMENT REGULATIONS 2017**

This preference form must form part of all bids invited. It contains general information and serves as a claim form for preference points for Broad-Based Black Economic Empowerment (B-BBEE) Status Level of Contribution

**NB: BEFORE COMPLETING THIS FORM, BIDDERS MUST STUDY THE GENERAL CONDITIONS, DEFINITIONS AND DIRECTIVES APPLICABLE IN RESPECT OF B-BBEE, AS PRESCRIBED IN THE PREFERENTIAL PROCUREMENT REGULATIONS, 2017.**

**1. GENERAL CONDITIONS**

1.1 The following preference point systems are applicable to all bids:

- the 80/20 system for requirements with a Rand value of up to R50 000 000 (all applicable taxes included); and
- the 90/10 system for requirements with a Rand value above R50 000 000 (all applicable taxes included).

1.2 The value of this bid is estimated to not exceed R50 000 000 (all applicable taxes included) and therefore the.....80/20.....system shall be applicable.

1.3 Preference points for this bid shall be awarded for:

- (a) Price; and
- (b) B-BBEE Status Level of Contribution.

1.3.1 The maximum points for this bid are allocated as follows:

	<b>POINTS</b>
<b>1.3.1.1 PRICE</b>	...80.....
<b>1.3.1.2 B-BBEE STATUS LEVEL OF CONTRIBUTION</b>	...20.....
<b>Total points for Price and B-BBEE must not exceed</b>	<b>100</b>

1.4 Failure on the part of a bidder to fill in and/or to sign this form and submit a B-BBEE Verification Certificate from a Verification Agency accredited by the South African Accreditation System (SANAS) or a Registered Auditor approved by the Independent Regulatory Board of Auditors (IRBA) or an Accounting Officer as contemplated in the Close Corporation Act (CCA) together with the bid, will be interpreted to mean that preference points for B-BBEE status level of contribution are not claimed.

1.5. The purchaser reserves the right to require of a bidder, 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 purchaser.

**2. DEFINITIONS**

2.1 "all applicable taxes" includes value-added tax, pay as you earn, income tax, unemployment insurance fund contributions and skills development levies;

2.2 "B-BBEE" means broad-based black economic empowerment as defined in section 1 of the Broad -Based Black Economic Empowerment Act

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

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- 2.3 **"B-BBEE status level of contributor"** means the B-BBEE status received by a measured entity based on its overall performance using the relevant scorecard contained in the Codes of Good Practice on Black Economic Empowerment, issued in terms of section 9(1) of the Broad-Based Black Economic Empowerment Act;
- 2.4 **"bid"** means a written offer in a prescribed or stipulated form in response to an invitation by an organ of state for the provision of services, works or goods, through price quotations, advertised competitive bidding processes or proposals;
- 2.5 **"Broad-Based Black Economic Empowerment Act"** means the Broad-Based Black Economic Empowerment Act, 2003 (Act No. 53 of 2003);
- 2.6 **"comparative price"** means the price after the factors of a non-firm price and all unconditional discounts that can be utilized have been taken into consideration;
- 2.7 **"consortium or joint venture"** 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;
- 2.8 **"contract"** means the agreement that results from the acceptance of a bid by an organ of state;
- 2.9 **"EME"** means any enterprise with an annual total revenue of R5 million or less .
- 2.10 **"Firm price"** means the price that is only subject to adjustments in accordance with the actual increase or decrease resulting from the change, imposition, or abolition of customs or excise duty and any other duty, levy, or tax, which, in terms of the law or regulation, is binding on the contractor and demonstrably has an influence on the price of any supplies, or the rendering costs of any service, for the execution of the contract;
- 2.11 **"functionality"** means the measurement according to predetermined norms, as set out in the bid documents, of a service or commodity that is designed to be practical and useful, working or operating, taking into account, among other factors, the quality, reliability, viability and durability of a service and the technical capacity and ability of a bidder;
- 2.12 **"non-firm prices"** means all prices other than "firm" prices;
- 2.13 **"person"** includes a juristic person;
- 2.14 **"rand value"** means the total estimated value of a contract in South African currency, calculated at the time of bid invitations, and includes all applicable taxes and excise duties;
- 2.15 ***"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;***
- 2.16 **"total revenue"** bears the same meaning assigned to this expression in the Codes of Good Practice on Black Economic Empowerment, issued in terms of section 9(1) of the Broad-Based Black Economic Empowerment Act and promulgated in the *Government Gazette* on 9 February 2007;
- 2.17 **"trust"** means the arrangement through which the property of one person is made over or bequeathed to a trustee to administer such property for the benefit of another person; and
- 2.18 **"trustee"** means any person, including the founder of a trust, to whom property is bequeathed in order for such property to be administered for the benefit of another person.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

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**3. ADJUDICATION USING A POINT SYSTEM**

- 3.1 The bidder obtaining the highest number of total points will be awarded the contract.
- 3.2 Preference points shall be calculated after prices have been brought to a comparative basis taking into account all factors of non-firm prices and all unconditional discounts;
- 3.3 Points scored must be rounded off to the nearest 2 decimal places.
- 3.4 In the event that two or more bids have scored equal total points, the successful bid must be the one scoring the highest number of preference points for B-BBEE.
- 3.5 However, when functionality is part of the evaluation process and two or more bids have scored equal points including equal preference points for B-BBEE, the successful bid must be the one scoring the highest score for functionality.
- 3.6 Should two or more bids be equal in all respects; the award shall be decided by the drawing of lots.

**4. POINTS AWARDED FOR PRICE**

**4.1 THE 80/20 OR 90/10 PREFERENCE POINT SYSTEMS**

A maximum of 80 or 90 points is allocated for price on the following basis:

$$\begin{array}{ccc}
 \mathbf{80/20} & \mathbf{or} & \mathbf{90/10} \\
 P_s = 80 \left( 1 - \frac{P_t - P_{\min}}{P_{\min}} \right) & \text{or} & P_s = 90 \left( 1 - \frac{P_t - P_{\min}}{P_{\min}} \right)
 \end{array}$$

Where

- $P_s$  = Points scored for comparative price of bid under consideration
- $P_t$  = Comparative price of bid under consideration
- $P_{\min}$  = Comparative price of lowest acceptable bid

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**
**5. Points awarded for B-BBEE Status Level of Contribution**

- 5.1 In terms of Regulation 5 (2) and 6 (2) of the Preferential Procurement Regulations, preference points must be awarded to a bidder for attaining the B-BBEE status level of contribution in accordance with the table below:

B-BBEE Status Level of Contributor	Number of points (90/10 system)	Number of points (80/20 system)
1	10	20
2	9	18
3	8	16
4	5	12
5	4	8
6	3	6
7	2	4
8	1	2
Non-compliant contributor	0	0

- 5.2 Bidders who qualify as EMEs in terms of the B-BBEE Act must submit a certificate issued by an Accounting Officer as contemplated in the CCA or a Verification Agency accredited by SANAS or a Registered Auditor. Registered auditors do not need to meet the prerequisite for IRBA's approval for the purpose of conducting verification and issuing EMEs with B-BBEE Status Level Certificates.
- 5.3 Bidders other than EMEs must submit their original and valid B-BBEE status level verification certificate or a certified copy thereof, substantiating their B-BBEE rating issued by a Registered Auditor approved by IRBA or a Verification Agency accredited by SANAS.
- 5.4 A trust, consortium or joint venture, will qualify for points for their B-BBEE status level as a legal entity, provided that the entity submits their B-BBEE status level certificate.
- 5.5 A trust, consortium or joint venture will qualify for points for their B-BBEE status level as an unincorporated entity, provided that the entity submits their consolidated B-BBEE scorecard as if they were a group structure and that such a consolidated B-BBEE scorecard is prepared for every separate bid.
- 5.6 Tertiary institutions and public entities will be required to submit their B-BBEE status level certificates in terms of the specialized scorecard contained in the B-BBEE Codes of Good Practice.
- 5.7 A person will not be awarded points for B-BBEE status level if it is indicated in the bid documents that such a bidder intends sub-contracting more than 25% of the value of the contract to any other enterprise that does not qualify for at least the points that such a bidder qualifies for, unless the intended sub-contractor is an EME that has the capability and ability to execute the sub-contract.
- 5.8 A person awarded a contract may not sub-contract more than 25% of the value of the contract

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

to any other enterprise that does not have an equal or higher B-BBEE status level than the person concerned, unless the contract is sub-contracted to an EME that has the capability and ability to execute the sub-contract.

**6. BID DECLARATION**

6.1 Bidders who claim points in respect of B-BBEE Status Level of Contribution must complete the following:

**7. B-BBEE STATUS LEVEL OF CONTRIBUTION CLAIMED IN TERMS OF PARAGRAPHS 1.3.1.2 AND 5.1**

7.1 B-BBEE Status Level of Contribution: = (maximum of 10 or 20 points)

(Points claimed in respect of paragraph 7.1 must be in accordance with the table reflected in paragraph 5.1 and must be substantiated by means of a B-BBEE certificate issued by a Verification Agency accredited by SANAS or a Registered Auditor approved by IRBA or an Accounting Officer as contemplated in the CCA).

**8 SUB-CONTRACTING**

8.1 Will any portion of the contract be sub-contracted? YES / NO (delete which is not applicable)

8.1.1 If yes, indicate:

(i) what percentage of the contract will be subcontracted?

.....%

(ii) the name of the sub-contractor?

.....

(iii) the B-BBEE status level of the sub-contractor?

.....

(iv) whether the sub-contractor is an EME? YES / NO (delete which is not applicable)

**9 DECLARATION WITH REGARD TO COMPANY/FIRM**

9.1 Name of firm : .....

9.2 VAT registration number : .....

9.3 Company registration number : .....

**9.4 TYPE OF COMPANY/ FIRM**

- Partnership/Joint Venture / Consortium
- One person business/sole propriety
- Close corporation
- Company
- (Pty) Limited

[TICK APPLICABLE BOX]

**9.5 DESCRIBE PRINCIPAL BUSINESS ACTIVITIES**

.....  
 .....  
 .....

**9.6 COMPANY CLASSIFICATION**

- Manufacturer
- Supplier
- Professional service provider

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

Other service providers, e.g. transporter, etc.  
[TICK APPLICABLE BOX]

**9.7 MUNICIPAL INFORMATION**

Municipality where business is situated

.....  
Registered Account Number .....  
Stand Number .....

**9.8 TOTAL NUMBER OF YEARS THE COMPANY/FIRM HAS BEEN IN BUSINESS?**

.....  
**9.9** I/we, the undersigned, who is / are duly authorised to do so on behalf of the company/firm, certify that the points claimed, based on the B-BBE status level of contribution indicated in paragraph 7 of the foregoing certificate, qualifies the company/ firm for the preference(s) shown and I / we acknowledge that:

- (i) The information furnished is true and correct;
- (ii) The preference points claimed are in accordance with the General Conditions as indicated in paragraph 1 of this form.
- (iii) In the event of a contract being awarded as a result of points claimed as shown in paragraph 7, the contractor may be required to furnish documentary proof to the satisfaction of the purchaser that the claims are correct;
- (iv) If the B-BBEE status level of contribution has been claimed or obtained on a fraudulent basis or any of the conditions of contract have not been fulfilled, the purchaser may, in addition to any other remedy it may have –
  - (a) disqualify the person from the bidding process;
  - (b) recover costs, losses or damages it has incurred or suffered as a result of that person's conduct;
  - (c) cancel the contract and claim any damages which it has suffered as a result of having to make less favourable arrangements due to such cancellation;
  - (d) restrict the bidder or contractor, its shareholders and directors, or only the shareholders and directors who acted on a fraudulent basis, from obtaining business from any organ of state for a period not exceeding 10 years, after the audi alteram partem (hear the other side) rule has been applied; and
  - (e) forward the matter for criminal prosecution.

**WITNESSES:**

1. ....  
2. ....

.....  
.....  
.....

**SIGNATURE(S) OF BIDDER(S)**



**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

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DATE:.....ADDRESS:.....

**MBD 6.2**

**T2.1.2.1 DECLARATION CERTIFICATE FOR LOCAL PRODUCTION AND CONTENT FOR  
DESIGNATED SECTORS**

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, 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. General Conditions**

- 1.1. Preferential Procurement Regulations, 2017 (Regulation 8) make provision for the promotion of local production and content.
- 1.2. Regulation 8.(2) prescribes that in the case of designated sectors, organs of state must advertise such tenders with the specific bidding condition that only locally produced or manufactured goods, with a stipulated minimum threshold for local production and content will be considered.
- 1.3. Where necessary, for tenders 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.
- 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. 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:

$$LC = [1 - x / y] * 100$$

Where

x is the imported content in Rand

y is the bid price in Rand excluding value added tax (VAT)

Prices referred to in the determination of x must be converted to Rand (ZAR) by using the exchange rate published by South African Reserve Bank (SARB) at 12:00 on the date of advertisement of the bid as indicated in paragraph 4.1 below.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

**The SABS approved technical specification number SATS 1286:2011 is accessible on [http://www.thedti.gov.za/industrial development/ip.jsp](http://www.thedti.gov.za/industrial%20development/ip.jsp) at no cost.**

- 1.6. A bid may be disqualified if this Declaration Certificate and the Annex C (Local Content Declaration: Summary Schedule) are not submitted as part of the bid documentation;
- 2. **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:**

<u>Description of services, works or goods</u>	<u>Stipulated minimum threshold</u>
_____	_____ %
_____	_____ %
_____	_____ %

- 3. Does any portion of the goods or services offered have any imported content?  
(Tick applicable box)

YES		NO	
-----	--	----	--

- 3.1. 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 SARB for the specific currency at 12:00 on the date of advertisement of the bid.

The relevant rates of exchange information is accessible on [www.reservebank.co.za](http://www.reservebank.co.za)

Indicate the rate(s) of exchange against the appropriate currency in the table below (refer to Annex A of SATS 1286:2011):

Currency	Rates of exchange
US Dollar	
Pound Sterling	
Euro	
Yen	
Other	

NB: Bidders must submit proof of the SARB rate (s) of exchange used.

- 4. 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 AO/AA provide directives in this regard.

SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION

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**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. ....**

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

**ISSUED BY:** (Procurement Authority / Name of Institution):

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.
- 2 Guidance on the Calculation of Local Content together with Local Content Declaration Templates (Annex C, D and E) is accessible on <http://www.thdti.gov.za/industrialdevelopment/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, ..... (full names),  
do hereby declare, in my capacity as .....  
of .....(name of bidder  
entity), the following:

- (a) The facts contained herein are 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
- (c) The local content percentage (%) 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 (30%)	
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 / Institution 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

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

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incorrect data, or data that are not verifiable as described in SATS 1286:2011, may result in the Procurement Authority / Institution 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 (PPFA), 2000 (Act No. 5 of 2000).

**SIGNATURE:** \_\_\_\_\_

**DATE:** \_\_\_\_\_

**WITNESS No. 1** \_\_\_\_\_

**DATE:** \_\_\_\_\_

**WITNESS No. 2** \_\_\_\_\_

**DATE:** \_\_\_\_\_

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

**T2.1.3 FULFILMENT OF THE CONSTRUCTION REGULATIONS, 2003**

In terms of regulation 4(3) of the Construction Regulations, 2003 (hereinafter referred to as the Regulations), promulgated on 18 July 2003 in terms of Section 43 of the Occupational Health and Safety Act, 1993 (Act No 85 of 1993) the Employer shall not appoint a contractor to perform construction work unless the Contractor can satisfy the Employer that his/her firm has the necessary competencies and resources to carry out the work safely and has allowed adequately in his/her tender for the due fulfillment of all the applicable requirements of the Act and the Regulations.

1. I confirm that I am fully conversant with the Regulations and that my company has (or will acquire/procure) the necessary competencies and resources to timeously, safely and successfully comply with all of the requirements of the Regulations.

(Tick)

YES	<input type="checkbox"/>
NO	<input type="checkbox"/>

2. Proposed approach to achieve compliance with the Regulations

(Tick)

Own resources, competent in terms of the Regulations (refer to 3 below)	<input type="checkbox"/>
Own resources, still to be hired and/or trained (until competency is achieved)	<input type="checkbox"/>
Specialist subcontract resources (competent) – specify: ..... ..... ..... ..... .....	<input type="checkbox"/>

3. Provide details of proposed key persons, competent in terms of the Regulations, who will form part of the Contract team as specified in the Regulations (CVs to be attached):

.....  
 .....  
 .....  
 .....  
 .....

4. Provide details of proposed training (if any) that will be undergone:

.....  
 .....

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

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.....  
.....  
.....  
.....

5. Potential key risks identified and measures for addressing risks:

.....  
.....  
.....  
.....  
.....  
.....  
.....

6. I have fully included in my tendered rates and prices (in the appropriate payment items provided in the Schedule of Quantities) for all resources, actions, training and any other costs required for the due fulfillment of the Regulations for the duration of the construction and defects repair period.

(Tick)

YES	
NO	

SIGNATURE OF PERSON AUTHORISED TO SIGN THIS TENDER:

..... ID NO: .....

SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION

**T2.1.4 MEDICAL CERTIFICATE FOR THE CONFIRMATION OF PERMANENT DISABLED STATUS**

I, ..... (surname and name), Identity number, ..... do hereby declare that I am a registered medical practitioner, attached to a public Institution, with my practice number being ..... Practicing at ..... (Physical and postal addresses) declare that I have examined Mr/Mrs ..... Identity number of ..... found the said person to be permanently disabled or having a recurring disability.

"Disability" means, in respect of a person, a permanent impairment of a physical, intellectual, or sensory function, which results in restricted, or lack of, ability to perform an activity in the manner, or within the range, considered normal for a human being." - As per Preferential Procurement Policy Framework act: no 5 of 2000 (PPPFA)

The nature of the disability is as follows:

.....  
.....  
.....

Thus signed at ..... on this day of ..... of .....

.....  
SIGNATURE

.....  
DATE

Official stamp of  
Medical practitioner



**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

**T2.2.1 AUTHORITY FOR SIGNATORY**

Indicate the status of the tenderer by ticking the appropriate box hereunder. The tenderer must complete the certificate set out below for the relevant category.

A Company	B Partnership	C Joint Venture	D Sole Proprietor	E Close Corporation

**A. Certificate for Company**

I, ....., chairperson

of the board of .....

hereby confirm that by resolution of the board (copy attached) taken on

..... 20...., Mr/Ms .....

acting in the capacity of ....., was authorised to sign all documents in connection with this tender for Contract No HGDM724/HGDM/2021 and any contract resulting from it on behalf of the company.

**As witnesses:**

1. .... Chairman: .....

2. .... Date: .....

**B. Certificate for Partnership**

We, the undersigned, being the key partners in the business trading as .....

....., hereby authorise

Mr/Ms ....., acting in the capacity of .....

....., to sign all documents in connection with this tender for

Contract No: HGDM724/HGDM/2021 and any contract resulting from it on our behalf.

Name	Address	Signature	Date

*Note: This certificate is to be completed and signed by all key partners upon whom rests the direction of the affairs of the Partnership as a whole.*

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

**C. Certificate for Joint Venture**

We, the undersigned, are submitting this tender offer in Joint Venture and hereby

authorise Mr/Ms ....., authorised signatory of the company

....., acting in the capacity of lead

partner, to sign all documents in connection with this tender for Contract No HGDMXX/HGDM/2021/XX and any contract resulting from it on our behalf.

This authorisation is evidenced by the attached power of attorney signed by legally authorised signatories of all the partners to the Joint Venture.

Name of Firm	Address	Authorising Name and Capacity	Authorising Signature
Lead Partner:			

**D. Certificate for Sole Proprietor**

I, ....., hereby confirm that I am

the sole owner of the business trading as .....

**As witnesses:**

1. .... Sole Owner: .....

2. .... Date: .....

**E. Certificate for Close Corporation**

We, the undersigned, being the key members in the business trading as .....

....., hereby authorise Mr/Ms .....

acting in the capacity of ....., to sign all to sign all documents in connection with this tender for HGDMXX/HGDM/2021/XX and any contract resulting from it on our behalf.

Name	Address	Signature	Date

*Note: This certificate is to be completed and signed by all key partners upon whom rests the direction of the affairs of the Partnership as a whole.*

SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION

---

**T2.2.2 CERTIFICATE OF TENDERERS' ATTENDANCE AT THE CLARIFICATION MEETING AND  
SITE INSPECTION**

This is to certify that I, .....  
representative of (Tenderer) .....

.....  
of (address) .....

.....  
Telephone number .....

.....  
Fax number .....

.....  
visited and examined the Site on (date) .....

.....  
in the company of (Engineer/Engineer's Representative) .....

.....  
TENDERER'S REPRESENTATIVE: .....

.....  
EMPLOYER' AGENT / REPRESENTATIVE: .....

**DATE STAMP TO BE AFFIXED**

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

**T2.2.3 SCHEDULE OF WORK CARRIED OUT BY THE TENDERER**

The Tenderer shall list below, as required in the criteria, with completion certificates per project, civil engineering contracts of a similar nature awarded to him. This information is material to the award of the Contract.

<b>EMPLOYER</b> (Name, Tel No and Fax No)	<b>CONSULTING ENGINEER</b> (Name, Tel No and Fax No)	<b>NATURE OF WORK</b>	<b>VALUE OF WORK</b>	<b>YEAR OF COMPLETION</b>

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

DATE: .....

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

**T2.2.4 LABOUR**

(a) PROPOSED KEY PERSONNEL

The Tenderer shall list below the key personnel (including first nominee and the second choice alternate), whom he proposes to employ on the contract should his tender be accepted, both at his headquarters and on the Site, to direct and for the execution of the work, together with their qualifications, experience, positions held and their nationalities.

DESIGNATION	NAME AND NATIONALITY OF:		SUMMARY OF QUALIFICATIONS, EXPERIENCE AND PRESENT OCCUPATION
	(i) NOMINEE	(ii) ALTERNATE	
<u>HEADQUARTERS</u>			
Partner/director			
Project manager			
Other key staff (give designation)			

SIGNED ON BEHALF OF TENDERER: .....

(b) LOCAL AND IMPORTED LABOUR

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

---

In the employment of workers on the contract, labour from the local beneficiary community will have to be given preference. The tenderer must indicate below the category and number of local labourers which he/she intends to utilize on the Works.

It is also accepted that a contractor has to rely on certain categories of key employees in his/her organization to enable him/her to perform as an independent contractor. The tenderer must provide details in respect of the key-employees he/she intends to bring from outside the local areas (import) to utilize on the Works.

<u>CATEGORY OF EMPLOYEE</u> (E.g. labourer, plasterer)	<u>NUMBER OF PERSONS</u>
<b>LOCAL LABOUR</b>	
<b>KEY EMPLOYEES</b>	

SIGNED ON BEHALF OF TENDERER: .....

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION****T2.2.5 FINANCIAL REFERENCES****FINANCIAL STATEMENTS**

I/we agree, if required to furnish an audited copy of the latest set of financial statements together with my/our Directors' and Auditors' report for consideration by the Employer.

**DETAILS OF COMPANY'S BANK**

I/we hereby authorize the Employer/Engineer to approach all or any of the following banks for the purposes of obtaining a financial reference:

DESCRIPTION OF BANK DETAIL	BANK DETAILS APPLICABLE TO TENDERER'S HEAD OFFICE
Name of bank	
Branch name	
Branch code	
Street address	
Postal address	
Name of manager	
Telephone number	( )
Fax number	( )
Account number	
Name in which the account is registered at the bank	

**TENDERER'S TAX DETAIL**

Tenderer's Vat vendor registration number: .....

Tenderer's SARS tax reference number: .....

**SIGNED ON BEHALF OF TENDERER:** .....

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

**T2.2.6 ESTIMATED MONTHLY EXPENDITURE**

The Tenderer shall state below the estimated value of work to be completed every month, based on his preliminary programme and his tendered unit rates.

The amount for contingencies must not be included.

MONTH	VALUE
1	R .....
2	R .....
3	R .....
4	R .....
5	R .....
6	R .....
7	R .....
8	R .....
9	R .....
10	R .....
TOTAL	COMPLETION OF CONTRACT
	R .....

SIGNED ON BEHALF OF TENDERER: .....



**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

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**T2.2.7 ALTERATIONS BY TENDERER**

Should the Tenderer desire to make any departures from or modifications to the General Conditions of contract, Specification, Schedule of quantities or Drawings, or to qualify his tender in any way, he shall set out his proposals clearly hereunder or alternatively state them in a covering letter attached to his tender and referred-ed to hereunder failing which the tender will be deemed to be unqualified.

Page

Clause or item

.....

.....

.....

.....

.....

.....

.....

.....

.....  
**DATE**

.....  
**SIGNATURE OF TENDERER**

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

**T2.2.8 DETAILS OF PLANT AND EQUIPMENT**

Tenderers are required to submit hereunder details of plant and equipment to be used for construction of the Works.

In the column Ownership Tenderers are to state whether the items are :

- (a) wholly owned by the Tenderer,
- (b) on hire (with name of owner),
- (c) under a hire purchase agreement, or
- (d) under a lease agreement.

In the case of either (c) or (d) being applicable, the amount of outstanding payments due and the name of the Finance Company are to be furnished.

<u>Item</u>	<u>Description (Make/Model/Capacity)</u>	<u>Age (Years)</u>	<u>Value</u>	<u>Ownership</u>
1.	Concrete Mixer.....			
2.	Vibrator.....			
3.	Compactor.....			
4.	Compressor.....			
5.	Backactor.....			
6.	Truck.....			
7.	Other (specify) ..... ..... ..... ..... .....			

.....  
**DATE**

.....  
**SIGNATURE OF TENDERER**

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

**T2.2.9 SCHEDULE OF PROPOSED SUB-CONTRACTORS**

I/We hereby notify you that it is my/our intention to employ the following Sub-Contractors for work in this contract.

NAMES AND ADDRESSES OF PROPOSED SUBCONTRACTORS	NATURE AND EXTENT OF WORK TO BE SUBCONTRACTED	PREVIOUS EXPERIENCE WITH SUBCONTRACTOR OR RECENT WORK EXECUTED BY THE SUB-CONTRACTOR

.....  
DATE

.....  
SIGNATURE OF TENDERER

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION****T2.2.10 RECORD OF ADDENDA TO TENDER DOCUMENT**

We confirm that the following communications received from the Engineer before the submission of this tender offer, amending the tender documents, have been taken into account in this tender offer:

	Date	Title or Details
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Attach additional pages if more space is required.

Signed: ..... Date: .....

Name: ..... Position: .....

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

**DATE:** .....

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

**T2.2.11 COMPULSORY ENTERPRISE QUESTIONNAIRE**

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

**Section 1: Name of enterprise:** .....

**Section 2: VAT registration number, if any:** .....

**Section 3: CIDB registration number, if any:** .....

**Section 4: Particulars of sole proprietors and partners in partnerships**

Name*	Identity number*	Personal income tax number*

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

**Section 5: Particulars of companies and close corporations**

Company registration number .....

Close corporation number .....

Tax reference number .....

**Section 6: Record of 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                   |   |

If any of the above boxes are marked, disclose the following:

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

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**
**Section 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 been 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 warrants 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 the neither the name of the enterprise or the name of any partner, manager, director or other person, who wholly or partly exercises, 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 exercises, or may 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 tenderers or those responsible for compiling the scope of work that could cause or be interpreted as a conflict of interest;
- iv) confirms that the contents of this questionnaire are within my personal knowledge and are to the best of my belief both true and correct;

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

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Signed \_\_\_\_\_ Date \_\_\_\_\_

Name \_\_\_\_\_ Position \_\_\_\_\_

Enterprise  
name \_\_\_\_\_

(c)

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

**T2.2.12 JOINT VENTURE DISCLOSURE FORM**

<b>EMPLOYER</b>	<b>:</b>	<b>HARRY GWALA DISTRICT MUNICIPALITY</b>
<b>CONTRACT DESCRIPTION</b>	<b>:</b>	<b>SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION</b>
<b>CONTRACT NUMBER</b>	<b>:</b>	<b>HGDM724/HGDM/2021</b>
<b>PROJECT REFERENCE NUMBER</b>	<b>:</b>	<b>HGDM724</b>

- Note:
- 1) This form needs not be completed for Joint Ventures which have targeted enterprise partners.
  - 2) All the information requested must be filled in the spaces provided. If additional space is required, additional sheets may be attached.
  - 3) A copy of the joint venture agreement must be attached to this form. In order to demonstrate the targeted enterprise partner's share in the ownership, control, management responsibilities, risks and profits of the joint venture, the proposed joint venture agreement must include specific details relating to:
    - i) The contributions of capital and equipment
    - ii) Work items to be performed by the targeted enterprise partner's own forces.
    - iii) Work items to be performed under the supervision of the targeted enterprise partner.
    - iv) The commitment of management, supervisory and operative personnel employed by the targeted enterprise partner to be dedicated to the performance of the Contract.
  - 4) Copies of all written agreements between partners concerning the contract must be attached to this form including those which relate to ownership options and to restrictions/limits regarding ownership and control.
  - 5) Targeted enterprise partners must each complete an Enterprise Declaration Affidavits.

**JOINT VENTURE PARTICULARS**

(d) Name : \_\_\_\_\_  
 Postal address : \_\_\_\_\_  
 Physical address : \_\_\_\_\_  
 Telephone : \_\_\_\_\_ Fax \_\_\_\_\_

**IDENTITY OF EACH NON-TARGETED ENTERPRISE PARTNERS**

(e) Name : \_\_\_\_\_  
 Postal address : \_\_\_\_\_  
 Physical address : \_\_\_\_\_  
 Telephone : \_\_\_\_\_ Fax \_\_\_\_\_  
 Contact Person : \_\_\_\_\_

(Continue as required for further non-targeted enterprise partners)

(f) Name : \_\_\_\_\_  
 Postal address : \_\_\_\_\_  
 Physical address : \_\_\_\_\_  
 Telephone : \_\_\_\_\_ Fax \_\_\_\_\_  
 Contact Person : \_\_\_\_\_



**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

**IDENTITY OF EACH TARGETED ENTERPRISE PARTNER**

(g) Name : \_\_\_\_\_  
 Postal address : \_\_\_\_\_  
 Physical address : \_\_\_\_\_  
 Telephone : \_\_\_\_\_ Fax \_\_\_\_\_  
 Contact Person : \_\_\_\_\_

(h) Name : \_\_\_\_\_  
 Postal address : \_\_\_\_\_  
 Physical address : \_\_\_\_\_  
 Telephone : \_\_\_\_\_ Fax \_\_\_\_\_  
 Contact Person : \_\_\_\_\_

(i) Name : \_\_\_\_\_  
 Postal address : \_\_\_\_\_  
 Physical address : \_\_\_\_\_  
 Telephone : \_\_\_\_\_ Fax \_\_\_\_\_  
 Contact Person : \_\_\_\_\_

**DESCRIPTION OF THE ROLE OF THE TARGETED PARTNERS IN THE JOINT VENTURE.**


**OWNERSHIP OF THE JOINT VENTURE**

a) Percentage Ownership in respect of	:	Targeted Enterprises	_____ %	Targeted Enterprises	_____ %
b) Profit an Loss Sharing	:	Targeted Enterprises	_____ %	Targeted Enterprises	_____ %
c) Initial Capital Contribution	:	Targeted Enterprises	_____ R	Targeted Enterprises	_____ R
d) Ongoing Capital Contribution	:	Targeted Enterprises	_____ R	Targeted Enterprises	_____ R
e) Major Plant and Equipment Contribution	:	Targeted Enterprises		Targeted Enterprises	

**RECENT CONTRACTS EXECUTED BY PARTNERS IN THEIR OWN RIGHT OR AS PARTNERS IN OTHER JOINT VENTURES**

**Targeted Enterprise Partners**

1. : \_\_\_\_\_
2. : \_\_\_\_\_
3. : \_\_\_\_\_
4. : \_\_\_\_\_
5. : \_\_\_\_\_

**Non-Targeted Enterprise Partners**

1. : \_\_\_\_\_
2. : \_\_\_\_\_
3. : \_\_\_\_\_

**CONTROL AND PARTICIPATION IN THE JOINT VENTURE.**

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

(Identify by name and firm those individuals who are, or will be, responsible for, and have authority to engage in the relevant management functions and policy and decision making, indicating any limitations in their authority e.g. co-signature requirements and Rand limits).

**(continue on next page)**

Function	Targeted Enterprise Partner		Non-Targeted Enterprise	
	Enterprise	Name of Person	Enterprise	Name of Person
Cheque Signing				
Authority to enter into contracts on behalf of the Joint Venture				
Signing, co-signing and/or collateralizing of loans				
Acquisition of lines of credit				
Acquisition of performance bonds				
Negotiating and signing labour agreements				

**MANAGEMENT OF CONTRACT PERFORMANCE**

(Fill in the name and firm of the responsible person).

Function	Targeted Enterprise Partner		Non-Targeted Enterprise	
	Enterprise	Name of Person	Enterprise	Name of Person
Supervision of field operations				
Major purchasing				
Estimating				
Technical management				

**MANAGEMENT AND CONTROL OF JOINT VENTURE**

a) Managing Partner : \_\_\_\_\_

b) What authority does each partner have to commit or obligate the other to financial institutions, insurance companies, suppliers, subcontractors and /or other parties participating in the execution of the contemplated works?

Partner	Targeted Enterprise Status		Authority Status	
	YES	NO	YES	NO

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

**PERSONNEL**

a. State the approximate number of operative personnel (by trade/ function/ discipline) needed to perform the Joint Venture work under the contract.

TRADE/FUNCTION/	Total Qty Required	Qty supplied by Targeted Enterprise	Qty supplied by non-Targeted Enterprise

b) Name of individual who will be responsible for hiring Joint Venture employees : \_\_\_\_\_

c) Name of individual who will be responsible for preparation of Joint Venture payrolls : \_\_\_\_\_

**CONTROL AND STRUCTURE OF THE JOINT VENTURE.**

Briefly describe the manner in which the Joint Venture is structured and controlled.


The undersigned warrants that he/she is duly authorised to sign this Joint Venture Disclosure Form and affirms that the foregoing statements are correct and include all material information necessary to identify and explain the terms and operations of the Joint Venture and the intended participation of each partner in the undertaking.

The undersigned further covenants and agrees to provide the Employer with complete and accurate information regarding actual Joint Venture work and the payment therefore, and any proposed changes in any provisions of the Joint Venture agreement, and to permit the audit and examination of the books, records, and files of the Joint Venture, or those of each partner relevant to the Joint Venture, by duly authorised representatives of the Employer.

Signature : \_\_\_\_\_

Name : \_\_\_\_\_

Duly authorised to sign on behalf of : \_\_\_\_\_

Address : \_\_\_\_\_

Telephone : \_\_\_\_\_

Fax : \_\_\_\_\_

Date : \_\_\_\_\_

SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT  
GREATER SUMMERFIELD PUMPSTATION

HARRY GWALA DISTRICT MUNICIPALITY

GREATER SUMMERFIELD WATER SUPPLY SCHEME

CONTRACT NO: HGDM724/HGDM/2021

SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL  
WORKS AT GREATER SUMMERFIELD PUMPSTATION

## CONTRACT

TABLE OF CONTENTS	Page	Colour
<b>C1: AGREEMENTS AND CONTRACT DATA</b>		
C1.1: FORM OF OFFER AND ACCEPTANCE .....	CD3	White
C1.2: CONTRACT DATA.....	C7	Yellow
C1.2.1: CONDITIONS OF CONTRACT .....	C8	Yellow
C1.2.2: PART A: DATA PROVIDED BY THE EMPLOYER .....	C9	Yellow
PART B: DATA PROVIDED BY THE CONTRACTOR	C10	Yellow
C1.3: FORM OF GUARANTEE .....	C11	White
C1.4: AGREEMENT IN TERMS OF SECTION 37(2) OF THE OCCUPATIONAL HEALTH AND SAFETY ACT No 85 OF 1993	C15	White
C1.5: RETENTION MONEY GUARANTEE .....	C16	White
C1.6: TRANSFER OF RIGHTS .....	C18	White
<b>C2: PRICING DATA</b>		
C2.1 PRICING INSTRUCTIONS .....	C19	Yellow
C2.2 SCHEDULE OF QUANTITIES .....	C24	Yellow
<b>C3: SCOPE OF WORKS</b>		
TABLE OF CONTENTS .....	C39	Blue
C3.1: STANDARD SPECIFICATIONS .....	C42	Blue
C3.2: PROJECT SPECIFICATIONS .....	C47	Blue
C3.3: PARTICULAR SPECIFICATIONS .....	C110	Blue
<b>C 4: SITE INFORMATION</b>		
C4.1: LOCALITY PLAN .....	C125	Green
C4.2: EXAMPLE OF CONTRACT SIGNBOARD DETAILS.....	C126	Green
C4.3: EXISTING SERVICES REPORT .....	C127	Green
C4.4: TRAFFIC INFORMATION .....	C128	Green
<b>C 5: DRAWINGS</b>		
C5.1: DRAWINGS .....	C129	Green

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

**C1: AGREEMENTS AND CONTRACT DATA**

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

**A. 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: HGDM724/HGDM/2021**

**PROJECT NAME: SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

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:**

Amount in Words.....  
.....  
.....

**R..... (in figures)**

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.

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

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

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

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

Address: .....

.....

Telephone number: ..... Fax number: .....

**Witness:**

**Signature:** .....

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

**Date:** .....

**[Failure of a Tenderer to sign this form will invalidate the tender]**

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION****B. ACCEPTANCE**

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 1 Agreements and Contract Data (which includes this Agreement)
- Part 2 Pricing Data, including the Schedule of Quantities
- Part 3 Scope of Work
- Part 4 Site Information

and the schedules, forms, drawings and documents or parts thereof, which may be incorporated by reference into Parts 1 to 4 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 deliver the Guarantee in terms of Clause 6.2 of the General Conditions of Contract 2015 3<sup>rd</sup> Edition, within the period stated in the Contract Data, and he shall, immediately 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 other bonds, guarantees, proof of insurance and any other documentation to be provided in terms of the Conditions of Contract identified in the Contract Data, within 14 days of the date on which this Agreement comes into effect. Failure to fulfil 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:** .....

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

**Capacity:** .....

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

**Address:** .....

.....

**Witness: Signature:** ..... **Name:** .....

**Date:** .....

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

**C. SCHEDULE OF DEVIATIONS**

The extent of deviations from the tender documents issued by the Employer prior to the tender closing date is limited to those permitted in terms of the Tender Data and the Conditions of Tender.

A Tenderer's covering letter will not necessarily be included in the final contract document. Should any matter in such letter, which constitutes a deviation as aforesaid, become the subject of agreement reached during the process of offer and acceptance, the outcome of such agreement shall be recorded here.

Any other matters arising from the process of offer and acceptance either as a confirmation, clarification or change to the tender documents and which it is agreed by the Parties becomes an obligation of the contract shall also be recorded here.

Any change or addition to the tender documents arising from the above agreement and recorded here shall also be incorporated into the final draft of the Contract.

- 1. **Subject:** .....  
**Details:** .....  
 .....
- 2. **Subject:** .....  
**Details:** .....  
 .....
- 3. **Subject:** .....  
**Details:** .....  
 .....
- 4. **Subject:** .....  
**Details:** .....  
 .....
- 5. **Subject:** .....  
**Details:** .....  
 .....
- 6. **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.

It is expressly agreed that no other matter whether in writing, oral communication or implied during the period between the issue of the tender documents and the receipt by the Tenderer of a completed signed copy of this Agreement shall have any meaning or effect in the contract between the parties arising from this Agreement.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT  
GREATER SUMMERFIELD PUMPSTATION**

---

**FOR THE TENDERER:**

**Signature:** .....

**Name:** .....

**Capacity:** .....

**Tenderer:** *(Name and address of organisation)* .....

**Witness:**

**Signature:** .....

**Name:** .....

**Date:** .....

**FOR THE EMPLOYER**

**Signature:** .....

**Name:** .....

**Capacity:** .....

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

**Witness:**

**Signature:** .....

**Name:** .....

**Date:** .....



**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT  
GREATER SUMMERFIELD PUMPSTATION**

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**HARRY GWALA DISTRICT MUNICIPALITY****GREATER SUMMERFIELD WATER SUPPLY SCHEME****CONTRACT NO: HGDM724/HGDM/2021****SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL  
WORKS AT GREATER SUMMERFIELD PUMPSTATION****C1.2: CONTRACT DATA****C1.2.1: CONDITIONS OF CONTRACT****TABLE OF CONTENTS**

<b>C1.2.1.1</b>	<b>GENERAL CONDITIONS OF CONTRACT .....</b>	<b>C8</b>
<b>C1.2.1.2</b>	<b>SPECIAL CONDITIONS OF CONTRACT .....</b>	<b>C8</b>
	<b>C1.2.1.2.1 GENERAL .....</b>	<b>C8</b>
	<b>C1.2.1.2.2 AMENDMENTS TO THE GENERAL CONDITIONS OF CONTRACT 2015 .....</b>	<b>C8</b>

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

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**C1.2.1 CONDITIONS OF CONTRACT****C1.2.1.1 GENERAL CONDITIONS OF CONTRACT**

This Contract will be based on the "General Conditions of Contract for Construction Works – 3<sup>rd</sup> Edition 2015", issued by the South African Institution of Civil Engineering (abbreviated title: "General Conditions of Contract 2015").

It is agreed that the only variations from the General Conditions of Contract 2010 are those set out hereafter under "Special Conditions of Contract".

**C1.2.1.2 SPECIAL CONDITIONS OF CONTRACT****C1.2.1.2.1 GENERAL**

These Special Conditions of Contract (SCC) form an integral part of the Contract. The Special Conditions shall amplify, modify or supersede, as the case may be, the General Conditions of Contract 2015 to the extent specified below, and shall take precedence and shall govern.

The clauses of the Special Conditions hereafter are numbered "SCC" followed in each case by the number of the applicable clause or sub clause in the General Conditions of Contract 2015, and the applicable heading, or (where a new special condition that has no relation to the existing clauses is introduced) by a number that follows after the last clause number in the General Conditions of Contract 2015, and an appropriate heading.

**C1.2.1.2.2 CIDB Registration**

Only contractors registered in terms of the Construction Industry Development Board Act, with a classification of ME, CE and a Grading Designation of **6CE or HIGHER** will be considered for the project

**C1.2.1.2.3 Tender Validity Period**

The Tender Validity Period will be ninety (90) days from the date of Closing of Tenders.

**C1.2.1.2.4 Tender Submission**

The tender shall submit his tender in terms of the Conditions of Tender as provided in this Tender Document. The entire and original tender document, including all Annexures and drawings together, must be returned for adjudication purposes. The entire tender document, with agreed amendments and construction drawings (which may differ from those issued during the tender phase) will form the Contract.

All returnable documents shall be duly completed and signed. Each page of the document, including Annexures and Drawings must be initiated by Tenderer.

**C1.2.1.2.2 AMENDMENTS TO THE GENERAL CONDITIONS OF CONTRACT 2015**

No amendments.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**
**C1.2.2: CONTRACT DATA (Applicable to this contract)**
**PART A: DATA PROVIDED BY THE EMPLOYER**

The following contract specific data are applicable to this contract.

REFERENCE GCC 2015	CONTRACT SPECIFIC DATA PROVIDED BY THE EMPLOYER
Clause 1.1.1.15:	<b>Name of Employer:</b> The Municipality of Harry Gwala District represented by Head of Municipality: Municipal Manager.
Clause 1.2.1.2:	<b>Address of Employer:</b>  <u>Physical:</u> 40 Main Street Ixopo 3276  <u>Postal:</u> Private Bag X 501 Ixopo 3276  E-Mail: makwakwab@harrygwaladm.gov.za  Telephone No: (039) 834 8700      Fax No: (039) 834 1517
Clause 1.1.1.16:	<b>Name of Engineer:</b> Impande Consulting Engineers (Pty) LTD
Clause 1.2.1.2:	<b>Address of Engineer:</b>  <u>Physical:</u> Impande House 172 Bird Street uMzimkhulu  <u>Postal:</u> Impande House 172 Bird Street uMzimkhulu  E-Mail: perfect@impande.co.za  Telephone No: (039) 259 0113      Fax No: (039) 259 0114
Clause 5.1 & 5.8:	Special non-working days are Sundays, the construction industry year end break and the following statutory public holidays as declared by National Government:  New Year's Day, Human Rights Day, Good Friday, Family Day, Freedom Day, Workers' Day, Youth Day, National Women's Day, Heritage Day, Day of Reconciliation, Christmas Day and the Day of Goodwill.  The construction industry year end break commences on the first working day after 15 December and ends on the first working day after 5 January of the next year.
Clause 3.3.2:	The Engineer is required to obtain the specific approval of the Employer for any expenditure in excess of the Contract Price.
Clause 6.2:	The time to deliver the Guarantee is within 14 days of the Commencement Date.
Clause 6.2:	The Liability of the Guarantee shall be for 8% of the first One Million Rand plus 3.5% of the balance of the Accepted Contract Price.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

REFERENCE GCC 2015	CONTRACT SPECIFIC DATA PROVIDED BY THE EMPLOYER
Clause 5.3:	The Contractor shall commence executing the Works within 14 days of the Commencement Date.
Clause 5.6:	The Contractor shall deliver his programme of work within 7 days of the Commencement Date.
Clause 8.6:	The value of materials supplied by the Employer to be included in the insurance sum is <u>Nil</u>
Clause 8.6.1.1.3:	The amount to cover professional fees for repairing damage and loss to be included in the insurance sum is <u>14% of contract value</u> .
Clause 8.6:	Special Risks Insurance issued by SASRIA is required.
Clause 8.6.1.3:	The limit of indemnity for liability insurance is <u>R10 000 000,00 (ten million rand only)</u> for any single liability claim. Liability insurance shall include spread of fire risk.
Clause 8.6:	The percentage allowance to cover overhead charges is 10%.
Clause 5.5.1:	The Works shall be completed for the portions as set out in the Scope of Works  The whole of the Works shall be completed within the period tendered by contractor under Clause 42.1 (refer to Part B: Data Provided by Contractor)
Clause 5.13.1:	<b>The penalty for failing to complete the whole of the Works is R1000, 00 of the total Tender Sum per day.</b>
Clause 6.8.2:	The value of the certificates issued shall be adjusted in accordance with the Contract Price Adjustment Schedule with the following values:  The values of the coefficients for calculating the Contract Price Adjustment Factor are:  a = 0.15      b = 0.50      c = 0.2      d = 0.15  The urban area nearest the site is Pietermaritzburg. The base month is the month prior to the month in which the closing date for the tender falls.
Clause 6.8.3:	Price adjustments for variations in the costs of special materials are allowed.
Clause 6.10.1.5:	The percentage limit on materials not yet built into the Permanent Works is 80%.
Clause 6.10.3:	The percentage retention on the amounts due to the Contractor is 10%.
Clause 6.10.3:	The limit of retention money is 10% of the tender offer including contract price adjustment, contingencies and VAT.
Clause 6.10.3.1:	A Retention Money Guarantee is permitted.
Clause 7.8.1:	The Defects Liability Period is 12 months.
Clause 10.2:	Dispute Resolution shall be by Mediation.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

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**1.2.3 Adjudication Process**

The adjudication process will be based on a 80/20 preference point system. For details of the adjudication process refer to Items 2.3.8. and 2.3.11. of the Conditions of Tender in Volume 1 of this tender document.

The adjudication process is summarised below:

**STEP 1 (at tender opening)**

- 1.1. Return tenders received late (as per Item 3.3. of the Conditions of Tender)
- 1.2. Tender submissions for which acceptable reasons for withdrawal have been submitted will not be opened.
- 1.3. Open valid tender submissions in public immediately after the closing time of tenders.
- 1.4. Announce the name of each tender opened, the total of his prices, preferences claimed and time for completion.

**STEP 2 (after tender opening, but before detailed evaluation)**

- 2.1. Determine responsiveness of tenders (refer to Item 3.8. of the Conditions of Tender).
- 2.2. Reject all non-responsive tender offers (refer to Item 3.8. of the Conditions of Tender).

**STEP 3 (detailed evaluation)**

- 3.1. Check arithmetical errors (refer to Item 3.9. of the Conditions of Tender).
- 3.2. Obtain required clarifications (refer to Item 3.10. of the Conditions of Tender).
- 3.3. Score tender evaluation points for financial offer.
- 3.4. Confirm that tenderers are eligible for the preferences claimed and if so, score tender evaluation points for preferencing.
- 3.5. Calculate total tender evaluation points.
- 3.6. Rank tender offers from the highest number of tender evaluation points to the lowest.
- 3.7. Recommend tenderer with the highest number of tender evaluation points for the award of the contract, unless there are compelling and justifiable reasons not to do so.

**1.2.4 EPWP Requirements**

The overall youth target is 55%; women 60% and people with disabilities is 2%

**Payment for the labour-intensive component of the works**

Payment for works identified in the Scope of Work as being labour-intensive shall only be made in accordance with the provisions of the Contract if the works are constructed strictly in accordance with the provisions of the Scope of Work. Any non-payment for such works shall not relieve the Contractor in any way from his obligations either in contract or in delict.

**Linkage of payment for labour-intensive component of works to submission of project data**

The Contractor's payment invoices shall be accompanied by labour information for the corresponding period in a format specified by the employer. If the contractors choose to delay submitting payment invoices, labour returns shall still be submitted as per frequency and timeframe stipulated by the Employer. The contractor's invoices shall not be paid until all pending labour information has been submitted.

**Applicable labour laws**

The current Ministerial Determination (also downloadable at [www.epwp.gov.za](http://www.epwp.gov.za)), Expanded Public Works Programmes, issued in terms of the Basic Conditions of Employment Act of 1997 by the Minister of Labour in Government Notice, shall apply to works described in the scope of work as being labour intensive and which are undertaken by unskilled or semi-skilled workers.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

**C1.2.2: CONTRACT DATA (Applicable to this contract)**

**PART B: DATA PROVIDED BY THE CONTRACTOR**

The following contract specific data are applicable to this contract.

REFERENCE GCC 2015	CONTRACT SPECIFIC DATA PROVIDED BY THE CONTRACTOR												
Clause 1.1.1.9:	<p><b>Name of the Contractor:</b> .....</p> <p>.....</p>												
Clause 1.2.1.2:	<p><b>Address of the Contractor:</b></p> <p style="text-align: center;"><u>Physical:</u> <span style="float: right;"><u>Postal:</u></span></p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>												
Clause 5.5.1	<p>Time of Completion is ..... <b>WEEKS</b></p>												
Clause 6.8.3:	<p>The Tenderer shall complete Table 1 below with respect to each of the special materials listed. This information shall be used to calculate the variation in cost of the special materials.</p> <p>The rates and prices for the special materials shall be furnished by the Tenderer, which rates and prices shall not include VAT but shall include all other obligatory taxes and levies. The quoted price to be provided by the Tenderer is the ruling price on the first of the month prior to the month in which the closing date for the Tender falls.</p> <p><b>Table 1</b></p> <table border="1"> <thead> <tr> <th>SPECIAL MATERIALS</th> <th>UNIT*</th> <th>RATE OR PRICE FOR THE BASE MONTH</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table> <p>* Indicate whether the material shall be delivered in bulk or in containers. When called upon to do so, the Contractor shall substantiate the above rates or prices with acceptable documentary evidence.</p> <p>Signed on behalf of Tenderer: .....</p>	SPECIAL MATERIALS	UNIT*	RATE OR PRICE FOR THE BASE MONTH									
SPECIAL MATERIALS	UNIT*	RATE OR PRICE FOR THE BASE MONTH											

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION****C1.3: FORM OF GUARANTEE****PRO FORMA****FORM OF GUARANTEE**

**Employer:** *(name and address)* \_\_\_\_\_

**Contract No:** \_\_\_\_\_

*(Contract title)* \_\_\_\_\_

**WHEREAS**

(hereinafter referred to as "the Employer") entered into a Contract with

(hereinafter called "the Contractor") on the \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_  
for the construction of *(Contract Title)*

at \_\_\_\_\_

AND WHEREAS it is provided by such Contract that the Contractor shall provide the Employer with security by way of a guarantee for the due and faithful fulfilment of such Contract by the Contractor;

AND WHEREAS \_\_\_\_\_ (hereinafter referred to as "the Guarantor") has/have at the request of the Contractor, agreed to give such guarantee;

NOW THEREFORE WE, \_\_\_\_\_ do hereby guarantee and bind ourselves jointly and severally as Guarantor and Co-principal Debtors to the Employer under renunciation of the benefits of division and excussion for the due and faithful performance by the Contractor of all the terms and conditions of the said Contract, subject to the following conditions:

1. The Employer shall, without reference and/or notice to us, have complete liberty of action to act in any manner authorized and/or contemplated by the terms of the said Contract, and/or to agree to any modifications, variations, alterations, directions or extensions of the Due Completion Date of the Works under the said Contract, and that its rights under this guarantee shall in no way be prejudiced nor our liability hereunder be affected by reason of any steps which the Employer may take under such Contract, or of any modification, variation, alterations of the Due Completion Date which the Employer may make, give, concede or agree to under the said Contract.
2. This guarantee shall be limited to the payment of a sum of money.
3. The Employer shall be entitled, without reference to us, to release any guarantee held by it, and to give time to or compound or make any other arrangement with the Contractor.
4. This guarantee shall remain in full force and effect until the issue of the Certificate of Completion in terms of the Contract, unless we are advised in writing by the Employer before the issue of the said Certificate of his intention to institute claims, and the particulars thereof, in which event this guarantee shall remain in full force and effect until all such claims have been paid or liquidated.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

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5. Our total liability hereunder shall not exceed the sum of

6.

\_\_\_\_\_ (In words)  
R \_\_\_\_\_ (in figures)

7. The Guarantor reserves the right to withdraw from this guarantee by depositing the Guaranteed Sum with the beneficiary, whereupon the Guarantor's liability hereunder shall cease.

8. We hereby choose our address for the serving of all notices for all purposes arising here from as

\_\_\_\_\_  
\_\_\_\_\_

IN WITNESS WHEREOF this guarantee has been executed by us at \_\_\_\_\_

on this \_\_\_\_\_ day of \_\_\_\_\_ 20 \_\_\_\_\_

As witnesses:

1. \_\_\_\_\_ Signature \_\_\_\_\_  
Name in Block Letters

2. \_\_\_\_\_ Signature \_\_\_\_\_  
Name in Block Letters

Duly authorized to sign on behalf of (Guarantor) \_\_\_\_\_

Address \_\_\_\_\_

\_\_\_\_\_



**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

**C1.4: AGREEMENT IN TERMS OF SECTION 37(2) OF THE OCCUPATIONAL HEALTH AND SAFETY ACT No 85 OF 1993**

THIS AGREEMENT is made between The **HARRY GWALA DISTRICT MUNICIPALITY** represented by Head of Municipality: Municipal Manager (hereinafter called the **EMPLOYER**) of the one part, herein represented by:

.....  
in his capacity as: .....

AND: .....  
(hereinafter called the **CONTRACTOR**) of the other part, herein represented by.....

.....  
in his capacity as: .....  
duly authorised to sign on behalf of the Contractor.

**WHEREAS** the **CONTRACTOR** is the Mandatary of the **EMPLOYER** in consequence of an agreement between the **CONTRACTOR** and the **EMPLOYER** in respect of:

**CONTRACT NO: HGDM724/HGDM/2021**

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

for the construction, completion and maintenance of the works;

**AND WHEREAS** the **EMPLOYER** and the **CONTRACTOR** have agreed to enter into an agreement in terms of the provisions of Section 37(2) of the Occupational Health and Safety Act No 85 of 1993, as amended by OHS Act Amendment Act No 181/1993 (hereinafter referred to as the **ACT**);

**NOW THEREFORE** the parties agree as follows:

1. The **CONTRACTOR** undertakes to acquaint the appropriate officials and employees of the **CONTRACTOR** with all relevant provisions of the **ACT** and the regulations promulgated in terms thereof.
2. The **CONTRACTOR** undertakes to fully comply with all relevant duties, obligations and prohibitions imposed in terms of the **ACT** and Regulations: Provided that should the **EMPLOYER** have prescribed certain arrangements and procedures that same shall be observed and adhered to by the **CONTRACTOR**, his officials and employees. The **CONTRACTOR** shall bear the onus of acquainting himself/herself/itself with such arrangements and procedures.
3. The **CONTRACTOR** hereby accepts sole liability for such due compliance with the relevant duties, obligations, prohibitions, arrangements and procedures, if any, imposed by the **ACT** and Regulations, and the **CONTRACTOR** expressly absolves the **EMPLOYER** and the Employer's **CONSULTING ENGINEERS** from being obliged to comply with any of the aforesaid duties, obligations, prohibitions, arrangements and procedures in respect of the work included in the contract.
4. The **CONTRACTOR** agrees that any duly authorised officials of the **EMPLOYER** shall be entitled, although not obliged, to take such steps as may be necessary to ensure that the **CONTRACTOR** has complied with his undertakings as more fully set out in paragraphs 1 and 2 above, which steps may include, but shall not be limited to, the right to inspect any appropriate site or premises occupied by the **CONTRACTOR**, or to take such steps the **EMPLOYER** may deem necessary to

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

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- remedy the default of the CONTRACTOR at the cost of the CONTRACTOR.
5. The CONTRACTOR shall be obliged to report forthwith to the EMPLOYER any investigation, complaint or criminal charge which may arise as a consequence of the provisions of the ACT and Regulations, pursuant to work performed in terms of this agreement, and shall, on written demand, provide full details in writing of such investigation, complaint or criminal charge.

Thus signed at ..... for and on behalf of the **CONTRACTOR**

on this the ..... day of ..... 20.....

SIGNATURE: .....

NAME AND SURNAME: .....

CAPACITY: .....

WITNESSES: 1. ....

2. ....

Thus signed at ..... for and on behalf of the **EMPLOYER** on this

the ..... day of ..... 20.....

SIGNATURE: .....

NAME AND SURNAME: .....

CAPACITY: .....

WITNESSES: 1. ....

2. ....

**C1.5 RETENTION MONEY GUARANTEE****PRO FORMA**

**RETENTION MONEY GUARANTEE**  
 THE HEAD: MUNICIPAL MANAGER  
 HARRY GWALA DISTRICT MUNICIPALITY  
 40 MAIN STREET  
 IXOPO  
 3276

**CONTRACT NO: HGDM724/HGDM/2021** FOR \_\_\_\_\_

**ISSUED TO:** the **HARRY GWALA DISTRICT MUNICIPALITY**, represented by **HEAD: MUNICIPAL MANAGER** (Hereinafter referred to as "the Employer")

**ON BEHALF OF:** .....(Hereinafter referred to as "the Contractor")

In connection with

**CONTRACT NO. HGDM724/HGDM/2021** (Hereinafter referred to as "the Contract")

WHEREAS the Employer and the Contractor have agreed that the Contractor may provide a guarantee in lieu of the whole or portion of the retention monies provided for under the Contract;

NOW THEREFORE we, the undersigned, undertake, in accordance with the following provisions, to pay the Employer such amounts as the Employer may, from time to time, demand from us.

- Each demand by the Employer shall be in writing signed by the Employer and delivered to us at

.....  
 or such other address as we shall in writing notify to the Employer and shall be accompanied by a certificate complying with Clause 2, signed by the Engineer in office as such in terms of the Contract.

- The Engineer's certificate referred to in Clause 1 shall certify

- that he is the Engineer in office as such in terms of the Contract,
- that the Contractor is in breach of his obligations under the Contract, and
- that the amount demanded, which amount the certificate shall specify,

- does not exceed the amount of retention monies which, but for this guarantee, would have been retained by the Employer in terms of the Contract at the date of the certificate, less the aggregate of the amounts of retention money actually retained by the Employer and the amounts previously paid by us to the Employer in terms hereof, and

- does not exceed a genuine estimate of the cost to the Employer of having the breach referred to in paragraph (b) remedied less the aggregate of any amounts withheld by the Employer from payments due the Contractor in terms of the Contract by reason of the breach referred to, and any amount in retention money actually held by the Employer save to the extent that the same had been deducted from any previous demand in terms hereof.

- We shall within 28 days after our receipt of a demand complying with the provisions of Clauses 1 and 2 make payment to the Employer of the amount demanded at 40 Main Street, Ixopo or at such other address as the Employer shall in writing notify us.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

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- 4. Subject to compliance with the provisions thereof, our liability to make the payments herein referred to shall be unconditional and shall not be affected nor diminished by any disputes, claims or counterclaims between the Employer and the Contractor.
- 5. Our aggregate liability under this guarantee is limited to R .....
- 6. This guarantee shall expire on the date on which the last of the retention monies, which but for this guarantee would have been retained by the Employer, becomes payable to the Contractor.
- 7. This guarantee is not transferable and must be produced for endorsement if any part payment is made and must be returned to us against final payment of our aggregate liability or on the date of the expiry of the guarantee in terms of Clause 6, whichever is the earlier.

Signed in the presence of the subscribing witnesses:

At ..... for and on behalf of .....

on this ..... day of .....

Signature : .....

Capacity: .....

Address: .....

As Witnesses:

1. .... Name in Block Letters .....

2. .... Name in Block Letters .....

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

**C1.6 TRANSFER OF RIGHTS**

**TRANSFER OF RIGHTS AND INDEMNITY**

(To be completed during construction by successful Tenderer only)

Claim for materials on site, Payment Certificate No. .... Date: .....

Contract No: ..... For (contract title) .....

I, the undersigned (name of signatory) ..... In my capacity as

..... of (name of Contractor) .....

duly authorised hereto on behalf of the Contractor hereby transfer, cede and assign all the Contractor's rights, title and interest in and to the materials and goods, for which evidence of bona fide ownership is attached hereto, unto and in favour of (name of Employer) .....

Insofar as the Contractor retains actual control of the materials and goods, the right of ownership thereof passes to the Employer by *constitutum possessorium*.

I herewith indemnify the Employer against any claim to and in respect of said materials by reason of the Contractor's sequestration or liquidation or of any defect in the Contractor's title to the materials and agree that no payment for materials on site will be made by the Employer until such time as I have submitted documentary proof of bona fide ownership of the said materials and goods.

This transfer shall become effective upon conclusion of the Contractor receiving payment from the Employer or from any other person on behalf of the Employer for the materials and goods as Materials on Site, payment of retention money thereon excluded.

I further confirm that I am fully responsible for all materials and goods listed under this Transfer of Rights and that they have been insured adequately against all risks and will remain insured until they are built into or used in the permanent works and taken over by the Employer.

**This certificate of Transfer of Rights applies only to the materials and goods as listed in the following table.**

DESCRIPTION OF ITEM	UNIT	QUANTITY	RATE	AMOUNT	SUPPLIER
TOTAL VALUE OF MATERIALS AND GOODS					

Signed by: ..... Date: .....  
for and on behalf of the Contractor.

Witnessed by: ..... Date: .....

NOTE: This form, together with the documentary proof of ownership or proof of payment by the Contractor to the supplier, shall accompany the Contractor's claim for payment for materials on site in terms of Clause 4.6.2 of the General Conditions of Contract 2015 3<sup>rd</sup> Edition.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION****HARRY GWALA DISTRICT MUNICIPALITY****GREATER SUMMERFIELD WATER SUPPLY SCHEME****CONTRACT NO: HGDM724/HGDM/2021****SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION****C2: PRICING DATA****C2.1 PRICING INSTRUCTIONS****1. GENERAL**

The Schedule 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, which include the Conditions of Tender, Conditions of Contract, the Specifications (including the Project Specifications) and the Drawings.

**2. DESCRIPTION OF ITEMS IN THE SCHEDULE**

The Conditions of Contract, the Contract Data, the Specifications (including the Project Specifications) and the Drawings shall be read in conjunction with the Bill of Quantities.

The Bill comprises items covering the Contractor's profit and costs of general liabilities and of the construction of Temporary and Permanent Works.

Although the Tenderer is at liberty to insert a rate of his own choosing for each item in the Bill, he should note the fact that the Contractor is entitled, under various circumstances, to payment for additional work carried out and that the Engineer is obliged to base his assessment of the rates to be paid for such additional work on the rates the Contractor inserted in the Bill. Clause 8 of each Standardized Specification, and the measurement and payment clause of each Particular Specification, read together with the relevant clauses of the Project Specifications, all set out which ancillary or associated activities are included in the rates for the specified operations.

The amounts and rates to be inserted in the Bill of Quantities shall be the full inclusive amounts to the Employer for the work described under the several items. Such amounts shall cover all the costs and expenses that may be required in and for the construction of the work described, and shall cover the costs of all general risks, profits, taxes (but excluding value-added tax), liabilities and obligations set forth or implied in the documents on which the Tender is based.

An amount or rate shall be entered against each item in the Bill of Quantities, whether or not quantities are stated. An item against which no amount or rate is entered will be considered to be covered by the other amounts or rates in the Bill.

The Tenderer shall also fill in a rate against the items where the words "rate only" appear in the amount column. Although no work is foreseen under these items and no quantities are consequently given in the quantity column, the tendered rates shall apply should work under these items actually be required.

Should the Tenderer group a number of items together and tender one sum for such group of items, the single tendered sum shall apply to that group of items and not to each individual item, or should he indicate against any item that full compensation for such item has been included in another item, the rate for the item included in another item shall be deemed to be nil.

The tendered rates, prices and sums shall, subject only to the provisions of the Conditions of Contract, remain valid irrespective of any change in the quantities during the execution of the Contract.

The quantities of work as measured and accepted and certified for payment in accordance with the

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

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Conditions of Contract, and not the quantities stated in the Bill of Quantities, will be used to determine payments to the Contractor. The validity of the Contract shall in no way be affected by differences between the quantities in the Bill of Quantities and the quantities certified for payment.

**Ordering of materials** are not to be based on the Bill of Quantities, but only on information issued for construction purposes.

For the purposes of this Bill of Quantities, the following words shall have the meanings hereby assigned to them:

Unit	:	The unit of measurement for each item of work as defined in the Standardized, Project or Particular Specifications
Quantity	:	The number of units of work for each item
Rate	:	The payment per unit of work at which the Tenderer tenders to do the work
Amount	:	The quantity of an item multiplied by the tendered rate of the (same) item
Sum	:	An amount tendered for an item, the extent of which is described in the Bill of Quantities, the Specifications or elsewhere, but of which the quantity of work is not measured in units

**3. QUANTITIES REFLECTED IN THE SCHEDULE**

The quantities given in the Schedule of Quantities are estimates only, and are subject to re-measure during the execution of the work. The quantities finally accepted and certified for payment, and not the quantities given in the Schedule of Quantities, shall be used to determine payments to the Contractor. The Contractor shall obtain the Engineer's detailed instructions for all work before ordering any materials or executing work or making arrangements for it. The quantities of material or work stated in the Schedule of Quantities shall not be regarded as authorisation for the Contractor to order material or to execute work.

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 Schedule of Quantities and the quantities finally certified for payment.

**4. PROVISIONAL SUMS**

Where Provisional sums or Prime Cost sums are provided for items in the Schedule 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 2015, 3<sup>rd</sup> Edition. 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 by the Employer in the "Amount" column of the Schedule of Quantities and in the Summary of the Schedule of Quantities unless ordered or authorised in writing by the Employer before closure of tenders. Any unauthorised changes made by the Tenderer to provisional items in the schedule, or to the provisional percentages and sums in the Summary of the Schedule of Quantities, will be treated as arithmetical errors.

**5. PRICING OF THE SCHEDULE OF QUANTITIES**

The prices and rates to be inserted by the Tenderer in the Schedule 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

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

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obligations set forth or implied in the documents on which the Tender is based.

Each item shall be priced and extended to the "Amount" column by the Tenderer, with the exception of the items for which only rates are required, or items which already have Prime Cost or Provisional Sums affixed thereto. If the Tenderer omits to price any items in the Schedule 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.

Should the Tenderer group a number of items together and tender one lump sum for such group of items, this single lump sum shall apply to that group of items and not to each individual item.

The tendered lump sums and rates shall be valid irrespective of any change in the quantities during the execution of the contract.

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.

Reasonable compensation will be received where no payment item appears in respect of work required in terms of the Contract which is not covered in any other pay item.

All rates and amounts quoted in the Schedule 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 Schedule of Quantities. Note that fractions of a cent in all rates shall be discounted.

**6. CONTINGENCY / PROVISIONAL SUMS**

The sum provided under contingency or Provisional Sums in the Bill of Quantity is under the sole control of the Employer and maybe deducted in whole or in part and shall only be expended by order of Employer as Variation Order. The use of Contingencies shall be upon approval by the **Executive Director, Infrastructure Services, Mr D.B. Makwakwa**

**7. CORRECTION OF ENTRIES**

Incorrect entries shall not be erased or obliterated with correction fluid but must be crossed out neatly. The correct figures must be entered above or adjacent to the deleted entry, and the alteration must be initialled by the Tenderer.

**8. INTERIM PAYMENTS**

Unless otherwise specified, progress payments in Interim Certificates, referred to in Clause 6.10.1 of the General Conditions of Contract 2015 3<sup>rd</sup> Edition, in respect of "sum" items in the Schedule of Quantities shall be by means of interim progress instalments assessed by the Engineer 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.

Notwithstanding any custom to the contrary, the work as executed will be measured for payment in accordance with the methods described in the contract documents under the various items of payment.

**9. UNITS OF MEASUREMENT**

The units of measurement described in the Schedule of Quantities are metric units. The following abbreviations are used in the Schedule of Quantities.



**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

mm	= millimetre	m <sup>3</sup> -km	= cubic metre-kilometre	Prov sum	= provisional sum
m	= metre	l	= litre	kPa	= kilopascal
km	= kilometre	kl	= kilolitre	MPa	= megapascal
km-pass	= kilometre-pass	kg	= kilogram	MN	= meganewton
m <sup>2</sup>	= square metre	t	= tonne (1 000 kg)	t-km	= tonne-kilometre
m <sup>2</sup> -pass	= square metre-pass	No.	= number	hr	= hour
ha	= hectare	%	= percent	dia	= diameter
m <sup>3</sup>	= cubic metre	PC sum	= prime cost sum	Sum	= lump sum
kW	= kilowatt	MN-m	= meganewton-metre		

**10. CONSISTENCY OF RATES**

In order to ensure that payments certified by the Engineer are reasonably consistent with the market value of the work done, and that variations in quantities do not distort the contract valuation, the rates, prices and amounts tendered in the Schedule of Quantities are required to be in balance.

A tender will be considered out of balance if:

- (i) The combined, extended total tendered for the item:

13.01 The Contractor's general obligations

- (a) Fixed obligations  
 (b) Value-related obligations  
 (c) Time-related obligations

exceeds a maximum of 15% of the Tender Offer (excluding contingencies, escalation and VAT).

- (ii) the rates, prices or amounts tendered for any other items differ by more than 20 (twenty) percent from either the next highest or next lowest rates, prices or amounts tendered, or else from the latest departmental estimates.

Any such unbalanced tender may be rejected if, after fourteen (14) days of having been given written notice by the Employer to adjust those rates or lump sums which are unreasonable or out of balance, the Tenderer fails to make the necessary satisfactory adjustments. These adjustments in rectification will be such that increases are balanced by decreases, leaving the tender offer unchanged.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT  
GREATER SUMMERFIELD PUMPSTATION**

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**C2.2. SCHEDULE OF QUANTITIES**

<u>TABLE OF CONTENTS</u>	Page
SCHEDULE OF QUANTITIES.....	PD 6
TENDER SUMMARY.....	PD 24

SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT  
GREATER SUMMERFIELD PUMPSTATION

Contract No.: HGDM724/HGDM/2020

Harry Gwala District Municipality

BoQ - BILL OF QUANTITIES

SUMMARY SHEET

SECTION	DESCRIPTION	AMOUNT
A	PRELIMINARY AND GENERAL	
B	SITE CLEARANCE & EARTHWORKS	
C	BEDDING & BACKFILL	
D	BUILDING WORKS	
E	MECHANICAL & ELECTRICAL WORKS	
F	MEDIUM PRESSURE PIPELINES AND FITTINGS	
G	MISCELLANEOUS	
I	DAYWORK (PROVISIONAL)	
	Sub-total	
	10% Contingencies (Provisional Sum)	
	Sub-total	
	VAT @ 15%	
	<b>TOTAL TENDERED SUM CARRIED TO FORM OF TENDER</b>	

## SECTION A: PRELIMINARY AND GENERAL

ITEM NO	PAYMENT REF.	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
<b>A</b>	<b>SABS 1200 A &amp; PSA</b>	<b><u>PRELIMINARY AND GENERAL</u></b>				
<b>A1</b>	<b>8.3</b>	<b>Fixed charge items</b>				
A1.1	8.3.1	Contractual Requirements (including Contract Works Insurance, sureties, UIF, etc.)	Sum	1		
A1.2	8.3.2	Provision for facilities on site				
A1.2.1		a) Facilities required by Contractor	Sum	1		
		i) Furnished airconditioned offices and storage sheds	Sum	1		
		ii) Ablution and latrine facilities	Sum	1		
		iii) Tools and equipment	Sum	1		
		iv) Water supplies, electric power and communications	Sum	1		
		v) Dealing with water	Sum	1		
		vi) Plant	Sum	1		
A1.2.2	8.3.2 (a)	b) Provision and erection of Contract Name Board as per HGDM standard specification approved by the Engineer	Sum	2		
A1.2.3	8.3.2.2	c) Facilities required by Engineer				
		i) Furnished airconditioned offices and storage sheds	Sum	1		
		ii) Ablution and latrine facilities	Sum	1		
		iii) Survey material	Sum	1		
		iv) Water supplies, electric power and communications	Sum	1		
		v) All weather access road and sheltered parking	Sum	1		
		vi) Laptop computer (Acer or HP or Apple or similar approved) 16GB RAM and A3 colour printer, including AutoCAD, MS Word, MS Excel and MS Projects software, 3G connection and digital camera	Sum	1		
A1.3	8.3.3	General responsibilities and other fixed charge obligations	Sum	1		
A1.4	8.3.4	Removal of site establishment on completion	Sum	1		
<b>A2</b>	<b>8.4</b>	<b>Time related items</b>				
A2.1	8.4.1	Contractual Requirements	weeks	28		
A2.2	8.4.2	Operate and maintaining of facilities on site				
A2.2.1		a) Facilities for Engineer	weeks	28		
A2.2.2		b) Facilities for Contractor	weeks	28		
<b>TOTAL AMOUNT CARRIED FORWARD</b>						

## SECTION A: PRELIMINARY AND GENERAL

ITEM NO	PAYMENT REF.	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
TOTAL AMOUNT BROUGHT FORWARD						
A2.3	8.4.3	General responsibilities and other time related obligations	weeks	28		
A3		Supervision				
A3.1		Provision of a local Community Liaison Officer (to be nominated by the Project Steering Committee)	Month	7		
A3.1.1		Contractor's Handling fee to Item Above.	%			
A3.2		Allowance for Health and Safety Officer	Sum	1		
A3.3		As-Built Information				
A3.3.1		Land survey, civil, structural, electrical, mechanical engineering inputs in the compilation and provision of as-built information and drawings to the Engineer as per District Municipality's requirements and specifications	P/Sum	1		
A3.4		Site Security				
		Provision of Site Security for the duration of the contract				
A3.4.1		a) Day shift personnel	Month			
A3.4.2		b) Night shift personnel	Month			
		Environmental Management				
A3.5		The sum shall cover the cost of all activities necessary to comply with Particular Specification for Environmental Management and the Environmental Management Plan, which have not been included in the tendered rates for the scheduled items allowed elsewhere in the bill of quantities.	P/Sum	1	R99 000,00	R 99 000,00
		Proving and Protection of existing services				
A3.6		a) Excavation by hand to prove, expose and protect existing services, pipes and other items as specified by Engineer	Sum			
A3.7		Allowance for training of local employees including transport and accommodation of trainees	P/Sum	1	R166 200,00	R 166 200,00
A3.8		General safety obligations and all costs related to compliance with the OHS Act	Sum			
A3.9		Allowance for Engineer's Witness Test	Sum			
Section total carried to summary page						

## SECTION F: SAFETY AND ACCESS WORKS

ITEM NO	PAYMENT REF.	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
<b><u>SITE CLEARANCE &amp; EARTHWORKS</u></b>						
B1	SANS 1200 C	SITE CLEARANCE				
B1.1	8.2.1	Clear and Grub: Pump station Area, Pipeline route, Access, Paving, Stormwater, Landscaping, including all areas where required as per scheduled items.	m <sup>2</sup>	7950		
<b><u>SANS 1200 D TOPSOILING AND GRASSING (WATER TREATMENT AREA)</u></b>						
Top soiling with material from stockpiles on site, including mixing in of compost, fertilizer, etc (supply of fertilizer, etc measured elsewhere) and						
B1.2		a) Spread over site	m <sup>3</sup>	525		
B1.3		b) Grassing or other vegetation, Hydroseeding, fertilizer and watering throughout as directed by Engineer	m <sup>2</sup>	3500		
TOTAL AMOUNT CARRIED FORWARD						

## SECTION F: SAFETY AND ACCESS WORKS

ITEM NO	PAYMENT REF.	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
TOTAL AMOUNT BROUGHT FORWARD						
B2	SANS 1200 D	EARTHWORKS				
B2.1		Earthworks (Pipe Trenches)				
	8.3.2	Excavation				
		a) Excavate in all materials for pipe trenches, backfill, compact and dispose of surplus / unsuitable material for pipes up to and including 900mm diameter in depths				
B2.1.1		i) 0m up to 1.5m deep	m <sup>3</sup>	3750		
B2.1.2		ii) 1.51m up to 2.5m deep	m <sup>3</sup>	450		
		b) Extra-over item (a) above for				
B2.1.3		i) Intermediate excavation	m <sup>3</sup>	420		
B2.1.4		ii) Hard rock excavation	m <sup>3</sup>	23		
		c) Excavate and dispose of unsuitable material				
B2.1.5		i) Soft and intermediate excavation	m <sup>3</sup>	840		
B2.1.6		ii) Hard rock excavation	m <sup>3</sup>	23		
TOTAL AMOUNT CARRIED FORWARD						

## SECTION F: SAFETY AND ACCESS WORKS

ITEM NO	PAYMENT REF.	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
TOTAL AMOUNT BROUGHT FORWARD						
B3	SANS 1200 DA					
B3.1		Earthworks (Small Works): Pump station				
	8.3.2	Excavation				
		a) Bulk excavation in all classes of material for proposed structures and spoil as directed by the Engineer (Rate to include for the shaping/trimming of embankments, shoring and dewatering):-				
B3.1.1		i) 0m up to 1.5m deep	m <sup>3</sup>	432		
B3.1.2		ii) 1.51m up to 2.5m deep	m <sup>3</sup>	62		
		b) Extra-over item (a) above for				
B3.1.3		i) Intermediate excavation	m <sup>3</sup>	121		
B3.1.4		ii) Hard rock excavation	m <sup>3</sup>	58		
		c) Excavate and dispose of unsuitable material from trench bottom				
B3.1.5		i) Soft and intermediate excavation	m <sup>3</sup>	48		
B3.1.6		ii) Hard rock excavation	m <sup>3</sup>	29		
Section total carried to summary page						



## SECTION F: SAFETY AND ACCESS WORKS

ITEM NO	PAYMENT REF.	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
<b>C</b>		<b><u>BEDDING &amp; BACKFILL</u></b>				
<b>C1</b>	<b>SANS 1200 LB</b>	Bedding & Backfill				
	<b>8.3.3.1</b>	Provision of bedding material from trench excavation;-				
C1.1		a) selected granular material	m <sup>3</sup>	588		
C1.2		b) selected fill material	m <sup>3</sup>	252		
C1.3		c) general on-site backfill material	m <sup>3</sup>	980		
		Provision of bedding material from borrow pits;-				
C1.4		a) selected granular material	m <sup>3</sup>	539		
C1.5		b) selected fill material	m <sup>3</sup>	441		
C1.6		c) general on-site backfill material	m <sup>3</sup>	245		
		Provision of bedding material from commercial sources;-				
C1.7		a) selected granular material	m <sup>3</sup>	59		
C1.8		b) selected fill material	m <sup>3</sup>	25		
C1.9		c) general on-site backfill material	m <sup>3</sup>	98		
		Soil Poisoning Soil insecticide in accordance with SANS 5859				
C1.10		Under floors etc including forming and poisoning shallow furrows against foundation walls etc, filling in furrows and ramming to bottoms and sides of trenches etc	m <sup>2</sup>	220		
Section total carried to summary page						

## SECTION F: SAFETY AND ACCESS WORKS

ITEM NO	PAYMENT REF.	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
<b>D BUILDING WORKS</b>						
D1	SANS 1200 GA	STRUCTURAL CONCRETE				
	8.2	Formwork The surfaces to be formed will as per the standard detail drawings for each component such as the foundation, base slab, walls, columns, beams, roof slab, etc.				
	8.2.1	a) Rough				
D1.1		i) Vertical sections	m <sup>2</sup>	90		
D1.2		ii) Soffit or Horizontal top sections	m <sup>2</sup>	50		
	8.2.2	b) Smooth				
D1.3		i) Vertical sections	m <sup>2</sup>	64		
D1.4		ii) Soffit or Horizontal top sections	m <sup>2</sup>	255		
	8.2.3	c) Narrow widths up to 300mm thick/wide				
D1.5		i) Horizontal sections - Beams	m	44		
	8.2.3	d) Narrow widths up to 500mm thick/wide				
D1.6		i) Horizontal sections - Beams	m	30		
	SANS 1200 H	Structural Steelwork				
	8.3.1	Steel Reinforcement Mild Steel Reinforcement up to 250Mpa Strength:-				
D1.7		a) Y16 mm steel bars	t	0,250		
D1.8		b) Y20 mm steel bars	t	0,250		
D1.9		c) Y25 mm steel bars	t	0,250		
	8.3.1	High Tensile Steel Reinforcement up to 500Mpa Strength:-				
D1.10		a) Y12 mm steel bars	t	5,000		
D1.11		b) Y16 mm steel bars	t	3,000		
D1.12		c) Y20 mm steel bars	t	1,500		
	8.3.2	High-Tensile Steel Welded Mesh. Reinforcing Steel cut and bent:-				
D1.13		a) Ref 193 welded steel mesh (5.6mm Diameter)	t	0,275		
D1.14		b) Ref 395 welded steel mesh ( 8mm Diameter)	t	0,200		
D1.15		c) Ref 617 welded steel mesh (10mm Diameter)	t	0,200		
TOTAL AMOUNT CARRIED FORWARD						
PD11						

## SECTION F: SAFETY AND ACCESS WORKS

ITEM NO	PAYMENT REF.	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
TOTAL AMOUNT BROUGHT FORWARD						
D2	8.3.2	Concrete Works  Concrete (Structural), Class 35 Mpa (19mm Stone), for Non-Water Retaining Structures preferably Ready Mix				
D2.1		a) Supply and place 250 mm thick reinforced 30/19 raft foundation complete, include 3 no. of pump plinths (2800x976x450mm) and 450mm high MCC platform	m <sup>3</sup>	42		
D2.2		b) Concrete at 300mm Thick Roof	m <sup>3</sup>	42		
D2.3		c) Concrete steps throughout Water Treatment Plant with reinforcement inclusive to be installed on site as directed by Engineer and specification. Width at 1350mm. Rate to be inclusive for completion of the item and finishes. Slope to suit Natural Ground Level and approved by Engineer.	m <sup>3</sup>	39		
	8.4.3	Surface Finishes				
D2.4		Unformed surface finish				
D2.5		a) Wood float finish	m <sup>2</sup>	300		
D2.6		b) Steel float finish	m <sup>2</sup>	120		
		c) Screed on slab surface	m <sup>2</sup>	120		
D3	SANS 1200 GE	Precast Concrete Units				
		Route Markers (at least 0.5m below and 1m above surface/finished level):-				
D3.1		Suction Pipeline Route Markers at Bends location	No	2		
D3.2		Rising Main Pipeline Route Markers	No	3		
D3.3		Isolating Valve (IV) Chambers	No	1		
D3.4		Air Valve (AV) Chambers	No	2		
D3.5		Scour Valve (SV) Chambers	No	1		
		Junction Manhole Rings, Frames & Covers				
		1m Diameter Ring (0.5m Sections), Frame & Cover. Item all inclusive.				
D3.6		a) Light Duty	No	2		
D3.7		b) Heavy Duty	No	2		
		2m Diameter Ring (0.5m Sections), Frame & Cover made from grating to allow water at the top. Item all inclusive.				
D3.8		a) Light Duty	No	1		
D3.9		b) Heavy Duty	No	1		
TOTAL AMOUNT CARRIED FORWARD						
PD12						

## SECTION F: SAFETY AND ACCESS WORKS

ITEM NO	PAYMENT REF.	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
TOTAL AMOUNT BROUGHT FORWARD						
D4	SANS 1200 GB	BUILDING  Undertake buildings as per the National Building Regulations and Building Standards in accordance with the requirements and specifications of the National Home Builders Registration Council (NHBC). Also in accordance with or meet District Municipality requirements and specifications: Refer to project drawings :-  Pump House Engineering Brick building complete as per contract drawings. The pump house shall be founded in a platform with Load Bearing Capacity able to withstand loads from the steel reinforced concrete roof slab, I-Beam or H Crawl Beam, Brick Walls, Concrete Floor Slab, Generator, Motors, Pumps, Pipework, Delivery Trucks, etc.  <u>Note:</u> Concrete works, steel reinforcement and				
D4.1		a) 230mm thick engineering brick with a 110mm thick 25/19 Mesh Ref. 688 concrete infill walls	m <sup>2</sup>	170		
D4.2		Doors Supply and install 1.83 m wide by 2.8 m high galvanized steel doorway complete with frame, cut out for crane beam, upper and lower bolt locking mechanism and spring closing mechanism.	No	1		
D4.3		Stainless Steel Fixed louvre units including frame  Supply and install natural anodised aluminium fixed louvre Size 900 x 745mm	No	14		
D4.4		Rainwater Downpipe Supply and cast into concrete roof slab 100mm diameter vertical type full bore outlet complete with 110mm uPVC downpipe extending down to tie into the new 110mm diameter stormwater pipe	No	4		
D4.5		Waterproofing protection (Roof): 19-25 mm crushed stone dressing evenly spread with larger stones around outlets: a) 50 mm thick on waterproofing to flat roofs	m <sup>2</sup>	50		
D4.6		Handrails Supply and install galvanized "Mentis" type handrailing as specified by Engineer throughout Water Treatment Plant, Pump station, pedestrian access walkway, complete with 3 m wide gate on the upper story of the building.	m	250		
TOTAL AMOUNT CARRIED FORWARD						
PD14						

## SECTION F: SAFETY AND ACCESS WORKS

ITEM NO	PAYMENT REF.	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
TOTAL AMOUNT BROUGHT FORWARD						
D5	SANS 1200	STEELWORK (SUNDRY ITEMS) Steel Specialists (Pump Station) Manufacture and supply the following metal special construction materials as per the Engineers instruction or contract drawings or Departmental Specification, etc. These must be customer made to suit the operation or project:-				
D5.1		a) Manhole/Junction chamber steel cover & frame	No	5		
D5.2		b) Locking mechanism supplied with suitable keys as per WSA and WSP specification Supply and install the following items complete as per the Drawings	No	5		
D5.3		(a) Hot dipped galvanised mild steel ventilators	No	5		
D5.4		(b) Manufacture and supply hot dipped galvanised mild steel access ladder on chambers and manholes - length to suit as per Drawings	No	5		
D5.5	PSL6	Pipe supports Supply and installed Grade 300W fully galvanized pipe support using 50mm x 50mm x 5mm thick equal leg steel angle sections and 12mm treaded hoop as per drawings. The rate shall include drilling, installation and fastening using M16 fasteners.	No	9		
D5.6		Crane, Gantry and Steel Beam Supply and fully install 9.2m long Crawl Beam (I-Section) bolted inside the pump house on a purpose built 2X (fixed on the floor) Frames Support mechanism (as shown on the drawing, including hoist chain to handle minimum of 2 tonnes weight:-	No	1		
D5.7		Cable Trenches, Sumps and Drainage Channel Supply and install hot dipped galvanized seating angle assembly 30 x 30 x 2.5mm galvanised mild steel angle iron cast into concrete with 25 x 5mm flat 100mm long fishtail anchor.	m	40		
D5.8		Supply and install 40 x 40 x 25 x 4.5mm wide galvanised mild steel standard manhole "Rectagrid" type RS40 to: (a) 500 x 500mm square opening for drain sump in pump station	No	2		
D5.9		(b) 400 mm wide for cable trenches in pump station	m	15		
D5.10		(c) 400 mm wide for drainage channel	m	10		
D5.11		(d) 2000 mm Diameter drainage manhole	No	1		
Section total carried to summary page						

## SECTION H: MECHANICAL WORKS

ITEM NO	PAYMENT REF.	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
E	SABS 1200 L	<b><u>MECHANICAL &amp; ELECTRICAL WORKS</u></b>  <i>All rates to include for supply, welding, fabrication, procure, delivery, store, install, fitment, testing &amp; commissioning.</i>				
E1		Pump and Motor				
E1.1	PPS2	Supply, deliver and install approved pump to suit duty point of 180m <sup>3</sup> /h at 310m head with minimum 78% efficiency or better. Complete with packing, nuts, bolts fixed onto pump plinth as per Drawing and Specification.	No.	3		
E1.2	PPS3	Supply, deliver and connect 250kW, 2-Pole Electric motor, or other similar approved. Include heaters, thermistors.	No.	3		
E1.3	PPS4	Pump and motor base sets including flexible coupling and guard complete with nuts, bolts, holding down bolts, and all shimming, packing, alignment, grouting and casting in.	No.	3		
TOTAL AMOUNT CARRIED FORWARD						
PD16						

## SECTION H: MECHANICAL WORKS

ITEM NO	PAYMENT REF.	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
TOTAL AMOUNT BROUGHT FORWARD						
	PS2.1.3	<u>ELECTRICAL WORKS</u>				
E1.4	PPS10	Motor Control Centre Design, manufacture, testing at works, deliver by road transport, erect, and commission a floor standing industrial pattern motor control centre suitable for the control of three 250 kW motors. Each motor to have it's own separate section. Inclusive of soft start and automatic stop timer and VSDs.	Sum	1		
E1.5		Supply and Design of shop drawings for Mechanical & Electrical components specified. Inclusive of operating manuals.	Sum	1		
E1.6		Cabling Design, supply, deliver, install and connect the supply cable from the Eskom Transformer to the motor control centre. Allow main cable suitably rated with an earth core.	Sum	3		
E1.7		Design, supply, deliver, install and connect the supply cable from the motor control centre to the pump motors. The lock nut system is not to be employed.	Sum	3		
E1.8		Design, supply, deliver, install and connect all lighting fittings from the motor control centre to the each switch and lights. The price is to include for the required cable glands and lugs.	Sum	3		
E1.9		Field Equipment - include for any necessary cabling and trunking A Distribution board section is to be installed in the main MCC for small domestic power and shall have an isolator; 30mA earth leakage 20A unit for plugs, 2 x 10A circuit breakers for lights and a manual override for the daylight sensor to operate the external lamp.	Sum	1		
TOTAL AMOUNT CARRIED FORWARD						
PD17						

## SECTION H: MECHANICAL WORKS

ITEM NO	PAYMENT REF.	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
TOTAL AMOUNT BROUGHT FORWARD						
E1.10		Supply and install an industrial pattern surface mounting 2 X 2 single lever one way light switches to operate the interior lights in MCC and pump station. It is to be coloured white.	No.	3		
E1.11		Supply and install a wall mounted IP 55 switched socket outlet complete with a matching plug. The unit is to be single phase rated for a current rating of 16 Amps.	No.	3		
E1.12		Supply, deliver and install dust proof 1.5m x 2 double tube industrial pattern fluorescent light fittings complete with power factor correction capacitors.	No.	5		
E1.13		Supply, deliver and install an 80 Watt high pressure mercury bulk head IP55 exterior light fitting. It is to be installed on the exterior wall above the service door of the MCC and the pump station.	No.	5		
E1.14		Supply, deliver and install a 16 Amp day light switch. The day light switch is to be housed in a poly carbonate IP55 enclosure fitted with a transparent cover. The enclosure is to be fitted with DIN rail and the required three terminals. It is to be mounted on the exterior wall opposite to the service door.	Sum	2		
E1.15		Gauges Supply, deliver and install a 100 mm diameter pressure gauge housed in a stainless steel enclosure. The gauge is to be fitted with two adjustable contacts, and is to be scaled 0 to 40000 kPA. It is to be suitable for a maximum over pressure of 50000 kPA. It is to be filled with silicon. The pressure gauge is to be fitted with a rear mounting flange and a bottom 1/2" BSP male connection complete with a stop cock. It is to be mounted on a 20 mm thick 250 x 250 mm meranti base installed on the wall next to the switchgear. A label with 25 mm lettering is to be fixed to the base with the inscription "DELIVERY PRESSURE".	No.	4		
E1.16		Supply, deliver and install a 100 mm diameter pressure gauge housed in a stainless steel enclosure. It is to be scaled -100 to 16000 kPA. It is to be suitable for a maximum over pressure of 20000 kPA. It is to be filled with glycerine. The pressure gauge is to be fitted with a rear mounting flange and a bottom 1/2" BSP male connection complete with a stop cock. It is to be mounted on a 20 mm thick 250 x 250 mm meranti base installed on the wall next to the switchgear. A label with 25 mm lettering is to be fixed to the base with the inscription "SUCTION PRESSURE".	No.	4		
TOTAL AMOUNT CARRIED FORWARD						
PD18						



## SECTION H: MECHANICAL WORKS

ITEM NO	PAYMENT REF.	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
TOTAL AMOUNT BROUGHT FORWARD						
E1.17		No-flow switch Supply, deliver and install No-flow switch on suction pipe fitting between the valve and the pump. Rate to include for any necessary supports that may be required for installation and electrical connection.	No.	3		
E1.18	PS2.1.3	Emergency switch Supply, deliver and install Emergency Push Button Stops on pedestals next to Pumps and Motors. Rate to include for any necessary supports that may be required.	No.	3		
	PS2.1.3	Earthing and Lightening Protection The following items must be installed by an accredited earthing and lightening sub-contractor. The sub-contractor shall produce all necessary certificates as are required:				
E1.19		Supply and install a suitable earthing system to the Pump Station. Earthing system to comprise of copper rods and 70mm Ø copper wire linking rods. The earthing system shall also be connected to the Eskom transformer earth leads.	No.	3		
E1.20		Supply and install a suitable lightening protection system to the Pump Station. Where possible, installation is to be concealed to prevent theft of the lightening protection system.	No.	3		
E1.21		Variable Speed Drives Supply, connect and install VSDs to control running philosophy of the three 250kW pumps, in line with overall operating philosophy from WTW to Command Reservoir. Rate inclusive of cables and other accessories.	No.	3		
E1.22		Instrumentation & Telemetry Manufacture, supply, install, connect, calibrate, commission, Telemetry System and SCADA Computerised System in order to ensure remote water supply scheme operation. The infrastructure shall be complete including compilation of operating manuals and provision of training to the WSP or scheme operators. Inclusive of hardware and software and all required water scheme operating and control switches to ensure smooth operation under all conditions possible.	Sum	1		
E1.23		Diesel Generator 500 KW Diesel Genset. Supply, install and connect with all accessories, including plinth, security detail, generator control to be connected to pumps to start automatically in case of Eskom power cuts.	No.	1		
Section total carried to summary page						
PD19						

## SECTION I: MEDIUM PRESSURE PIPELINES AND FITTINGS

ITEM NO	PAYMENT REF.	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
F	SABS 1200 L	<b>MEDIUM PRESSURE PIPELINES AND FITTINGS</b>				
F1		Preparation of Shop Detail Drawings				
F1.1	PS2	Measure on site; Provide shop detailed drawings and construction methodology to the Engineer for approval	Sum	2		
F2	3.4 & PSL1.3	Suction Pipeline from WTW				
		<i>Manufacture and supply 350mm Diameter PN16 Steel Pipe and fittings complete with flanges, inner lining and exterior coating, length to suit site, EN1092-2. The rates should include manufacture, delivery to site, flanges, gaskets, flange packing, hot-dipped galvanised nuts, bolts and washers, (Flanged to SANS 1123 - Table 1600/3):</i>				
F2.1		Pipe 355mm dia x 8.0mm DFL steel pipe at PN16 wall thickness. Rate to include for bolts, nuts and gaskets and dense wrapping (Table 4000). Rates inclusive of bends and other accessories.	m	210		
F2.2		Item 1 - Class 16, DN125-DN250. Flanged Eccentric Reducer Connected and Bolts to suit Pump Inlet	No	3		
F2.3		Item 2 - Class 16, DN250. F.O.E 90 Degree Short Steel Bend Welded into Spool piece also F.O.E	No	3		
F2.4		Item 3 - Class 16, DN250. F.B.E. Gate Valve with Hand-Wheel.	No	3		
F2.5		Item 4 - Class 16, DN250. Flange adaptor to Steel Pipe Spool Piece	No	3		
F2.6		Item 5 - Class 16, DN250. Puddle pipe 1175mm Long Welded One End into item (6)	No	3		
F2.7		Item 6 - Class 16, DN350 - DN250. F.B.E. Steel Reducing Tee. 350x250. (Allow blank flange for one Tee)	No	3		
F2.8		Item 7 Class 16, DN350. F.B.E. Steel Spool Piece Length to Suit Site Measurement	No	2		
F2.9		Item 8 Class 16, DN350. F.B.E. Gate Valve with Hand-Wheel.	No	1		
F2.10		Item 9 Class 16, DN350. Flange Adaptor	No	1		
F2.11		Item 9A - F.B.E 350x200 Reducing Tee with Spool piece as shown on drawing	No	1		
F2.12		Item 9B - F.B.E DN200 Gate valve with handwheel	No	1		
F2.13		Item 10 Class 16, DN350. F.B.E. Steel 2 x Spool Piece Pipes Welded and Connected to 45 Degree Bends as Shown, With Allowance for Pressure Gauge Installation	No	1		
F2.14		Item 10 Class 16, DN350. F.B.E. Steel 2 x Spool Piece Pipes Welded and Connected to 45 Degree Bends as Shown, With Allowance for Pressure Gauge Installation	No	1		
TOTAL AMOUNT CARRIED FORWARD						
PD20						

## SECTION I: MEDIUM PRESSURE PIPELINES AND FITTINGS

ITEM NO	PAYMENT REF.	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
TOTAL AMOUNT BROUGHT FORWARD						
F3	3.4 & PSL1.3	Delivery Pipeline from WTW  <i>Manufacture and supply 350-200mm Diameter PN40 Steel Pipe and fittings complete with flanges, inner lining and exterior coating, length to suit site. EN1092-2. The rates should include manufacture, delivery to site, flanges, gaskets, flange packing, hot-dipped galvanised nuts, bolts and washers, (Flanged to SANS 1123 - Table 1600/3):</i>				
F3.1		Pipe 350mm dia x 10.0mm DvFL steel pipe at PN40 wall thickness. Rate to include for bolts, nuts and gaskets and dense wrapping (Table 4000). Rates inclusive of bends and other accessories.	m	240		
F3.2		Item A - DN100 - 200 Flanged Concentric Reducer.	No	3		
F3.3		Item B - DN200 F.B.E. Globe-Style Check Valve	No	3		
F3.4		Item C - Class 40, DN200, F.B.E. Gate Valve with Hand-Wheel.	No	3		
F3.5		Item D - Class 40, DN200, 90 Degree Short Steel Bend Welded Item (E)	No	3		
F3.6		Item E - Class 40, F.B.E. Steel Reducing Tee, DN350x200. (Allow blank flange for one Tee)	No	3		
F3.7		Item F - Class 40, DN350 F.B.E. Steel Spool Piece length to suit site measurement	No	2		
F3.8		Item G - Class 40, DN350 F.B.E. Steel Spool Piece with allowance for Pressure Gauge Installation, DN50 Air Valve and Ultrasonic Water Meter	No	1		
F3.9		Item H - Class 40, DN50 Double-Acting Anti-Surge Air Valve assembly fitted as shown	No	1		
F3.10		Item I - Class 40, DN350 FBE Tilting disc non-return valve	No	1		
F3.11		Item F1 - Class 40, Pressure gauge with readings up to PN50 fitted onto Item (G)	No	3		
F3.12		Item J - 45 Degree Bends fitted as shown on the drawing	No	1		
F3.13		Item K1 - F.B.E DN200x100 Reducing Tee	No	1		
F3.14		Item K2 - DN200 Class 40 Flanged Surge Anticipation Valve	No	1		
F3.15		Item K3 - F.B.E DN100 90 Degree Bend with spool piece fitted onto item K5 (flange adaptor)	No	1		
F3.16		Item K4 - F.B.E DN100 90 Degree Bend with F.B.E spool piece	No	1		
F3.17		Item K6 - F.B.E DN100 90 Degree Bend fixed onto scouring flanged spool piece	No	1		
F3.18		Item L - F.B.E DN350 Spool piece	No	1		
F3.19		Item M1 - F.A.E 350x200 Y-Reducing piece (Angle = 45 Deg)	No	1		
F3.20		Item M2 - Cl.40 DN200 Flanged Gate Valve	No	2		
F3.21		Item M3 - F.B.E DN200 45 Degree Bend	No	2		
Section total carried to summary page						

## SECTION L: MISCELLANEOUS

ITEM NO	PAYMENT REF.	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
<b>G</b>		<b>MISCELLANEOUS</b>				
G1.1		Dealing with water	Sum	1		
G1.2	PP57	Testing and commissioning of the pump station and supplying of a complete test certificate.	Sum	1		
G1.3.1		Testing, Reseal and Disinfection of 2ML Command Reservoir according to Specification.	P/Sum	1	R 200 000,00	R 200 000,00
G1.3.2		COMMAND RESERVOIR FENCE & GATE				
G1.3.2.1		a) Supply and install (Rates all inclusive) 2,03m H x 2.5m W coated, high tensile panels of Clearview fence; with 76x12mm Arpeture, spikes, associated square poles including all materials for stabilising, concrete support, etc.	m	600		
G1.3.2.2		Supply steel gates (stainless steel or hot dipped galvanised steel): a) 5m wide gate	No.	1		
G1.4		Testing and Disinfection of 6.6km PN40 Steel pipe DN200mm according to Specification.	P/Sum	1		
G2	SABS 1200 M	ROAD & PARKING PAVEMENT LAYERS (also Pedestrian such as Wheelchair Ramps)				
G2.1		Construct 150mm thick G9 selected layer, natural gravel with CBR of 7 or greater, with material from commercial sources, place and compact to 93% Modified AASHTO density in 150mm layers	m <sup>2</sup>	225		
G2.2		Process selected layer material by the following processes and use in the subbase:- a) heavy grid rolling	m <sup>2</sup>	225		
G2.3		b) mechanical modification	m <sup>2</sup>	225		
G2.3		Pavement layers, Crushed gravel subbase layer (C4) compacted to 96% modified AASHTO density (Minimum of G6 before treatment)	m <sup>2</sup>	225		
G2.4		Chemical Stabilising Agent: Portland blast-furnace cement CEM 11 B-S	t	15		
G2.5		Constructed from Type G2 material obtained from commercial sources and compacted to 96% MOD ASSHTO, 150 mm thick	m <sup>2</sup>	300		
G2.6		MC-30 cut-back bitumen	litre	1070		
G2.7		Aggregate for binding	m <sup>2</sup>	1500		
G2.8		Asphalt surfacing (30 mm thick with 60/70 pen. Bitumen)	m <sup>2</sup>	1500		
TOTAL AMOUNT CARRIED FORWARD						
PD22.1						

## SECTION L: MISCELLANEOUS

ITEM NO	PAYMENT REF.	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
TOTAL AMOUNT BROUGHT FORWARD						
G3	SABS 1200 LE	STORMWATER DRAINAGE				
		Precast Concrete Pipes				
G3.1	8.2.1	Supply and lay concrete pipe culverts on class C bedding material including jointing.				
G3.2		a) 375mm Diameter	m	50		
G3.3	8.2.4	Extra-over for cutting end units for culverts on site				
G3.4		a) Straight cut	No	1		
G3.5		b) Skew cut	No	1		
		Brick Manholes and Kerb Inlets or Catch pits (both Inlet & Outlet)				
	8.2.8	Supply and install manholes				
		a) Manholes				
G3.6		i) Brick manhole to depth of 1m to 1.5m	No	5		
G3.7		ii) Brick manhole to depth of 1.51m to 2.5m	No	4		
		Brick Headwalls (both Inlet & Outlet)				
	8.2.8	Supply and install headwalls				
		a) Headwalls				
G3.8		i) Brick headwall to depth of 1m to 1.5m	No	5		
G3.9		ii) Brick headwall to depth of 1.51m to 2.5m	No	4		
		Sub-Soil Drainage				
G3.10		Construct subsoil drain including a 1.5m deep x 1m wide, 160mm diameter pipe, granular bedding, geofabric membrane etc. as per standard detail drawing	m	300		
		WTW FENCE & GATE				
G3.11		a) Supply and install (Rates all inclusive) 2.03m H x 2.5m W coated, high tensile panels of Clearview Betafence; with 76x12mm Arpelure, spikes, associated square poles including all materials for stabilising, concrete support, etc.	m	800		
		Supply steel gates (stainless steel or hot dipped galvanised steel)				
G3.12		a) 1.5m wide pedestrian gates	No.	1		
G3.13		b) 5.0m wide vehicular gates	No.	1		
TOTAL AMOUNT CARRIED FORWARD						

## SECTION L: MISCELLANEOUS

PD22.2						
ITEM NO	PAYMENT REF.	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
TOTAL AMOUNT BROUGHT FORWARD						
G4		GENERAL				
		Carports				
G4.1		Supply and install permanent carport to accommodate 4 cars. All steel poles to be galvanised. Minimum dimensions are 2.4m high and 3m x 6m for each car. Rate all inclusive for all costs associated such as painting.	Sum	1		
		Fire Fighting Equipment (At Pump station)				
		a) Safety : Fire Fighting Equipment - according to the Health & Safety Act Standard requirements:-				
G4.2		i) Fire Extinguisher: standard size cylinder	No	4		
G4.3		ii) Signage and operating manuals	Sum	2		
G4.4		iii) 50mm Wall-Mounted Fire Hose	m	30		
		High Mast Lights				
G4.5		20m High Mast Light - according to Department of Energy (DOE) minimum standard, founded on concrete stand or foundation. To be LED High Mast light with an automatic on/off control mechanism	No	1		
	SABS 1200GA	RETAINING WALL				
G4.6	8.6	Construct Loffelstein retaining wall using L500 and L300 blocks with rock face finish. Rate to include 300mm wide granular drainage layer, 110mm diameter drainex agricultural drainage pipe and geofabric (bidum A1 or similar approved), to foundation, wall and toe drain.	m <sup>2</sup>	80		
		GUARD HOUSE				
G4.7		Construct brick guard house as specified on the drawing, to be located 1m away from the main gate.	Sum	1		
		STAFF OFFICE FURNITURE				
G4.8		Supply and Install furniture for Staff Office as specified by the Operations and Maintenance lead policy	P/Sum	1	R90 000,00	R 90 000,00
Section total carried to summary page						
PD22.3						

## SECTION B: DAYWORK (PROVISIONAL)

ITEM NO	PAYMENT REF.	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
	SABS 1200 A & PSA6	<u>DAYWORK (PROVISIONAL)</u>				
11	1200 AA	General (Small Works)				
11.1	8,5	Labour				
11.1.1		Skilled	days	100,00		
11.1.2		Semi-skilled	days	100,00		
11.1.3		Unskilled	days	200,00		
12	8,5	<u>Plant</u>				
12.1		4 x 4 TLB or similar ; Type..... KW.....(to be filled in by Tenderer)	hrs	100,00		
12.2		Excavator: Type..... KW.....(to be filled in by tender)	hrs	100,00		
13		<u>Other</u>				
13.1	PPS7.1.2	Setting out	Sum	1		
Section total carried to summary page						

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

**HARRY GWALA DISTRICT MUNICIPALITY**

**GREATER SUMMERFIELD WATER SUPPLY SCHEME**

**CONTRACT NO: HGDM724/HGDM/2021**

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

**SUMMARY OF SCHEDULE OF QUANTITIES**

Section	Description	Amount R c
A	PRELIMINARY AND GENERAL	
B	SITE CLEARANCE & EARTHWORKS	
C	BEDDING & BACKFILL	
D	BUILDING WORKS	
E	MECHANICAL & ELECTRICAL WORKS	
F	MEDIUM PRESSURE PIPELINES AND FITTINGS	
G	MISCELLANEOUS	
I	DAYWORK (PROVISIONAL)	
	<b>SUBTOTAL (A)</b>	
	ADD: 10% CONTINGENCIES	
	<b>SUBTOTAL (A) + (B)</b>	
	ADD: VAT @ 15%	
	<b>TOTAL CARRIED TO FORM OF OFFER (Page CD3)</b>	

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

Date: .....

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



**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

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**HARRY GWALA DISTRICT MUNICIPALITY**

**GREATER SUMMERFIELD WATER SUPPLY SCHEME**

**CONTRACT NO: HGDM724/HGDM/2021**

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND  
MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

**PART C3: SCOPE OF WORKS**

The Project Specifications, consisting of four parts, form an integral part of the contract and supplement the Standardised Specifications.

**Part 1** contains Project Specifications and the requirements to be met.

**Part 2** contains reference to the Standardised Specifications.

**Part 3** contains variations, amendments and additions to the Standardised Specifications.

**Part 4** contains Particular Specifications for aspects of the works for which there are no Standardised Specifications per se.

In the event of any discrepancy between a part or parts of the Standardised Specifications and the Project or Particular Specifications, the Project and Particular Specifications shall take precedence.

In the event of a discrepancy between the Specifications (including the Project Specifications), the Bill of Quantities and the Drawings, the Specifications take precedence, thereafter the Bill of Quantities and thereafter the Drawings.

In all events, any discrepancies whatsoever shall be brought to the attention of the Engineer before the execution of the work under the relevant items.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

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**Part 1: Project Specifications****PS 1 General Description**

The Greater Summerfield Water Treatment Works is located on the crest of a prominent hill approximately 1.5km east of Clydesdale and 4.5km south east of UMzimkhulu.

The proposed 6M<sup>3</sup>/D PN40 pump station and is to be located next to the Water Treatment Works in construction, approximately 200m. The pump station will receive water from Water Treatment Works via a steel gravity pipeline, then pump it to existing 200mmØ 6.6km long PN40 steel D/FL 4.5mm wall thickness rising main pipeline connected to existing 2M<sup>3</sup> balancing reservoir.

**PS 2 Details of Contract****PS2.1.2 Civil and Mechanical:-**

This contract comprises:

- The manufacture, supply, delivery to site, installation and commissioning of the following equipment:
  - 3 x pumping units (KSB WKLn or Similar Approved), each with a delivery capacity of 180 m<sup>3</sup>/h at a head of 310 m.
  - 3 x 250 kW Electric Motors directly coupled to the pumping units.
- Associated pipework with necessary fittings and valves.
- Connection of pipework at water treatment works outlet and at the existing rising main, including at the 2M<sup>3</sup> Reservoir.
- Pump house and Standby Generator
- Testing and disinfection of existing rising main pipeline.
- Design and supply of "as built drawings and operation manuals" and training of operators and staff.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

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**PS2.1.3 Electrical:-**

- Supply and installation of cables from existing supply points to a proposed Motor Control Centre (MCC) inside the pump station building.
- Design, supply and installation of a complete MCC to ultimately control 3 x 250 kW motors.
- Supply and installation of the low voltage cables connecting the transformers with the MCC and the MCC to the electric motors.
- The pumps are to be started by means of soft starters and timers for automatic shut-down located in the MCC.
- Supply and installation of Variable Speed Drives (VSDs) to ensure that pumps yield total 2M<sup>3</sup>/d, which will be increased to 6M<sup>3</sup>/d when the Greater Summerfield Water Supply Scheme is completed and in full operation.
- Supply and installation of control cabling to field equipment in and around the pump station such as pump control valves, water meters, no-flow switches and emergency stops etc
- Internal and external lighting and earthing according to specifications
- Cable Racking where needed
- Supply and installation of relevant Eskom Transformer
- Design and supply of "as built drawings and operation manuals" and training of operators and staff.

**PS2.2 Balancing Reservoir Testing**

The works for the 2M<sup>3</sup> Balancing Reservoir include:

- o Testing and disinfection of existing 2M<sup>3</sup> Reservoir and associated 6km rising main.
- o Connection, Testing and Supply of Associated communication Instrumentation mechanism including but not limited to Telemetry, Shut-off valves, Level Sensors etc to ensure full automated operation of the rising main, from WTW, pump station and reservoir.
- o Supply and install coated, high tensile panels of Clearview fence; with 76x12mm Arpeture, spikes, associated square poles including all materials for stabilising, concrete support.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

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**PS2.3 Miscellaneous Scope of Works at WTW**

The works at WTW includes but not limited to:

- o Road & Parking Pavement Layers (Also Pedestrian Such as Wheelchair Ramps)
- o Stormwater Drainage
- o Supply and install coated, high tensile panels of Clearview fence; with 76x12mm Arpeture, spikes, associated square poles including all materials for stabilising, concrete support.
- o Supply and install permanent carport to accommodate 4 cars.
- o Supply and Install 20m High Mast Light - according to Department of Energy (DOE) minimum standard, founded on concrete stand or foundation. To be LED High Mast light with an automatic on/off control mechanism
- o Construct brick guard house as specified on the drawing, to be located 1m away from the main gate.
- o Provide full furniture to the staff compound.

**PS 3 Location of Site and Access to the Site**

The project is located on the crest of a prominent hill approximately 1.5km east of Clydesdale and 4.5km south east of UMzimkhulu.

**PS 4 Condition of Soil**

The Contractor will encounter excavations in soft material and boulders. A geotechnical investigation has been done for the Water Treatment Works. The Contractor is to make his own assessment of conditions where this impacts on his rates at the pump station.

**PS 5 Site Facilities Available****PS5.1 Water Supplies**

Water for general purposes is available from the UMzimkhulu River. Drinking water may be available from the Water Treatment facility but is entirely the responsibility of the Contractor.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

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**PS5.2 Electricity**

Electricity is not available on site, and the Contractor will have to make his own arrangements to suit his requirements.

**PS5.3 Locations Of Camp And Depot**

The Contractor's camp and depot shall be located on site at a position to be agreed with the Engineer.

**PS5.4 Accommodation**

The Contractor will be required to provide his own accommodation, storage, security and ablution facilities on site.

**PS 6 Site Facilities Required**

There is no provision for an Engineer's office on site; however the Contractor must ensure that a suitable meeting room is available on site for the monthly progress meetings.

**PS6.1 Testing Equipment**

Concrete test cubes will be called for from all concrete pours and suitable cube moulds must be provided for as well as facilities for identifying and storing test cubes. These test cubes must be crushed and reported on by an approved laboratory.

Suitable testing equipment will be required on site to test for compaction density. Testing can be carried out using a "Troxler" type nuclear probe. Any equipment used on site must have valid calibration certificates. The Engineer may call for sand replacement tests to verify the compaction results.

**PS 7 Preservation of Environment**

Damage to the environment and vegetation on site, in the vicinity of the works and outside of the sites, must be kept to a minimum. No hunting, fishing, disturbing, capturing or destroying of any birds or animals is allowed. All firearms are prohibited from site unless with the express permission of the employer for security purposes.

The Contractor will have to comply with the Environmental Management Plan (EMP).

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

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**PS 8 Construction Programme**

The maximum construction programme for this contract is 24 weeks.

The Contractor must indicate in the Tender Document that he has sufficient staff and construction equipment to meet the above programme.

**PS 9 Insurance**

The contract works insurance shall be arranged by the Contractor and must include for insurance of the Works and of all materials on the Site intended for incorporation in the Works against damage or physical loss from whatsoever cause arising except the causes set out in Clause 32.3 of the General Conditions of Contract for Construction Works (2004).

**PS 10 Applicable Standardised Specifications**

Specifications published by the South African Bureau of Standards (SABS/SANS), series 1200 (Standardised Specifications for Civil Engineering Construction) shall apply.

Your attention is brought to the following specifications:-

- SABS 1200 A: General
- SABS 1200 C: Site Clearance
- SABS 1200 DA: Earthworks
- SABS 1200 GA: Concrete
- SABS 1200 H: Structural Steelwork
- SABS 1200 HC: Corrosion Protection of Structural Steelwork
- SABS 1200 L: Medium Pressure Pipelines

In general, all electrical work shall comply with the relevant SANS/SABS specifications for workmanship and material. Where no SANS/SABS specification exist, the applicable BS, DIN or IEC specification shall be applicable. All Steel flanges are to comply with SANS1123 in line with specified minimum pressure/class rating requirements.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

**PS 11 DRAWINGS****PS 11.1 Drawings Prepared by Engineer**

The drawings listed at the back of this report have been prepared and issued by the Engineer.

The drawings issued to tenderers during the tender period must be regarded as provisional and preliminary in order to enable the tenderers to generally assess the scope of work.

At the commencement of the contract, the Engineer shall deliver to the Contractor copies of the construction drawings and any instructions required for the commencement of the works. From time to time thereafter during the progress of the works, the Engineer may issue further drawings for construction purposes as may be necessary for adequate construction, completion and defects correction of the works. The work shall be carried out in accordance with the latest available revision of the drawings.

All drawings and specifications and copies thereof remain the property of the Employer, and the Contractor shall return all drawings and copies thereof to the Employer at the completion of the contract.

**PS 12 CONSTRUCTION AND MANAGEMENT REQUIREMENTS****PS 12.1 General**

The Contractor is referred to SANS 1200A: General for Construction and Management Requirements for Works Contracts. Certain aspects however require further attention as described hereafter.

**PS 12.2 Management and disposal of water (Read with SANS 1200A sub-clause 5.5)**

The Contractor shall pay special attention to the management and disposal of water and storm water on the site. It is essential that all completed works or parts thereof are kept dry and properly drained. Claims for delay and for repair of damage caused to the works as a result of the Contractor's failure to properly manage rain and surface water, will not be considered.

**PS 12.3 Disposal of spoil or surplus material (Read with SANS 1200A sub-clause 5.6)**

The Contractor shall dispose all surplus and unsuitable material in designated spoil areas.

**PS 12.4 Testing (Read with SANS 1200A clause 7)**

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

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

**PS 12.5 Management of the Environment**

An Environmental Management Programme (EMPr) was compiled as part of the process of obtaining environmental authorisation for this project. The environmental authorisation for this project was obtained on 22 March 2016 (Department of Economic Development, Tourism and Environmental Affairs reference number DC43/0013/2015). It is noted that the requirements of the EMPr must therefore be borne in mind when tendering and pricing for this contract. A copy of the EMPr can be made available to the Tenderers should they wish to peruse it during the tender period. The appointed Contractor will be provided with a copy of the environmental authorisation and the EMPr before the commencement of construction.

The Contractor's initial costs for complying with the EMPr as well as all costs to maintain compliance with the EMPr and the environmental authorisation for the duration of the construction period are to be included in the Sums tendered.

**PS 12.6 Security**

The Contractor must ensure that all his/her employees as well as the employees of his/her subcontractors are able to identify themselves as members of the construction team.

**PS 13 CONSTRUCTION PROGRAMME****PS 13.1 Preliminary programme**

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

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

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

**PS 13.2 Programme in terms of Clause 5.6 of General Conditions of Contract (2015)**

It is essential that the construction programme, which shall conform in all respects to Clause 5.6 of the General Conditions of Contract (2015), be furnished within the time stated in the Contract Data. The preliminary programme to be submitted with the tender shall be used as basis for this programme. The Contractor's attention is also drawn to clause 5.7 of the General Conditions of Contract 2010.



**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

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The Contractor shall indicate on the programme all critical path activities. In this regard, the Contractor's attention is drawn to Clause 5.12.1 of the General Conditions of Contract (2015), where consideration will only be given to claims for extension of time associated with critical path activities.

Activities must be broken down into sufficient detail so that it is possible to make an accurate assessment of the actual progress of work in relation to programme at any time.

The Contractor must submit a written progress report together with a copy of the approved construction programme (Gantt Chart) marked up with the current status line for the Engineer's approval at least 48 hours in advance of each formal site meeting. Such meetings will be held at no longer than monthly intervals.

**PS 14 SITE FACILITIES AVAILABLE**

At the commencement of the contract, the Employer shall make a portion of land on the site available to the Contractor for the purposes of setting up his site camp and storage area.

There is no drinking water available at the site of the Works. The Contractor shall therefore make his own arrangements for the provision of drinking water for his staff. Any costs associated with this will be deemed to have been allowed for in the Contractor's rates and no additional payment for the provision of drinking water on site will therefore be entertained by the Employer.

Water for construction purposes will be available from the uMzimkhulu River. Any costs associated with the transfer of the water from the uMzimkhulu River to the site of the Works shall be for the Contractor's account. No wastage of water by the Contractor will be tolerated.

There are no sanitation facilities present at the site of the Works. The Contractor is therefore to provide sufficient on-site ablution facilities for his staff and visitors to the site in the form of portable chemical latrines. The Contractor will be responsible for the maintenance and servicing of these facilities for the duration of the contract and will ensure that all latrines are maintained in a clean and sanitary working condition. The Contractor shall also be responsible for removing the latrines on completion of the Contract.

Electricity for construction purposes will not be available on site and the Contractor will therefore be required to make his own arrangements for the provision of power for construction purposes. Any costs associated with the provision of power on site for construction purposes as well as for the provision of power to any office buildings on site shall be for the Contractor's account.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION****PS 15 OCCUPATIONAL HEALTH AND SAFETY****PS 15.1 General Statement**

It is a requirement of this contract that the Contractor shall provide a safe and healthy working environment and direct all his activities in such a manner that his employees and any other persons, who may be directly affected by his activities, are not exposed to hazards to their health and safety. To this end the Contractor shall assume full responsibility to conform to all the provisions of the Occupational Health and Safety Act No 85 of 1993 (OHS Act) and the Construction Regulations 2014 issued on 17 February 2014 as amended by the Department of Labour.

The Contractor will implement an integrated Safety Health and Environment system (SHE). The environmental management unit and staff will however function separately from the SHE staff and functional area. SHE staff will act as environmental inspectors as part of their health and safety inspections and safety representatives appointed as per the OHS act will also act as environmental representatives.

For the purpose of this contract, the Contractor is referred to **Particular Specification PA – Health and Safety**. The purpose of this Specification is to ensure that Principal Contractors entering into a contract with the Employer maintain a level of performance with regard to health and safety issues during the performance of the contract that is in complete compliance with the relevant Health and Safety Regulations. In this regard the OHS Specifications form an integral part of the Contract and the Principal Contractor shall ensure that their contractors and/or suppliers comply with the requirements of this Specification.

**PS 15.2 Health and Safety Plan**

The Contractor shall, on receipt of notification that he has been awarded the contract, submit his own detailed Health and Safety Plan for the execution of the work under the contract. His Health and Safety Plan must at least cover the following:

- (i) a proper risk assessment of the works, risk items, work methods and procedures in terms of Regulations 7 to 28;
- (ii) pro-active identification of potential hazards and unsafe working conditions;
- (iii) provision of a safe working environment and equipment;
- (iv) statements of methods to ensure the health and safety of subcontractors, employees and visitors to the site, including safety training in hazards and risk areas (Regulation 5);
- (v) monitoring health and safety on the site of works on a regular basis, and keeping of records and registers as provided for in the Construction Regulations. During the monitoring, a record of any environmental matters requiring attention will also be recorded.
- (vi) details of the Construction Supervisor, the Construction Safety Officers and other competent persons he intends to appoint for the construction works in terms of Regulation 6 and other applicable regulations; and

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

---

- (vii) details of methods to ensure that his Health and Safety Plan is carried out effectively in accordance with the Construction Regulations 2014.

The Contractor's Health and Safety Plan will be subject to approval by the Employer, or amendment if necessary, before commencement of construction work. The Contractor will not be allowed to commence work, or his work will be suspended if he had already commenced work, before he has obtained the Employer's written approval of his Health and Safety Plan.

Time lost due to delayed commencement or suspension of the work as a result of the Contractor's failure to obtain approval for his safety plan, shall not be used as a reason to claim for extension of time or standing time and related costs.

**PS 15.3 Cost of Compliance with the OHS Construction Regulations**

The rates and prices tendered by the Contractor shall be deemed to include all costs for conforming to the requirements of the Act, the Construction Regulations and any specific Health and Safety requirements of the Employer, as applicable to this contract. Should the Contractor fail to comply with the provisions of the Construction Regulations, he will be liable for penalties as provided for in the Construction Regulations.

**PS 16 WORKS INSPECTION REQUIREMENTS**

The works will be inspected on a monthly basis by an environmental specialist (appointed by the Employer) to ensure compliance with the Environmental Management Programme. The works will also be inspected on a monthly basis by a Health and Safety specialist (appointed by the Employer) to ensure that workers and working conditions comply with the relevant safety requirements.

The works will also be inspected on a regular basis by the Engineer to ensure compliance with the standards, specifications, drawings and details, safety and security etc. all in accordance with the contract.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION****Part 2: Standardised Specifications**

The standardised specifications on which this contract is based are **Standards South Africa's Standardised Specifications for Civil Engineering Construction SANS 1200**.

*(Note: "SABS" has been changed to "SANS", without change to the contents of the specifications).*

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:

SANS 1200 A	:	General
SANS 1200 AA	:	General (small works)
SANS 1200 AB	:	Engineer's office
SANS 1200 C	:	Site clearance
SANS 1200 D	:	Earthworks
SANS 1200 DA	:	Earthworks (small works)
SANS 1200 DB	:	Earthworks (pipe trenches)
SABS 1200 DE	:	Small earth dams
SANS 1200 DK	:	Gabions and pitching
SANS 1200 G	:	Concrete (structural)
SANS 1200 GA	:	Concrete (small works)
SABS 1200 HA	:	Structural steelwork (small works)
SANS 1200 L	:	Medium-pressure pipelines
SANS 1200 LB	:	Bedding (pipes)
SANS 1200 LC	:	Cable ducts
SANS 1200 LD	:	Sewers
SANS 1200 LE	:	Stormwater drainage

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

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**Part 3: Variations to Standardised Specifications****PSA GENERAL****PSA 1 SCOPE (1)**

*Replace sub-clause 1.1, including the notes, with the following:*

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

**PSA 2 INTERPRETATIONS (2)****PSA 2.1 Definitions (2.3)****(a) Measurement and payment (c)**

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

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

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

**PSA 3 MATERIALS (3)****PSA 3.1 Quality (3.1)**

*Add the following:*

"No used or recycled material may be used in the Works unless expressly authorized by the Engineer.

Where applicable, materials are to bear the official standardisation mark.

Samples of concrete aggregates and pipe bedding material are to be delivered to an approved laboratory.

Where proprietary materials are specified it is to indicate the quality or type of materials or articles required and where the terms "or other approved" or "or similar approved" are used in connection with proprietary materials or articles, it is to be understood that the approval shall be at the sole discretion of the Engineer.

**PSA 3.2 Ordering of materials (New sub-clause 3.3)**

*Add new sub-clause 3.3 to clause 3:*

"The quantities set out in the Bill of Quantities have been determined from calculations based on data available at the time and should therefore be considered as approximate quantities

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

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only. The liability shall rest entirely and solely with the Contractor to determine before ordering, the required types and quantities of the various materials required for the completion of the Works in accordance with the Project Specifications and the Drawings issued to the Contractor for construction purposes.

Any reliance placed by the Contractor on the estimated quantities stated in the Bill of Quantities issued for tendering purposes, or measurements made by the Contractor from the drawings issued for tendering purposes, shall be entirely at the Contractor's risk, and the Employer accepts no liability whatever in respect of materials ordered by the Contractor on the basis of Tender Documents."

**PSA 4 PLANT (4)****PSA 4.1 Silencing of Plant (4.1)**

Alter the reference to the "Machinery and Occupational Safety Act, 1983 (Act 6 of 1983)" to "Occupational Health and Safety Act, 1993 (Act 85 of 1993)".

**PSA 4.2 Contractor's Office, Stores and Services (4.2)**

*Add the following paragraph before the existing first paragraph in sub-clause 4.2:*

"The Contractor's buildings, sheds and other facilities erected or utilised on the Site for the purposes of the Contract shall be fenced off and shall contain all offices, stores, workshops, testing laboratories, toilet facilities, etc. as may be required by the Contractor. The facilities shall always be kept in a neat and orderly condition. All roadways and pathways inside the enclosed area shall be treated to make them dust free and negotiable under all weather conditions, either with crushed stone, gravel or other approved means.

No personnel may reside on the Site. Only night-watchmen may be on the Site after hours."

*Add the following to the first paragraph of sub-clause 4.2:*

"Stores erected by the Contractor shall be suitable for storing materials for the various sub-contractors engaged on this Contract. Such stores may be combined as one store or separate as the Contractor deems necessary."

**PSA 4.3 Completion of Works (New sub-clause 4.3)**

*Add new sub-clause 4.3 to clause 4:*

"On completion of the Works, or as soon as facilities provided by the Contractor under sub-clause 4.2 are no longer required, the Contractor shall remove those facilities and clear surface indications of their presence, such that these areas are reinstated to their original condition. The Contractor is to allow for any costs associated with returning these areas to their original state within his tendered rates."

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

**PSA 5 CONSTRUCTION (5)****PSA 5.1 Protection of Structures (5.3)**

Alter the reference to the "Machinery and Occupational Safety Act, 1983 (Act 6 of 1983)" to "Occupational Health and Safety Act, 1993 (Act 85 of 1993)".

**PSA 5.2 Safety (5.7)**

*Re-title this sub-clause "HEALTH AND SAFETY" and replace the contents of this sub-clause with:*

"All work under this Contract shall be carried out in terms of the Occupational, Health and Safety Act, 1993 (Act No. 85 of 1993) and shall be subject to its Construction Regulations, 2014 as well as any Health and Safety Specifications contained within the Project Specifications for this contract."

**PSA 5.3 Ground and Access to Works (5.8)**

*Add to the sub-clause:*

"On completion of operations the Contractor shall restore the ground surface, wherever it may have been disturbed, to its original condition by filling in all 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."

**PSA 6 MEASUREMENT AND PAYMENT (8)****PSA 6.1 Scheduled Fixed Charge and Value Related Items (8.3)*****PSA 6.1.1 Contractual Requirements (8.3.1)***

*Add to the description:*

"The Contractor's initial costs for complying with the Construction Regulations, 2014 of the Occupational, Health and Safety Act (Act 85 of 1993) shall be included in the Sum tendered."

***PSA 6.1.2 Establishment of Facilities on Site (8.3.2)******PSA 6.1.2.1 Facilities for the Engineer (8.3.2.1)***

*Re-title the sub-clause "Office Facilities for the Engineer" and add the following:*

"Office facilities to be provided for the Engineer and his assistant shall include two desks with draws, two chairs of adjustable height, two steel stationery cupboards, an A0 size plan table, two drawing racks with hangers, a photocopier/fax machine, a telephone with internet access facilities, an air conditioning unit, a refrigerator, an electric kettle, a tea set and window blinds."

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

**PSA 6.2 Scheduled Time Related Items (8.4)*****PSA 6.2.1 Contractual Requirements (8.4.1)***

*Add to the description:*

"The Contractor's time related costs for complying with the Construction Regulations, 2014 of the Occupational, Health and Safety Act, 1993 (Act 85 of 1993) shall also be included in the Sum tendered."

***PSA 6.2.2 Accredited Training***

The sum tendered under this item shall allow for the Contractor's cost involved in paying for accredited off site training of local employees including transport to the training venue and accommodation of trainees and shall be paid in monthly instalments.



**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

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**PSAB ENGINEER'S OFFICE****PSAB 1 SCOPE (1)****PSAB 1.1 Sub-clause 1.1**

*Replace the clause with:*

"This specification covers the requirements for offices, be it prefabricated, semi prefabricated, mobile or semi-mobile and associated facilities for the Engineer's supervisory staff on Site, including the provision of the necessary structures, services and all arrangements in connection with the land on which the facilities are to be provided.

**PSAB 2 MATERIALS (3)****PSAB 2.1 Name boards (3.1)**

*Add the following to this clause:*

"The Contractor will be required to supply 2 name boards for construction purposes under this contract. The name boards shall be erected at the commencement of construction at locations indicated by the Employer. The tendered rate shall include for the supply and erection of the nameboards at the positions indicated by the Employer, maintenance of the name boards for the duration of the construction period as well as for the removal of the name boards from site upon completion.

In addition, the Contractor is to also supply a permanent signboard for the Greater Summerfield Pumpstation as well as permanent signage to ensure compliance with the OHS Act, for erection upon completion of construction. Separate provisional sums have been included within the BOQ for these items."

**PSAB 2.2 Office Buildings (3.2)**

*Replace the contents of sub-clause 3.2 with:*

"All buildings provided by the Contractor shall be considered as temporary by nature and may be of fully or partially prefabricated construction. The Contractor shall supply and furnish one air-conditioned "Kwikjack" or similar approved (6m x 3m) office for the use of the Engineer and his/her staff, and one air-conditioned "Kwikjack" or similar approved (9m x 3.4m) conference facility for conducting meetings with kitchen space provided.

In addition, a shelter, at least 12 m long x 5 m deep and 2.1 m high, constructed of timber frame with 80% shade cloth fixed to the top and to 3 sides, adequately sized to house four motor vehicles, shall be provided. The shade cloth at the sides shall extend to no more than 1.5 m above the finished ground level. The floor of the shelter shall be finished with a gravel layer or crushed stone."

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

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**PSAB 2.3 Engineer's Accommodation (New clause 3.3)**

"Accommodation for the Engineer and his assistant shall be required under this Contract.

Accommodation for the Engineer and his assistant shall consist of the following: An accommodation unit of two separate single bedrooms, a toilet, a shower and an open plan lounge/dining room/kitchen area. All windows to have curtaining and mosquito netting.

**PSAB 3 PLANT (4)****PSAB 3.1 Telephone (4.1)**

*Replace the contents of the sub-clause with:*

"The Contractor shall be required to provide telephone communication including Internet access at the Engineer's office. In addition, the Contractor shall provide a cellphone for sole use by the Engineer for the duration of the construction period with a minimum monthly allowance of R1000 per month."

**PSAB 4 CONSTRUCTION (5)****PSAB 4.1 Survey Assistants (5.5)**

*Delete the first sentence and substitute the following:*

"The Contractor shall make available to the Engineer two suitably trained and educated labourers for use on and about the site on survey and other work directed by the Engineer at all reasonable times."

**PSAB 4.2 Survey Equipment (New sub-clause 5.6)**

*Add new sub-clause:*

"The Contractor shall at least provide the following survey equipment on the Site from the commencement to the completion of the Works:

- One automatic levelling Engineer's level plus tripod;
- One levelling staff (4m long, 1 cm gradations);
- Two tachometric staffs (5 m long, 1cm chess-board pattern);
- One spirit level (one metre long);
- One hammer (2kg);
- Two canvas carry-bags;
- One 100 m steel tape;
- One 30 m steel tape;
- One 5 m steel tape;

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

The survey equipment may be shared by arrangement between the Contractor and the Engineer or his representative on Site. The Contractor shall keep the equipment continuously insured against any loss, damage, or breakage and he shall indemnify the Engineer and the Employer against any claims in this regard. Upon completion of the Works, the survey equipment as listed above shall revert to the Contractor."

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

**PSD EARTHWORKS****PSD 1 INTERPRETATIONS (2)****PSD 1.1 Definitions (2.3)**

*Replace the definition "Borrow" with the following:*

"Borrow material: Material, other than material obtained from excavations required for the Works, obtained from sources such as borrow pits or the authorized widening of excavations. 'Borrow' shall have a corresponding meaning."

*Replace the definition "Specified density" with the following:*

"Specified density: The specified dry density expressed as a percentage of modified AASHTO dry density."

*Replace the definition "Stockpile" with the following:*

"Stockpile (Verb): The process of selecting and, as may be necessary, loading, transporting and off-loading material in a designated area for later use and specific purpose."

*Add the following definitions:*

"Fill: An embankment or terrace constructed from material obtained from excavations or borrow."

Fill (material): Material used for the construction of an embankment or terrace."

**PSD 2 MATERIALS (3)****PSD 2.1 Classification for Excavation Purposes (3.1)*****PSD 2.1.1 Method of classifying (3.1.1)***

*Add the following:*

"Classification of material other than 'soft excavation' shall be agreed upon before excavation may be commenced.

The Contractor shall immediately inform the Engineer when the nature of the material being excavated changes to such an extent that a new classification is warranted for further excavation. Failure on the part of the Contractor to advise the Engineer in good time shall entitle the Engineer to reclassify, at his discretion, such excavated material."

***PSD 2.1.2 Classes of Excavation (3.1.2)***

*Delete sub-clause 3.1.2 b) as no separate classification for intermediate materials will be permitted.*

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

**PSD 3 CONSTRUCTION (5)****PSD 3.1 Safeguarding of Excavations (5.1.1.2)**

*Delete the first paragraph of this and replace with the following:*

"a) The Contractor or his agent or representative appointed in writing by the Contractor shall be deemed to be the 'competent person' as defined in Clause 13(1) of the Construction Regulations, 2014.

**PSD 3.2 Soil Erosion Measures (New sub-clause 5.1.1.4)**

"Care shall be taken during construction to ensure that free flow paths are maintained in all drains, gutters and waterways. Special precautions shall be taken by the Contractor not to change existing conditions by leaving spoil in waterways. The Contractor shall be responsible throughout the duration of the Contract for the construction and maintenance of all soil erosion preventative measures necessary to protect the land utilised by the Contractor during the Contract from any adverse effects of soil erosion, settlement, scour etc., resulting from the construction activities."

**PSD 3.3 Methods and Procedures (5.2)*****PSD 3.3.1 Excavation (5.2.2)***

*Add to b):*

"Where outside shuttering is ordered by the Engineer, excavation of not more than 600 mm over the outside dimensions of the structure shall be deemed necessary for the fixing of outside formwork. This extra excavation and refilling, up to 600 mm wide, where necessary is to be measured and paid for under quantities allowed for this purpose in the Bill of Quantities. Outside shuttering shall be used for the construction of all major structures unless ordered otherwise by the Engineer."

*Delete the first sentence of c) and replace with:*

"Each excavated surface on which or against which a permanent concrete structure will be placed shall be trimmed to ensure that there is no projection greater than 20 mm into the excavated profile."

**PSD 4 MEASUREMENT AND PAYMENT (8)****PSD 4.1 Scheduled Items (8.3)*****PSD 4.1.1 Bulk Excavation (8.3.2)***

*Remove all references to "intermediate excavation" or "intermediate material" from sub-clause b).*

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

***PSD 4.1.2 Restricted Excavation (8.3.3)***

*Remove all references to "intermediate excavation" or "intermediate material" from sub-clause b)*

***PSD 4.1.3 Grassing (8.3.11)***

*Delete sub-clause 8.3.11 and replace with:*

"Approved grass shall be planted after topsoiling has been completed, with the tufts being spread at not more than 150 mm centres. The planted areas shall be kept neatly trimmed, fertilised and watered. The Contractor shall ensure that the planted areas are kept moist and do not dry out. Any grass that fails to grow shall be replaced by the Contractor, at his expense, with fresh grass until satisfactory cover is obtained. The rate shall cover the cost of supplying the grass and the labour for planting and maintaining the grass in accordance with this Specification."

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

**PSDB EARTHWORKS (PIPE TRENCHES)****PSDB 1 MATERIALS (3)****PSDB 1.1 Backfill Material (3.5)**

*In the third line of a) substitute "100 mm" for "150 mm".*

**PSDB 1.2 Selection (3.7)**

*Delete the second sentence and substitute the following:*

"The Contractor is not required to use selective methods of excavating but may do so at his own cost. The Contractor shall however, if so instructed by the Engineer, screen or otherwise treat excavated material in order to produce material suitable for bedding or covering or both bedding and covering for the pipeline."

**PSDB 2 CONSTRUCTION (5)****PSDB 2.1 Soil Erosion Measures (New sub-clause 5.1.2.4)**

"Care shall be taken during construction to ensure that free flow paths are maintained in all drains, gutters and waterways. Special precautions shall be taken by the Contractor not to change existing conditions by leaving spoil in waterways. The Contractor shall be responsible throughout the duration of the Contract for the construction and maintenance of all soil erosion preventative measures necessary to protect the pipelines and land utilised by the Contractor during the Contract from any adverse effects of soil erosion, settlement, scour etc., resulting from the construction of the pipelines."

**PSDB 2.2 Barricading, Signage, Watching and Lighting (New sub-clause 5.1.5)**

"While the responsibility for the efficient barricading, signage, lighting and watching of all trenches and stacks of materials shall rest upon the Contractor, he shall be required to make the following minimum provisions.

Barricading shall be done by means of at least two pieces of horizontal double sided 'red/white' chevron tape, or equivalent as approved by the Engineer. The tape shall be stretched tightly between suitable supports along both sides and ends of the excavation at approximately 0,45 m and 1,25 m above the ground. The supports shall consist of poles or steel fencing standards securely planted in solid ground so as to enclose the spoil material and the excavations and shall be at not more than 10 m centres, unless directed otherwise by the Engineer.

The Contractor shall make available on Site at all times a sufficient number of steel plates at least 2 m x 1,2 m x 8 mm thick which may be laid across open excavated trenches to provide bridges for vehicles along the route of the work as and where considered necessary by the Engineer."

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

**PSDB 2.3 Backfilling (5.6)*****PSDB 2.3.1 General (5.6.1)***

*Add to this sub-clause:*

"Notwithstanding the requirements of sub-clauses 5.6.1 and 5.6.6 of SANS (SABS) 1200 DB, no pipe joint or pipe fitting shall be covered by either the blanket fill or the main fill prior to the successful completion of the visual inspection and the pressure testing of the relevant section of the pipeline."

***PSDB 2.3.2 Disposal of Soft Excavation Material (5.6.3)***

*Replace the sub-clause with:*

"Soft excavation material from the trench, which is unsuitable or has become surplus because of bulking, displacement by the pipe and importation, shall be disposed of along the trench servitude, at designated spoil areas or approved spoil areas furnished by the Contractor, as applicable. The requirements of SANS 1200D shall apply to overhaul and to free haul for the disposal of surplus excavated material."



**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

**PSG CONCRETE (STRUCTURAL)****PSG 1 MATERIALS (3)****PSG 1.1 Cement (3.2)*****PSG 1.1.1 Applicable Specifications (3.2.1)***

Unless agreed to otherwise by the Engineer, the cement used on the Works shall be CEM 1, grade 42.5 complying with the requirements of SANS (SABS EN 197-1) 50197-1:2000/EN 197-1:2000.

***PSG 1.1.2 Storage of Cement (3.2.3)***

*Add to the sub-clause:*

"Cement shall not be kept in storage for longer than three weeks without the Engineer's permission. The cement store shall be run on a first in, first out basis."

**PSG 1.2 Aggregates*****PSG 1.2.1 Use of Plums (3.4.2)***

The use of plums will not be permitted, unless agreed to by the Engineer.

**PSG 1.3 Admixtures (3.5)**

Unless approved by the Engineer, neither admixtures nor air-entraining agents shall be used in any concrete.

**PSG 2 PLANT (4)****PSG 2.1 Formwork (4.5)*****PSG 2.1.1 Ties (4.5.3)***

*Add to the sub-clause:*

"The water tightness requirement of the structure shall be taken into account when deciding upon the type of tie to be used. The cover requirement will apply to ties left permanently in place.

No plugs, bolts, ties or clamps of any description used to hold the formwork will be allowed to project into or through the concrete unless expressly approved by the Engineer.

Only approved ferrules consisting of solid rods (that remain embedded in the concrete) and with removable ends shall be used to hold the formwork of the walls. The removable tie-rod ends shall facilitate removal without damage to the concrete, and no permanently embedded parts of such tie-rods shall have less than 50 mm of cover to the finished concrete surface.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

The cavities left in the concrete when the tie-rod end cones are removed shall be soundly caulked with a cement mortar to which an approved non-shrink grout has been added strictly in accordance with the manufacturer's specifications, and shall be neatly finished to a smooth surface uniform with that of the surrounding concrete.

The cost of supplying special tie-rods as well as the filling of cavities left by the tie-rod cones shall be included in the rates tendered for formwork under the appropriate payment items.

On no account shall formwork be secured to reinforcing bars."

**PSG 3 CONSTRUCTION (5)****PSG 3.1 Reinforcement (5.1)*****PSG 3.1.1 Bending (5.1.1)***

*Add to the sub-clause:*

"Reinforcement shall be cut with cropping or shearing equipment only. Cutting torches shall not be used."

***PSG 3.1.2 Fixing (5.1.2)***

*Add to the sub-clause:*

"No welding of reinforcement will be permitted."

**PSG 3.2 Formwork (5.2)*****PSG 3.2.1 Classification of Finishes (5.2.1)***

*Delete Clause 5.2.1(b) and replace with:*

"This finish shall be obtained by the use of steel-faced forms arranged in a regular pattern to fit the appearance of the structure. After stripping, all small fins, bulges and other projections shall be removed, surface honeycombing, surface discolorations and other irregularities repaired and the surface rubbed to form a smooth finish of uniform texture and colour. The finish shall be to Degree of Accuracy 1 tolerances defined in Clause 6.2.2 and 6.2.3."

*Add to the sub-clause 5.2.1 (c):*

"The quality of the formwork to the external surfaces shall fall within the "Special" category and shall be such that no after-treatment e.g. rubbing down, other than the sealing of ferrule holes (which themselves shall be placed with precision in a regular pattern) will be necessary. The formwork used shall be unblemished and erected in a regular pattern so that the joints shall be a feature of the finished surface which shall be to Degree of Accuracy 1 tolerances as defined in Clauses 6.2.2 and 6.2.3."

SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION

---

**PSG 3.2.1.1 Removal of Formwork (5.2.5.2)**

*Rephrase the first two lines to read:*

"For this purpose and except as allowed in 5.2.5.3, the formwork shall remain in place, after all the concrete has been placed in the relevant lift, for the appropriate minimum period of time given in Table 2."

**PSG 3.3 Holes, Chases and Fixing Blocks (5.3)**

*Add to this sub-clause:*

"Fixing blocks for the attachment of fixtures may be embedded in concrete if the strength or any other desirable feature (such as appearance) is not, in the opinion of the Engineer, impaired thereby."

**PSG 3.4 Chamfers (New sub-clause 5.5)**

"Unless otherwise noted on the drawings, all exposed corners and arises shall be chamfered 25 x 25 mm."

**PSG 3.5 Concrete (5.5)**

**PSG 3.5.1 Quality (5.5.1)**

**PSG 3.5.1.1 Consistency (5.5.1.2 (b))**

*Delete the paragraph (b) and substitute the following:*

(b) by the Engineer in respect of prescribed mix and strength concrete, or

**PSG 3.5.1.2 Durability (5.5.1.5)**

*Add to the sub-clause:*

"The exposure conditions at the site of the works are to be considered as being severe."

**PSG 3.5.1.3 Prescribed Mix Concrete (5.5.1.6)**

*Delete the fourth to tenth lines inclusive from the sub-clause and substitute the following:*

"The grades of prescribed mix concrete are designated Grades 20, 15 and 10 and are composed of cement, sand and stone, as specified herein before, proportioned as listed in the accompanying table.

Grade (MPa)	Size of stone (mm)	Cement (kg)	Sand (m <sup>3</sup> )	Stone (m <sup>3</sup> )
20	19	50	0.11	0.14
15	19	50	0.13	0.16
10	37.5	50	0.16	0.22

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

While the proportion of cement to the combined quantity of sand and stone must remain constant for each grade of concrete, as set out in the table, the relative proportions of sand and stone are to be adjusted if required by the Engineer, so as to attain the most suitable consistency of concrete, due allowance being made for the bulking of sand due to moisture.

The addition of water shall be regulated by the use of properly calibrated containers, only sufficient water being added as will in the opinion of the Engineer, afford a workable mix.

The fine and coarse aggregate approved for use in strength concrete Grades 30 and 25 are to be used for prescribed concrete mixed Grades 20 and 15.

**PSG 3.5.1.4 Strength Concrete (5.5.1.7)**

*Replace the contents of the sub-clause with:*

"The grades of strength concrete are designated Grades 30 and 25 and are composed of cement, sand and stone, as specified herein before, proportioned as listed in the accompanying table.

Grade (MPa)	Size of stone (mm)	Cement (kg)	Sand (m <sup>3</sup> )	Stone (m <sup>3</sup> )
30	19	50	0.080	0.110
25	19	50	0.095	0.125

The concrete mixes for Grade 30 and 25 concrete shall be designed by the Portland Cement Institute's laboratory nearest to the site of the Works, or another competent laboratory approved by the Engineer. At least three weeks before placing any strength concrete on the Works, the Contractor shall supply and deliver to a laboratory at his own cost, samples of the aggregates he proposes to use in the strength grade concrete. While the proportion of cement to the combined quantity of sand and stone must remain constant for each grade of concrete, as set out in the table, the relative proportions of sand and stone may be adjusted to achieve the requirements of this Specification.

**PSG 3.5.2 Mixing (5.5.3)**

**PSG 3.5.2.1 Ready Mixed Concrete (5.5.3.2)**

*Delete the first sentence and substitute the following:*

"Concrete produced at a central concrete production facility other than at the site of the Works shall only be accepted for use in the Works with the prior and express approval of the Engineer. When such approval has been given, the Engineer shall then decide whether or not to accept the test results obtained by the facility concerned."

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

***PSG 3.5.3 Placing (5.5.5)******PSG 3.5.3.1 Dropping Concrete Freely (5.5.5.5)***

*Replace the contents with:*

"Dropping concrete freely will only be permitted if the Engineer is satisfied that this is the only practical method of placing."

***PSG 3.5.3.2 Pumping of Concrete (5.5.5.9)***

*Delete the sub-clause 5.5.5.9 and substitute the following:*

"The placing of concrete by pumping will not be permitted."

***PSG 3.5.3.3 Blinding Layer (New sub-clause 5.5.5.10)***

"Beneath all structural grades of concrete or elsewhere, if so ordered by the Engineer, or shown on drawings, the bottom of the excavation is to be covered by a blinding layer (screed) in Grade 15/19 concrete to a depth of 75 mm to prevent disturbance of the ground and to serve as an even and accurate positioned working floor for setting steel and placing foundation concrete. This blinding layer shall be laid immediately after excavations have been taken out and trimmed to the required depths and have been inspected and approved by the Engineer."

***PSG 3.5.4 Construction Joints (5.5.7)******PSG 3.5.4.1 General Preparation of Construction Joints (5.5.7.3)***

*Delete sub sub-clauses (a), (b), (c), and (d) and substitute the following:*

- "a) All horizontal and vertical construction joints shall be cleaned of all dirt and loose particles and shall be prepared to the satisfaction of the Engineer. All intersections of construction joints with concrete surfaces which will be exposed to view, shall be made straight and level or plumb and shall be constructed to the details shown on the drawings.
- b) The Contractor shall provide a compressor on site for the whole period during which concreting is in progress, and this must be available for cleaning concrete faces prior to placing fresh concrete or pouring joints.
- c) "Blowing off" may generally be carried out on horizontal surfaces but under special circumstances approved by the Engineer, it may also be carried out on vertical surfaces. The surface concrete to be prepared shall be between 4 and 8 hours old after completion of placing and shall be blown off using a mixture of air and water under a pressure of at least 500 kPa or by using a high-pressure water jet until all dirt, laitance, etc. is removed and particles of clean coarse aggregate are exposed sufficiently to produce a rough surface. Any loose particles of coarse aggregate shall also be removed. The success of this method of preparation depends on selecting the correct time (dependent on the type of cement) so that the concrete has set to just the necessary degree of hardness. The operation may therefore have to be undertaken

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

---

- outside normal working hours and at night. When the surfaces are at least 12 hours old, any remaining loose fine aggregate particles shall be washed off.
- d) "Scabbling", which refers to removal of all surface laitance plus roughening the concrete surface with pneumatic picks in order to expose the coarse aggregate in a uniform pattern, may be carried out on both horizontal and vertical surfaces. The surfaces to be prepared in this manner shall be at least 12 hours old after mixing the concrete. At least 35% of the roughened surface area shall consist of exposed coarse aggregate.
- e) All surfaces either prepared, by "blowing-off" or by "scabbling", shall be kept continuously wet until the next lift of fresh concrete is to be placed against them; the minimum time being 12 hours.
- f) The use of approved wet-to-dry epoxy resin concrete adhesive, strictly in accordance with the manufacturer's instructions, will be permitted in the formation of concrete joints at surfaces where the concrete is older than 7 days."

***PSG 3.5.4.2 Placing Fresh Concrete at Joints (New sub-clause 5.5.7.4)***

- "a) Vertical construction joint surfaces shall be, as instructed by the Engineer, either smooth, clean and kept damp for at least 24 hours before placing fresh concrete against them, or scabbled, cleaned and dampened as specified above.
- b) Horizontal construction joint surfaces shall have been "scabbled" or "blown off", cleaned and kept continuously wet as specified above before fresh concrete is placed over them. Immediately before placing the fresh concrete, the damp surface of the set concrete shall be evenly coated (by brushing or brooming) with a layer of cement mortar between 10 mm and 15 mm thick. The water/cement ratio and the cement/sand ratio of this mortar shall be the same as that of the fresh concrete to be placed and the mortar shall be produced by leaving the coarse aggregate fraction out of a batch of the fresh concrete. Coating with mortar is to be done in stages immediately before areas of set concrete are covered with fresh concrete, so that no mortar is exposed for longer than one hour after mixing, or less if the mortar has become dry or has started to set before being covered with fresh concrete. Any dried out mortar shall be removed and, after cleaning the surface, shall be replaced with fresh mortar.
- c) No fresh concrete shall be placed on the top surface of concrete, which is laterally restrained (e.g. by formwork or by in-situ earth) while the top layer of concrete is between 3 hours and 12 hours old after mixing. No fresh concrete shall be placed on top of the concrete with an unrestrained lateral surface while the top layer of concrete is between 2 and 12 hours old after mixing."

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

***PSG 3.5.5 Curing and Protection (5.5.8)***

*Add to the sub-clause:*

"Notwithstanding the acceptable methods of curing itemised under (a) to (c) of the sub-clause, the walls of thin-wall reservoirs or other structures shall be subjected to continuous spray curing for a minimum period of 7 days."

*Delete from the sub-clause all references to the curing periods relating to concrete made with Portland Blast Furnace Cement since the use of the latter is not permitted in terms of the Contract.*

***PSG 3.5.6 Adverse Weather Conditions (5.5.9)******PSG 3.5.6.1 Hot Weather Concreting (5.5.9.2)***

*Add to the sub-clause:*

"When concrete operations are being carried out at ambient temperatures in excess of 32°C, the Contractor shall apply the relevant recommendations for hot weather concreting set out in PCI 305 "Recommended practice for hot weather concreting."

***PSG 3.5.7 Concrete Surfaces (5.5.10)******PSG 3.5.7.1 Unformed Concrete Surfaces (5.5.10.2)***

*Add to the sub-clause:*

"All unformed concrete surfaces shall be finished to one or more of the following classes of finishes:

a) Class 1: Screeded Finish

Immediately after being poured the concrete shall be screeded with a straight edge working between templates set accurately to line and level. No mortar shall be added to overcome surface irregularities. These shall be made good by re-screeding or by the addition of concrete.

b) Class 2: Wood Floated Finish

After screeding to line and level and when the water sheen has disappeared, the concrete surface shall be trowelled by hand with a wood float to a uniform consolidated surface free from any trowel marks and uniform in texture and appearance.

c) Class 3: Steel Trowelled Finish

Commence as for Class 2 and finish with a steel trowel. The final finish shall be done at the correct time, for example, while the concrete is still sufficiently plastic to take polish but when it has hardened sufficiently to prevent drawing water and fine materials to the surface. Any adherence of mortar to the steel trowel indicates that the correct stage has not yet been reached."

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

***PSG 3.5.7.2 Tolerances (New sub-clause 5.5.10.4)***

- "a) Surface Class 1 shall not vary by more than 6 mm measured from a 3 m straight edge placed anywhere on the surface.
- b) Surface Class 2 and 3 shall not vary by more than 3 mm measured from a 3 m straight edge placed anywhere on the surface.
- c) Special surfaces such as bearing seats shall be finished to a higher degree of accuracy, as shown on the drawings."

***PSG 3.5.8 Watertight concrete (5.5.11)***

*Add the following:*

"All water retaining structures are to be subjected to a water tightness test. No vertical or inclined construction joints of any kind will be permitted in the perimeter walls of water retaining structures unless these have been specially ordered or authorised by the Engineer.

All water retaining structures shall be subjected to a watertightness test prior to backfilling around the structures. After the structures have reached their design strength, they shall be slowly filled with clean water at a rate not exceeding 2 metres depth per 24 hours to their normal maximum water level. After allowing a further 24 hours for takeup by the concrete surfaces, the rate of leakage shall be measured by a hook-gauge to be provided by the Contractor. If the rate of leakage exceeds 2 litres per square metre of water surface area per 24 hours and there is no prospect, in the opinion of the Engineer, of the rate of leakage improving, the Contractor shall take remedial steps as specified by the Engineer. The cost of any remedial steps required will be for the Contractor's account."

***PSG 3.5.8.1 Concrete for Watertight concrete (New sub-clause 5.5.11.1)***

*Add new sub-clause:*

"Grade 35 MPa /19 mm concrete shall be used for the construction of all water retaining structures."

***PSG 3.5.8.2 Pipes and Conduits Embedded in Concrete for Watertight Retaining Structures (New sub-clause 5.5.11.2)***

*Add new sub-clause:*

"Except with the approval of the Engineer, no pipes other than those shown on the drawings shall be embedded in the concrete."

***PSG 3.5.8.3 Disinfection of Water Retaining Structures (New sub-clause 5.5.11.3)***

*Add new sub-clause:*

"Before filling each water retaining structure for the first time with water, it shall be swept thoroughly clean. While the structure is being filled with water, a sodium hypochlorite solution shall be dosed to achieve a theoretical total chlorine concentration of 25ppm."



**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**


---

Once the structure has been filled with water, it shall be left for a 24 hour period. Thereafter, total chlorine concentration shall be measured. A concentration of 20ppm total chlorine will be considered acceptable. Should such concentration not be achieved, the Contractor shall carry out, at his own cost, all steps deemed necessary by the Engineer to achieve satisfactory disinfection.

Once satisfactory disinfection is achieved, the structure shall be drained and sufficient sodium thiosulphate (typically 1 part/part of total chlorine) shall be dosed into the system to fully neutralise the chlorine before discharging.

The structure shall then be filled and after 24 hours, samples will be taken by the Engineer for analysis (the Contractor shall allow for the cost of these tests within his tendered rate). Should the following limits not be achieved, the Contractor shall carry out, at his own cost, all steps deemed necessary by the Engineer to confirm satisfactory disinfection:

PARAMETERS	COUNT
E Coli	0
Coliforms	0
Faecal Streptococci	0

***PSG 3.5.9 Grouting (5.5.13)***

*Add to the sub-clause:*

"Grouting shall be done to the instruction of the Engineer using materials of suitable consistency as follows. Unless otherwise directed, grouting mixtures shall consist of one part cement to two parts concrete sand by volume, well mixed and with sufficient water added to obtain the required consistency. Where recesses to be filled are of appreciable dimensions, the Engineer may direct the Contractor to replace a proportion of sand with fine stone to reduce shrinkage."

***PSG 3.5.10 Liquid Grout (New sub-clause 5.5.13.1)***

*Add new sub-clause:*

Where liquid grout is required for bolt holes etc., water shall be added in such quantity that, when the material is thoroughly mixed and stirred, it shall flow readily so as to fill all recesses and air spaces in the work to be grouted. Before grouting any section of the work with liquid grout, the surfaces to receive grout shall first be thoroughly cleaned and flushed with water. The grout shall then be introduced in such a manner as to fill effectively all recesses. When the grout has set the surface of the work shall be finished off flush and smooth with cement mortar.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

***PSG 3.5.11 Grouting of Pipes/Specials through Walls (New sub-clause 5.5.13.2)***

"Where entry holes for pipes / specials have been left in the walls, the Contractor shall be responsible for the grouting in of such pipes / specials regardless of whether or not these have been supplied by himself.

Before commencing the positioning in holes of any pipes/specials, the Contractor shall:

- (a) Remove all shuttering and boxing remaining in the holes;
- (b) Make any alterations required to the position and shape of the holes;
- (c) Thoroughly clean the sides of the holes so as to obtain satisfactory bond surface for the new concrete; and
- (d) Free all surfaces of the pipes / specials of all coatings and thoroughly scrape and clean the pipes / specials.

After accurately positioning the pipes / specials in the respective holes, the Contractor shall fix the pipes / specials in the holes.

Immediately prior to grouting being carried out by the placing of mortar and concrete around the pipes, the surface of the existing concrete shall be saturated with water. All surplus water shall be removed and the surface covered with a layer, approximately 12 mm thick, of mortar consisting of three parts concrete sand and one part cement.

The concrete ingredients shall be mixed and placed as dry as possible to obtain a dense, waterproof concrete. Where a watertight seal is required, the concrete shall be carefully worked around the puddle flange, if any, and the pipe barrel or body of the special, shall be vibrated in layers so as to obviate any failing away from pipe / special surfaces of the concrete already placed. The whole shall, when set, form a dense, homogeneous, and waterproof mass. A spare vibrator with an independent power source shall be kept in readiness to ensure continuity of placing in the event of the breakdown of the duty vibrator.

Smooth formwork that has been suitably strengthened for use with a vibrator shall be provided for facing the concrete around each pipe / special."

***PSG 3.5.12 Dry-Packed Grout (New sub-clause 5.5.13.3)***

"When dry-packed grout is specified, under base plates etc., only sufficient water shall be added to make the mixture ball when squeezed in the hand. Before any grouting is done with dry caulking, the surfaces between which the caulking is to be placed shall first be thoroughly cleaned and flushed with water. All surplus visible water shall be wiped or blown away and the dry caulking shall be forcefully rammed or hammered into place using suitable tools. Exposed surfaces shall be finished off neatly with a trowel and extensive exposed areas shall be covered with wet sacking and kept damp for at least 24 hours.

Where additives are required for grouting operations, these shall be brought onto site in the manufacturer's unopened containers and used strictly in accordance with the manufacturer's instructions, which the Contractor shall not fail to obtain. If necessary, the Engineer may

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

---

require the Contractor to undertake preliminary tests to check the behaviour of proprietary additives under the conditions prevalent on the site.\*

***PSG 3.5.13 Epoxy Grout (Epoxy mortar type only) (New sub-clause 5.5.13.4)***

*Add new sub-clause:*

"The manufacturer's instructions shall be observed when an epoxy grout is used."

***PSG 3.5.14 Cement Mortar (New sub-clause 5.5.16)***

*Add new sub-clause:*

"Where cement mortar is specified for filling around pipes etc. water shall be added to obtain a firm paste, which can be worked with a trowel but is not fluid. Surfaces to receive mortar shall be well wetted and excess water allowed to drain, or be removed. The mortar shall be worked into place with a trowel or tamping rod, exposed surfaces floated off, covered with wet hessian for 24 hours, and allowed to harden without disturbance."

***PSG 3.5.15 Joints (New sub-clause 5.5.16)******PSG 3.5.15.1 Fibreboard (New sub-clause 5.5.16.1)***

\*Fibreboard shall be provided between concrete sections wherever shown on the drawings. Fibreboard shall be impregnated and treated with a special bituminous compound to protect it from weathering, e.g. "Flexcell", as manufactured by Expandite (Pty) Ltd or a similar approved board of comparable composition, which shall be securely fixed in position to avoid distortion or displacement while concreting operations are in progress.\*

***PSG 3.5.15.2 Expansion Joints (New sub-clause 5.5.16.2)***

\*Joint recesses to receive sealing compound are to be formed to the dimensions and shapes indicated on the drawings. These recesses are to be formed with rough sides and so shuttered that the shuttering can be removed without any timber having to be left in the recesses. Shuttering shall be left in the joints until the joints are ready for priming and filling with sealant. After the removal of the shutters, joints shall be cleaned by mechanically operated wire brushes and shall be hacked and scabbled and all dust removed."

***PSG 3.5.15.3 Sealing Joints (New sub-clause 5.5.16.3)***

\*The sealing of the joints (contraction / movement) is to be carried out by the Contractor under the supervision of a representative of the specialist firm supplying the sealing compounds. The Contractor is to be responsible for supplying these approved materials, transporting them to site, storing and using them, as required, and providing all labour, tools, equipment and everything necessary to prime and fill the joints.

Before priming and pouring, the joints recesses are to be thoroughly cleaned and dried out, in which connection, the use of compressed air is stipulated, to the approval of the Engineer.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

No sealing of joint recesses is to be carried out until at least 21 days after the adjacent concrete has been cast.

Every care shall be exercised by the Contractor to ensure that the work shall be carried out in accordance with the requirements of this specification and in strict conformity with any special instructions given by the manufacturers for the proper use and treatment of the sealing materials provided by them."

***PSG 3.5.16 Bituminous Coatings to Earth Faces (New sub-clause 5.5.17)***

"All earth covered concrete surfaces shall receive two applications of an approved bituminous coating such as Ebsco E55 Bituminous Waterproofing Compound or similar approved.

The coatings shall be applied strictly in accordance with the manufacturer's instructions and shall be repaired to the satisfaction of the Engineer if damaged during backfill operations."

**PSG 4 TESTS (7)****PSG 4.1 Testing (7.2.)*****PSG 4.1.1 Laboratory Testing (7.2.3)***

*Add to the sub-clause:*

"The Contractor will be liable for all costs incurred in designing the concrete mixes and making structural concrete cubes and having these tested."

**PSG 5 MEASUREMENT AND PAYMENT (8)****PSG 5.1 Measurement and Rates (8.1)*****PSG 5.1.1 Reinforcement (8.1.2)***

*Delete sub-clause 8.1.2.1 b).*

*Delete sub-clause 8.1.2.2 a) and replace with:*

- "a) Each reinforcement bar size and type will be separately scheduled. Additional splice lengths or swage type connections introduced at the Contractor's request shall not be measured and will be to the Contractor's account."

*Delete from the first line of sub-clause 8.1.2.3 a) "of nominal size 25 mm".*

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

***PSG 5.1.2 Concrete (8.1.3)***

*Delete sub-clause 8.1.3.1(b) and replace with:*

- "(b) No allowance will be made for concrete required to make up over-break in soft, intermediate or hard rock excavation. No payment will therefore be made for additional concrete or formwork, ordered in writing by the Engineer to replace over-break."

*Add to sub-clause 8.1.3.3 a):*

"Any additional precautions required for adverse weather conditions shall be covered in the unit rate."

*Delete from the first line of sub-clause 8.1.3.3 (a) the words:*

"the cost of the design of the mix in the case of strength concrete,"

*Add the following new sub-clause after sub-clause 8.1.3.3. (d):*

- "(e) Separate items have been included in the Bill of Quantities for concrete complete with formwork for each particular grade of concrete or for structural units of similar size and shape, or for both. The unit rates shall cover the cost of the provision of concrete (made with ordinary Portland Cement unless otherwise so scheduled); mixing, testing, placing, compacting, the forming of stop-ends and unforeseen construction joints, striking where necessary, together with the cost of all parts of formwork in contact with the concrete and the necessary bearers, struts, and other supports, plus the layout and plant necessary to erect and strike such formwork."

***PSG 5.1.3 Scheduled Reinforcement Items (8.3)***

***PSG 5.1.3.1 Steel Bars (8.3.1)***

*Delete "Unit: t" and replace with "Unit: kg"*

***PSG 5.1.4 Bituminous Coating to Earth Faces (New sub-clause 8.9)***

"Bituminous Coating .....Unit: m<sup>2</sup>

The unit of measurement of bituminous coating to concrete surfaces shall be the square meter of surface coated. The rate tendered shall provide for all materials, plant, tools, labour, etc., necessary for the satisfactory installation of the coating according to the manufacturers specifications."

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

**PSL MEDIUM-PRESSURE PIPELINES****PSL 1 INTERPRETATIONS (2)****PSL 1.1 Abbreviations (2.4)**

"HDPe : High Density Polyethylene"

**PSL 2 MATERIALS (3)****PSL 2.1 Steel Pipes, Fittings and Specials (3.4)*****PSL 2.1.1 Pipes of nominal bore up to 150 mm (3.4.2)***

Delete "shall be screwed" in the second and third lines.

Add the following to this sub-clause:

"The pipes shall be 'normalized' or seamless steel pipes and shall be used with malleable cast iron fittings complying with the requirements of SANS (SABS 509) 14:1994/ISO 49:1994."

**PSL 2.2 Other Types of Pipe (3.7)*****PSL 2.2.1 uPVC pipes (3.7.1)***

Only Unplasticised Polyvinyl Chloride (uPVC) pipes shall be used. Unplasticised Polyvinyl Chloride (uPVC) pipes shall be in accordance with SANS (SABS) 966-1:2013. Minimum working pressure to be Class 12.

***PSL 2.2.2 High Density Polyethylene Pipes (HDPe) (New sub-clause 3.7.3)***

High Density Polyethylene (HDPe) pipes shall be in accordance with SANS ISO 4427 in material grade PE 80. Minimum working pressure to be PN 10, Standard Diameter Ratio (SDR) 13.6 (equivalent to material grade PE 100, PN 12.5).

**PSL 2.3 Jointing material (3.8)*****PSL 2.3.1 Flanges and Accessories (3.8.3)***

Add to the sub-clause:

"c) Each bolt and nut set is to be supplied with two appropriately sized washers. When fitting the bolts and nuts, one washer is to be placed against each bolt and nut."

***PSL 2.3.2 Loose Flanges (3.8.4)***

Add to the sub-clause:

"Bolts and nuts are to comply with SABS 136."

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

***PSL 2.3.3 HDPE pipe couplings (New sub-clause 3.8.8)***

"All couplings to HDPE pipes up to be 16 bar rated compression fittings. Only compression fittings of the following brand names, or similar approved, will be acceptable: Philmac, Magnum, Plasson, Astore, Unidelta and Elprene."

**PSL 2.4 Corrosion protection (3.9)*****PSL 2.4.1 Steel Pipes (3.9.2)******PSL 2.4.1.1 Steel Pipes of Nominal Bore up to 150 mm (3.9.2.1)***

*Delete the contents of this clause and substitute the following:*

Corrosion protection of steel pipes of nominal bore up to 250mm shall conform to the requirements of **Particular Specification PC: Mild Steel Pipes and Fittings**.

***PSL 2.4.1.2 Steel Pipes of Nominal Bore over 150 mm (3.9.2.2)***

*Delete the contents of this clause and substitute the following:*

Corrosion protection of steel pipes of nominal bore over 250mm shall conform to the requirements of **Particular Specification PC: Mild Steel Pipes and Fittings**.

***PSL 2.4.2 Protection Against Electrolytic Corrosion (3.9.3)***

*Delete the third line and substitute the following:*

"tape or tape impregnated with a petroleum based material, or other approved insulating material, shall be applied in"

***PSL 2.4.3 Flexible Couplings (3.9.4)***

*Delete the contents of this clause and substitute the following:*

"All flexible couplings shall be thoroughly wrapped with tape impregnated with a petroleum-based material."

***PSL 2.4.4 Joints, Bolts, Nuts and Washers (3.9.5)***

*Delete "hot-dipped bitumen coated" and replace with "hot-dipped galvanised".*

***PSL 2.4.5 Valves (3.10)***

*Delete the contents of this clause and substitute the following:*

Valves shall comply with the requirements of **Particular Specification PB: Valves (Medium-Pressure)**.

**PSL 2.5 Manholes and surface boxes (3.11)**

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

***PSL 2.5.1 Bricks (3.11.1)***

*Delete the first sentence and substitute the following:*

"Bricks shall be obtained from an approved manufacturer and shall be either engineering bricks of minimum compressive strength 7MPa that comply with the applicable requirements of SANS (SABS) 227:2007 or concrete masonry blocks (390 x 190 x 190) of minimum compressive strength 3,5 MPa that comply with the applicable requirements of SANS (SABS 0400) 10400:1990 and SANS (SABS) 1215:2008."

***PSL 2.5.2 Sand (New sub-clause 3.12)***

"Sand used for mortar (general purpose) and for plaster (external) shall comply with the applicable requirements of SANS (SABS) 1090:2009."

***PSL 2.5.3 Cement (New sub-clause 3.13)***

"The cement used on the Works shall be CEM 1, grade 42.5 complying with the requirements of SANS (SABS EN 197-1) 50197-1:2000/EN 197-1:2000."

**PSL 3 CONSTRUCTION (5)****PSL 3.1 Laying (5.1)*****PSL 3.1.1 Depths and cover (5.1.4)******PSL 3.1.1.1 General (5.1.4.1)***

*Add to this sub-clause:*

"Unless otherwise directed, all uPVC and HDPE pipes to be laid with their pipe markings facing upwards for ease of pipe type, size and class identification if/when exposed in the future."

**PSL 3.2 Valve and hydrant chambers (5.6)*****PSL 3.2.1 General (5.6.1)***

*Replace "Drawing L-1" with "Typical Drawings".*

***PSL 3.2.2 Construction of Chambers (5.6.2)***

*Replace "Drawings L-1, L-2 and L-3" with "Typical Drawings".*

**PSL 3.3 Brickwork in Chambers and Manholes (5.8)**

*Delete the eleventh line and substitute the following:*

"Mortar for brickwork and plasterwork shall be composed of one part of cement to four parts of sand."

*Twelfth and thirteenth lines to be deleted.*

*Add to the sub-clause:*

"Plaster is to be applied in one coat not less than 12 mm in thickness."



**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

**PSL 3.4 Flanges and Accessories (New sub-clause 5.11)*****PSL 3.4.1 Bolted Connections (New sub-clause 5.11.1)***

"Bolted connections shall comply with the following:

- a) All pipes larger than 150 mm in diameter, connected to equipment or fittings, or where specifically indicated, shall be flanged to SANS (SABS) 1123:2011.
- b) All flanges shall be Type 3, plate flanges for welding and blank flanges shall be Type 8. Matched flanges shall correspond in construction and dimensions to flanges on equipment. Matched flanges shall be provided with the correct bolts, nuts and packing rings. All piping shall be thoroughly cleaned before connections are made.
- c) Bolts, tie-bolts and nuts shall be galvanised to SANS (SABS 763) 10684:2011/ISO 10684:2011 and shall comply with the relevant requirements of SABS 135:1985 and SABS 136:1985.
- d) The length of each bolt shall be such that after the bolt has been tightened, the end of the bolt shall not project beyond the nut by more than two threads. Tie-bolts on restrained couplings shall be fitted with "backing nuts".
- e) All bolt threads shall be liberally coated with "Copper slip" or similar approved prior to assembly. Upon completion, bolt heads and nuts shall be wrapped with the "Denso Mastic Blanket System" comprising of a priming solution, mastic blanket, petrolatum tape and lay-flat sheeting.
- f) Satisfactory temporary end covers shall be provided by the Contractor for protection of flanges, prepared ends of open ended pipes and fittings and screwed ends, to prevent damage to internal lining and external coating during transportation and during handling on site."

**PSL 4 TESTING (7)****PSL 4.1 Standard hydraulic pipe test (7.3)*****PSL 4.1.1 Water for Testing (New sub-clause 7.3.4)***

"The Contractor shall make his own arrangements for providing water for testing."

**PSL 5 MEASUREMENT AND PAYMENT (8)****PSL 5.1 Scheduled Items (8.2)*****PSL 5.1.1 Anchor/Thrust Blocks and Pedestals (8.2.11)***

*Delete the last line and substitute the following:*

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

\*formwork, concrete, reinforcement (if any), and screeding of top surfaces\*.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

**PSLB BEDDING (PIPES)****PSLB 1 MATERIALS (3)****PSLB 1.1 Bedding (3.3)**

*Add to the sub-clause:*

"The bedding for all flexible pipes laid under this Contract shall be as per Drawing LB-2 with joint holes (pockets) being provided in the bedding as shown on the drawing, at each pipe joint and coupling. No sharp-edged stones shall come into contact with either the pipes or the couplings (joints). No extra payment will be made for forming joint holes (pockets)."

**PSLB 1.2 Selection (3.4)*****PSLB 1.2.1 Suitable Material available from Trench Excavation (3.4.1)***

*Delete the sub-clause and substitute the following:*

"The excavation of a pipe trench shall comply with the requirements of sub-clause 5.4 of SANS (SABS) 1200 DB, and the provisions of sub-clause 3.7 of SANS (SABS) 1200 DB (in terms of which, for the purposes of providing bedding materials, the Contractor is not required to use selective methods of excavating) shall apply. Nevertheless, the Contractor shall take every reasonable precaution to avoid burying or contaminating material that is suitable and is required for bedding or covering the pipeline. If, in the opinion of the Engineer, bedding material can be produced from the excavated material, the Contractor if so ordered by the Engineer, shall screen or otherwise treat the excavated material in order to produce material suitable for bedding."

**PSLB 2 PLANT (4)****PSLB 3 CONSTRUCTION (5)****PSLB 3.1 Concrete Casing to Pipes (5.4)**

*Add to the sub-clause:*

"Where concrete casing is ordered by the Engineer it is to be of 20/19 grade concrete with a minimum thickness of 150 mm above the top of the pipe".

**PSLB 4 MEASUREMENT AND PAYMENT (8)****PSLB 4.1 Principles (8.1)*****PSLB 4.1.1 Volume of Bedding Materials (8.1.3)***

*Replace the sub-clause with:*

"The volume of bedding materials will be computed from:

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

---

- a) The outside dimensions of the pipe and the side allowance determined in accordance with sub-clause 8.2.3 of SANS 1200DB and as shown on Drawing LB-2, and
- b) The depth of each bedding section as shown on Drawing LB-2. No allowance will be made for bulking of material i.e. computed volumes are **compacted** bedding volumes to the above dimensions.
- c) The volume of the pipe will be deducted from bedding volume calculations."

***PSLB 4.1.2 Disposal of displaced material (8.1.5)***

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

"Material displaced by the pipeline and by importation of material from sources other than trench excavation, shall be disposed of as specified in SANS 1200 DB - sub-clause 5.6.3."

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

**Part 4: Particular Project Specifications****PA HEALTH AND SAFETY****PA 1 SCOPE**

This specification covers general Health and Safety requirements specific to this project. The purpose of this specification is to assist the Contractor in preparing his Health and Safety Plan for the construction of the Works. As such, this specification must not be considered as a comprehensive Health and Safety manual covering all construction activities that could be expected to occur on the Works, but must rather be seen as a minimum requirement.

**PA 2 REFERENCES****PA 2.1 Legal Requirements**

The approach to Health and Safety on the Works shall be in accordance with the Occupational Health and Safety Act No. 85 of 1993, subject to the Construction Regulations 2014, hereinafter referred to as the Regulations.

These specifications shall be read in conjunction with the Supporting Specifications listed in PA 2.2 and contain revisions that will be deemed to satisfy this project.

**PA 2.2 Supporting Specifications**

References made to Health and Safety in the documentation that comprise the Tender and Contract documentation for this project shall be read as part of this specification.

**PA 2.3 Definitions**

Reference made in the Construction Regulations to the "Client" shall refer to the same representation as referred to in the project Tender or Contract documentation as the "Employer". Reference made in the Construction Regulations to "Principal Contractor" shall refer to the same representation as referred to in the project Tender or Contract documentation as "Contractor". Reference made in the Construction Regulations to "Contractor" shall refer to the same representation as referred to in the project Tender or Contract documentation as "Sub-Contractor".

**PA 3 CONTRACTOR**

The Contractor accepted by the Employer for the construction of the Works under this contract, shall take on the responsibilities of the Principal Contractor as described above.

**PA 4 SUB-CONTRACTORS**

The Contractor shall take on the responsibility to ensure that the Sub-Contractors comply with the Regulations.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

**PA 5 CONTRACTOR'S HEALTH AND SAFETY PLAN**

The Contractor shall submit his Health and Safety Plan, required in accordance with Regulation 5(1), within 14 days after receiving a written appointment from the Employer for the Contract.

**PA 6 SUB-CONTRACTORS' HEALTH AND SAFETY PLANS**

No Sub-Contractor will be allowed to perform any work under this Contract until the Sub-Contractor's Health and Safety Plan has been approved by the Employer.

**PA 7 SUPERVISION OF CONSTRUCTION WORK**

Before any work commences on site, the Contractor shall submit to the Employer the name of the person or Contractor's employee, who will be the designated Construction Supervisor, as defined under Regulation 6(1). That person may assume the role of Construction Supervisor, in terms of the Regulations, for work performed by the Contractor's sub-contractors, subject to complying with the other sub-regulations under Regulation 6.

**PA 8 RISK ASSESSMENT****PA 8.1 General**

It will not be required for every Contractor to perform a risk assessment as required in Regulation 7(1). Where Sub-Contractors are appointed to perform work of a similar nature, trenching and pipe laying for instance, it will be deemed sufficient if a blanket risk assessment is performed for typical activities. The Contractor shall be responsible however, to make each Sub-Contractor aware of the blanket risk assessment before the Sub-Contractor commences working on site. The Contractor remains responsible to comply with Regulation 7

**PA 8.2 Health and Safety Committee/Representative**

The Contractor shall actively pursue the formation of a Health and Safety Committee representing all the people to be employed on site and the Labour Desk that will be established by the Employer to facilitate the employ of local labour, shall be invited to participate in the activities of the Health and Safety Committee.

**PA 9 FALL PROTECTION**

The necessary fall protection plan, training, medicals, appointments and equipment shall be compiled and implemented by the Contractor if any construction activities falling under this project could pose a potential "fall risk" as defined in the Regulations.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

**PA 10 EXCAVATION WORK****PA 10.1 Excavation**

Excavation to depths exceeding 1.5 metres are a possibility on this project. If excavations of deeper than 1.5m are required, the Contractor will be required to implement all necessary precautions such as sloping the sides of the excavation or erecting shoring / bracing, all in accordance with the requirements of the Regulations.

**PA 11 WATER ENVIRONMENTS**

No work is expected to be executed in water environments under this contract.

**PA 12 HOUSE KEEPING AT CONSTRUCTION SITES**

The Contractor shall make adequate precautions to prevent diesel spillage at the Contractor's diesel storage and dispensing points, from contaminating the surrounding area.

**PA 13 CONSTRUCTION WELFARE FACILITIES****PA 13.1 General**

The requirement for sanitary facilities as required under Regulation 28 throughout the project shall apply.

**PA 13.2 Ergonomic Considerations**

The Employer's general requirements are that the design of the project and components thereof where possible, must take into account the ergonomics of the required task.

The Works requires the installation of heavy equipment, such as valves, steel pipe specials and the like, into underground chambers that are considered as confined spaces. All chambers where access is intended should be sized so that a person of average height and size can work inside with reasonable ease. To this end, the finished floor to soffit height in all accessible chambers should be not less than 1.7 meters, while the minimum size of accessible chambers should be 1.5 x 1.5 metres.

Accesses to chambers should be placed and sized for ease of access and for ease of installing the fittings required for the chamber.

The Contractor is required to scrutinise the designs presented to him for construction, for features that compromise the Ergonomic aspects of Health and Safety and bring potential problem areas to the attention of the Employer or the Engineer at least four weeks before construction of the particular feature. The problem area will then be attended to or, if the design cannot be altered, special precaution will be required or special steps taken to circumvent the problem.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

If the Contractor fails to identify and/or notify the Engineer or Employer of any aspects that could affect Health and Safety ergonomically, in the required time beforehand, delays caused in rectifying these will be the Contractor's responsibility.

**PA 13.3 Confined Spaces**

Workers will not be required to work in confined spaces other than that created through trench excavation, and chamber construction as per PA13.2. The Contractor shall comply with all the requirements of General Safety Regulation 5.

**PA 14 GENERAL HEALTH AND SAFETY REGULATIONS**

This specification contains regulations of a general nature that contribute to Health and Safety on site and are aspects of Health and Safety that the Contractor must note. The Employer or Engineer shall have the right to instruct the Contractor to comply with a Regulation, or any other Health and Safety related aspect not included in these General Regulations, if the Employer or the Engineer considers that a relevant action or situation could endanger the Health and Safety of a worker or workers.

**PA 14.1 Definitions**

"building work" means building work as defined in the General Administrative Regulations published under Government Notice R2206 of 5 October 1984;

"confined space" means an enclosed, restricted or limited space in which, because of its construction, location or contents, or any work activity carried on therein, a hazardous substance may accumulate or an oxygen-deficient atmosphere may occur, and includes any chamber, tunnel, pipe, pit, sewer, container, valve, pump, sump, or similar construction, equipment, machinery or object in which a dangerous liquid or a dangerous concentration of gas, vapour, dust or fumes may be present;

"fire-resistance" means the minimum period for which a building element or component will comply with the requirements for stability, integrity and insulation when tested in accordance with SANS 10177-2:2005;

"flammable liquid" means any liquid, which produces a vapour that forms an explosive mixture with air, and includes any liquid with a closed-cup flash point of less than 55°C;

"high-risk substance" means a substance listed in the Schedule to the General Administrative Regulations published under Government Notice R2206 of 5 October 1984, as amended from time to time;

"putlog scaffold" means a scaffold supported by a single row of standards and the structure in connection with which it is being used;

[Definition of "putlog scaffold" added by GN R1791 of 1988.]



**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

"scaffold" means any temporary elevated platform and supporting structure used for supporting workers or materials or both;

[Definition of "scaffold" added by GN R1791 of 1988.]

"SANS 10177-2:2005: Part II" means the South African Bureau of Standards' code of practice entitled Fire Resistance Test for Building Elements, SANS 10177-2:2005;

"suspended scaffold" means a working platform suspended from supports by means of one or more separate suspensions from each support;

[Definition of "suspended scaffold" added by GN R1791 of 1988.]

"trestle scaffold" means a working platform supported on trestles, stepladders, tripods and the like.

[Definition of "trestle scaffold" added by GN R1791 of 1988.]

**PA 14.2 Personal Safety Equipment and Facilities**

- (1) Subject to the provisions of paragraphs (f), (g), (h) and (l) of regulation 5 of the General Administrative Regulations published under Government Notice R2206 of 5 October 1984, the Contractor and user of machinery shall make an evaluation of the risk attached to any condition or situation which may arise from the activities of the Contractor or user, as the case may be, and to which persons at a workplace or in the course of their employment or in connection with the use of machinery are exposed, and he shall take such steps as may under the circumstances be necessary to make such condition or situation safe.
- (2) Where it is not practicable to safeguard the condition or situation contemplated in sub-regulation (1), the Contractor or user of machinery, as the case may be, shall take steps to reduce the risk as much as is practicable, and shall provide free of charge and maintain in a good and clean condition such safety equipment and facilities as may be necessary to ensure that any person exposed to any such condition or a situation at a workplace or in the course of his employment or on premises where machinery is used is rendered safe.
- (3) Taking into account the nature of the hazard that is to be countered, and without derogating from the general duties imposed on Contractors and users of machinery by sub-regulations (1) and (2), the safety equipment and facilities contemplated in sub-regulation (2) shall include, as may be necessary-
  - a) suitable goggles, spectacles, face shields, welding shields, visors, hard hats, protective helmets, caps, gloves, gauntlets, aprons, jackets, capes, sleeves, leggings, spats, gaiters, protective footwear, protective overalls, or any similar safety equipment or facility of a type that will effectively prevent bodily injury;
  - b) waterproof clothing, high-visibility clothing, chemical-resistant clothing, low temperature clothing, chain mail garments, waders, fire retardant or flame-proof

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

---

- clothing, ice-jackets, or any similar safety equipment of a type that will effectively protect the wearer thereof against harm;
- c) belts, harnesses, nets, fall arresters, life lines, safety hooks, or any similar equipment of a type that will effectively protect persons against falls;
  - d) mats, barriers, locking-out devices, safety signs, or any similar facility that will effectively prevent slipping, unsafe entry or unsafe conditions;
  - e) protective ointments, ear-muffs, ear-plugs, respirators, breathing apparatus, masks, air lines, hoods, helmets, or any similar safety equipment or facility of a type that will effectively protect against harm;
  - f) suitable insulating material underfoot where persons work on a floor made of metal, stone, concrete or other similar material; and
  - g) generally, such safety equipment or facilities as may be necessary to render the persons concerned safe.
- (4) The Contractor or the user of machinery, as the case may be, shall take steps to ensure that no safety equipment or facility provided as required by this or any other regulation is removed from a workplace or from premises where machinery is used, except for purposes of cleaning, repair, maintenance, modification, mending or replacement, and no person shall remove any such safety equipment or facility from a workplace or premises where machinery is used, except for the aforesaid purposes.
- (5) The Contractor shall instruct his employees in the proper use, maintenance and limitations of the safety equipment and facilities provided.
- (6) The Contractor shall not require or permit any employee to work unless such an employee uses the required safety equipment or facility provided in terms of this or any other regulation.
- (7) The provisions of this regulation shall not be construed as derogating from the provisions of any specific regulation prescribing specific safety equipment or facilities.

**PA 14.3 First Aid, Emergency Equipment and Procedures**

- (1) The Contractor shall take all reasonable steps that are necessary under the circumstances, to ensure that persons at work receive prompt first aid treatment in case of injury or emergency.
- (2) Where more than five employees are employed at a workplace, the Contractor of such employees shall provide a first aid box or boxes at or near the workplace which shall be available and accessible for the treatment of injured persons at that workplace.
- (3) Taking into account the type of injuries that are likely to occur at a workplace, the nature of the activities performed and the number of employees employed at such workplace, the Contractor shall make sure that the first aid box or boxes contemplated in sub regulation (2) contain suitable first aid equipment which include at least the

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

- equipment listed in the Annexure hereto. The Contractor shall further make sure that only articles and equipment contemplated here or other similar equipment or medicine is kept in the first aid box or boxes.
- (4) Where more than 10 employees are employed at a workplace, the Contractor of such employees shall take steps to ensure that for every group of up to 50 employees at that workplace, or in the case of a shop or an office as contemplated in the Basic Conditions of Employment Act, 1983 (Act No. 3 of 1983), for every group of up to 100 employees, at least one person is readily available during normal working hours, who is in possession of a valid certificate of competency in first aid, issued by-
- a) the SA Red Cross Society;
  - b) the St John's Ambulance;
  - c) the SA First Aid League; or
  - d) a person or organisation approved by the chief inspector for this purpose.
- (5) The Contractor shall at a workplace where a high-risk substance or toxic, corrosive or similar hazardous substances are used, handled, processed or manufactured, ensure that the first aid worker contemplated in sub regulation (4) is trained in the first aid procedures that are necessary for the treatment of injuries that may result from such activities, including the acute detrimental effects of exposure to such substances, and in the emergency procedures which are necessary in the case of accidental leakage or dumping of such substances.
- (6) The Contractor shall affix a prominent notice or sign in a conspicuous place at a workplace, indicating where the first aid box or boxes are kept as well as the name of the person in charge of such first aid box or boxes.
- (7) An employee with an open wound, cut, sore or any similar injury, who works in a workplace where a substance contemplated in sub regulation 5 is used, handled, processed or manufactured, shall report such injury to his Contractor forthwith. The Contractor may not permit such employee to continue working before the injury has been cleaned with soap and water or with a diluted disinfectant.
- (8) Where any employee is exposed or can be exposed to a potential hazard of injury to the eye through contact with a biological or chemical substance, the Contractor concerned shall make sure that there is an eye-wash fountain in the immediate vicinity of the workplace of such employee and that the employee is trained in the use thereof.
- (9) Where an employee at a workplace is exposed or can be exposed to a potential hazard of injury to or absorption through the skin as a result of sudden contact with a large amount of toxic, corrosive, high risk or similar hazardous substance, the Contractor concerned shall make sure that there is a fast-reacting deluge-shower with clean water or a similar facility in the immediate vicinity of the workplace of such employee and that the employee is trained in the use thereof.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

**PA 14.4 Use and Storage of Flammable Liquids**

- (1) The Contractor shall not require or permit any person to work in a place where the vapour of any flammable liquid is generated to such an extent that it constitutes an actual or potential fire or explosion hazard or endangers the safety of any person, unless the provisions of sub-regulation (2) to (12) of this regulation are complied with.
- (2) The Contractor shall not require or permit a flammable liquid to be used or applied other than in a room, cabinet or other enclosure specially constructed for this purpose of fire-resisting material, or in a place which, owing to its situation or construction or any other feature or circumstance, is of such a nature that
  - a) no fire or explosion hazard is, can or may be created thereat;
  - b) any vapour resulting from such use or application is efficiently dispersed and diluted into the atmosphere subject to the provisions of the Air Pollution Prevention Act, 1965 (Act No. 45 of 1965); and
  - c) no other workplace can or may be contaminated by such vapour.
- (3) The Contractor shall cause every room, cabinet or enclosure contemplated in sub-regulation (2) to be fitted with an efficient intake and exhaust ventilation system to remove any vapour there from and to prevent its re-circulation in a manner which may lead to the contamination of any other workplace or the creation of a fire or explosion hazard: Provided that, notwithstanding any other provision of this regulation, the Contractor shall provide every employee doing spraying with a respirator, mask or breathing apparatus of a type approved by the chief inspector, and that any such employee shall while spraying use such apparatus provided to him.
- (4) Where spraying is done in any room, the Contractor concerned shall ensure that the ventilation system contemplated in sub-regulation (3) complies to the following requirements:
  - a) If the air supply and extraction is horizontal, the average air speed measured at a level of 1.5 metres above the floor, or at the level of the platform on which persons stand to work, shall not be less than 0.5 metres per second;
  - b) if the air supply is vertical and the extraction thereof is done through slits or a grill along the side walls at floor level, the average air speed measured at a level of 1.5 metres above the floor, or at the level of the platform on which persons stand to work, shall not be less than 0.4 metres per second; or
  - c) if the air supply is vertical and the extraction thereof is done through a grill over the whole of the floor area, the average air speed measured at a level of 1.5 metres above the floor, or at the level of the platform on which persons stand to work, shall not be less than 0.3 metres per second.
- (5) Where spraying is done into any cabinet or enclosure as contemplated in sub-regulation (2), the Contractor concerned shall ensure that the ventilation system contemplated in sub-regulation (3) complies with the following requirements:

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

---

- a) Where the area of the open face of the cabinet is not more than one square metre, the average speed of air movement through the said face shall not be less than one metre per second;
  - b) where the area of the open face is more than one square metre but less than two square metres, the average speed of air movement through the said face shall not be less than 0.75 metres per second; or
  - c) where the area of the open face is equal to or exceeds two square metres, the average speed of air movement through the said face shall not be less than 0.5 metres per second.
- (6) With regard to the ventilation system contemplated in sub-regulation (3) the Contractor shall cause-
- a) all ducts, trunks and enclosures of the system to be of fire-resistant material with a smooth interior finish and to be constructed in such a manner as to facilitate the cleaning thereof;
  - b) the system to be kept in operation during working hours as well as for at least the period of time thereafter that may be necessary to clear the vapour from the atmosphere of the room, cabinet or enclosure to below 25 per cent of the lower explosive limit of that vapour; and
  - c) the work to be so organised that the flow of air towards the intake of such ventilation system is not obstructed and draws the spray or vapour of the flammable liquid away from any employee operating the equipment.
- (7) With regard to any room contemplated in sub-regulation (2), the Contractor shall cause every such room-
- a) with a floor area exceeding 20 square metres to have at least two separate entrances at opposite ends of the room, which shall be fitted with doors opening outwards that cannot be locked; and
  - b) to be fitted with an inspection window of strengthened and shatterproof glass that cannot be opened.
- (8) The Contractor shall not permit-
- a) any fire, flame or naked light or anything which may generate static electricity or any other thing which may ignite a flammable liquid or its vapour, to be used in or taken into any room, cabinet or enclosure contemplated in sub-regulation (2) in which any such flammable liquid is used, sprayed or stored, and shall affix a suitable and conspicuous sign prohibiting any such act at all the entrances to any such room, cabinet or enclosure;
  - b) any person to, and no person shall, smoke in any place in which flammable liquid is used or stored, and the Contractor shall affix a suitable and conspicuous notice prohibiting such smoking at all the entrances to any such place; and
  - c) any process capable of causing sparks or fire, or the application of any heat for the drying of sprayed or treated articles, to take place in any room, cabinet or

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

enclosure used for spraying, before the space or atmosphere has been cleared of all vapour.

- (9) With respect to any room, cabinet, or enclosure contemplated in sub- regulation (2), the Contractor concerned shall cause-
- a) discarded cotton waste, cleaning rags or similar material to be removed daily and safely disposed of;
  - b) only that quantity of flammable liquid needed for work on one day to be taken into or kept in such room, cabinet or enclosure: Provided that partially consumed stock may be stored in a properly marked, fireproof wall cabinet inside the workplace;
  - c) all drums, cans, canisters or similar containers holding flammable liquids to be kept tightly closed when not in actual use and, after their contents have been used up, to be removed from the workplace and safely disposed of daily; and
  - d) every such room, cabinet or enclosure to be kept clean and all fans, ducts, trunks and enclosures of the ventilation system contemplated in sub-regulation (3) to be kept clean and in good working order: Provided that any cleaning, scraping or scouring shall be done with implements that cannot cause sparking if the concentration of the vapour exceeds 25 per cent of the lower explosive limit of that vapour.
- (10) The Contractor shall cause every flammable liquid store to be-
- a) separated by means of fire-resisting material with a fire-resistance of two hours from any room, cabinet or enclosure contemplated in sub-regulation (2);
  - b) constructed of fire-resisting material with a fire-resistance of two hours;
  - c) constructed in such a way that, in case of spillage, a volume of the flammable liquid in question equal to the quantity of flammable liquid ordinarily kept in store plus 10 per cent of that quantity, can be contained;
  - d) ventilated to the open air in such a manner that vapour cannot accumulate inside the store; and
  - e) clearly marked with a sign indicating that it is such a store and also indicating the amount of flammable liquid which may be stored therein.
- (11) Taking into account the construction and location of the premises in question and the quantity and types of flammable liquids involved, the Contractor shall install an adequate amount of efficient fire-fighting equipment in suitable locations in and around every building in which such substances are used, handled or stored, or as may be recommended by the fire chief of the local authority concerned.
- (12) The provisions of this regulation shall not be construed as applying to the use of flammable liquids in the course of or in connection with building work: Provided that every Contractor engaged in building work shall ensure that, where flammable liquids are used or applied at the workplace concerned, this is done in such a manner that no fire or explosion hazard is created, and that the workplace is effectively ventilated: Provided further that where the workplace cannot be ventilated effectively the

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

Contractor shall provide every employee involved with a respirator, mask or breathing apparatus of a type approved by the chief inspector, and shall take steps to ensure that every such employee, while using or applying flammable liquid, uses the apparatus supplied to him.

**PA 14.5 Work in Confined Spaces**

- (1) The Contractor or user of machinery shall take steps to ensure that a confined space is entered by an employee or other person only after the air therein has been tested and evaluated by a person who is competent to pronounce on the safety thereof, and who has certified in writing that the confined space is safe and will remain safe while any person is in the confined space, taking into account the nature and duration of the work to be performed therein.
- (2) Where the provisions of sub-regulation (1) cannot be complied with, the Contractor or user of machinery, as the case may be, shall take steps to ensure that any confined space in which there exists or is likely to exist a hazardous gas, vapour, dust or fumes, or which has or is likely to have, an oxygen content of less than 20 per cent by volume, is entered by an employee or other person only when-
  - a) subject to the provisions of sub-regulation (3), the confined space is purged and ventilated to provide a safe atmosphere therein and measures necessary to maintain a safe atmosphere therein have been taken; and
  - b) the confined space has been isolated from all pipes, ducts and other communicating openings by means of effective blanking other than the shutting or locking of a valve or a cock, or, if this is not practicable, only when all valves and cocks which are a potential source of danger have been locked and securely fastened by means of chains and padlocks.
- (3) Where the provisions of sub-regulation (2) (a) cannot be complied with, the Contractor or user of machinery shall take steps to ensure that the confined space in question is entered only when the employee or person entering is using breathing apparatus of a type approved by the chief inspector and, further, that-
  - a) the provisions of sub-regulation (2) (b) are complied with;
  - b) any employee or person entering the confined space is using a safety harness or other similar equipment, to which a rope is securely attached which reaches beyond the access to the confined space, and the free end of which is attended to by a person referred to in paragraph (c).
  - c) at least one other person trained in resuscitation is and remains in attendance immediately outside the entrance of the confined space in order to assist or remove any person or persons from the confined space, if necessary; and
  - d) effective apparatus for breathing and resuscitation of a type approved by the chief inspector is available immediately outside the confined space.
- (4) The Contractor or user of machinery shall take steps to ensure that all persons vacate a confined space on completion of any work therein.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

- (5) Where the hazardous gas, vapour, dust or fumes contemplated in sub regulation (2) are of an explosive or flammable nature, the Contractor or user of machinery shall further take steps to ensure that such a confined space is entered only if-
- a) the concentration of the gas, vapour, dust or fumes does not exceed 25 per cent of the lower explosive limit of the gas, vapour, dust or fumes concerned where the work to be performed is of such a nature that it does not create a source of ignition; or
  - b) such concentration does not exceed 10 per cent of the lower explosive limit of the gas, vapour, dust or fumes where other work is performed.
- (6) The provisions of this regulation shall mutatis mutandis also apply, in so far as they can be so applied, to any work which is performed in any place or space on the outside of and bordering on or in the immediate vicinity of, any confined space, and in which place or space, owing to its proximity to the confined space, any hazardous article, oxygen-deficient atmosphere or dangerous concentration of gas, vapour, dust or fumes may occur or be present.

**PA 14.6 Work in Elevated Positions**

The Contractor shall not permit any person to work in an elevated position, and no person shall work in an elevated position, unless such work is performed safely from a ladder or scaffolding, or from a position where such person has been made as safe as if he were working from scaffolding.

**PA 14.7 Working in Danger of Engulfment**

- 1) The Contractor shall not require or permit any person to, and no person shall, enter any place from or into which solid or particulate material is being discharged where a danger exists of a person being engulfed by such solid or particulate material, unless-
- a) such a person is provided with and properly uses a safety belt and rope;
  - b) at least one other person who has been properly instructed, is and remains in attendance outside such place to keep the persons therein under continuous observation in order to render assistance in case of emergency; and
  - c) the precautions prescribed by regulation 5 of these regulations are taken if dangerous gas, fumes, dust or vapour may be present in such a place.

**PA 14.8 Stacking of Articles**

- (1) The Contractor shall not permit the building of stacks, which consist of successive tiers, one on top of another, unless-
- a) the stacking operation is executed by or under the personal supervision of a person with specific knowledge and experience of this type of work;
  - b) the base is level and capable of sustaining the weight exerted on it by the stack;
  - c) the articles in the lower tiers are capable of sustaining the weight exerted on them by the articles stacked above them;



**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

---

- d) all the articles which make up any single tier are consistently of the same size, shape and mass;
  - e) pallets and containers are in good condition; and
  - f) any support structure used for the stacking of articles is structurally sound and can support the articles to be stacked on it.
- (2) The Contractor shall not permit-
- a) articles to be removed from a stack except from the topmost tier or part of that tier; and
  - b) anybody to climb onto or from a stack, except if the stack is stable and the climbing is done with the aid of a ladder or other safe facility or means.
- (3) The Contractor shall take steps to ensure that-
- a) persons engaged in stacking operations do not come within reach of machinery which may endanger their safety;
  - b) stacks that are in danger of collapsing are dismantled immediately in a safe manner; and
  - c) the stability of stacks is not endangered by vehicles or other machinery or persons moving past them.
- (4) Unless a stack is otherwise supported, the Contractor shall take steps to ensure that tiers of stacked material consisting of sacks, cases, cartons, tins or similar containers-
- a) are secured by laying up articles in a header and stretcher fashion and that corners are securely bonded; and
  - b) are stepped back half the depth of a single container at least every fifth tier or that, alternatively, successive tiers are stepped back by a lesser amount: Provided that at least the same average angle of inclination to the vertical is achieved: Provided further that where the containers are of a regular shape and their nature and size are such that the stack will be stable, they may be stacked with the sides of the stack vertical if the total height of the stack does not exceed three times the smaller dimension of the underlying base of the stack.
- (5) Notwithstanding the provisions of sub-regulation (4), free standing stacks that are built with the aid of machinery may, with the approval of an inspector, be built to a height and in a manner permitted by the nature of the containers being stacked: Provided that-
- a) the stacks are stable and do not overhang; and
  - b) the operator of the stacking machinery is rendered safe as regards falling articles.

**PA 14.9 Welding, Flame Cutting, Soldering and Similar Operations**

- (1) The Contractor shall not permit welding or flame cutting operations to be undertaken unless-
- a) the person operating the equipment has been fully instructed in the safe operation and use of such equipment and in the hazards which may arise from its use;
  - b) effective protection is provided and used for the eyes and respiratory system and, where necessary, for the face, hands, feet, legs, body and clothing of persons performing such operations, as well as against heat, incandescent or flying particles or dangerous radiation;

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

---

- c) leads and electrode holders are effectively insulated; and
  - d) the workplace is effectively partitioned off where practicable and where not practicable all other persons exposed to the hazards contemplated in paragraph (b) are warned and provided with suitable protective equipment.
- (2) The Contractor shall not permit welding or flame cutting operations to be undertaken in a confined space, unless-
- a) effective ventilation is provided and maintained; or
  - b) masks or hoods maintaining a supply of safe air for breathing are provided and used by the persons performing such operations.
- (3) The Contractor shall not permit electric welding to be undertaken in wet or damp places, inside metal vessels or in contact with large masses of metal, unless-
- a) the insulation of the electrical leads is in a sound condition;
  - b) the electrode holder is completely insulated to prevent accidental contact with current-carrying parts;
  - c) the welder is completely insulated by means of boots, gloves or rubber mats; and
  - d) at least one other person who has been properly instructed to assist the welder in case of an emergency is and remains in attendance during operations, provided that the provisions of this sub-regulation shall not apply to a welding process where the maximum voltage to earth does not exceed 50 volts.
- (4) The Contractor shall not permit welding, flame cutting, grinding, soldering or similar work to be undertaken in respect of any tube, tank, drum, vessel or similar object or container where such object or container-
- a) is completely closed, unless a rise in internal pressure cannot render it dangerous; or
  - b) contains any substance which, under the action of heat, may-
    - i. ignite or explode; or
    - ii. react to form dangerous or poisonous substances,unless a person who is competent to pronounce on the safety thereof has, after examination, certified in writing that any such danger has been removed by opening, ventilating or purging with water or steam, or by any other effective means.
- (5) Where hot work involving welding, cutting, brazing or soldering operations is carried out at places, other than workplaces which have been specifically designated and equipped for such work, the Contractor shall take steps to ensure that proper and adequate fire precautions are taken.

**PA 14.10 Ladders**

- (1) The Contractor shall ensure that every ladder is constructed of sound material and is suitable for the purpose for which it is used, and-
- a) is fitted with non-skid devices at the bottom ends and hooks or similar devices at the upper ends of the stiles which shall ensure the stability of the ladder during normal use; or

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

---

- b) is so lashed, held or secured whilst being used as to ensure the stability of the ladder under all conditions and at all times.
- (2) The Contractor shall not permit a ladder to be used if it-
- a) has rungs fastened to the stiles only by means of nails, screws, spikes or in like manner; or
  - b) has rungs which have not been properly let into the stiles: Provided that in the case of welded ladders or ladders of which the rungs are bolted or riveted to the stiles, the rungs need not be let into the stiles; or
  - c) has damaged stiles, or damaged or missing rungs.
- (3) The Contractor may not permit that-
- a) a ladder which is required to be leaned against an object for support be used which is longer than 9 m; and
  - b) except with the approval of an inspector, the reach of a ladder be extended by fastening together two or more ladders: Provided that the provisions of this sub regulation shall not apply to extension or freestanding ladders.
- (4) In the case of wooden ladders the Contractor shall ensure that-
- a) the ladders are constructed of straight grained wood, free from defects, and with the grain running in the length of the stiles and rungs; and
  - b) the ladders are not painted or covered in any manner, unless it has been established that there are no cracks or other inherent weaknesses: Provided that ladders may be treated with oil or covered with clear varnish or wood preservative.
- (5) When work is done from a ladder, the Contractor shall-
- a) take special precautionary measures to prevent articles from falling off; and
  - b) provide suitable sheaths or receptacles in which hand tools shall be kept when not being used.
- (6) The Contractor shall ensure that a fixed ladder which exceeds 5 m in length and is attached to a vertical structure with an inclination to the horizontal level of 75° or more-
- a) has its rungs at least 150 mm away from the structure to which the ladder is attached; and
  - b) is provided with a cage which-
    - i. extends from a point not exceeding 2,5 m from the lower level to a height of at least 900 mm above the top level served by the ladder; and
    - ii. shall afford firm support along its whole length for the back of the person climbing the ladder, and for which purpose no part of the cage shall be more than 700 mm away from the level of the rungs: Provided that the foregoing provisions of paragraph (b) shall not apply if platforms, which are spaced not more than 8 m apart and suitable for persons to rest on, are provided.

**PA 14.11 Ramps**

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

---

- (1) The Contractor shall ensure that every ramp-
  - a) is constructed in accordance with accepted technical standards;
  - b) has a safety factor of at least two with respect to the load it is expected to carry: Provided that the design makes sufficient provision for the load on the ramp as a result of the turning, braking and acceleration of vehicles, if the ramp is used for vehicles; and
  - c) has an inclination to the horizontal level of not more than 34° or one vertical to one and one half horizontal.
  
- (2) The Contractor shall ensure that every ramp-
  - a) the inclination of which renders additional foothold necessary, but in every case where the inclination is more than 14° or one vertical to four horizontal, is provided with stepping laths which-
    - i. are placed at suitable intervals; and
    - ii. extend the full width of the ramp: Provided that the stepping laths may be interrupted over a width not exceeding 230 mm to facilitate the movement of barrows; and
  - b) which is higher than 2 m and is provided on both sides with-
    - i. substantial guard rails which are at least 900 mm and not exceeding 1000 mm in height, and
    - ii. toe-boards that are at least 150 mm high and so affixed that no open space exists between the toe-board and the ramp.

**PA 14.12 Scaffold framework**

- (1) The Contractor shall ensure that-
  - a) scaffold standards are properly propped against displacement and are secured vertically on firm foundations: Provided that putlog scaffolds shall incline slightly towards the structure;
  - b) steel scaffold standards with "heavy", "medium", "light" or "very light" platform loadings which shall not exceed 320, 240, 160 and 80 kg/m<sup>2</sup>, respectively, are spaced not more than 1.8 m, 2 m, 2.5 m and 3 m apart, respectively; and
  - c) wooden scaffold standards are spaced not more than 3m apart;
  - d) ledgers are spaced vertically not more than 2.1 m apart;
  - e) putlogs or transoms-
    - i. which do not support a platform, are spaced at the same distances as the distances prescribed in paragraph (b) in respect of scaffold standards;
    - ii. which support a platform, are spaced not more than 1,25 m apart if the platform is constructed of solid timber boards; and
  - f) every part of a wooden scaffold frame has a diameter of at least 75 mm or a section of similar strength.
  
- (2) The Contractor shall not permit a scaffold to be used unless it-
  - a) is securely and effectively braced to ensure stability in all directions;

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

---

- b) is secured at suitable vertical and horizontal distances to the structure to which work is being done, unless it is designed to be completely free-standing;
  - c) is so constructed that it has a throughout factor of safety of at least two; and
  - d) is inspected at least once a week and every time after bad weather by a person who has adequate experience in the erection and maintenance of scaffolds, and all findings are recorded in a register or report book.
- (3) The Contractor shall not permit that-
- a) a scaffold with a supporting wooden framework exceeds a height of 10 m; and
  - b) a scaffold is erected, altered or dismantled by or under the supervision of a person other than a person who has had the necessary training and experience of such work and who has been appointed by the Contractor in writing for this purpose.

**PA 14.13 Scaffold platforms**

- (1) The Contractor shall ensure that-
- a) every plank of a solid wooden scaffold platform is at least 275 mm wide and 38 mm thick;
  - b) every plank which forms part of a scaffold platform is supported at distances not exceeding 1.25 m, and its ends are projected not less than 70 mm and not more than 200 mm beyond the last prop;
  - c) every plank of a scaffold platform is firmly secured to prevent its displacement; and
  - d) every platform is so constructed as to prevent materials and tools from falling through.
- (2) The Contractor shall ensure that every scaffold platform-
- a) with "heavy", "medium", "light" or "very light" platform loadings is not less than 1 125 mm and not more than 1 380 mm, not less than 1 125 mm and not more than 1 150 mm, not less than 900 mm and not more than 1 150 mm, and not less than 675 mm and not more than 1 150 mm, respectively, wide: Provided that where a platform is used only as a gangway, a platform width of 450 mm shall be sufficient;
  - b) which is more than 2m above the ground is on all sides, except the side facing the structure, provided with-
    - i. substantial guard rails of at least 900 mm and not exceeding 1 000 mm in height; and
    - ii. toe-boards which are at least 150 mm high from the level of the scaffold platform and so affixed that no open space exists between the toe-boards and the scaffold platform: Provided that if the toe-boards are constructed of timber, they shall be at least 25 mm thick;
  - c) is not more than 75 mm from the structure: Provided that where workmen must sit to work, this distance may be increased to not more than 300 mm; and
  - d) is kept free of waste, projecting nails or any other obstructions, and is kept in a non-slip state.
- (3) The Contractor shall not permit that a working platform which is higher than 600 mm be supported on a scaffold platform, and shall provide an additional guard rail of at

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

least 900 mm and not exceeding 1 000 mm in height above every such working platform.

- (4) The Contractor shall ensure that convenient and safe access is provided to every scaffold platform, and where the access is a ladder, the ladder shall project at least 900 mm beyond the top of the platform.

**PA 14.14 Suspended scaffolds**

- (1) The Contractor shall ensure that the outriggers of each suspended scaffold-
- a) are constructed of steel or any other material of similar strength and have a factor of safety of at least four with respect to the load it is to carry;
  - b) have an overhang of not more than 1,8m beyond the edge of the structure and are of such length that the counteracting length can be anchored securely;
  - c) are, otherwise than by means of weights at the inner-ends, properly propped, suitably spaced and firmly anchored: Provided that an inspector may grant permission that outriggers may be anchored by means of weights; and
  - d) are provided with stop or other effective devices at the outer-ends to prevent the displacement of ropes.
- (2) The Contractor shall ensure that the working platform of every suspended scaffold is suspended by-
- a) pulley-blocks, sheaves, winches or hoists of the correct size for the ropes being used;
  - b) at least two independent steel wire ropes in the case of a working platform which is not wider than 912 mm, and at least four independent steel wire ropes in the case of a working platform which is 912 mm and wider; and
  - c) steel wire ropes of which the factor of safety is at least ten with respect to the maximum load which each rope is to carry.
- (3) The Contractor shall ensure that-
- a) the hand or power-driven machinery used for the lifting or lowering of the working platform of a suspended scaffold is so constructed and maintained that an uncontrolled movement of the working platform cannot occur;
  - b) the machinery referred to in paragraph (a) is so situated that it is easily accessible for inspection;
  - c) the rope connections to the outriggers are vertically above the connections to the working platform; and
  - d) in the case of a working platform suspended by two ropes only, the connections of the ropes to the working platform are of such height above the level of the working platform as to ensure the stability of the working platform.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

- (4) The Contractor shall ensure that the working platform of every suspended scaffold-
- is at least 456 mm and not exceeding 1.8 m in width;
  - is suspended as near as possible to the structure to which work is being done and, except when light work is being done, is secured at every working position to prevent horizontal movement between the working platform and the structure;
  - is on all sides, except the side facing the structure, provided with substantial guard rails of at least 900 mm and not exceeding 1 000 mm in height above the level of the working platform: Provided that in the case of a working platform suspended by two ropes only, the guard rails shall be on all sides; and
  - is on all sides provided with toe-boards which are at least 150 mm high from the level of the working platform and so affixed that no open space exists between the toe-boards and the working platform: Provided that if the toe-boards are constructed of timber, they shall be at least 25 mm thick.

**PA 14.15 Trestle scaffolds**

- The Contractor shall not use a trestle scaffold, or permit it to be used, unless-
  - it is soundly constructed of solid material; and
  - all reasonable precautionary measures have been taken to prevent the unexpected spreading of its supporting legs when it is in use.
- The Contractor shall not use a trestle scaffold or permit it to be used, if it-
  - is higher than 3 m; or
  - consists of more than two tiers.

**PA 14.16 Minimum Contents of a First-Aid Box**

- |          |   |
|----------|---|
| Item 1:  | Wound cleaner/antiseptic (100 ml).  |
| Item 2:  | Swabs for cleaning wounds.  |
| Item 3:  | Cotton wool for padding (100 g).  |
| Item 4:  | Sterile gauze (minimum quantity 10).  |
| Item 5:  | 1 Pair of forceps (for splinters).  |
| Item 6:  | 1 Pair of scissors (minimum size 100 mm).                                   |
| Item 7:  | 1 Set of safety pins.   |
| Item 8:  | 4 Triangular bandages.  |
| Item 9:  | 4 Roller bandages (75 mm × 5 m).  |
| Item 10: | 4 Roller bandages (100 mm × 5 m).   |
| Item 11: | 1 Roll of elastic adhesive (25 mm × 3 m).                                   |
| Item 12: | 1 Non-allergenic adhesive strip (25 mm × 3 m).                              |
| Item 13: | 1 Packet of adhesive dressing strips (minimum quantity, 10 assorted sizes). |
| Item 14: | 4 First aid dressings (75 mm × 100 mm).                                     |
| Item 15: | 4 First aid dressings (150 mm × 200 mm).                                    |
| Item 16: | 2 Straight splints.   |
| Item 17: | 2 Pairs large and 2 pairs medium disposable latex gloves.                   |
| Item 18: | 2 CPR mouth pieces or similar devices.                                      |

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

**PB VALVES (MEDIUM-PRESSURE)****PB 1 SCOPE**

This specification covers the supply and installation of gate valves up to 600 mm diameter, air valves up to 150 mm diameter and reflux valves for use on pipelines transporting potable water.

**PB 2 INTERPRETATIONS****PB 2.1 References****PB 2.1.1 *Code of Practice***

The recommendations of SANS (SABS 0120) 10120-5 L have been incorporated into this specification as far as they are applicable.

**PB 3 MATERIALS****PB 3.1 General**

Valves shall be of the types specified in the schedule or in the project specification and, unless otherwise required in terms of the project specification, they shall be capable of withstanding the applicable test pressures specified in Clause PB 7. All valves shall be supplied complete with coupling and jointing material.

Unless otherwise stated in the Bill of Quantities or otherwise not applicable, all valves shall be supplied with operating caps.

Satisfactory temporary end covers shall be provided to protect threads, flanges and prepared ends of valves from damage during transportation and handling on site.

Valves shall be so transported, stored and handled as to prevent damage. Valves damaged in any way shall be removed from the site.

**PB 3.2 Durability of Valves**

The valves shall be suitable for use on domestic water reticulation in the area in which they are used and all materials utilised in the construction of the valves shall be resistant against corrosion from the water in the area.

**PB 3.3 Gate Valves****PB 3.3.1 *General***

All gate valves shall comply with the requirements of SANS (SABS) 664:2011 and shall carry the SANS (SABS) mark. The valves are to be cast iron fitted with non-rising spindles and all valves shall be of the resilient seal type except those that are fitted for scour purposes.



**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

**PB 3.3.2      *Direction of Rotation***

Unless otherwise stated in the Bill of Quantities or project specification, the direction of spindle rotation for valve closing will be clockwise when viewed from above.

**PB 3.3.3      *Class of Valves***

Gate valves shall be of a class commensurate with a maximum working pressure as defined by the Engineer or as shown on the drawings.

**PB 3.3.4      *Valve Trim***

The valve trim shall be Type B, gunmetal trim, to SANS (SABS) 664:2011 i.e. gunmetal seats (body and gate), bronze spindle, and gunmetal spindle nut.

**PB 3.3.5      *Seat Rings***

The seating rings on valves up to and including 300 mm diameter shall be pressed into undercut recesses, machined into both the gate and valve body in such a manner that the permanent distortion of the seating ring prevents them from becoming loose.

For valves larger than 300 mm diameter, the gunmetal-seating ring shall be pinned into a rectangular recess machined in both the valve gate and body.

**PB 3.3.6      *Auxiliary Fittings***

Unless otherwise stated in the Project Specification, valves of 300 mm diameter and larger shall be fitted with the following auxiliary fittings:

***PB 3.3.6.1      Drain Plugs***

300 mm diameter valves and larger shall be supplied with gunmetal drain plugs screwed into the lowest point of the valve and the valve body shall be suitably drilled and tapped to accept the drain plug. The plug must be in position when the test pressure is applied.

***PB 3.3.6.2      Ball Bearing Thrust Collars***

300 mm diameter valves and larger shall be fitted with a ball bearing race fitted on the top and bottom of the thrust collars. The ball bearing races shall be totally enclosed in a grease packed cover, which shall be sealed to prevent the egress of grease. Provision shall be included for lubricating the ball races and the lubrication arrangement shall allow for greasing while the valve is under pressure.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**
***PB 3.3.6.3 Spur Gearing***

Where considered necessary by the supplier, gate valves of 300 mm diameter and larger, shall be fitted with spur gearing and an indicator, clearly visible from above, to show the position of the valve gate. The spur gearing must be fitted with a cast iron cap. The gear ratios shall comply with the valves given in the table below.

Size of valve (mm)	Spur gear ratio	Size of valve (mm)	Spur gear ratio
300	2:1	450	3:1
350	2:1	500	3:1
375	2.5:1	525	3:1
400	2.5:1	600	3:1

***PB 3.3.6.4 By-Pass Unit***

Valves of 300 mm diameter and larger shall be fitted with a by-pass valve, fitted either integral with the valve body or to suitable short double flanged tailpieces. All fittings used for the by-pass arrangement shall be capable of withstanding the test pressure of the main valve and shall comply with the conditions of this specification. By-pass sizes shall comply with the values given in the table below.

Size of valve (mm)	By-pass size (mm)	Size of valve (mm)	By-pass size (mm)
300	40	450	75
350	40	500	75
375	50	525	75
400	50	600	75

**PB 3.4 Butterfly Valves**
***PB 3.4.1 General***

Buttery valves shall generally comply with the requirements of SANS (SABS) 1849:2008 – Butterfly Valves for General Purposes except where a specific product is specified.

The butterfly valves required for this project shall be the AMRI-KSB ISORIA 16 series, flanged or wafer type as detailed on the drawings or as scheduled. The valves shall be provided with ductile iron bodies, 13% Cr stainless steel shafts, stainless steel discs and shall be lined with special formulation E.P.D.M. lining.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

**PB 3.5 Air Valves**

All air valves shall be either 16, 25 or 40 bar rated 50 mm, 80 mm or 100 mm dia "Vent-O-Mat" RBX double acting anti-slam air valves as shown on the drawings.

**PB 3.5.1 Isolating Valves for Air Valves**

Air valves shall be provided and supplied complete with isolating valves of suitable pressure rating entirely reliable in operation for the shutting down of the air valve for its complete inspection and removal and replacement of the balls or other parts as required.

- a) The isolating valve shall either be 16, 25 or 40 bar rated 50 mm dia lever operated ball valves to SANS (SABS) 1056-3:2012 or 16, 25 or 40 bar rated 80 or 100 mm dia AVM or similar approved lever operated butterfly valves incorporated in the inlet stem to the air valve and jointed as specified or shown on the drawings.
- b) The direction of rotation of the isolating valve, unless otherwise stated in the Project Specification or Bill of Quantities, shall be clockwise closing, when viewed from above.

**PB 3.6 Flanges**

Flanges shall be to the dimensions and drilled as for gate valves according to SANS (SABS) 664:2011.

**PB 3.7 Reflux Valves**

**PB 3.7.1 General**

Unless otherwise specified, reflux valves shall be flange ended and shall comply with the requirements of SABS 144, Cast Iron Single Door Reflux Valves or SABS 192 Cast Steel Single Door Reflux Valves as applicable and shall bear the SABS mark.

**PB 3.7.2 Class of Valve and Body**

The working pressure and class of valve shall be as stated in the Bill of Quantities or Project Specification and shall be according to the table below.

Class	Maximum working pressure	Body construction
10	1.0 Mpa	Cast iron
16	1.6 Mpa	Cast iron
25	2.5 Mpa	Cast steel
40	4.0 Mpa	Cast steel
100	10.0 Mpa	Cast steel

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

**PB 3.7.3     *Flange Drilling***

Flanges shall be drilled and bolted according to the requirements of SABS 144 and SABS 192 as applicable. Precision bolts and nuts unless otherwise stated in the Project Specification are not required.

**PB 3.7.4     *Valve Trim***

The trim of reflux valves shall be as follows:

- a) Cast iron reflux valves shall have stainless steel trims;
- b) Cast steel reflux valves shall have stainless steel seats and stainless steel hinge pins.

**PB 3.7.5     *Finish***

All cast iron parts, except flange faces shall be thoroughly cleaned and an epoxy primer applied, followed by one or more coats of high-build epoxy material to give a total dry film thickness of at least 250 µm applied in conformity with the manufacturer's recommendations.

**PB 3.8     *Surge Anticipation Valve***

The Surge Anticipating Valve shall open in response to the pressure drop associated with abrupt pump stoppage to dissipate the returning high pressure wave, eliminating the surge. It shall smoothly close drip tight as quickly as the relief feature allows, while preventing closing surge. The valve shall also relieve excessive system pressure.

**PB 3.8.1     *Main Valve***

The main shall be a centre guided, diaphragm actuated globe valve of oblique Y –pattern design. The body shall have a replaceable, raised stainless steel seat ring. The valve shall have an unobstructed flow path, with no stem guides, bearings, or supporting ribs. The body and cover shall be cast iron and epoxy coated. The valve shall be flanged. All external bolts, nuts, and studs shall be Duplex® coated. All valve components shall be accessible and serviceable without removing the valve from the pipeline.

**PB 3.8.2     *Actuator***

The actuator assembly shall be double chambered with an inherent separating partition between the lower surface of the diaphragm and the main valve. The entire actuator assembly (seal disk to top cover) shall be removable from the valve as an integral unit. The stainless steel valve shaft shall be centre guided by a bearing in the separating partition. The replaceable radial seal disk shall include a resilient seal and shall be capable of accepting a V-Port Throttling Plug by bolting.

**PB 3.8.3     *Control System***

The control system shall consist of two adjustable 2-way pilots, a needle valve, a flow stem, a cock valve, and a filter. All fittings shall be forged brass or stainless steel. The assembled valve shall be hydraulically tested.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

**PB 3.8.4      *Quality Assurance***

The valve manufacturer shall be certified according to the ISO 9001 Quality Assurance Standard. The main valve shall be certified as a complete drinking water valve according to NSF, WRAS, and other recognised standards.

**PB 3.9      *Gauges*****PB 3.9.1      *General***

Scale markings shall be radial, plain, straight, black lines on a white background and shall be spaced so that one scale division represents approximately 1% - 1,5 % of the maximum scale in values of 1,2 and 5 multiplied by any power of 10.

On circular gauges the scale shall be concentric and the maximum and minimum scale values shall be at the bottom of the gauge, with the scale symmetrically disposed about the vertical centre line of the gauge.

The tip of the pointer shall be of such length and width that the gauge may be read to a value within the accuracy of the gauge and shall preferably be of the knife edge type. The tip of the pointer shall be as close as practical to the dial. Wherever applicable, gauges shall be clearly marked in green to indicate the normal operating range and in red to indicate the maximum permissible value or non-permissible range of values.

The dial shall be clearly marked with the designation of the units of scale and the gauge shall be clearly labelled with the duty it is performing.

All pressure connections shall be provided with an isolating cock of the type, which has the handle in line with the bore of the cock when the cock is open.

Gauges shall be mounted vertically and in such a position that it can easily be read from floor level. Where this cannot be done the Engineer's requirements shall be ascertained.

**PB 3.9.2      *Pressure Gauges***

Pressure gauges shall comply with BS 1780 or equivalent for Industrial Gauges shall be calibrated in kilopascals and shall be not less than 100 mm diameter. Full-scale reading shall be between 1,5 and 2 times maximum actual operating pressure except where otherwise specified.

All gauges shall be suitable for continuous operation and shall be liquid filled where fluctuations in pressure may cause damage. Where blockages of the gauge are possible, diaphragm seals with large bases and a facility for cleaning shall be provided. This shall apply in all cases where liquids bearing solids or sludge are handled.

Gauges shall not be mounted directly on equipment subject to vibration.

For dry locations indoors, the casing may be plastic or epoxy coated aluminium. For damp indoor locations, particularly in any location where sewage is flowing, and for all locations outdoors, the gauges shall be weatherproof and have AISI 316 stainless steel cases.

Isolating and bleed cocks shall be provided for each pressure gauge, except on installations for hazardous fluids.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

**PB 4 PLANT**

In the assembly and coupling up of valves, correct tools and spanners of the correct size designed for the function they are to fulfil shall be used. The indiscriminate use of pipe wrenches will not be permitted and any fittings damaged by the use of incorrect tools shall be removed from the site.

**PB 5 CONSTRUCTION**

The applicable clause of SANS (SABS) 1200 L: Medium Pressure Pipelines shall apply unless otherwise stated in the Project Specifications.

**PB 6 TOLERANCES**

The dimensional tolerances specified in the following standard specifications shall apply:

SABS 144	Cast Iron Single-Door Reflux Valves
SANS (SABS) 664:2011	Cast Iron Gate Valves for Waterworks
SABS 192	Cast Steel Single-Door Reflux Valves

**PB 7 TESTING**

The testing of the various valves shall be according to the relevant SANS (SABS) specifications 144, 664, 192 and 128 for the works test.

Once installed in pipelines, the valves shall be subject to the same hydraulic tests and pressures specified for the pipelines.

**PB 8 MEASUREMENT AND PAYMENT**

The applicable clauses of SANS (SABS) 1200 L shall apply unless otherwise stated in the Project Specification.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

**PC MILD STEEL PIPES AND FITTINGS****PC 1 STEEL PIPES & FITTINGS OF NOMINAL DIAMETER UP TO 250 MM****PC 1.1 Scope**

This specification applies to the fabrication, welding and galvanizing of mild steel pipes and fittings of nominal diameter up to 250 mm.

**PC 1.2 Fabrication**

- a) All fabricated steel pipe of nominal diameter up to 250 mm to be manufactured using ASTM A106 (Standard Schedule 40) Seamless Pipes in conjunction with ASTM A234 Grade WPB butt weld fittings to ANSI B16.9 and BS1640 and welded in accordance with SANS 15614-1: 2007 and/or ISO 15614-1: 2004.
- b) The supply and installation of all steel pipe work to be in accordance with SANS 1200L.
- c) All steel pipe to have a minimum wall thickness of 4.5mm.
- d) All steel pipe work and fittings for welded assemblies/specials to be sand blasted internally and externally prior to – and after - being welded together (refer to PC 1.4 item a)).
- e) All gaskets to be full-faced "Klinger" or similar approved.
- f) Allowances have been made in pipe and fitting assembly lengths for 2mm spaces between flange faces for gaskets and 10mm spaces between the pipe end and flange face for flange adaptors.
- g) All pipe work and fittings dimensions to be checked on site and any discrepancies reported to the Engineer, prior to any installation/assembly taking place.
- h) All pipework, including puddle flanges, passing through brickwork or concrete walls or buried underground to be "Denso" wrapped, unless otherwise directed in writing.

**PC 1.3 Welding**

The specification and qualification of welding procedures for metallic materials, including welding procedure tests, to be in accordance with **SANS 15614-1: 2007** and/or **ISO 15614-1: 2004**.

Apart from reference to the above, the following documentation is required prior to the evaluation of an offer to tender or prior to any welding taking place:

- a) A preliminary welding procedure specification.
- b) The qualification or appropriate range of qualifications of the welder or welding operator who undertakes the welding procedure.
- c) Documentation relating to the above, including a copy of a current certificate of competence and photograph of the welder or welding operator.

After the award of the tender, but prior to installing the initial batch of pipe work, the following must be presented to the Engineer for approval:

- a) A signed and numbered radiographic report and visual copy of the x-rays of at least two butt welds carried out on the initial pipe work. (Items to be numbered).

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

- b) All remaining welds to be supported by documentation relating to a solvent dye penetration test of each weld. (Both document and item to be numbered accordingly).

NB: The Engineer reserves the right to call for further radiographic procedures if deemed necessary. All further batches of pipe work must be accompanied by written proof of dye penetration tests of all welds.

**PC 1.4 Galvanizing**

- a) All welded assemblies to be sand blasted internally and externally prior to hot dip galvanizing. NB: This is in addition to the sandblasting of steel work and fittings prior to the welding procedure (refer to PC 1.2 item d)).
- b) All welds to be inspected and approved by the Engineer prior to hot dip galvanizing, unless otherwise directed in writing.
- c) All pipe work and fittings including bolts, nuts and washers to be hot dip galvanized to **SANS 121 - ISO 1461**.
- d) All nuts to be oversized to allow for hot dip galvanizing.
- e) All damaged hot dip galvanized surfaces, or all ends of pipes cut to suit on site, to be treated with "Zincfix" or similar approved epoxy repair coating, to manufacturer's specification.

NB: Documentation relating to the above must accompany each batch of galvanized pipe work and fittings delivered to site (each item to be listed).

It is also a recommendation that the galvanizer should be a member of the Hot Dip Galvanizers Association of Southern Africa. This allows the Contractor some recourse in the case of delays or rejection of items.

**PC 2 STEEL PIPES & FITTINGS OF NOMINAL DIAMETER GREATER  
THAN 250 MM****PC 2.1 Scope**

This specification applies to the fabrication, welding and galvanizing of mild steel pipes and fittings of nominal diameter greater than 250 mm.

**PC 2.2 Fabrication**

- a) All fabricated steel pipe work of greater than 250 mm ND to be Grade C carbon steel in accordance with SABS 719-2011.
- b) The supply and installation of all steel pipe work to be in accordance with SANS 1200L.
- c) Steel pipe wall thickness as specified in SANS 719, depending on pipe ND to be used. Minimum pipe wall thickness to be 4.5 mm. Whereby SANS 719 specification is deemed insufficient, API5L may be used, in line with minimum thickness required to match pressure rating, as approved by Engineer.
- d) All steel pipe work and fittings for welded assemblies/specials to be sand blasted internally and externally prior to being welded together.



**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

---

- e) All gaskets to be full-faced "Klinger" or similar approved.
- f) Allowances have been made in pipe and fitting assembly lengths for 3 mm spaces between flange faces for gaskets. For flange adaptors, spaces between the pipe end and flange face have been allowed in accordance with the manufacturer's specifications.
- g) All pipe work and fittings dimensions to be checked on site and any discrepancies reported to the Engineer, prior to any installation/assembly taking place.
- h) All pipework, including puddle flanges, passing through brickwork or concrete walls or buried below ground to be "Denso" wrapped, unless otherwise directed in writing.

**PC 2.3 Welding**

As per PC 1.3.

**PC 2.4 Linings and Coatings****PC 2.4.1 Surface Preparation**

- a) Remove all weld splatter, sharp edges and protrusions;
- b) Pipes and fittings to be in rust condition A to C of Swedish Standard SIS 05 5900. Pipes and fittings in rust condition D will be rejected.

**PC 2.4.2 Cleaning of Surface**

- a) Surfaces to be degreased with water based solvent degreaser in accordance with SANS 1244;
- b) Surfaces to be thoroughly washed with clean potable water to remove all residues and allowed to dry.

**PC 2.4.3 Blast Cleaning**

- a) Surfaces to be sand-blasted in accordance with Swedish standard SIS 05 5900 (or ISO 8501-1);
- b) The pipe surface shall not be contaminated by oil, grease or any other contaminants harmful to the lining and coatings process.

**PC 2.4.4 Pipe Lining**

- a) Pipe lining to be solvent-free epoxy in accordance with ANSI/AWWA C210-97 "Liquid-Epoxy Coating Systems for the Interior and Exterior of Steel Water pipelines";
- b) The dry film thickness to be a minimum of 400 and a maximum of 600 microns and to be free from sags and runs.

**PC 2.4.5 Pipe Coating**

- a) Pipe coating to be solvent-free polyurethane in accordance with ANSI/AWWA C222-99 "Polyurethane Coatings for the Interior and Exterior of Steel Water Pipe and Fittings";

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

- b) The minimum dry film thickness of coating to be 2000 microns within a tolerance of -100 microns and + 1000 microns.

**PC 2.4.6      *Damage to Linings and Coatings***

**Internal lining** - to be repaired with two-component solvent-free polyamide cured epoxy to same thickness as existing adjacent lining.

**External coating** – to be repaired with solvent-free polyurethane coating to same thickness as existing adjacent coating.

**PD      BUILDING WORKS****PD 1      GENERAL**

This specification covers the various construction activities associated with the erection of buildings which form part of this Contract. Building work shall be carried out in accordance with the National Building Regulations, SABS 0400, the applicable clauses of the SANS Standardized Specifications and the information contained in this specification. Work appurtenant to the erection of buildings such as earthworks, concrete work, structural steelwork etc. shall be carried out as specified in the appropriate standardized specifications and will be measured and paid for under those specifications.

**PD 2      BRICKWORK, PLASTERWORK AND FLOOR SCREEDS****PD 2.1      Materials****PD 2.1.1      *Bricks***

Burnt clay bricks shall comply with SABS 227 and shall be of the class scheduled or shown on the Drawings.

All brickwork below ground shall be engineering bricks (ROK), 14 MPa in class 1 mortar (10 MPa) compressive strength. Brickwork in all superstructures shall be engineering bricks (NFX), 7 MPa in class II mortar (5 MPa compressive strength) with ROAN SATIN FBX facebricks.

All load bearing bricks shall be 14 MPa bricks. Concrete bricks where approved by the Engineer, shall have a nominal compressive strength of 8 MPa. Satisfactory proof of the load-bearing capacity of the bricks offered shall be submitted before deliveries are made to the Site.

Air bricks shall be well-burnt terracotta and shall be free from cracks and blemishes and lined with copper mosquito gauze.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

---

Three samples of each type of brick shall be submitted to the Engineer for approval. All subsequent deliveries shall be of a standard equal to or better than that of the approved samples.

**PD 2.1.2      *Cement***

Cement shall comply with the requirements of SABS 471 and shall be stored under cover. The use of Portland blast-furnace cement (PBFC) which complies with the requirements of SABS 626 will only be allowed if approved by the Engineer.

**PD 2.1.3      *Aggregate***

Fine aggregate shall consist of natural sand, or crushed rock or gravel, and shall be hard, clean and free from adherent coatings or other deleterious matter. Sand for plaster and mortar shall comply with the requirements of SABS 1090, whereas the aggregates for normal and granolithic floor screeds shall comply with the requirements of BS 1199 and BS 1201 respectively.

**PD 2.1.4      *Water***

Water shall be clean and free from clay, silt, oil, acid, alkali, organic or other matter which would impair the required strength and durability of the mortar, plaster or floor screed.

**PD 2.1.5      *Wall ties and brickwork reinforcement***

Wire ties shall be of galvanized steel of the single wire type for solid walls and either the "Butterfly" or Modified PWD type for hollow walls. Ties shall be of sufficient length to allow not less than 75 mm of each end to be built into brickwork or embedded in concrete.

Brickwork reinforcement shall be manufactured from hard drawn steel wire conforming to BS 785 and shall consist of two 2,8 mm diameter main wires with 2,5 mm diameter cross wires at 300 mm centres welded at intersections.

Brickwork reinforcement shall be lapped not less than 300 mm at end joints and for a length equal to the width of the widest reinforcement at intersections.

**PD 2.1.6      *Damp-proof sheeting***

Damp-proof sheeting shall comply with SABS 248, type FV for fibre felt, or SABS 952, type B for embossed polyethylene sheeting.

**PD 2.2      *Construction of Brickwork*****PD 2.2.1      *Cement mortar***

Cement mortar shall, unless otherwise specified, consist of one part Portland cement to four parts sand (1:4) by volume for foundation brickwork and one part Portland cement to six parts sand (1:6) by volume for superstructure brickwork. The ingredients for cement mortar shall be

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

---

measured in proper gauge boxes on a boarded platform and thoroughly mixed. Alternatively, mixing may be by means of an approved mechanical batch mixer. Only when the dry ingredients have been thoroughly mixed and a mixture of uniform colour has been obtained may the water be added in sufficient quantity to obtain mortar with the required consistency.

Cement mortar shall be used within two hours of adding water to the mix and shall not be used after two hours or if it has begun to set. Mortar shall be turned over frequently to prevent it from setting until it is used.

**PD 2.2.2     *Brickwork***

Dimensions of all the brickwork shall be set out and built as shown on the Drawings. Bricks shall be kept wet before laying and the top of brickwork shall be wetted before any further bricks are laid. Bricks shall be well buttered with mortar before being laid and all joints shall be thoroughly flushed up as the work proceeds. All joints to face brickwork shall be neatly made and key-drawn with a 6 mm key.

Brickwork shall be carried up in a uniform manner with no portion being raised more than 1 m above an adjacent portion. All perpend, quoins, etc, shall be kept strictly true and square and the whole properly bonded together.

Brickwork shall be built in stretcher bond or English bond as shown on the Drawings, and bats shall not be used except where required for the bond. All joints shall be 10 mm wide and four courses shall measure 340 mm.

All brickwork shall be constructed with galvanized brickwork reinforcement build-in at every fourth course in superstructure brickwork and every second course in foundation brickwork.

Brickwork for cavity walls and solid walls built in stretcher bond shall be tied with wall ties at 255 mm vertical and 690 mm horizontal in foundations and at 340 mm vertical and 690 mm horizontal in superstructure, and shall be staggered vertically. At openings, the ties shall be positioned not more than 300 mm apart along the periphery of the opening and 150 mm from the opening.

Face brickwork shall be kept perfectly clean and rubbing down of the brickwork shall not be allowed. Scaffold boards shall be turned back during heavy rain to avoid splashing. Soiled brickwork shall be cleaned at the Contractor's expense, and the cleaning method shall be approved by the Engineer.

**PD 2.2.3     *Reinforced brickwork***

Brickwork over door and window openings shall be reinforced with steel rods, welded or expanded mesh, etc. Reinforcement shall be placed in each course of brickwork for a minimum of four (4) courses or as shown on the Drawings. Reinforced brickwork shall continue at least 300 mm on each side of the openings.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

Brick lintels shall be built upon rigid temporary supports left in position for not less than seven (7) days after brick-laying. Pre-stressed concrete lintels may be used where approved by the Engineer.

**PD 2.2.4      *Key for plaster***

Joints of all brickwork receiving plaster shall be raked out, or the brick surfaces shall otherwise be prepared with an acrylic slurry or any other approved bonding agent.

**PD 2.2.5      *Damp-proofing***

A damp-proof course shall be laid over the full width of all the walls at a minimum height of 150 mm above the final ground level or wherever else it may be required, and it shall be lapped for at least 150 mm at angles and joints. A damp-proof course shall also be laid and stepped up under all external sills.

**PD 2.2.6      *General***

Rough and fair cutting shall be performed as required, and the brickwork shall be fitted around any steel work. Face brickwork shall be carefully cut and fitted to suit fittings. Chases shall be left or formed for edges of concrete floors, staircases, etc. Chases shall also be provided wherever they may be required for pipes, conduits, switch boxes, distribution boards, and the like. Joints shall be raked out for flashings

**PD 2.3      *Plasterwork*****PD 2.3.1      *Plaster coats***

A plastered finish shall consist of a single coat, comprising one application of a 1:6 cement sand mixture with a wood or steel-float finish except where otherwise indicated.

**PD 2.3.2      *Thickness***

The total thickness of the plaster finish shall be 13 mm minimum and 20 mm maximum.

**PD 2.3.3      *Workmanship***

All plasterwork shall be finished smooth and ready to receive paint. Plaster shall be flush with the faces of all switch and plug boxes, the interiors of which shall be kept free from plaster. Plastered surfaces shall be plumb and jambs and reveals shall be formed square

The plasterer shall cut out and make good all cracks, blisters and other defects and leave the plasterwork, on completion, in a state which is acceptable to the Engineer

**PD 2.4      *Floor Screeds***

Floor screeds shall have a mix proportion by mass consisting of one (1) part Portland cement and three (3) parts (1:3) fine aggregate. A minimum amount of water is to be used, but it shall be sufficient to allow adequate compaction.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

Screeds shall be laid on clean hardened bases in panels not exceeding 14 m<sup>2</sup> and shall be steel-trowelled to a true and smooth finish. In monolithic construction, the panels shall not exceed 30 m<sup>2</sup>. Joints in screeds shall coincide as nearly as possible with joints in the bases. The thickness of screeds shall be as shown on the drawings or as directed by the Engineer.

The entire screed surface shall be free from loose or raised particles of aggregate, trowel marks or any irregularities, humps or depressions exceeding 5 mm when measured from a 3 m long straight edge. Screeds shall be cured for three (3) to seven (7) days as may be directed by the Engineer, and shall be protected from damage. No moisture-sensitive floor finish shall be laid on screeds unless a reliable moisture test shows that the screed is sufficiently dry to receive the covering.

**PD 3 DOORS AND WINDOWS****PD 3.1 Materials****PD 3.1.1 *General***

All steel and iron work shall be delivered clean and free from rust, pitting or other defects. Shop primers shall be applied before delivery and shall consist of a coat of red oxide paint, or any other approved antirust paint on all surfaces.

Unless otherwise specified, all materials shall conform at least to the appropriate SABS or BS standards where such standards apply to ironmongery, or steel, cast iron and any other related materials.

**PD 3.1.2 *Pressed-steel door frames***

Pressed-steel door frames shall comply with SABS 1129 and shall be manufactured from 1,6 mm thick mild-steel sheeting, pressed to the required shapes, properly mitred, welded and reinforced, with all welding neatly cleaned off.

Frames shall be of the widths required to suit the thickness of the walls into which they are built and shall be fitted with suitable tie bars and braces at the bottom. Three lugs to be built into the brickwork shall be provided on each jamb.

Rebates in frames and transoms for doors shall be of the widths required to suit the thicknesses of the doors and shall be fitted with a pair of approved steel butt hinges set flush into recesses in the frames. 4,5 mm thick reinforcing plates shall be welded to the backs of the frames at hinge positions.

Heads of frames over double doors shall be drilled where required to form keeps for bolts and shall be fitted with one rubber buffer for each leaf of the door.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

Frames for single doors shall be fitted with approved chromium striking plates and an adjustable striking-plate keeper boxed in at the back of the frame by a welded-on sheet-metal box. The frames shall be fitted with a minimum of two rubber buffers.

Frames shall be protected against twisting and damage during transit and erection.

**PD 3.1.3      *Pressed-steel doors***

Pressed-steel doors shall be manufactured from 1,6 mm thick steel plate. The doors shall be of standard design, pressed to shape with 40 mm reveals all round. The doors shall be strengthened with full-length vertical V-shaped or other approved sectional strengthening ribs projecting to the outer face. Two horizontal stiffening rails shall also be welded to the inner face of the doors.

A door shall be hung on a pair of 100 mm long steel butt hinges with loose pins. The leaves of the hinges shall be welded to both the door and the door frame, and a 1,6 mm thick steel plate shall be welded to the inner face of the door to protect the lock.

One leaf of double doors shall be fitted at the top and bottom with approved 150 mm cast brass barrel bolts in an approved manner and the other leaf shall be fitted with a lock, the striking plate of which shall be fixed to the first leaf.

Where indicated on the drawings, doors shall be fitted with louvred ventilation grills of approved design, backed with insect and vermin-proof gauze screening.

**PD 3.1.4      *Steel window frames***

All steel window frames shall comply with SABS 727 and shall be of the types and sizes shown on the Drawings.

Standard industrial types of steel window frame shall be constructed from rolled mild-steel industrial sections, 35 mm wide by 3 mm thick, with opening sections constructed from standard residential sections, 25 mm wide by 3 mm thick, welded at angles and properly jointed at intersections.

**PD 3.1.5      *Door locks and handles***

All door locks shall comply with the requirements of SABS 4 and shall be of approved manufacture and pattern. All locks shall be supplied with two keys. Keys shall be distinctly numbered with consecutive numbers and each key shall be stamped with the same number as that of the lock which it controls. No two locks in any one building may have the same key.

External doors shall be fitted with master-keyed four-lever heavy duty mortice locks or cylinder locks as indicated.

All locks shall be properly installed and, after completion, striker plates shall be adjusted and the locks serviced.

Door handles shall be of cast zinc of approved manufacture and pattern.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

**PD 3.1.6      *Miscellaneous fittings***

All retaining devices for doors and windows as well as fittings such as coat hooks, retaining hooks, etc shall be of solid brass unless otherwise indicated. All fittings shall be secured by screws or set screws of the same material and finish as the fitting.

Fittings to be fixed to plastered walls, masonry or floors shall be fixed direct by means of patent plastic or fibre plugs fitted into drilled holes.

Door stops shall be provided at every door and shall be 40 mm diameter rubber stops.

Patented precast concrete window surrounds or blocks shall be as scheduled in the bill of quantities.

**PD 3.2      *Installation of Doors and Windows***

All built-in door and window frames shall be set straight, plumb and level, and shall operate to the satisfaction of the Engineer after fixing has been completed.

Fittings shall be either removed, or wrapped and protected from damage, until all rough trades have been completed.

**PD 4      *CARPENTRY AND JOINERY*****PD 4.1      *General*****PD 4.1.1      *Materials***

All timber used for structural purposes shall be of merchantable grade and shall comply with the requirements of SABS 563 and SABS 1245. Structural timber shall be carefully selected and of the best quality, free from large or dead knots, shakes, waney edges or other defects. Purlins and bracing shall comply with the requirements of SABS 653. Finger-jointed structural timber shall comply with the requirements of SABS 096 and laminated timber with the requirements of SABS 1089. Hardwoods and softwoods for joinery shall comply with SABS 1099 and SABS 1359 respectively and suitable species shall be used for the various purposes.

Unless otherwise specified, all materials shall conform to the appropriate SABS or BS Specification where such standards exist for nails, screws, bolts, adhesives, etc.

**PD 4.1.2      *Preservative treatment***

All structural timber shall be given a preservative treatment suitable for the duty for which the timber is intended in accordance with SABS 05, and no untreated timber shall be used. The preservative treatment shall not impair the final finish. The timber shall be impregnated throughout. When surface coating is specified, the compounds applied on the surfaces of the timber shall form an unbroken film.



**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

**PD 4.1.3     *Priming***

The jointing surfaces of all joints exposed to the weather and built-in portions of frames shall be thickly primed except where adhesives are specified. Carpentry and joinery items which are prepared for painting by the manufacturer, shall be knotted and primed before being dispatched to the Site. Primed surfaces shall be touched up where necessary during the progress of the work or where site adjustments have been made.

**PD 4.2     Carpentry Work****PD 4.2.1     *Scope of work***

Carpentry work shall be carried out in a manner consistent with good workmanship and in compliance with the Drawings.

The carpenter shall perform all cutting away and making good in attendance upon all other trades and he shall provide and maintain temporary coverings required for the protection of any finished work that might be damaged if left unprotected during the progress of the work.

**PD 4.2.2     *Dimensions***

Unwrought timber shall be as sawn and shall be to the dimensions and within the tolerances specified in the relevant SABS Standard Specifications mentioned in subclause PD 5.1.1.

**PD 4.2.3     *Jointing***

Unless otherwise specified, all joints shall be secured by means of a suitable type and a sufficient number of approved connectors. All joints shall be carefully made in such a way that they will not impair the strength and stiffness of the beams or members.

**PD 4.2.4     *Timber roof construction***

The plates, joists, rafters, purlins, bracing and other pieces used for the construction of the roof and trusses shall be of the dimensions, spacing and construction as shown on the Drawings.

All the joints in the framework shall be of the most appropriate type, accurately formed and adequately secured with fasteners as specified.

**PD 4.3     Joinery Work****PD 4.3.1     *Scope of work***

Joinery work shall consist of the manufacture, delivery to the Site, and fixing in the buildings, of all joinery shown on the Drawings.

Except where a special finish is specified, the Contractor shall have all stairs, landings, doors, shelves and other joinery work cleaned and scrubbed down and shall leave all his work in a good order to the satisfaction of the Engineer.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

**PD 4.3.2     *Dimensions***

All wrought timber shall be sawn, planed, drilled or otherwise machined or worked to the correct sizes and shapes shown on the Drawings. Reasonable tolerances shall be provided at all connections between joinery works and the building structure to compensate adequately for any irregularities, settlements or any other movements.

**PD 4.3.3     *Manufacture***

The joiner shall perform all the necessary mortising, tenoning, grooving, matching, tonguing, housing, rebating and all the other works necessary for correct jointing. He shall also provide all metal plates, screws, nails and other fixings that may be necessary for doing the specified joinery work properly.

**PD 4.3.4     *Joints***

Where joints are not specifically indicated, they shall be the recognised forms of joints for each position. The joints shall be so made as to comply with Part 2 of BS 1186.

**PD 4.3.5     *Doors and frames***

Door frames, linings, panel doors, framed, ledged and braced doors, flush doors, sliding doors, etc. shall be supplied or made by the joiner and shall be installed, fitted or hung as detailed on the Drawings. All timber shall be wrought and prepared for oiling, staining, varnishing or painting.

**PD 4.3.6     *Skirtings, cornices etc.***

Skirtings, cornices etc. shall not be installed until after the wall coverings have been applied, the flooring laid and ceilings installed, unless otherwise specified.

**PD 4.3.7     *In-situ joinery***

In-situ joinery work shall not be executed until after all floor, wall and ceiling surfaces have been formed or constructed, unless otherwise instructed.

**PD 4.3.8     *Ceilings***

Ceilings shall, unless otherwise specified or scheduled, consist of plaster board or fibre-cement panels as shown on the Drawings and shall be nailed to the bracing or suspended from the roof structure. The panels shall be separated by exposed tees and insulated with a 50 mm thick fibreglass wool blanket where shown on the Drawings.

**PD 5        ROOF SHEETING AND ACCESSORIES**

Roof sheeting and accessories shall comply with and shall be measured and paid for under SABS 1200 HB. All sheeted roofs shall be 'Kliplok' Zinalume IBR sheeting (or similar approved) in continuous lengths (colour to client. spec.).

**PD 6        PLUMBING**

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

**PD 6.1 Materials****PD 6.1.1 General**

All materials shall be of the best quality and shall be approved by the Engineer before installation.

Cracked, chipped, dented or faulty items or materials shall be replaced at the Contractor's expense. Glazed ceramic sanitary ware shall comply with the requirements of SABS 497 and all other materials shall comply with the standards as specified, scheduled or shown on the Drawings.

**PD 6.1.2 Water closet (WC) suites**

WC suites shall unless otherwise specified or scheduled consist of a glazed vitreous china closet with an S or P trap and seat lugs, a 14 litre low-level matching flat-bottomed flushing cistern placed and fixed on the closet, or a suspended enamelled cast-iron cistern with the flush pipe connected to the flushing rim of the closet with rubber cone joints, and a solid heavy-duty plastic seat with cover, hinges and buffers.

**PD 6.1.3 Urinals**

Urinals shall be of the type specified or scheduled, of glazed vitreous china, wall mounted, with an automatic or a manual flushing system, and chromium-plated fittings.

**PD 6.1.4 Wash-hand basins**

Wash-hand-basins shall unless otherwise specified or scheduled be of glazed vitreous china or enamelled cast iron, wall mounted on a pair of cast-iron brackets, and fitted with chromium-plated fittings consisting of two taps, outlet and chain, and supplied with a plug and an anti-siphon trap.

**PD 6.1.5 Sinks**

Sinks shall comply with the requirements of SABS 242 and shall be complete with cabinet, chromium-plated outlet, anti-siphon trap, plug, chain and two bib taps or one mixer tap, all as detailed or as scheduled.

**PD 6.1.6 Pipes and tubing**

Cast-iron and steel pipes used in plumbing work shall comply with the requirements of SABS 746 and SABS 62 respectively. Copper tubing shall comply with the requirements of SABS 460 and malleable cast-iron fittings with SABS 509.

**PD 6.2 Construction**

Plumbing shall be carried out strictly in accordance with the Drawings and with the National Building Regulations, with specific reference to Government Notice R1875 dated 31 August 1979.

Steel pipes and their malleable cast-iron fittings shall be joined with red lead and hemp, lead pipes shall have wiped soldered joints, and cast-iron pipes shall be joined by caulking with

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

hemp and metallic lead. Soil pipes from WC's shall have an internal diameter of at least 100 mm and shall be fitted with a pan connector and an access bend (or an access junction where a vent pipe is used), and carried through walls and into the ground for connection to the sewer. Vent pipes shall be fitted with approved balloon gratings. Waste pipes from basins and sinks shall have an internal diameter of at least 32 mm and shall discharge into gulleys. Bends for waste pipes shall incorporate cleaning eyes. Cisterns, basins and sinks shall be connected to the pipe system with 12 mm diameter copper service pipes, and chromium-plated stopcocks shall be installed for isolation and maintenance purposes.

**PD 7 PAINTING****PD 7.1 General**

No paint shall be applied to any surface containing traces of dust, grit, grease, oil, loose rust, millscale or corrosion products of any kind or to any surface that is not free from moisture. Where necessary, surfaces shall be thoroughly washed to remove all traces of soluble salts and/or corrosive air-borne contaminants prior to painting, and the surfaces shall be dried and painted immediately thereafter.

Welding shall be completed in so far as it is possible before painting commences, but in cases where welding can be done only at a later stage, no paint shall be applied to within 75 mm of the proposed weld position unless otherwise specified. Welds and adjacent parent metal shall be abrasive blasted and/or ground and all contaminants such as flux shall be removed prior to painting.

Surfaces of members which are to rest on concrete or other floors or which will be otherwise inaccessible after erection shall receive the full paint system prior to erection.

Damaged paint areas on metal surfaces shall be cleaned, rust spots removed where applicable and the surrounding paint which is still intact shall be feathered for a distance of 20 mm beyond the damaged area.

Spot priming and repair shall consist of all the coats previously applied and shall overlap the damaged area.

Damaged galvanised areas shall be cleaned and any rust spots and any flakes of the coating surrounding the damaged area removed. The coating shall then be restored by zinc spraying or soldering, or painting with a zinc-rich paint, as may be approved by the Engineer.

Where the shop coat is allowed to age for a few months before the final painting is done, light sanding or rubbing with steel wool or scrubbing with clean water using a bristle brush shall be carried out. Steel to be embedded in concrete shall not be painted below 50 mm from the final level of the concrete. Each priming coat and each undercoat of paint shall be inspected and approved by the Engineer before any subsequent undercoat or finishing coat is applied. All finishing colours shall be as shown on the Drawings, or as directed by the Engineer.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

**PD 7.2 Materials**

Paints shall comply with the requirements of the appropriate Specifications below:

**PD 7.2.1 Primers**

- SABS 678 : For wood
- SABS 679 : Zinc chromate for steel
- SABS 723 : Etch-wash primer for metals
- SABS 912 : Calcium plumbate for galvanized iron
- SABS 926 : Zinc-rich epoxy for steel

**PD 7.2.2 Undercoats**

- SABS 681 : For all undercoats

**PD 7.2.3 Finishing coats**

- SABS 515 : For interior use, flat and egg-shell finish
- SABS 630 : For interior and exterior use, high-gloss enamel
- SABS 631 : For interior and exterior use, oil gloss paint
- SABS 633 : For interior use, emulsion paint
- SABS 634 : For exterior use, emulsion paint
- SABS 684 : For exterior use on structural steel
- SABS 801 : For interior and exterior use, epoxy-tar paint
- SABS 802 : For interior and exterior use, bituminous aluminium paint
- SABS 887 : For interior use, glossy and egg-shell varnish

The Contractor shall furnish the Engineer with the following information and details regarding the paints and decorative materials for the painting system he proposes to use, for written approval:

- a) The name of the manufacturer and trade name.
- b) The brand, type or grade of paint and the appropriate SABS Specification.
- c) Manufacturer's data sheets, colour references, instructions for use, including surface preparation, sealers, primers, undercoats, finishing coats, coat thicknesses and curing periods, which shall all be considered as being part of these Specifications if approved by the Engineer.
- d) Safeguards to protect the applied paint from damage until the work is accepted by the Engineer.
- e) The shelf or pot life of materials, if applicable.
- f) An undertaking that the proposed paint system is suitable for its intended use and that the various coats of paint are compatible with one another

Where proprietary brands are used, the manufacturer's priming and all subsequent coats of paint suitable for that particular brand shall be employed in accordance with the manufacturer's instructions.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

---

No other materials of a similar nature and quality or from another manufacturer may be used instead of those approved, unless written permission to do so has been obtained from the Engineer. All materials shall be brought onto the Site in containers sealed by the manufacturer. Paints of a different quality, type, brand or colour shall not be mixed, or thinned and shall not be adulterated in any way, but shall be used as supplied by the manufacturer. Any mixing or tinting required shall be carried out by the manufacturer. Tinting of paint on the Site by the Contractor will only be allowed with the written permission of the manufacturer and the Engineer.

**PD 7.3 Inspection and Preliminary Work**

Before commencing paintwork, the Contractor shall carefully inspect the surfaces to be painted to satisfy himself that the surfaces are in a satisfactory or acceptable condition to receive the paint system specified. All metal fittings and fastenings shall be removed where applicable before the preparatory processes are commenced. On completion, the metal fittings and fastenings shall be cleaned and refitted in position.

**PD 7.4 Workmanship and Finishes**

Paint may be applied by spray, brush or roller depending on the materials used, the surface to be painted, and the manufacturer's instructions. Every coat of paint, irrespective of the method of application, shall be adequately and permanently keyed or bonded to the base material or previously applied coat, and shall be evenly distributed, continuous, free from sags, runs, brush marks, pin holes or other imperfections, and shall dry to a smooth finish. An approved water trap and air-regulating valve shall be furnished and installed on all equipment used in spray painting.

Before painting the interiors of buildings they shall be cleaned and the floors shall be washed and kept free from dust during the progress of the interior work.

The Contractor shall protect all nearby surfaces against disfigurement by spatters, splashes and smirches of paint or paint materials. The Contractor shall be responsible for any damage by paint or dirt caused by his operations to vehicles or property or injury to persons and he will be required to provide protective measures to prevent any such damage or injury and make good, where required, at his own expense. If passing traffic creates dust which may harm or spoil the appearance of external painted surfaces, the Contractor shall sprinkle the adjacent areas with water, at his own cost, for a sufficient distance on each side of the location where painting is being done.

Undercoats shall be tinted by the manufacturer to distinguish between successive coats. The final coats or finishing coats of paint shall be applied after all the other work in the vicinity has been completed. The painter shall keep some of the final paint in reserve in the event of his having to make good any patching which may be required as a result of damage or unforeseen circumstances.

Upon completion, the Contractor shall, in the case of buildings, clean all glass, remove all paint spots from walls, floors and fittings, and leave the premises clean and fit for occupation.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

All inflammable materials, comprising solvents, thinners, wiping cloths, etc. shall be placed in tightly closed containers and properly disposed of.

**PD 7.5 Painting of Plaster, Concrete or Brick Surfaces****PD 7.5.1 Surface preparation**

Surfaces for painting shall be prepared by sandpapering, scraping or wire-brushing to remove loose material, dust, laitance, scum or other deleterious materials or high spots. Defective areas shall be cut out where necessary and made good with an approved non-shrink filler. Cracks shall be cut out, suitably keyed, and given a coat of an approved bonding agent before the filler is applied. All patches shall be rubbed down to an even surface. Surfaces shall be washed and allowed to dry. Surfaces shall be treated with neutralising liquid for walls, and if the surface is coarse or textured, either one full coat of pigmented wall sealer or one full filler coat shall be applied in addition to the neutralising liquid.

**PD 7.5.2 Paint application**

Prior to the emulsion paint being applied, the surface shall be sealed with an approved clear sealer and primed with an undercoat diluted to 50%. Emulsion paint (PVA or acrylic) shall then be applied in two finishing coats. Egg-shell finish (alkyd oil-based), oil gloss paint or enamel gloss paint shall be applied as follows: one coat of universal undercoat shall be applied and it shall be followed by one coat of a mixture comprising 50% of the undercoat and 50% of the paint to be used for the finishing coat. A finishing coat of semi-gloss eggshell, or oil gloss paint or enamel gloss paint shall then be applied.

**PD 7.6 Painting of Woodwork****PD 7.6.1 Surface preparation**

The surfaces shall be cleaned, sandpapered and rubbed down to a smooth, even face before painting. The moisture content of the timber shall not be more than 20% at the time when the first coat is applied. All cracks, shakes or scars shall be filled flush with a filler approved by the Engineer before painting. The surface shall then be washed with cleaner and allowed to dry.

**PD 7.6.2 Primer application**

One coat of an approved wood primer shall be applied. After open-grained timber has been prepared and primed, the grain shall be stopped and filled with synthetic filler and rubbed down with water paper. All new woodwork shall be properly primed on all surfaces and edges before being fixed in position. All woodwork not previously painted shall be given a prime coat, well brushed in.

**PD 7.6.3 Paint application**

One coat of universal undercoat shall be applied followed by one coat of a mixture of 50% of the undercoat and 50% of the paint to be used for the finishing coat. A finishing coat of oil gloss paint or enamel gloss paint or semi-gloss egg-shell (alkyd oil-based) paint shall then be applied.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

**PD 7.6.4     *Varnish finish***

Two coats of gloss varnish or egg-shell varnish shall be prepared, stopped and applied.

**PD 7.7     Painting of Metal Surfaces****PD 7.7.1     *General***

Wherever possible, all painting shall be done at the manufacturer's works, but where this is not feasible, the Engineer may permit the application of the undercoat and finishing coats to be carried out on the Site, in which case a prime coat shall be applied at the manufacturer's works prior to the members being despatched to the Works.

**PD 7.7.2     *Surface preparation***

The preparation of metal surfaces shall comply with SABS Code of Practice 064 and shall receive the greatest care to ensure rust-free conditions prior to the paint system being applied. All surfaces shall be prepared by removing loose paint, rust, plaster, scale, dust, dirt, grease etc. and by repairing or patching defective paint surfaces before painting or repainting. Damaged shop-primed surfaces shall be thoroughly cleaned of rust and patched with a prime coat.

**PD 7.7.3     *Paint application******PD 7.7.3.1     Iron and steel work***

All iron and steel work shall be properly primed with a red-lead-based primer where steel work is likely to be exposed to the elements for longer than 30 days. Zinc-chromate primer may be used where overpainting will be completed within 30 days of priming. Metal-etch wash primers may be used under dry conditions where overpainting will be completed within 24 hours of priming. The dry-film thickness of the prime coat shall not be less than 0,300 mm.

After priming, one coat of universal undercoat shall be applied. If necessary, the undercoat shall be tinted to a shade just lighter than the desired finish with approved liquid stainers. The dry-film thickness shall not be less than 0,250 mm.

The two finishing coats shall either be of alkyd resin-based synthetic enamel, gloss or matt oil paint, or as specified elsewhere. The dry-film thickness shall not be less than 0,250 mm per coat.

When mating surfaces are brought together, both surfaces shall have been given the full treatment specified, but where this cannot be done, each surface shall be given a copious coating



**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

of primer and the surfaces drawn together while the paint is still wet.

The portion of structural steel members to be buried in soil, and all bases to a height of 500 mm shall be given two coats of an epoxy-tar primer instead of the zinc-chromate primer specified for other surfaces.

The surfaces of steel and cast-iron articles, such as floor gratings, grids and manhole covers shall, after a thorough brushing to remove loose rust, be painted with two coats of epoxy-tar paint, each at least 0,230 mm thick.

***PD 7.7.3.2 Galvanized iron and steel***

All traces of protective coating shall be removed with galvanized iron cleaner, and two coats of calcium plumbate primer shall be applied. One coat of tinted universal undercoat and two finishing coats of alkyd resin-based synthetic enamel gloss paint shall be applied.

***PD 7.7.3.3 Non-ferrous metals***

Surfaces of aluminium, copper etc. shall be prepared and cleaned, and one coat of self-etch zinc-chromate wash primer shall be applied. One coat of universal tinted undercoat and two finishing coats of enamel gloss paint shall then be applied. Where non-ferrous metals are not to be painted, the surfaces shall be cleaned, polished and two coats of lacquer applied.

**PD 7.8 Painting of Floor Screeds**

Where chemicals could cause damage to floors, such floors shall be painted with an approved epoxy paint. The type of paint to be used will be shown on the Drawings and will depend on the types of chemical that are used. The preparation of such floor screeds for painting and the subsequent application of paints shall be carried out strictly in accordance with the manufacturer's instructions.

**PD 7.9 Paint Thickness**

Unless otherwise specified, all coats of paint, whether prime coat, undercoat or finishing coat, shall have a dry-film thickness of not less than 0,200 mm, irrespective of the method of application.

**PD 7.10 Inspection**

The Contractor shall provide the necessary equipment to establish whether the primers, undercoats and finishing coats have been applied to the correct thickness according to the correct applications. The Engineer may take samples of the paints during painting operations for testing and quality control

SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION

---

**PD 8 MEASUREMENT AND PAYMENT**

**PD 8.1 Brickwork**

(Thickness, type and class indicated) ..... Unit:  
m<sup>2</sup>

The unit of measurement shall be the square metre of each type of brickwork built, calculated from the leading dimensions of the brickwork. Areas of pipes etc. built into brickwork shall not be included in the areas measured. At corners and intersections common to more than one brick wall, the areas shall be measured only once. The tendered rates shall include full compensation for the construction of the brickwork complete as specified, including pointing, the supply and building-in of conduits, beams, lintels, pipe sleeves, the raking-out of joints, weepholes, wall ties, brickforce reinforcement as specified, as well as the building in of plasterwork, facings, paintwork doors, windows, etc. where scheduled.

**PD 8.2 Plasterwork**

(Thickness of plaster and finish indicated) ..... Unit:  
m<sup>2</sup>

The unit of measurement shall be the square metre of each type of coat completed as specified.

The tendered rates shall include full compensation for the construction of the plasterwork, including supplying all materials, mixing, applying, finishing, forming reveals, joints, narrow widths, rounded angles, V-joints etc. complete as specified.

**PD 8.3 Floor Screeds**

(Description and thickness indicated) .....  
Unit: m<sup>2</sup>

The unit of measurement shall be the square metre of floor screed laid, as specified, on floors, steps or areas shown on the Drawings or as designated by the Engineer. The tendered rates shall include full compensation for constructing the floor screeds, including supplying all materials, mixing, laying, finishing, and forming nosings, reedings, skirtings etc.

**PD 8.4 Doors and Windows**

(Type and size indicated) ..... Unit:  
No.

The unit of measurement shall be the number of doors and windows installed complete as specified. The tendered rates shall include full compensation for manufacturing and installing steel or aluminium doors, windows, and frames complete with hinges, handles, locks, barrel bolts, door closers, retaining devices, door stops, stays and any other work or ironmongery

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

---

necessary to complete the work as specified or as shown on the Drawings. The tendered rate for doors and windows shall also include full compensation for glazing, window sills and thresholds as specified, including all necessary timber subframes for aluminium doors and windows, etc

**PD 8.5 Ceilings**

(1) Plaster-board ceiling (type and thickness indicated):

a) Fixed ceiling ..... Unit: m<sup>2</sup>

The unit of measurement shall be the square metre of fixed or suspended ceiling or bulkheads installed complete as scheduled. The unit of measurement for cornices shall be the linear metre.

The tendered rates shall also include full compensation for the construction of the ceilings, bulkheads and cornices including the exposed tees, grids, frameworks, hangers, trap doors, insulation blanket and brading as specified, as well as the suspension system where applicable.

**PD 8.6 Joinery**

(1) Items measured by number:

a) Doors (type and size indicated)..... Unit: No.

b) Etc for other items measured by number

(2) Items measured by length:

a) Skirtings (type and size indicated) ..... Unit: m

b) Etc for other items measured by length

The units of measurement shall be the number or metre of each type and/or size of joinery item specified. The tendered rates shall include full compensation for supplying all materials, and manufacturing, cutting, wasting, fixing and installing the joinery items. Tendered rates for doors shall also include for all ironmongery applicable to the specific doors as specified and indicated on the door and ironmongery schedule drawings, including fixing, installing, testing etc.

**PD 8.7 Miscellaneous Work**

(1) Paintwork ..... Unit: m<sup>2</sup>, m, Sum

(2) Plumbing ..... Unit: m, No., Sum

The unit of measurement shall be as scheduled. The tendered sums or rates shall include full compensation for the supply of all materials, delivery to site, storage, all equipment and labour,

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

---

preparation, application, installation, testing, all temporary work and safety precautions, replacement of defective work, protection of completed work and clean-up after completion.

**PD 8.8 Miscellaneous Items**

(1) Items measured by area:

a) (Description of item) ..... Unit:  
m<sup>2</sup>

(2) Items measured by length:

a) (Description of item) .....  
Unit: m

b) Etc

(3) Items measured by number:

a) (Description of item) ..... Unit:  
No.

b) Etc

The unit of measurement shall be the number, linear metre and square metre as applicable to each item. The tendered rates shall include full compensation for all labour, plant, equipment, transport etc., manufacturing or providing and installing each item complete as scheduled and shown on the Drawings, and shall include all corrosion protection where applicable.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

**PE MECHANICAL EQUIPMENT SPECIFICATIONS****PE1 Refurbishment of Steel Pipelines and Fittings****PE1.1 General**

If possible, pipes and fittings are to be moved to a convenient location for inspection by the Engineer. Long pipes may be cut only upon written instruction from the Engineer, but this is to be kept to a minimum.

Once the pipes and fitting have been moved and cleaned, the Contractor is to arrange for inspection by the Engineer. The Contractor will make available any equipment necessary for the inspection, which may include lifting and rotating the items.

On inspection the Engineer will confirm if the items may be reused, and which method is to be followed for the refurbishment. A combination of methods may be instructed.

It is anticipated that Surface Preparation Method 1 will be required over the full length of the pipes and fittings to be refurbished.

**PE1.2 Surface Preparation Method 1 (Hand)**

Power tool cleaning with chipping hammers, scrapers, wire brushes and sanding to remove all loose rust, mill scale, old loose paint and foreign matter to a Swedish St2 standard.

**PE1.3 Surface Preparation Method 2 (Abrasive Blasting)**

Surface preparation is to comply with the Society for Protective Coatings (SSPC) standards SSPC-SP6. All oil, grease, dirt, rust, scale and foreign matter are completely removed from the surface and all rust, mill scale and old paint are completely removed by abrasive blasting except for slight shadows, streaks or discoloration caused by rust stains, mill scale oxides or slight, tight residues of paint or coating that remain. If the surface is pitted, slight residue or rust or paint may be found in the bottom of pits. At least two thirds of each square inch of surface areas shall be free of all visible residues and the remainder shall be limited to the light residues mentioned above.

**PE1.4 Coating and Lining**

The prepared surface is to be coated with Carbogaurd 891 Epoxy coating or similar approved. The products are to be applied in accordance with the manufacturer's specifications.

The minimum dry film thickness of coating is to be 250 microns.

Where pipes are being coating prior to butt welding, the blast cleaned surface shall be stopped or cut back by suitable masking which shall not contaminate the cleaned

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

surface. Cut backs to be 100mm in length from the end to be welded. All coatings are to be feathered or mitred to prevent air entrapment in the joint coating system.

**PE1.5 Testing**

The coating shall be free from holidays and tested in accordance with Clause 7.2.2 of SABS 1178 at 15Kv.

The coating thickness on each pipe is to be tested. At least four readings at equally spaced intervals around the pipe circumferences, approximately 300mm from each end of the pipe shall be taken. One reading shall be over the weld bead if it is visible.

**PE1.6 Payment**

Recover pipe and fittings (m)

Rate to include for all costs associated with the recovery, cleaning and inspection of the pipes and fittings in accordance with this specification.

Refurbish and coat pipes

To Method 1 preparation (m)

To Method 2 preparation (m<sup>2</sup>)

Rate is to include for all costs to prepare the surface and coat the pipe and fittings.

**PE2 Pumps – Standard Specification****PE2.1 General**

PE2.1.1 Pumps shall be silent and vibration free during operation.

PE2.1.2 No pump shall be started before installation of strainers.

PE2.1.3 Pumps shall be provided with adequate protection over inlet and outlet flanges before being delivered to site. Protection covers shall be able to withstand normal handling during construction work.

PE2.1.4 Pumps shall be suitable for the fluids and fluid temperature that they handle and shall be selected accordingly. See pump data forms in this regard.

PE2.1.5 Manual vent valves shall be provided at high points on the pump casings. For applications with temperatures above boiling point, the vent must be piped to a safe drain point.

PE2.1.6 Drain plugs shall be provided at low points on the pump casings.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

**PE2.2 Couplings and Alignment**

- PE2.2.1 Pumps shall be complete with flexible drive couplings to allow for angular and axial misalignment where applicable.
- PE2.2.2 Pumps shall be aligned by a representative of the pump supplier, but the contractor still remains solely responsible for the guarantee period.
- PE2.2.3 Pump drives shall be suitably protected by a securely mounted sheet metal guard and comply with Machinery and Occupational Safety Act (Act 611983).
- PE2.2.4 Each flexibly coupled pump shall be provided with a cast iron or fabricated steel baseplate of ample size to hold both pump and motor in correct alignment. The pump and motor shall be accurately aligned when running at normal temperature. Dowel pins shall be fitted to base plates after alignment.
- PE2.2.5 Couplings shall be selected to match at least the power of the electric motor and shall not impose any restriction on the normal expansion and tolerances.

**PE2.3 Pump Selection**

- PE2.3.1 The efficiency of each pump selected shall not be less than 70% and not more than 115% of the *Best Efficiency Point* for the impeller furnished. As shown in the pump data forms, where a number of alternative duty points are provided, the selected pump must be capable of operating for extended periods at any combination of points. These points correlate to the total system head when different combinations of pumps are run.

**PE2.4 Pump Installation**

- PE2.4.1 All pumps are to be installed in accordance with the Manufacturers specifications. The rate for installation and commissioning of pumps must include for all nuts, bolts, base plates or straps that are required for their fixing, according to the Manufacturers specifications.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

**PE3 Electric Motors, Motor Starters And Motor Protection****PE3.1 Motors**

All electric motors shall fully comply with the relevant standard specifications:

SABS 948: Standard Specification for Three Phase Induction Motors.

BS 2613: The Electrical Performance of Rotating Electrical Machinery.

BS 170: The Electrical Performance of Fractional Horsepower Electric Motors and Generators.

**PE3.2 Motor Installation**

PE3.2.1 All motors are to be installed in accordance with the Manufacturers specifications. The rate for installation and commissioning of motors must include for all nuts, bolts, base plates or straps that are required for their fixing, according to the Manufacturers specifications.

IEC 2 pole motors with cast iron frames to be provided. The motor selection to provide a minimum of three consecutive star delta starts per hour with the full load connected without exceeding the allowable temperature limits. Motors should be able to operate under all weather conditions.

Cable entry: Looking from the backside of the motor to the drive end side, a left side cable entry port needs to be provided.

Electric motors to be supplied with thermistors

**PE4 Power Transmission****PE4.1 General**

In the interest of standardisation and ease of maintenance, the drive components shall wherever possible be standard stock items

**PE4.2 Couplings**

Couplings shall be of the rubber tyre type, with taper lock bushes which shall be keyed to the shafts. After installation the Contractor in the presence of the Project Manager shall check the alignment of all couplings. Alignment shall be accurate resulting in the specified vibration levels and to the approval of the Project Manager. Alignment of motor and pumping units should be of a high standard to protect the bearings of the units.

**PE4.3 Baseplates**

Both direct coupled and belt driven machines shall be mounted with their motors on common cast iron or fabricated steel base plates of rigid construction. Each item



**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

to be mounted on the base plate shall be provided with mounting pads, which shall have machined faces. On fabricated base plates this machining shall be done after fabrication and, where applicable, stress relieved. The thickness of the pads shall be not less than 1,25 times the diameter of the holding down bolts and shall be drilled and tapped to suit fastening down by studs or set screws.

Preliminary alignment shall be done at the factory to ensure that the baseplate has been correctly manufactured, but final alignment shall always be done on site after installation and grouting has been completed. Alignment shall be accurate and to the approval of the Project Manager and a final alignment check, witnessed by the Project Manager, must be carried out by the Contractor prior to start up.

Multiple shimming, which can cause subsequent misalignment due to corrosion, will not be accepted.

With direct-coupled units with motor weights exceeding 150 kg, jacking screws for motor alignment shall be provided.

Base plates shall be so designed and grouted so as not to provide collection points for water or dirt.

Except where otherwise approved in writing by the Project Manager, all baseplates on concrete plinths shall be fully grouted in. Suitable grouting holes must be provided on baseplates having a continuous top plate and holes tapped through shall be suitable protected.

In applications where baseplates are not practical, machined soleplates, suitably fixed and grouted to the concrete plinths, shall be provided.

No machine may be mounted directly onto a concrete base without the use of either a baseplate or soleplate.

**PE5      Welding****PE5.1    General**

This specification covers the gas and arc welding of butt and fillet and socket welds in piping. The welding may be done by shielded metal-arc welding, gas tungsten-arc welding, gas metal-arc welding or oxy acetylene welding process, using a manual semi-automatic or automatic welding technique or combination of these techniques.

No position welding will be allowed without written approval by the Engineer.

Metal arc welding shall be in accordance with BS 1856 or BS 2633 as applicable.

All oxy-acetylene welding and testing shall be in accordance with BS 1821 or BS2640 as applicable.

The Engineer shall have the right to test any welds in the installation during the installation period or before final acceptance.

The Contractor shall at his expense cut out the required welds for testing and also re-weld the piping where such test pieces have been removed.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

Welding Electrodes: Welding electrodes shall be in accordance with SABS 455. Electrodes shall be stored and handled in accordance with the recommendations of the supplier and electrodes which are older than six months, shall not be used.

**PE7 Inspection And Testing****PE7.1 General**

- PE7.1.1 The equipment supplied under this Contract shall be subject to inspection by the Engineer or his Nominated Agent at all stages of manufacture.
- PE7.1.2 The tests and commissioning procedure laid out below and such additional tests as the Engineer may reasonably require proving compliance with the specification shall be carried out at the Contractor's Works and at site.  
The Contractor shall give reasonable notice of time and place in writing to enable the Engineer to inspect and witness tests of materials and equipment. He shall provide the Engineer with facilities for witnessing these tests and for any additional tests or inspection of any portion of the Works as required by the Engineer.  
The Contractor shall at his own cost render all assistance and supply all labour appliances and any other materials the Engineer may require to check the setting out, measure up and inspect any portions of the Works at any stage during fabrication, construction, erection or painting. During such operations the Contractor shall, if required, suspend any or all of the Works without having claim for loss or damage as a result thereof.
- PE7.1.3 The testing of the plant (or a part thereof) supplied under this Contract shall be carried out through its full operating range (or part thereof) as required by the Engineer.  
All such tests and inspections and the necessary inspection facilities shall be provided at the Contractor's expense.
- PE7.1.4 At the commencement of, and during the whole of Commissioning and Testing periods, the Contractor shall have available on site all essential spares and tools considered necessary to enable repair of defective parts to be carried out immediately, in the event of a breakdown.
- PE7.1.5 The Contractor shall be responsible for the proper operation and maintenance of the plant throughout the period of the tests and until the operator training period is complete.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

PE7.1.6 Acceptance by the Engineer of any plant item, following such inspection or tests, shall not relieve the contractor of any obligations under this Contract.

**PE7.2 Testing Before Delivery**

PE7.2.1 All items of plant will be subject to inspection at the manufacturer's works before despatch.

PE7.2.2 Materials, components and electric motors shall be tested for compliance with relevant British or South African standards and certificates submitted in triplicate.

PE7.2.3 Pressure vessels shall be tested in accordance with an acceptable Code of Practice and to the requirements of any statutory body having jurisdiction over the Works.

PE7.2.4 Electrical equipment shall be subjected to appropriate insulation resistance tests, function tests and general inspection.

**PE7.3 Testing At Site**

PE7.3.1 Welds  
Welds shall be tested as required by the relevant Code of Practice.

PE7.3.2 Pressure tests shall be applied to each pipework system by filling it with water and applying a pressure of 1.5 times the operating pressure.  
Systems shall be tested in sections to suit the overall contract programme and all pipework, which is to be concealed, shall be tested before it is concealed. Care shall be taken that no equipment items are over-stressed during pressure testing and components not suitable for the test pressure shall be by-passed or replaced with make-up pipe sections. The Contractor shall provide and fit all necessary temporary connections, blanks, make-up pieces and drains required for the tests and make good on completion of the tests.  
The section of pipework to be tested shall be fully vented and primed and the pressure applied for 24 hours. At the end of this period the Employer will inspect the pipework and witness that no pressure loss occurs over a period of one hour. Welded joints shall be lightly hammered during testing.  
On completion of the sites, water shall be drained rapidly out of the system to provide a flushing action. Any faults found during the test shall be rectified in an approved manner and the system shall be retested until no faults are found. When the Employer is satisfied with test results, an approval certificate will be issued.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

PE7.3.3 Schedule of Test Pressure (*Example*)

Service	Normal Operating Pressures	Test Pressure
Mainlines	800 kPa	900 kPa

Where the test pressure specified for individual items of equipment is less than the test pressure specified for the connecting pipe line the equipment shall be disconnected for the test and suitable makeup lengths of pipework or plugged connections shall be installed to enable the pipe line tests to be carried out.

PE7.3.4 Draining and Cleaning

On completion of the pressure test on a section of pipework, the water used for testing shall be drained away as quickly as possible to remove as much dirt and dross as possible. After completion of a pipework circuit, the circuit shall be flushed through to remove all pipe scale, dross and similar material.

The contractor shall provide all necessary connections, by-pass pipes, temporary strainers, and temporary make-up pieces, to enable the systems to be drained and cleaned.

PE7.3.5 Alignment

Alignment checks of all driven machinery may be required and shall be witnessed by the Employer and the results recorded.

PE7.3.6 Controls

All automatic control functions, alarm and safety cut-out devices shall be tested by operational or simulated tests and set-points and calibrations set and their settings recorded, all in the presence of the Engineer.

PE7.3.7 Electrical Equipment

All electrical equipment installed under this Contract shall be tested in accordance with the requirements of the Local Authority and certificates of acceptance by the Authority obtained by the Contractor prior to electrical power being applied.

PE7.3.8 Performance Tests

Tests shall be carried out on all plant items to check that they are capable of their related performance.

The Engineer, or his nominated agent, shall witness each test and a signed certificate of approval shall be obtained from the Engineer upon completion of the tests to his satisfaction.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

**PE7.3.9 Tests on Completion**

During completion of the balancing and commissioning of equipment the plant shall be brought into normal operation and the final adjustments of the equipment shall be made.

Thereafter the Tests on Completion in terms of the Conditions of Contract shall be carried out to ensure that the plant will fulfil the functions for which it has been designed.

Such tests shall include the following:

Simulated tests for all alarm and safety cut out equipment to prove the operation of the equipment.

Simulation tests on automatic controls to prove the ability of the controls to correct the conditions outside the required design parameters needs to be done by the Contractor. The tests shall be carried out by manually changing the desired values to produce an incorrect condition and then re-setting the controls to the design conditions and checking the operation of valves, etc, to restore the design conditions.

The Contractor shall provide all necessary temporary measuring and recording equipment. The equipment shall be of a type generally used for this type of testing and shall be to the approval of the Engineer. All instruments shall be accurately calibrated before the tests begin.

On completion of the whole of the tests and when the Contractor is satisfied that the entire plant is operating satisfactorily and will fulfil the function for which it has been supplied, he shall submit to the Engineer triplicate copies of all test records and charts together with reports on all the tests called for in this Specification.

The Engineer shall reserve the right to ask for any reasonable additional tests or for the repetition of previous tests in order to prove that the operation of the plant is satisfactory and in accordance with the Specification and Drawings.

**PE7.3.10 Test Certificates**

The Contractor shall provide three copies of test certificates for the installed pumps and materials and equipment specified for testing. Further copies are to be bound into the manuals to be supplied.

**PE8 Operation And Maintenance Manuals**

**PE8.1** The contractor prior to commissioning shall provide three copies of the Operation and Maintenance Manual. These manuals shall be of a standard acceptable to the Engineer and shall be subject to his approval. At least one set of manuals shall contain original copies.

Manuals shall be in English, shall be easy to use, practically and neatly presented, bound between plastic protected covers, clearly titled, well indexed and

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

sectionalised and specifically applicable to the equipment supplied. Where standard manuals are used these shall be marked up to be unambiguously applicable to the equipment supplied. Drawings shall be held in plastic envelopes in the manual.

The manuals must contain the following:

A description of the equipment supplied giving full details of name, manufacturer, model number, size design duty and design and performance data. This shall, inter alia, include the information called for in the Pump and Motor Data Forms – part of the bill of quantities.

Descriptive and technical literature including clear and comprehensive performance curves specifically applicable to the equipment supplied. Re Pump curves and test certificates)

Operating instructions supported by drawings, flow diagrams, explanatory sketches etc as may be necessary and including details of control and protection systems incorporated, and safety precautions which must be observed.

Dimensional arrangement and layout drawings.

A comprehensive lubricating schedule covering all equipment supplied with full details of recommended lubricants, initial fill lubricants used, capacities and lubrication periods.

A comprehensive schedule of routine maintenance with timelines, for all equipment supplied.

Assembly and disassembly instructions supported by clear assembly and/or exploded view drawings.

A comprehensive spare list for the equipment, complete referenced cross-sectional drawings and indicating recommended spares. All information required for the ordering of spares to be given including manufacturer's part numbers, supplier's name and all identification information.

Electrical circuit drawings.

Copies of all Test Certificates.

Documents, information and charts providing a full record of the results of the Tests on Completion.

**PE9 Control Philosophy For Pump Station**

The preferred method of Pumping control is through the use of timers and VSDs.

**PE9.1 Pump Station**

General

The Pump Station will be required to provide clear water from the Greater Summerfield Water Treatment Works to an existing 2 Megalitres command reservoir located 6 km away. The Pump Station is sized for 3 No. KSB Wkln Pumps with 250kW Motors delivering 180m<sup>3</sup>/hr at 310m total head.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

Power supply to the pump station will be via a transformer that will be installed under this contract.

The pumps will be controlled via Pump Control Timers. Any surges in the pipeline will be mitigated through a Surge Anticipating Control Valve with Solenoid Control (Bermad Model 735-55-M) that will be located outside the Pump Station.

A "No Flow" switch must be installed on the suction line before the Pumps.

**Pump Operation / Control Philosophy**

The 18 hour timer will signal the Pump to start after manual startup. This time period is adequate to supply the peak daily water demand of 1.77 Mℓ/day. The pumps are sized for ultimate future supply of 3Mℓ/day and 6Mℓ/day after upgrade of treatment plant. Flow pumping optimisation will be done through decreasing pumping period and flow since pumps are sized to each deliver 3Mℓ/d, which is the ultimate future demand, while **existing rising main pipeline DN200 has maximum capacity to carry 115m<sup>3</sup>/h ≈ 32ℓ/s at a speed of 1.1m/s**, subject to future upgrade. Current demand will be limited to 2Mℓ/d.

At Pump start, the pumps will start over a period of 30 seconds through using the soft start in the control room. The duty and standby pumps should be alternated regularly at least weekly.

If the "no flow sensor" senses no flow in the suction pipe, then the pump is to stop via the STANDARD SHUT DOWN PROCEDURE.

Surge Anticipating Bermad to be set to open at pressures less than 10bar, greater than 32bar or on POWER FAILURE. To avoid this valve opening during pump startup, it must be set with a timeout for say 120 seconds. In the event that any fault occurs, then the pump is to stop via the STANDARD SHUT DOWN PROCEDURE.

Emergency Stops located on pedestals beside the motor are to stop the pumps immediately, bypassing the STANDARD SHUT DOWN PROCEDURE – this will start the EMERGENCY SHUT DOWN PROCEDURE. Indication lamps are to identify whether it is a suction fault (low Reservoir / no flow), delivery faults (over pressure, low pressure or no flow), Standard Shut Down Procedure (pressure off / manual off), or emergency stop.

If the "no flow sensor" senses no flow at any stage, then the EMERGENCY SHUT DOWN PROCEDURE must commence immediately.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

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**PE10 Soft Starter and Timer**

The Control Unit should have a pump control option. The soft start shall start the electric motor by setting an adjustable initial torque setting which is user-adjustable from 0% to 90% of locked rotor torque. From the initial torque level, the output voltage to the motor is incrementally increase during an acceleration ramp time of 30 seconds. After the controller sense that the motor has reached the desired rotational speed after the voltage ramp operation, the internal bypass contactor will be pulled in.

The control unit should also include a 30hr timer to set and adjust the pump runtime between soft-start and soft-stop in hourly increments ranging from 1-24 hours.

The controller should also employ a soft stop after the pre-set run-time have been completed.

**Protection:** The unit should provide the following protective and diagnostic features:

Overload protection

Underload protection

Under-voltage protection

Overvoltage protection

Unbalance in line voltage protection

Stall protection and Jam detection

Ground fault sensor, trip and alarm

Thermistor/PTC Protection

Excessive starts per hour, over temperature, open gate indicator and line faults detector.



**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

**PE LABOUR INTENSIVE CONSTRUCTION**

**PE 1 CONSTRUCTION ACTIVITIES**

**PE 1.1 Excavation**

Material, including topsoil may be excavated by hand only if practicable. Harder material may be loosened by mechanical means prior to excavation by hand, where practicable. The excavation of any material which could represent danger or injury to workers shall not be excavated by hand.

**PE 1.1.1 Trench Excavation**

Materials classified as suitable for hand excavation may be excavated by hand in trenches having a depth of less than 1.5 metres.

Typical task rates for labour intensive constructive methods (for tendering purposes) are provided below.

Activity	Production Rate / Person / Day
1. <b>Trench Excavation 0 to 1m deep</b>	
(i) In Very Loose/Very Soft material	3.5m <sup>3</sup>
(ii) In Loose/Soft material	2.8m <sup>3</sup>
(iii) In Medium Dense/Firm material	1.7m <sup>3</sup>
2. <b>Trench Excavation 1 to 1.5 m deep</b>	
(i) In Very Loose/Very Soft material	3.0m <sup>3</sup>
(ii) In Loose/Soft material	2.4m <sup>3</sup>
(iii) In Medium Dense/Firm material	1.5m <sup>3</sup>
3. Grubbing 1 metre wide strip	10.0m
4. Earthworks (incl. load up to 1m lifting)	
(i) In Very Loose/Very Soft material	4.5m <sup>3</sup>
(ii) In Loose/Soft material	4.0m <sup>3</sup>
(iii) In Medium Dense/Firm material	3.5m <sup>3</sup>
(iv) In Dense/Stiff material	3.0m <sup>3</sup>
5. Wheel barrow haul	
(i) 0 - 20 m	11,5m <sup>3</sup>
(ii) 20 - 40 m	8,5m <sup>3</sup>
(iii) 40 - 60 m	6,5m <sup>3</sup>
(iv) 60 - 80 m	5m <sup>3</sup>
(v) 80 - 100 m	4,5m <sup>3</sup>
6. Backfilling using sand 0 - 1,5 m deep	3,5m <sup>3</sup>
7. Placing pipe bedding	2.5m <sup>2</sup>
8. Concrete	
(i) Mixing	1,5m <sup>3</sup>
(ii) Placing	1m <sup>3</sup>
9. Laying blockwork/brickwork	
(i) Per packer	50m <sup>2</sup>
(ii) Per team member	3,5m <sup>2</sup>

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

**PE 1.1.2      *Backfilling to trenches in non-trafficable areas***

Backfilling to trenches shall be placed in layers of thickness not exceeding 100 mm. Each layer may be compacted by hand stampers where practicable:

- a) To 90% Proctor density;
- b) Such that more than 5 blows of a Dynamic Cone Penetrometer (DCP) is required to penetrate 100 mm of the backfill, provided that the backfill does not comprise more than 10 percent gravel of size less than 10 mm and contains no isolated boulders, or
- c) Such that the density of the compacted trench backfill is not less than that of the surrounding undisturbed soil when tested comparatively with a DCP.

**PE 1.1.3      *Other Excavation***

In all other excavations up to a depth of 1.5 meters, materials suitable for excavation by hand, including topsoil so classified, may be excavated by hand where practicable. Harder material may be loosened by mechanical means for removal by hand.

**PE 1.2      *Clearing and Grubbing***

Grass, shrubs and small bushes may be cleared by hand where practicable.

**PE 1.3      *Shaping***

All shaping may be done by hand where practicable.

**PE 1.4      *Loading***

All loading of material excavated by hand, regardless of the method of haulage, may be undertaken by hand where practicable.

**PE 1.5      *Haulage***

Material excavated by hand may be hauled to its point of placement by means of wheelbarrows where practicable, where the haulage distance is not greater than 100 metres and the slope against which the haulage is done is less than 20 percent.

**PE 1.6      *Offloading***

Material not hauled by tipper trucks, dumpers or wheelbarrow, may be off-loaded by hand where practicable.

**PE 1.7      *Spreading***

Materials, except rock fill, may be spread by hand where practicable.

**PE 1.8      *Grassing***

Grassing may be undertaken by hand where practicable.

**PE 1.9      *Stone pitching and rubble concrete masonry***

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

Stone required for stone pitching and rubble concrete masonry, whether grouted or dry, may be collected, loaded and offloaded by hand where practicable, unless acquired from a commercial source. Stone placing may be by hand. Grout for stone pitching may be mixed by hand where practicable.

**PE 1.10 Manufactured Elements**

Individual elements designed and manufactured by the contractor, such as manhole rings, cover slabs, concrete planks and pipes, edge beams and the like, may not have a mass of more than 320kg. The elements should also be large enough so that four workers can comfortably and simultaneously acquire a proper handhold on them.

**PE 2 EMPLOYMENT OF LOCAL LABOUR****PE 2.1 Labour Resourcing**

Unskilled and semi-skilled labour shall be resourced through the project's labour desk.

**PE 2.2 Contract of Employment**

A pro-forma Contract of Employment must be completed for each member of the labour force engaged. A copy of the Contract of Employment completed for each and every member of the labour force engaged shall be given to the Engineer prior to their commencing work on this Contract.

**PE 2.3 Construction Activity Tasks****PE 2.3.1 *Production Rates for Tender Purposes***

It will be assumed that the tendered rates, where applicable, have been based on the typical production rates given in the table under clause PF 1.1.1.

Notwithstanding the production rates shown in the table, tasks established by the Contractor shall be such that:

- i. the average worker completes 5 tasks per week in 40 hours or less and,
- ii. the weakest worker completes 5 tasks per week in not more than 55 hours.

When it is established that the production rates set by the Contractor do not comply with (i) and (ii) above, the Contractor shall, on instruction from the Engineer, revise the production rates to comply with the requirements of (i) and (ii).

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

**PF ELECTRICAL SPECIFICATION: SMALL POWER & LIGHTING****PF 1 DEFINITIONS / ABBREVIATIONS**

A	Ampere(s)
AC	Alternating Current
al	Aluminium
CT	Current Transformer
cu	Copper
DB	Distribution Board
ECC	Earth Continuity Conductor
HV	High Voltage (> 36 000 V)
kV	kilo Volt (voltage)
kVA	kilo Volt-Ampere (unit of apparent power)
kVAr	Kilo Vars (unit of reactive power)
kW	kilo Watt (unit of real power)
kWh	kilo Watt Hours (unit of energy consumption)
LED	Light Emitting Diode
LM	Lumens
LV	Low Voltage (< 1000 V)
m	Metre (unit of length)
MCB	Miniature Circuit Breaker
MCC	Motor Control Centre
MCCB	Moulded Case Circuit Breaker
MV	Medium Voltage (1000 – 36 000 V)
OHS&E	Occupational Health, Safety & Environment
PEC	Photo Electric Cell
PVC	Polyvinyl Chloride
SWA	Steel Wired Armored
TBD	To be Determined
TBP	To be Provided
V	Volt(s)
W	Watt

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

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**PF 2 SCOPE OF WORKS****PF 2.1 INTRODUCTION**

This section is to provide guidelines for the electrical design concepts that will be used in the design of the Electrical Installation for the refurbishment of the pump station. The design shall provide the best options with respect to safety, cost and quality.

**PF 3 GENERAL****PF 3.1 BRIEF SCOPE DESCRIPTION**

The scope of works for the electrical installation is the design, manufacture, factory testing, supply, delivery, installation, site testing, commissioning and upholding during the defects liability period of the following equipment and materials:

- New Motor Control Centre (MCC),
- Building lighting,
- Lightning protection system for pump station building to be inspected and refurbished if necessary,
- Factory and Site acceptance testing of MCC,
- Testing and commissioning of complete installation,
- Issue a Certificate of Compliance, and
- Issue of Operating Manuals (3).

**PF 3.2 OBJECTIVES AND DESIGN BASIS**

The electrical equipment shall be designed, engineered and or selected to (in order of Priority):

- Provide a safe working environment for personnel and equipment,
- Integrate with the existing installations,
- Provide a reliable electrical installation based on sound engineering utilising as far as practicable, concepts which have been tested and proven,
- Technological advance where appropriate on current installations, and
- Minimize the environmental impact.

**PF 4 DOCUMENTATION**

Drawings are to be produced on the latest available version of AutoCAD.

Electrical Drawing symbols and standards shall be to IEC60617 or NRS 002, as amended.

All drawings listed shall be taken to be "as built" status on completion of the project.

**PF 5 APPLICABLE STANDARDS, REGULATIONS AND CODES OF PRACTICE**

The following SANS and IEC specifications will be used for this project:

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

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- SANS 10142-1 Wiring of premises, Part 1
- IEC 61439-1 General rules
- IEC 61439-2 Power switchgear and control assemblies
- IEC 61439-3 Distribution boards
- IEC 61439-4 Particular requirements for assemblies for construction sites
- IEC 61439-5 Assemblies for power distribution in public networks
- IEC 61439-6 Busbar trunking systems

**PF 6 AREA CLASSIFICATION – SANS 10108**

The plant contains no hazardous materials and therefore no study will be done for this project.

**PF 7 DESIGN CONSIDERATIONS****PF 7.1 ELECTRICAL SUPPLY**

An electrical supply from the Electrical Supply Authority will be co-ordinated with supply to the Water Treatment Works.

**PF 7.2 MAINTAINABILITY**

Wherever possible all equipment shall be selected such that:

- It is standardized
- It is proven technology
- It shall be purchased from approved suppliers.
- It is maintainable without the need for special tools and equipment.
- It has remote supplier support

**PF 7.3 EQUIPMENT REDUNDANCY**

No redundancy will be provided on the LV system.

**PF 7.4 EQUIPMENT NUMBERING SYSTEM**

The equipment will be numbered based on the Plant Numbering Standard. If a numbering system is not available, the Contractor will submit a numbering system for approval.

**PF 7.5 VOLT DROPS**

The following volt drops shall be applied.

Steady State Volt Drop to be based on the following:

- Volt drop from MCC to motor terminals under normal running conditions will be 3%.
- Volt drop during motor starting will be less than 15%.

**PF 8 ELECTRICAL PHILOSOPHIES****PF 8.1 LOAD ESTIMATION**

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

---

The Total Designed Operating load estimate shall be the vector sum of the following loads:

- All normally operating motors per MCC – excluding all loads designated standby.
- All normally operating non-rotating loads - Excluding loads designated standby.
- All provision for known future loads.
- Mechanical equipment/power users list.
- Lighting and small power.
- All emergency power requirements.

The sum totals of the above shall be vectorially added to arrive at the final design load per distribution board and or MCC. Each Distribution board or MCC shall on the Overall SLD detail both the Total Connected Load as well as the total designed operating load.

The load schedule shall be periodically updated as the engineering progresses and issued to all concerned.

**PF 8.2 CONSTRUCTION POWER**

Construction power will be available from the existing electrical infrastructure.

**PF 9 EARTHING AND LIGHTNING PROTECTION****PF 9.1 GENERAL**

All earthing designs to comply with SANS Code of Practice: 10313. Soil resistivity will be ascertained by means of an earthing survey. The design of the earthing and lightning protection system will be determined from the results of this survey. The new earthing system will be bonded to the existing earthing system. The lightning protection system will be connected to the earthing system.

Earthing connections shall be made on clean metal surfaces free of paint, primers or any insulating material, using materials designed for the purpose.

Earthing connections shall be made using thermo-weld moulded type connections such as "Cadweld", or equivalent, covered with a coat of zinc rich paint or by compression connectors made with proper compression tools and dies. Enough slack shall be provided to ensure no mechanical constraint.

**PF 9.2 EARTHING REQUIREMENTS FALL INTO THE FOLLOWING CATEGORIES**

- Electrical systems and structures - Electrical system and equipment, structures and other non-electrical metal work. A dedicated earthing system shall be provided for this requirement.
- Contractor shall design and install buried earthing system to provide maximum earthing grid resistance.

**PF 9.3 LIGHTNING PROTECTION**

Lightning protection shall be carried out in accordance with the requirements of SANS 10313:2005.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

The lightning protection system shall be connected to the main earthing system to from a common system. The lightning protection design will be conducted by an appointed lighting protection specialist.

**PF 10 ELECTRICAL EQUIPMENT SELECTION & SYSTEM DESIGN****PF 10.1 MOTOR CONTROL CENTRE (MCC)**

The Motor Control Centre (MCC) will conform to the following minimum requirements:

- The MCC will be fixed pattern type, with front/back access and bottom entry
- The MCC colour will be B26 electric orange, epoxy powder coated.
- Enclosures shall be the general-purpose type for indoor/outdoor use, with individual starter cubicles per drive/feeder application as per the following drawings:
- Main MCC
- Motor starters shall utilise motor starting MCCBs - Type 2 co-ordinated using published charts for heavy duty starting and rated for the designed maximum fault level.
- Interface shall be hardwired, via potential free contacts.
- The control voltage will be taken directly from one phase and neutral off the 400V main busbars. Fuse protection will be use to limit the fault rating.
- Each cubicle shall be provided with a door interlocked and pad-lockable handle for safe isolation.
- Indicating lamps shall be LED cluster type.
- Each motor starter and feeder will be provided with 1 ammeter with associated CT's as required.
- Incomers will be provided with Voltmeters, and Instantaneous ammeters.
- All control wiring shall be single core, PVC insulated, multi-stranded wire with a minimum voltage rating of 660 V and minimum 1,5 mm<sup>2</sup> cross-section. Solid core wire shall not be used.
- Each starter shall be equipped with at least the following:
  - One triple pole MCB serving as main isolator and circuit breaker, interlocked with the cubicle door. Unit shall be suitable for padlocking in the 'off' position.
  - Variable Speed Drives.
  - One single pole control circuit breaker.
  - Interlocking control relays.
  - All necessary wiring, interconnections, terminal blocks, cable glands, labels, etc.
- Protection and warning instrumentation for reverse power and low voltage shall be incorporated in MCC.



**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

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**PF 11 INSPECTION, TESTING AND COMMISSIONING**

The equipment shall be checked and tested to mechanical completion as per the individual vendor completion check sheets (Approval required from Project Engineer). Prior to commencing tests on equipment and electrical systems a test program shall be submitted.

A competent person to execute, supervise and control all testing and checking activities. This person shall liaise closely with the Project Engineer in order that testing activities may be conducted and sequenced in a manner best suited to the commissioning programme.

Defects revealed during testing and checking shall be made good by the Contractor.

Before any equipment is to be energised, continuity and insulation tests are to be performed and protection settings verified. These results are to be submitted to the Project Engineer for approval.

**PF 12 FIRE EXTINGUISHERS, FIRST AID KITS, DANGER SIGNS AND NOTICES**

All danger signs and safety notices shall be in two of the official languages, operating notices, signs and labels that are not safety related need only be in English. Signs / notices with approved symbols may be used in the place of text signs.

Fire extinguishers shall be provided alongside the entrance.

First aid kits shall be provided at the entrance/exit of the pump room at a position to be agreed with the Engineer. The kit will be in a metal first aid box, at an appropriately demarcated and sign posted first aid station, on a wall mounted shelf or other approved mounting.

"Burn shield" Dressings" shall be provided in each kit as follows:

- 4 off 100 x 100 mm,
- 2 off 200 x 200 mm.

**PF 13 CERTIFICATE OF COMPLIANCE**

On completion of an installation a Certificate of Compliance will be issued for the electrical installation as required by SANS 10142.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

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**PZ EMPLOYER'S ENVIRONMENTAL MANAGEMENT SPECIFICATION FOR  
ENVIRONMENTAL MANAGEMENT OF CONSTRUCTION PROJECTS****PZ1 INTRODUCTION****PZ1.1 SCOPE**

This specification is additional to the South African Bureau of Standards Standardised Specification for Civil Engineering Contracts and must be read in conjunction with the said specification.

This specification covers the principles, responsibilities and requirements generally applicable to implement effective environmental management during the execution of any construction contract. The aim of this specification is to ensure that construction activities are conducted in an environmentally and socially responsible manner.

**PZ1.2 INTERPRETATIONS**

This specification contains clauses that are generally applicable to the implementation of effective environmental management on construction contracts. Interpretations of, and variations to, this specification are set out in the project specification.

**PZ1.2.1 Supporting specifications:**

Reference is made to the SABS 1200 standards which are to be read in conjunction with this specification. All aspects of these SABS requirements which are relevant to environmental management during construction contracts will apply.

**PZ1.2.2 Principles**

- The following principles should be considered at all times during construction phase activities:
- The Environment is considered to be composed of both biophysical and social components.
- Construction is a disruptive activity and all due consideration must be given to the environment, particularly the social environment, during the execution of a project to minimise the impact on affected parties.
- Minimisation of areas disturbed by construction activities will minimise many of the construction related environmental impacts of the project and reduce rehabilitation requirements and costs.
- As minimum requirements, all relevant standards relating to international, national, provincial and local legislation, as applicable, shall be adhered to. This includes requirements relating to waste emissions (e.g. hazardous, airborne, liquid and solid), waste disposal practices, noise regulations, road traffic ordinance etc.
- All effort should be made to minimise, reclaim or recycle 'waste' material.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

**PZ1.3 DEFINITIONS**

For the purpose of this specification, the definitions given in SABS 1200 shall apply.

Additional definitions which shall apply to this specification are as follows:

**Environmental Control Officer:** Either an Employer's staff member or an Environmental Consultant assigned to the project on a part or full-time basis. The Environmental Control Officer will be part of the Project staff and will advise the Engineer on all environmental matters relating to the works, in terms of this specification and the project specification, if applicable.

**Environmental Officer:** Either an Employer's employee (e.g. Quality Assurance Inspector) or Consultant designated to monitor the implementation and compliance with the environmental specifications and environmental management plan on a daily basis.

**Cleared surface:** "surface vegetation" as referred to in SABS 1200 C 2.3 will be deemed to be any woody or herbaceous vegetation but exclude grasses, sedges, rushes and reeds. Clearing and grubbing shall for the purpose of this specification mean the removal of all woody and herbaceous vegetation including stumps, but excluding grass and groundcover vegetation.

**Engineer:** Is to read Engineer or Supervisor (in the case of the NEC contract), whichever is applicable to the Contract.

**Interested and Affected Parties (IAP):** All persons who may be affected by the project either directly or indirectly, or who have an interest or stake in the area to be affected by the project. IAPs include landowners, tribal or local authorities, public interest groups etc.

**Liquid Waste Stream:** Any reagent solutions, fuels, oils, greases, contaminated run-off, sewerage and wash water, etc.

**Open Trench:** Open trench will, for the purpose of this specification, be deemed to include: clearing and grubbing; stripping of topsoil; trenching; placing of bedding; pipe-laying; placing of selected fill; backfilling to ground level; removing excess material; construction of cross berms to channel water (if required); and replacement of topsoil to final finished level (refer to Figure 1: Appendix A).

**Progressive Reinstatement:** Reinstatement of disturbed areas to topsoil profile on an ongoing basis, immediately after selected construction activities (e.g. backfilling of a trench) are completed. This allows for passive rehabilitation (i.e. natural recolonisation by vegetation) to commence. See also 'Open Trench' and 'Rehabilitation'.

**Project Manager:** The person responsible for co-ordinating and integrating activities across multiple, functional lines.

**Rehabilitation:** Rehabilitation is defined as the return of a disturbed area to a state which approximates the state (where possible) which it was before disruption. Rehabilitation for the purposes of this specification is aimed at post-reinstatement revegetation of a disturbed area and the assurance of a stable land surface. Revegetation should aim to accelerate the natural succession processes so that the plant community develops in the desired way, i.e. promote rapid vegetation establishment.

**Riparian vegetation:** Vegetation occurring on the banks of a river or stream (i.e. vegetation fringing a water body). In this specification, riparian vegetation in terms of removal, storage and replacement (see PZ3 17.1 and PZ3 17.2), is only applied to sedge, grass, groundcover, reed, bulrush, or herbaceous component of riparian vegetation and excludes the woody component.

**Sedges:** Grass-like plants growing in wetland/ marshy areas or adjacent to water.

**Subsoil:** Subsoil is the soil horizons between the topsoil horizon and the underlying parent rock. Subsoil often has more clay-like material than the topsoil. Subsoil is of less value to plants, in terms of nutrient (food) and oxygen supply, than topsoil. When subsoil is exposed it tends to erode fairly easily.

**Timeous:** At least 5 working days prior to an activity.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

**Topsoil:** This is defined as the A horizon of the soil profile. Topsoil is the upper layer of soil from which plants obtain their nutrients for growth. It is often darker in colour, due to the organic (humic) fraction. Topsoil is deemed for the purposes of this specification as the layer of soil from the surface to the specified depth required for excavation (see PZ3 5.3, relevant SABS 1200 clause and project specification). Where topsoil is referred to, it is deemed to be both the soil and grass / ground cover fraction. (see 'Cleared Surface')

**Veld:** This is defined for the purpose of this specification as unimproved natural vegetation areas (e.g. grasslands).

**Water body:** Any open body of water including streams, dams, rivers, lakes, and the sea.

**Wetland:** A seasonally, temporally, or permanently wet area which also may exhibit a specific vegetation community. It is often marshy in character.

**Wetland Vegetation:** Vegetation which is indicative of a wetland environment - for example, sedges, rushes, reeds, hydrophilic grasses and groundcovers, but for the purposes of this specification excludes woody species.

**Xeriscaping:** Landscaping with vegetation which has a low water usage. The objective is to conserve as much water as possible, whilst still beautifying an area (i.e. conservation and aesthetics). Concept embraces utilising indigenous as opposed to exotic plants.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

**PZ1.4 ABBREVIATIONS**

DWAF	: Department of Water Affairs and Forestry
ECO	: Environmental Control Officer
EMP	: Environmental Management Plan
EMPR	: Environmental Management Programme Report
EO	: Environmental Officer
IAPs	: Interested and Affected Parties
IEM	: Integrated Environmental Management
MSDS	: Material Safety Data Sheet
NEC	: New Engineer Contract or The Engineering and Construction Contract

**PZ1.5 DRAWINGS**

Drawings referred to in this specification are included in C4.4 Drawings of Section C4 Site Information.

**PZ1.6 FORMS**

Forms referred to in this specification are included in Part T2 or attached to this environmental specification.

**PZ1.7 CONDITIONS OF CONTRACT****PZ1.7.1 Duties and Powers of the Project Manager**

The Project Manager is ultimately responsible for ensuring compliance with the environmental specification and upholding the Employer's Environmental Policy on a project.

The Project Manager:

- Arranges information meetings for or consults with IAPs about the impending construction activities;
- May on the recommendation of the Engineer and /or Environmental Officer order the Contractor to suspend any or all works on site if the Contractor or his Sub-Contractor/ supplier fails to comply with the said specifications;
- Maintains a register of complaints and queries by members of the public at the site office as per attached pro-forma. This register is forwarded to the Environmental Control Officer on a monthly basis.

**PZ1.7.2 Duties and Powers of the Engineer / Supervisor (NEC)**

The Engineer or Supervisor is responsible for:

- enforcing the environmental specification on site;
- monitoring compliance with the requirements of the specification;
- assessing the Contractor's environmental performance in consultation with the Environmental Officer from which a brief monthly statement of environmental performance is drawn up for record purposes;
- documenting, in conjunction with the Contractor, the state of the site prior to construction activities commencing. This documentation will be in the form of photographs or video record.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

**PZ1.7.3 Duties and Powers of the Environmental Control Officer****The Environmental Control Officer:**

- briefs the Contractor about the requirements of the Environmental Specification and/or Environmental Management Plan, as applicable;
- advises the Project Manager and Engineer/ Supervisor about the interpretation, implementation and enforcement of the Environmental Specification and other related environmental matters;
- attends site meetings, as necessary;
- monitors the Constructor's compliance with this specification and the project environmental specification as applicable;
- undertakes periodic audits of the effectiveness of the environmental specifications on the site;
- communicates environmental policy issues to the Project Manager;
- provides technical advice relating to environmental issues to the Engineer/ Supervisor and Project Manager;
- reports on the performance of the project, in terms of environmental compliance.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

**PZ1.7.4 Duties and Powers of the Environmental Officer**

The Environmental Officer:

- attends site meetings;
- monitors the site for compliance with the Environmental Specification and EMP;
- reports on the performance of the project in terms of environmental compliance to the ECO and Project Manager as per the pro-forma attached;
- liaises with the ECO on matters of policy and those requiring clarity and advice.

**PZ1.7.5 Extent of the Contractor's Obligations**

The Contractor is required to:

- provide information on previous environmental management experience and company environmental policy;
- supply method statements for all activities requiring special attention as specified and/or requested by the Project Manager, Environmental (Control) Officer and/or Engineer during the duration of the Contract;
- be conversant with the requirements of this environmental specification and the project specification as applicable;
- brief his staff about the requirements of the environmental specification; comply with requirements of the Environmental (Control) Officer in terms of this specification and the project specification, as applicable, within the time period specified;
- ensure any sub-Contractors/ suppliers who are utilised within the context of the contract comply with the environmental requirements of the Employer, in terms of the specifications. The Contractor will be held responsible for non-compliance on their behalf;
- bear the cost of any delays, with no extension of time granted, should he or his Sub-Contractors/ Suppliers contravene the said specifications such that the Engineer orders a suspension of work. The suspension will be enforced until such time as the offending party(ies), procedure, or equipment is corrected;
- bear the costs of any damages/ compensation resulting from non-adherence to the said specifications or written site instructions;
- comply with all applicable legislation in terms of 7.6 below;
- ensure that he informs the engineer timeously of any foreseeable activities which will require input from the Environmental (Control) Officer.

The Contractor will conduct all activities in a manner that minimises disturbance to directly affected residents and the public in general, and foreseeable impacts on the environment.

**PZ1.7.6 Compliance with Applicable Laws**

The supreme law of the land is "The Constitution of the Republic of South Africa", which states: "Every person shall have the right to an environment which is not detrimental to his or her health or well-being"

Laws applicable to protection of the environment in terms of Environmental Management (and relating to construction activities) include but are not restricted to:

Animals Protection Act, Act No 71 of 1962

Atmospheric Pollution Prevention Act, No 45 of 1965

Conservation of Agricultural Resources Act, No 43 of 1983

Environmental Conservation Act, No 73 of 1989

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

Environmental Planning Act, Act No 88 of 1967  
Fertilisers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, No 36 of 1947  
Forest Act, No 122 of 1984  
Forest and Veld Conservation Act, Act No 13 of 1941  
Hazardous Substances Act, No 15 of 1973  
Lake Areas Development Act No 34 of 1975  
Land Survey Act, No 9 of 1921  
Minerals Act, No 50 of 1991  
Mountain Catchment Act, No 63 of 1970  
National Monuments Act, No 28 of 1969  
National Parks Act, No 57 of 1976  
National Resources Development Act, Act no 51 of 1947  
Occupational Health and Safety Act, No 85 of 1993  
Provincial and Local Government Ordinances and Bylaws  
Soil Conservation Act, Act No 76 of 1969  
Water Act, No 54 of 1956  
Water Services Act No 108 of 1997  
and all regulations framed thereunder and amendments there to.



**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**


---

**PZ1.7.7 Compliance with the Environmental Specification**

The Contractor is deemed not to have complied with the Environmental Specification if:

- within the boundaries of the site, site extensions and haul/ access roads there is evidence of contravention of clauses;
- if environmental damage ensues due to negligence;
- the Contractor fails to comply with corrective or other instructions issued by the Project Manager or Engineer within a specified time,
- the Contractor fails to respond adequately to complaints from the public.

Application of a penalty clause will apply for incidents of non-compliance. The penalty imposed will be per incident. Unless stated otherwise in the project specification, the penalties imposed per incident or violation will be:

Failure to demarcate working servitudes	R1000
Working outside of the demarcated servitude	R2000
Failure to strip topsoil with intact vegetation	R1000
Failure to stockpile topsoil correctly	R500
Failure to stockpile materials in designated areas	R500
Pollution of water bodies (including increased suspended solid loads)	R1000
Failure to control stormwater runoff	R1000
Failure to provide adequate sanitation	R500
Unauthorised removal of woody vegetation	R2000
Failure to erect temporary fences	R500
Failure to provide adequate waste disposal facilities and services	R500
Failure to reinstate disturbed areas within the specified timeframe	R3000
Failure to rehabilitate disturbed areas within the specified timeframe	R3000
Any other contravention of the project specific specification	R400
Any other contravention of the particular (general) environmental specification	R300

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

**PZ2 SITE ESTABLISHMENT AND HOUSEKEEPING****PZ2.1 LAYOUT**

The Contractor will take into account any of the limitations identified in the project specification with regard to establishment of site, in particular the location of access routes, and establishment layout.

Notwithstanding the provision of a project specification, the Contractor will provide the Project Manager and Environmental Control Officer with a layout design of the site indicating the position of all of the following, as applicable: offices, ablution facilities, storage areas, workshops, laboratories, batching plant, particulate matter stockpile area (i.e. soil/ granular chemicals/ cement fines etc), waste disposal facilities, hazardous substances storage area, access routes, etc. This layout plan is to be submitted prior to site establishment for acceptance. Any changes to this plan require review by the Project Manager in conjunction with the ECO. The Contractor will take into account prevailing wind directions when designing the site layout to minimise impacts due to dust, unpleasant odours etc.

The Contractor will take into account the positions of residences when designing the site layout in order to minimise noise impacts on the residents.

Site security lighting is to be positioned such that the direct beam is focused away from residential properties and does not pose a nuisance or danger to road users.

No site establishment will be allowed within 100 m of a water body or drainage channel or on a flood plain unless approved by the Environmental (Control) Officer or specified in the project specification.

**PZ2.2 SITE CLEARANCE**

No trees or shrubs may be removed without the prior permission of the Environmental Officer, unless in keeping with the final site reinstatement and rehabilitation plan.

Topsoil is to be stripped from all areas where permanent or temporary structures and access roads are to be constructed. Topsoil conservation is to be in terms of clause PZ3 5.3 of this document.

**PZ2.3 SERVICES****PZ2.3.1 Sanitation**

Portable chemical toilets are to be utilised at site unless a connection to sewer is possible or a proper septic tank system is installed. In the case of the septic tank, the installation will require the relevant approvals from the local authority and will require removal upon completion of the contract, unless otherwise directed.

Sanitation facilities will be located within 100 m from any point of work, but not closer than 50 m to a water body.

**PZ2.3.2 Solid Waste Facilities**

Facilities for solid waste collection are to be provided. These are to be at least a 200 l drum and clearly identified as the point for waste disposal.

Waste is to be separated into paper, glass and metal with separate collection points for each. The Contractor will ensure that the appropriate recycling Contractors receive this waste.

The Contractor is to institute a daily litter collection programme. The collected waste is to be disposed of regularly and proportionately to its generation at a site designated for waste disposal.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

---

No burning will be permitted on any site unless by approved incineration methods and in a low risk fire area. In the case of incineration, ash is to be co-disposed with spoil in a designated spoil dump.

No burying of waste will be allowed on any site.

**PZ2.3.3 Cooking and Heating Facilities**

No open fires will be allowed anywhere on site.

Contained fires (i.e. in a fire drum) will be allowed for heating and cooking only in designated areas, in other cases cooking is restricted to gas or electrical equipment.

**PZ2.4 FUELS, HAZARDOUS SUBSTANCES AND OTHER LIQUID POLLUTANTS****PZ2.4.1 Storage and handling**

All potentially hazardous raw and waste materials are to be handled by trained staff and stored on site in accordance with manufacturer's instructions and relevant legal requirements. The product MSDS is to be lodged with the Engineer.

Storage and handling areas for fuels, lubricants, chemicals and other hazardous substances are to be paved with concrete to prevent accidental contamination of the soil. Alternatively, an impermeable liner may be placed beneath above-ground storage tanks. The integrity of the liner is to remain intact for the duration of the contract, until removal.

Open storage vessels, for example shutter lubricant drums, are to be stored under cover to prevent 'splash' contamination.

All storage areas are to be bunded (with at least sandbags) and have a peripheral collection drain, with oil interceptors (if required).

The bunded area is to be sufficiently large to contain a spillage equivalent to the volume of one container of the substances stored.

All products to be dispensed from 200 litre drums will be done so with appropriate equipment, and not dispensed by tipping of the drum.

Daily checks are to be conducted on the dispensing mechanism of above-ground storage tanks to ensure the timeous identification of faults.

Collection containers (e.g. drip trays) are to be placed under all dispensing mechanisms of hydrocarbon or hazardous liquid substances to ensure contamination from leaks and dispensing is contained.

The dispensing mechanism of diesel and petrol storage tanks is to be stored in a container when not in use.

**PZ2.4.2 Control of pollutants**

A drainage diversion system is to be installed to divert runoff from areas of potential pollution, e.g. batching area, vehicle maintenance area, workshops, chemical and fuel stores, etc if applicable.

Contaminated runoff and wastewater is to be directed into a collection system (e.g. sump, attenuation dam, PVC porta-ponds etc.) for treatment or collection and disposal. The final collection point (e.g. sump) is to be PVC lined.

Collected contaminated runoff/ wastewater is to be pumped out of the final collection point and disposed of at an appropriate landfill site. Sump liners are to be treated in the same manner.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

---

The treated wastewater, effluent and contaminated runoff may require analysis prior to discharge as detailed in the project specification or instructed by the Environmental Officer.

Details regarding proposed methods for treatment of pollutants are to be submitted to the Environmental (Control) Officer for acceptance upon award of the Contract.

Any spillages, irrespective of their size, are to be contained and cleaned up immediately. The Pollution Control section may provide technical assistance for clean-up, if required. No spills may be hosed down into a stormwater drain or sewer.

Use of specialised clean-up techniques and/ or products may be required depending on the spill. This will be instructed by the Environmental Control Officer. These will be to the Contractor's cost.

**PZ2.5 GENERAL**

Site staff are not permitted to use any open water body or other natural water source (e.g. springs) for purposes of bathing, or the washing of clothes, machinery or vehicles. Nor draw water from a spring without the permission of the community utilising that spring.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

**PZ2.6 MEASUREMENT AND PAYMENT**

Measurement and payment for compliance with clauses PZ2.1 to 5 of the specification are deemed to be fully included in the Contractor's rates for fixed and time related Preliminary and General Items scheduled under SABS 1200 A or AA.

**PZ3 CONSTRUCTION****PZ3.1 CONSTRUCTION METHODS AND PROGRAMME****PZ3.1.1 Construction Method**

The Contractor will provide method statements for construction activities (14 working days prior to the activity commencing) relating to the following environments and those listed in the project environmental specification, unless methods have been prescribed in this or the project environmental specification:

- rivers, streams, or any other open water body;
- wetlands;
- access roads (see PZ3.13 below);
- steep slopes (i.e. steeper than 1:4) or less if friable material is present;
- indigenous bush/ forest;
- close proximity (i.e. 50 m or less) to a residential dwelling;
- drilling and/or blasting of rock.

If a construction method employed by the Contractor is not environmentally acceptable to the Employer, the Contractor may be instructed to cease the utilisation of that method in favour of a more environmentally acceptable one, proposed either by himself or the Employer.

**PZ3.1.2 Construction Programme**

The Contractor will programme construction so as to minimise the impact on the environment and provide this programme to the Environmental Control Officer for perusal and acceptance at the onset of the contract period. The Environmental Control Officer is to be made aware of any amendments to the construction programme or alterations to the scope of work in order that their impacts on the environment can be assessed.

The Contractor (through the Project Manager) will ensure that all affected landowners/ authorities are advised of the proposed programme at the beginning of the contract period.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

**PZ3.2 AREAS OCCUPIED / DEMARCATION OF SITE**

Routes for temporary access and haul roads are to be located within the approved demarcated areas and vehicle movement is to be confined to these roads. Movement of vehicles outside the designated working areas is not permitted without authorisation from the Engineer.

All construction activities are restricted to working areas designated on the drawings and/or demarcated and approved by the Engineer. Materials including spoil are stockpiled at designated areas.

Any areas disturbed outside of the demarcated areas or without permission of the Environmental (Control) Officer or Engineer will be subject to reinstatement and rehabilitation (as per PZ4 below) to the Contractor's cost.

In terms of pipeline projects, a general maximum working servitude width of 15 m will apply for machine excavation unless otherwise indicated in the project specification. A maximum width of 6 m will apply for manual excavation. These maximum working servitude widths may vary depending on the sensitivity of the environment, as detailed in the project specification.

In sensitive biophysical environments, for example wetlands, indigenous forest / bush, pristine natural grasslands, and sensitive social environments, as defined in the project specification or by the Environmental Control Officer, the working servitude is reduced as indicated in the project specification.

The working servitude shall contain all construction related activities, including, stockpiling of materials, placing of toilets, vehicle movement areas, etc.

Demarcation of linear projects (executed with machine excavation) and features (e.g. pipelines, access roads, etc.) will be by means of wooden stakes. These stakes will be at least 1 m high, painted white and placed at least every 15 m, on either side of the linear feature, in all areas where works are occurring. Progressive movement of stakes is required as linear projects progress.

In the case of a fenced site, the boundary fences will be denoted as the outermost limit of the site, but internal areas may be demarcated with stakes as above. The site boundaries of non-fenced, but 'contained' projects are to be delineated using stakes or temporary fencing, depending on the hazard which that site poses.

**PZ3.3 SUPPLY OF WORKS FACILITIES**

No water may be abstracted from water bodies for the purposes of construction, without approval of the Engineer in consultation with the Environmental Control Officer.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

**PZ3.4 CLEANLINESS**

SABS 1200 AD, clause 5.2.4, second sentence, is to read: "No rubbish or debris shall be deposited below the full supply level (FSL)."

**PZ3.5 SITE CLEARANCE****PZ3.5.1 Clearance**

Spoil sites will require clearing and grubbing in addition to those areas in terms of SABS 1200 C 5.1.

The site shall only be cleared immediately prior to construction activities commencing i.e. at the last practicable stage.

No trees or indigenous shrubs may be removed without the prior permission of the Environmental (Control) Officer, unless in keeping with the final site reinstatement and rehabilitation plan.

**PZ3.5.2 Disposal of materials**

Material obtained from clearing and grubbing operations shall be disposed of at appropriate municipal disposal facilities. They are not to be disposed of as per Paragraph 1 of Sub-clause 3.1 of SABS 1200 C.

Wood obtained from clearing and grubbing operation remains the property of the landowner/ community and must be stacked at sites designated by relevant person. The Contractor will be required to remove and dispose of any wood from site at a designated site for vegetation disposal, should the landowner/ community not require it.

All tree trunks and branches of diameter greater than 50mm are to be cut into lengths not exceeding 2400mm.

Brush wood (i.e. < 50mm diameter) is to be disposed of, or utilised as specified in the project specification or upon instruction of the Engineer.

**PZ3.5.3 Conservation of topsoil**

The Contractor is required to strip topsoil (as defined in this specification) together with grass, groundcover and sedges from all areas where permanent or temporary structures are located, construction related activities occur, and access roads are to be constructed, etc. The depth to which topsoil will be stripped shall be 200mm unless stated otherwise in the project specification.

Topsoil is to be handled twice only - once to strip and stockpile, and secondly to replace, level, shape and scarify.

Topsoil is to be replaced along the contour.

Topsoil is to be replaced by direct return (i.e. replaced immediately on the area where construction is complete), rather than stockpiling it for extended periods. This is feasible for progressive construction (e.g. pipelines), but not necessarily so for reservoirs, site establishments, dams, etc.

Topsoil stockpiles are not to exceed 2 m in height.

Topsoil stockpiles are to be maintained in a weed free condition (i.e. no 'broad-leafed' plants regarded as weeds in terms of the Conservation of Agricultural Resources Act No 43 of 1989, or those plants regarded as a 'general nuisance in the area' are to be growing on the stockpiles).

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**


---

The Environmental Control Officer will provide guidance as to which plants are weeds and require removal.

The stockpiles are not to be contaminated with sub-soil, or any other waste material.

Topsoil may not be compacted in any way, nor may any object be placed or stockpiled on it.

Topsoil may not be compacted in any way, nor may any object be placed or stockpiled on it.

Topsoil which is to be stockpiled for periods exceeding 4 months is to be vegetated. In summer a mixture of *Eragrostis tef* (Teff) and *Eragrostis curvula* (Weeping Lovegrass) (ratio 1:2) is to be applied at an application rate of 6 kg/ha, unless otherwise instructed in the project specification. In winter, a mixture of *Lolium multiflorum* (Annual/Italian Rye grass) and *Eragrostis curvula* (Weeping Lovegrass) (ratio 1:1) is to be applied at an application rate of 6kg/ha (see PZ4 5.3 for sowing times), unless otherwise instructed in the project specification. Fertiliser is to be applied as per PZ4 5.2.

**PZ3.5.4 Cutting of trees**

Any tree branches which require removal are to be properly pruned and sealant applied to the cut surface, if required.

The Contractor's attention is drawn to Sub-clause 5.2.3.3 of SABS 1200 C with respect to work in indigenous forests.

Any indigenous trees or bush which require removal in terms of the project, and which have not been identified in the project specification or EMP, are to be timeously indicated to the Environmental Officer prior to work affecting them.

**PZ3.5.5 Landscape Preservation and Conservation of Flora**

Notwithstanding Clause 5.7 of SABS 1200 C, the Contractor will be required to transplant designated plants to alternative locations as specified in the project specification or identified by the Environmental Control Officer, upon the instruction of the Engineer.

Transplanting shall be undertaken by employing the following method:

**Removal**

- Mark the orientation of the tree/shrub (for example, the north-facing side of the trunk indicated by a small arrow made with indelible ink) trunk. Do not scratch a mark on the surface of the trunk;
- Delineate a circle from the trunk with a radius equivalent to the dripline of the tree, or as indicated by the Environmental Control Officer on site;
- Excavate the tree with an intact rootball.

**Replanting**

- A hole 500mm larger in diameter than the anticipated rootball must be prepared in advance of the tree removal in order that the tree can be replanted immediately;
- The tree must be positioned as per its original orientation;
- A planting method known as 'puddling' must be employed. This method involves the addition of soil and water simultaneously to expels air from the planting hole. Place the tree in its new hole, making sure the top surface of the rootball is level with the ground level. Place a hose pipe in the hole and leave it running whilst extra soil is added around the rootball;
- 'Compact' the tree in the hole and attach tree stays for stabilisation.

Compensatory planting of species may be required should transplantation not be feasible, as indicated in the project specification or upon instruction of the Engineer.



**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

**PZ3.6 EARTHWORKS****PSZ3.6.1 Backfill material**

With reference to SABS 1200 DB sub-clause 3.5, no material stripped or excavated which is classed, in terms of this specification, as topsoil, may be used as backfill in any excavation.

**PZ3.6.2 Excavation and backfilling**

During excavation 'conservation of topsoil', as specified in PZ3 5.3 above will apply.

Excavated material is to be stockpiled along a pipeline trench within the working servitude, unless otherwise authorised.

Surplus excavated soft, intermediate and hard rock material shall not be disposed of along the pipeline trench as indicated in SABS 1200 DB sub-clause 5.6.3 and 5.6.4, but shall be removed to a spoil site (see PZ3.15 below) designated during the project if applicable, or agreed by the Engineer in conjunction with the Environmental Control Officer and Project Manager.

In certain cases, for example to help stabilise the disturbed area or to reinstate the natural aesthetics of an area, excess excavated intermediate and hard material may be disposed of in a designated manner along a pipeline trench, as indicated by the Environmental Control Officer and Project Manager, or in the project specification. In this case, rock material shall not exceed 250mm in maximum dimension (see PZ4 2.1).

In terms of SABS 1200 DB 5.6.5 and SABS 1200 LB 3.4.2, deficiency of backfill material shall not be made up by excavation within the free haul distance of 0.5km of site, without the prior approval of the Engineer of the source of the material. Where backfill material is deficient, it should ideally be made up by importation from an approved borrow pit (i.e. one which operates within the ambient of an EMPR.) (See also PZ3 14 below).

The Contractor will backfill in accordance with the requirements of progressive reinstatement. The maximum length of open trench shall be specified in the project specification.

**PZ3.7 SAFETY**

All works which may pose a hazard to humans and animals are to be adequately protected and appropriate warning signs erected. The Contractor's attention is drawn to SABS 1200 D section 5.1 in this regard.

With reference to SABS 1200 D 5.1.1.3, where blasting is required in terms of the project, the Contractor will ensure that all structures in the vicinity that could be affected by the activity will be inspected and their condition photographically recorded (as necessary), prior to blasting.

Notice of intent to blast is to be provided to landowners timeously.

Speed limits, appropriate to the vehicle driven, are to be observed at all times on access roads. Operators and drivers are to ensure that they limit their potential to endanger humans and animals at all times, by observing strict safety precautions.

**PZ3.8 PLANT****PZ3.8.1 Silencing of plant**

With reference to SABS 1200 A amend: "built up areas": to read as "all areas within audible distance of residents (albeit urban, peri-urban or rural areas)."

Appropriate directional and intensity settings are to be maintained on all hooters and sirens.

Silencer units on equipment and vehicles are to be maintained in good working order.

Construction activities are to be confined to normal working hours (07h30 - 17h00) Mondays to Saturdays, except for the activities designated to be carried out at night.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

---

**PZ3.14 BORROW PITS**

Where the Contractor is required to import material, this shall be from commercial sources or borrow areas specified in the project specification.

The Contractor may source material from alternative borrow pits provided: the site location; method of winning material and reinstatement and rehabilitation are environmentally acceptable and approved by the Environmental Control Officer.

In this regard, the Contractor shall give the Environmental Control Officer in writing, 30 days prior to opening up alternative borrow pits the following information for acceptance:

- quantities of borrow material required;
- method statement for excavation of material including depth and extent of excavation;
- anticipated 'active life' of the borrow area;
- proposal for reinstatement and rehabilitation of borrow area, including final profile;
- written approval from the landowner/ relevant authority that material may be removed from their land subject to their stated conditions, requirements, and royalties, and if the proposal is acceptable to the Environmental Control Officer.

Development and rehabilitation of borrow pit areas are likely to include the following activities (but these must not be regarded as exhaustive):

- Stripping and stockpiling of topsoil as per PZ3 5.3 of this specification;
- Removal (to nominal depth of 500mm) and stockpiling of sub-soil;
- Infill of borrow pit with spoil material;
- Contouring of borrow pit to approximate natural topography and/ or reduce erosion impacts on the site;
- Placement of excavated subsoil over spoil material;
- Placement of stripped topsoil on subsoil;
- Grassing of topsoil in terms of clause PZ4 4 of this specification.

The Contractor is to familiarise himself with the requirements of the Minerals Act No 50 of 1991 in terms of borrow pit development, and the requirements of the EMPR, as applicable.

**PZ3.15 SPOIL SITES**

Where the Contractor is required to spoil material, spoil sites must be identified which are environmentally acceptable and approved by the ECO, unless spoil site areas have been identified in the project specification, in which case these will be the designated spoil sites.

If no spoil sites have been previously identified together with reinstatement and rehabilitation criteria, the Contractor is to provide the following information to the ECO at least 30 days prior to requiring sites to spoil material:

- the location, description of and access to alternative sites identified in order that they may be assessed;
- the quantity of material to be spoiled;
- the type of material to be spoiled (i.e. blast rock/ excavated rock/ soft shale/ subsoil etc.);
- the proposed method of spoiling;
- the proposed reinstatement and rehabilitation plan including final profile;

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

**PZ3.16 NUISANCE****PZ3.16.1 Dust**

At all times the Contractor shall control dust on the site, access roads, borrow pits and spoil dumps with water, chemical soil stabilisers or temporary surfacing as specified in the project specification or upon instruction of the Engineer.

Dust control shall be sufficient so as not to have significant impacts in terms of the biophysical and social environments. These impacts include visual pollution, decreased safety due to reduced visibility, health aspects, and ecological impacts due to dust particle accumulation.

On gravel or earth roads, vehicle speeds may not exceed 30km per hour.

**PZ3.16.2 Noise**

The operational layout of the construction site is to be designed to control and reduce noise from source (see clause PZ2 1).

Machinery and vehicle silencer units are to be maintained in good working order. Offending machinery and /or vehicles will be banned from use on site until they have been repaired.

Construction activities generating output levels of 85 dB(A) or more (excessively noisy), in residential areas, are to be confined to working hours (08h00 - 17h00) Mondays to Fridays only. 'Normal' or 'noisy' working hours may only be extended with the prior written approval of the Project Manager, who has been notified, at least 7 days in advance, of the impending work requiring extension.

The Project Manager will ensure that the neighbours are timeously forewarned of imminent noisy activities.

Should community complaints be received with regard to noise generation, the Contractor will, at the discretion of the Project Manager and Environmental Control Officer, provide an independent and registered noise monitor to undertake a survey of noise output levels from site, and implement measures to reduce noise to legislated levels.

**PZ3.16.3 Visual**

All site establishment components, as well as equipment, will be positioned to limit visual intrusion to neighbours (see clause PZ2 1 above).

The type and colour of roofing and cladding materials are to be selected to reduce reflection.

Security lighting (both temporary and permanent) and lighting required for specific works activities must be placed such that it is not a nuisance to residents and the general public.

**PZ3.16.4 Interference with neighbours and public**

No construction staff may approach site neighbours, for whatever reason, without the knowledge and permission of the Project Manager.

Complaints from neighbours and public with regard to interference from contract staff will be regarded in a serious light, and the offender(s) may be subject to disciplinary action.

**PZ3.16.5 Disruption of Services**

Disruption of services, e.g. road access, water and electricity, must be kept to a minimum at all times.

Where service disruption is unavoidable, the Contractor is to advise the Project Manager (at least 7 days in advance), who in turn will timeously warn the affected parties.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

---

**PZ3.17 SPECIAL ENVIRONMENTS****PZ3.17.1 Wetlands**

Pipeline trenches which traverse wetlands shall be constructed as specified in the project specification. The Contractor will submit a method statement for work in wetland areas as per PZ3 1.1

Construction may not permanently alter the surface or subsurface flow of water through the wetland.

The Contractor shall submit a method statement for review at least 14 days prior to commencing construction in a wetland.

The Contractor will remove all wetland vegetation with their root ball intact. This vegetation is to be kept moist at all times. It is to be placed in the shade and covered with moistened hessian cloth until replanting, which is to be undertaken immediately surface reinstatement is complete. No construction materials may be stockpiled in any wetland areas.

The pre-construction profile of the wetland shall be returned to one similar as before construction, with no created "ridge or channel" features present.

**PZ4.1 HOUSEKEEPING**

All areas are to be cleared of rubble associated with construction. This includes the removal of surplus materials, excavation and disposal of consolidated waste concrete and concrete wash water, litter, etc.

All soil contaminated by hydrocarbons, for example from leaking machines, refuelling spills etc., is to be excavated to the depth of contaminant penetration, placed in 200 litre drums and removed to an appropriate landfill site.

**PZ4.2 FINISHING****PZ4.2.1 Final Grading**

Final levels of all disturbed areas are, where feasible in terms of the project requirement, to be consistent with the natural topography of the area.

In certain instances, it will be acceptable to reinstate rock onto a works area (e.g. pipeline servitude), provided that that rock does not exceed 250mm in maximum dimension and is placed in a manner consistent with the natural surrounds as indicated by the Environmental Control Officer and Project Manager.

All drainage lines affected by construction are to be reinstated to approximate their original profile. Where this is not feasible due to technical constraints, the profile is to be agreed upon by the Environmental Control Officer and Project Manager.

All compacted (disturbed) areas (including stockpile areas) are to be ripped (along contour) to a depth of 150mm prior to the replacement of topsoil.

**PZ4.2.2 Topsoiling**

Topsoil is to be replaced to a minimum depth of 100mm.

Topsoil is not to be compacted, but once replaced is to be scarified (to a depth of 50mm) consistent with the natural contour.

If insufficient topsoil is available, subsoil or similar material may be used that may be a suitable substrate after addition of soil improving substances e.g. compost, pH rectifiers (lime or gypsum) etc. Soil testing may be required at an approved facility.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**
**PZ4.5.3 Planting times**

Summer (includes Spring) is considered to be between the 1 September and 28 (29) February. Winter (includes Autumn) is considered to be between 1 March and 31 August.

Re-grassing will be undertaken (as far as possible) in summer as germination and establishment of grasses is most effective, assuming reasonable spring rains.

Vegetation re-establishment is likely in many cases to be held off until this suitable growing season.

Hydroseeding with a winter mix will only be specified where regrassing is urgently required and cannot wait until the summer season. In this case irrigation will be required as per PZ4 5.4 below.

**PZ4.5.4 Establishment and maintenance**

During summer, 25mm of irrigation shall be applied each week until reasonable (60%) ground cover has been obtained.

During winter (where annual rye grass is specified) 15mm of irrigation shall be applied each week until reasonable (60%) ground cover has been obtained.

If rapid establishment is required, additional watering may be necessary as specified in the project specification

The amount of irrigation to be applied will make up the difference between rainfall recorded on site and the minimum requirement.

**PZ4.5.5 Grass Seed Selection and Application Rates**

The specific seed selection and application rates for each of the defined areas are covered separately, as follows.

**PZ4.5.5.1 Coastal area**
**Summer mix (1 September - 28 February)**

Grass species	Common name	General application rate (kg/ha)
Eragrostis tef	Teff	5
Eragrostis curvula	Weeping lovegrass	10
Chloris gayana	Rhodes grass	10
Digitaria eriantha	Smuts' fingergrass	5
Total		30

**Winter mix (1 March - 31 August)**

Grass species	Common name	General application rate (kg/ha)
Lolium multiflorum cultivar - Midmar	Annual/Italian rye grass	10
Eragrostis curvula	Weeping lovegrass	10
Chloris gayana	Rhodes grass	5
Total		25

**PZ4.5.5.2 Coastal hinterland.**
**Summer mix (1 September - 28 February)**

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

Grass species	Common name	General application rate (kg/ha)
Eragrostis tef	Teff	5
Eragrostis curvula	Weeping lovegrass	10
Chloris gayana	Rhodes grass	10
Cenchrus ciliaris	Blue buffalo grass	2
Cynodon dactylon	Couch/KWeek/Star grass	10
Total		37

**Winter mix (1 March - 31 August)**

Grass species	Common name	General application rate (kg/ha)
Lolium multiflorum cultivar – Midmar	Annual/Italian rye grass	10
Eragrostis curvula	Weeping lovegrass	10
Chloris gayana	Rhodes grass	5
Cenchrus ciliaris	Blue buffalo grass	2
Cynodon dactylon	Couch/KWeek/Star grass	3
Total		30

**PZ4.5.5.3 Midlands area**
**Summer mix (1 September - 28 February)**

Grass species	Common name	General application rate (kg/ha)
Eragrostis tef	Teff	4
Eragrostis curvula	Weeping lovegrass	10
Chloris gayana	Rhodes grass	10
Digitaria eriantha	Smuts' fingergrass	2
Cynodon dactylon	Couch/KWeek/Star grass	2
Paspalum notatum	Lawn paspalum	2
Total		30

**Winter mix (1 March - 31 August)**

Grass species	Common name	General application rate (kg/ha)
Lolium multiflorum cultivar - Midmar	Annual/Italian rye grass	10
Eragrostis curvula	Weeping lovegrass	10
Chloris gayana	Rhodes grass	5
Paspalum notatum	Lawn paspalum	2.5
Total		27.5

**PZ4.5.6 Seeding methods**

Two methods are recommended, namely hydroseeding and hand-broadcasting. The required method shall be as specified in the project specification.

All seed supplied should be labelled in accordance with the Government Seed Act No. 20 of 1961 and the Contractor shall be required to produce such certification, if requested by the Engineer.

**PZ4.5.6.1 Hydroseeding**

The Grassing Contractor shall be conversant with this method.

Cellulose pulp (consisting of either wood shavings, shredded straw, shredded paper or cotton waste) shall be added to the mix to be applied at a rate of 250 kg/ha.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

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In addition to the cellulose pulp, compost (consisting of either chicken litter, kraal manure, sugar cane filter cake or mushroom compost) shall be incorporated at a rate of 5m<sup>3</sup>/ha (□100 X 50kg fertiliser bags/ha).

**PZ4.5.6.2 Hand-broadcasting**

Fertiliser, at the appropriate rate, is to be distributed by hand in a manner to ensure that there is an even spread of fertiliser over the site. This is to be done prior to seeding.

The seed mix is to be weighed and made up in an appropriately large container which shall be stirred to ensure no settling out of the grass seed, and a uniform distribution of the different types of seed.

The seed is to be distributed by hand in a regular grid broadcasting manner to ensure that there is an even spread of grass over the entire site.

The area seeded is to be raked over once the seed and fertiliser have been applied to incorporate these elements into the topsoil.

**PZ4.5.7 General**

Where there is a possibility of neighbourhood livestock grazing a rehabilitated site these should, as far as is practicable, be excluded for the first 3 months of re-grassing.

**PZ4.6 LANDSCAPING**

Landscaping of the site may be required as indicated in the project specification.

Compensatory planting of trees or shrubs may be required should the transplantation of such not be successful in terms of PZ3 5.5 or due to plants removed in terms of PZ3 5.4

Planting of trees will be in accordance with the following method:

- All tree holes shall be square in plan;
- Tree holes shall be a minimum of 600mm by 600mm square by 700mm deep;
- Holes are to be backfilled with excavated soil in a ratio of 3:1 with compost. The compost is to be weed free and have been composted at temperatures in the order of 65oC. Where possible, any available topsoil should be placed in the hole at the level where the tree rootball will rest. A handful (half-a-cup) of each Superphosphate and 2.3.2 should be mixed into the soil-compost mix;
- The tree holes are to be backfilled to the point where the tree and its rootball are in the desired position. The tree is to be removed temporarily and the hole filled with water and allowed to drain away. This operation of watering and draining should be repeated at least four times in order that the surrounding ground and hole are thoroughly moist. The tree is then to be replaced and the remaining soil replaced;
- All trees shall be tied (using a tree tie) to a suitable timber stake planted in the ground to a depth of at least 500mm. The stake shall have a minimum diameter of 35mm and shall be at least 300mm higher than the planted tree;
- Water retaining basins of at least 500mm diameters are to be formed around each tree;
- The Contractor is to apply at least 10 litres of water per tree per fortnight for a period of at least 3 months.

The planting of shrubs will be in accordance with the tree planting method with the exception that the holes are to be a minimum of 400mm by 400mm square by 500mm deep, and that the tree stakes and ties are not required.

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

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**PZ4.7 ALIEN PLANT CONTROL**

All sites disturbed by construction activities will be monitored for colonisation by invasive alien plant species.

The Environmental Control Officer will identify those plants which require removal during both the construction and maintenance period, for the Contractor's action.

The Environmental Control Officer will provide advice as to effective methods of removal and control of alien plant species.



SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION

**PUBLIC COMPLAINTS REGISTER**

COMPLAINANTS NAME	DESIGNATION/ AFFILIATION	REASON FOR COMPLAINT	ACTION TAKEN	ACTION BY	ACTION BY DATE	ACHIEVED BY DATE	DATE REFERRED TO NW environmental control officer

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION**

DATE	COMPLAINANTS NAME	DESIGNATION/ AFFILIATION	REASON FOR COMPLAINT
ACTION TAKEN	ACTION BY	ACTION BY DATE	ACHIEVED BY DATE
DATE REFERRED TO NW environmental control officer			

**MONITORING OF COMPLIANCE WITH ENVIRONMENTAL SPECIFICATIONS**

PROJECT NAME: .....

CONTRACT NUMBER: .....

PROJECT MANAGER: .....

ENGINEER'S REPRESENTATIVE / SUPERVISOR: .....

CONTRACTOR: .....

CONTRACT PERIOD:.....  
(including start and completion dates):

PERIOD COVERED: .....

REPORT PREPARED BY: .....

\_\_\_\_\_  
Signature

**ENVIRONMENTAL CONTROL OFFICER REPORT**

PROJECT NAME: \_\_\_\_\_ CONTRACT N° \_\_\_\_\_

DATE OF SITE INSPECTIONS DURING REPORTING PERIOD:

\_\_\_\_\_

Specification Breach Responsible	Spec. No. Action Taken	Remedial Action Recommended	Due Date	Authority
----------------------------------	------------------------	-----------------------------	----------	-----------

SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION

**1 PUBLIC COMPLAINTS**

DATE	COMPLAINANTS NAME	DESIGNATION/ AFFILIATION	REASON FOR COMPLAINT	ACTION TAKEN	ACTION BY	ACTION BY DATE	ACHIEVED BY DATE	DATE REFERRED TO NW environmenta l control officer

PUMPSTATION ELECTROMECHANICAL WORKS AT GREATER SUMMERFIELD WATER TREATMENT PLANT

**GOOD PERFORMANCE REPORT**

List any aspects of the Contract in which the Contractor is performing well and beyond that which is required in terms of the specification.

<b>C4: SITE INFORMATION</b>
-----------------------------

- C4.1: GEOTECHNICAL
- C4.2: ATMOSPHERIC/CLIMATIC
- C4.3: ENVIRONMENTAL
- C4.4: LOCALITY PLAN
- C4.5: DRAWINGS

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

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**C4: SITE INFORMATION**

<b>TABLE OF CONTENTS</b>	<b>PAGE</b>
C4.1: Geotechnical .....	C4.3
C4.2: Atmospheric/Climatic.....	C4.3
C4.3: Environmental .....	C4.4
C4.4: Locality Plan .....	C4.5
C4.5: Drawing .....	C4.6

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS AT GREATER SUMMERFIELD PUMPSTATION****C4.1 GEOTECHNICAL**

Tenderers must satisfy themselves as to the nature of materials to be excavated under this contract.

No responsibility is accepted for any conclusions drawn by Tenderers from the results and information supplied (if any) and Tenderers must satisfy themselves as to the nature of materials to be excavated under this contract. Tenderers are at liberty to excavate any further trial holes or to carry out other investigations to satisfy themselves as to the nature of the ground that will be encountered in carrying out the Works, provided that they advise the Engineer of their intention to carry out such further trial hole excavations or other investigations so that the necessary safety requirements can be ensured. Any trial hole excavated in areas close to pedestrian or vehicular traffic shall be barricaded and shall be backfilled immediately after inspection of the soil conditions.

The Tenderer shall be fully liable for any claims for losses, damage or injuries whatsoever arising out of, or as a consequence of, carrying out trial hole excavations for the purpose of his tender. Furthermore, the Engineer's authority for the carrying out of any exploratory excavations is subject to the Tenderer indemnifying the Employer and the Engineer against any such claims.

**C4.2 ATMOSPHERIC / CLIMATIC**

Extension of time will be considered for abnormal rainfall. The numbers of days per month on which work is expected not to be possible as a result of normal rainfall, and for which the Contractor shall make provision in his tendered rates, prices and programme, are listed in Table C4.2.1 hereafter. Only the number of days lost as a result of adverse weather conditions, exceeding the number of days listed in Table C4.2.1, will qualify for consideration of extension of time.

Table C4.2.1: Expected Number of Working Days Lost per Month due to Normal Rainfall

Month	Expected number of working days lost as result of normal rainfall - "n"
January	5
February	5
March	4
April	1
May	1
June	1
July	1
August	1
September	2
October	3
November	4
December	5
<b>TOTAL</b>	<b>33 days</b>

*(The number of working days lost for December and January exclude the rain days for the annual*

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

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*year end shut down period as recommended by SAFCEC.*

During the execution of the Works, the Engineer's Representative will certify a day lost due to abnormal rainfall and adverse weather conditions only:

- if rain on site exceeded 10 mm over 24 hours.
- if no work was possible on the relevant working day on any item which is on the critical path according to the latest approved construction programme; or
- if less than 30% of the work force and plant on site could work during that specific working day.

Extension of time as a result of abnormal rainfall and adverse weather conditions shall be calculated monthly being equal to the number of working days certified by the Engineer's Representative as lost due to rainfall and adverse weather conditions, less the number of days allowed for as in Table C4.2.1, which could result in a negative figure for certain months. The total extension of time as a result of abnormal climatic conditions, 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.

**C4.3 ENVIRONMENTAL**

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.



**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

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#### C4.4 LOCALITY PLAN

##### C4.1 LOCALITY PLAN

The Locality of the site is as per the attached Locality Plan.

###### C4.1.1 Access

The general site is approximately 12km South of Umzimkhulu CBD. Access to Washbank is via surfaced and gravel roads

##### C4.2 CONDITIONS ON SITE

A brief description of the site conditions is given under this section.

###### C4.2.1 Nature of Ground and Subsoil Conditions

No subsoil investigations have been carried out on this site. The employer will not be held accountable for any assumptions that tenderers may make in pricing based on their visual inspection of the site during the tender briefing meeting. Tenderers must satisfy themselves as to the nature of materials to be excavated under this contract.

###### C4.2.2 Weather Conditions

The following general weather conditions are prevalent on site

Site Conditions	Specific Details
Altitude above sea level	Maximum 950 m
Ambient temperatures	Maximum : 30°C Minimum : 4°C 24 hour Average Max : 30°C
Maximum relative humidity	100%
Environmental atmosphere	Humid with high salt content, severely corrosive.
Lightning	Severe

**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL AND MECHANICAL WORKS  
AT GREATER SUMMERFIELD PUMPSTATION**

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**C4.5 DRAWINGS****DRAWINGS ARE PROVIDED ON A SEPARATE BOOKLET FORMING PART OF THIS DOCUMENT**

The drawings issued to tenders as part of the tender documents must be regarded as provisional and preliminary for the tenderer's benefit to generally assess the scope of work.

The work shall be carried out in accordance with the latest available revision of the drawings approved for construction

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

All drawings and specifications and copies thereof remain the property of the Employer, and the Contractor shall return all drawings and copies thereof to the Employer at the completion of the contract.

The drawings listed in the table overleaf have been bound into the document.

Tenderers are to ensure that they receive a complete set of the tender drawings and must immediately inform the Engineer of any drawings that are missing so that further copies can be issued.



## GREATER SUMMERFIELD WATER SUPPLY SCHEME PUMP STATION LIST OF DRAWINGS

LIST OF DRAWINGS	DRAWINGS				LIST OF DRAWINGS				DRAWINGS			
	SEA	BEUL	BEUL	BEUL	SEA	BEUL	BEUL	BEUL	SEA	BEUL	BEUL	BEUL
001 SITE LAYOUT												
P000-011-02-001-11-01 - GENERAL ARRANGEMENT												
P000-011-02-001-12-01 - ELEVATIONS AND SECTION												
P000-011-02-001-13-01 - CONCRETE DETAILS 1 OF 2												
P000-011-02-001-14-01 - CONCRETE DETAILS 2 OF 2												
P000-011-02-001-15-01 - PIPEROCK ARRANGEMENT AND SCHEDULE												
P000-011-02-001-16-01 - TYPICAL DETAILS												
P000-011-02-001-17-01 - STRUCTURAL REVISIONS/BRIEF												
P000-011-02-001-18-01 - GUARDPOLE 1 OF 2												
P000-011-02-001-19-01 - GUARDPOLE 2 OF 2												
P000-011-02-001-20-01 - FILL/RAZE FENCING												
P000-011-02-001-21-01 - ROAD TYPICAL CROSS-SECTION												
P000-011-02-001-22-01 - STORAGE/WORK DETAILS												

FOR TENDER ONLY

**impqno**  
Infrastructure & Project Management  
1035/1036  
Makgonahe  
P.O. Box 12  
1216  
Tel: 011 709 1000  
Fax: 011 709 1001  
Website: www.impqno.co.za

**PROJECT**  
GREATER SUMMERFIELD  
WATER SUPPLY SCHEME  
PUMP STATION

**CLIENT**  
HARRY OMALU  
DISTRICT  
MUNICIPALITY

**DRAWING NO.**  
SUMMERFIELD CLEARWATER  
PUMP STATION  
LIST OF DRAWINGS

DATE	BY	SCALE

**GENERAL NOTES**

1. THE INFORMATION CONTAINED HEREIN IS FOR INFORMATION ONLY AND IS NOT TO BE USED FOR ANY OTHER PURPOSE.
2. THE INFORMATION CONTAINED HEREIN IS NOT TO BE USED FOR ANY OTHER PURPOSE.
3. THE INFORMATION CONTAINED HEREIN IS NOT TO BE USED FOR ANY OTHER PURPOSE.
4. THE INFORMATION CONTAINED HEREIN IS NOT TO BE USED FOR ANY OTHER PURPOSE.
5. THE INFORMATION CONTAINED HEREIN IS NOT TO BE USED FOR ANY OTHER PURPOSE.

**PROPOSAL SUMMARY**

Project Name		No.	100
Client			
Location			
Contract No.			

**Impence**  
 CONSULTING ENGINEERS  
 15/15/2024

**HENWOOD & MUMFORD**  
 CONSULTING ENGINEERS  
 15/15/2024



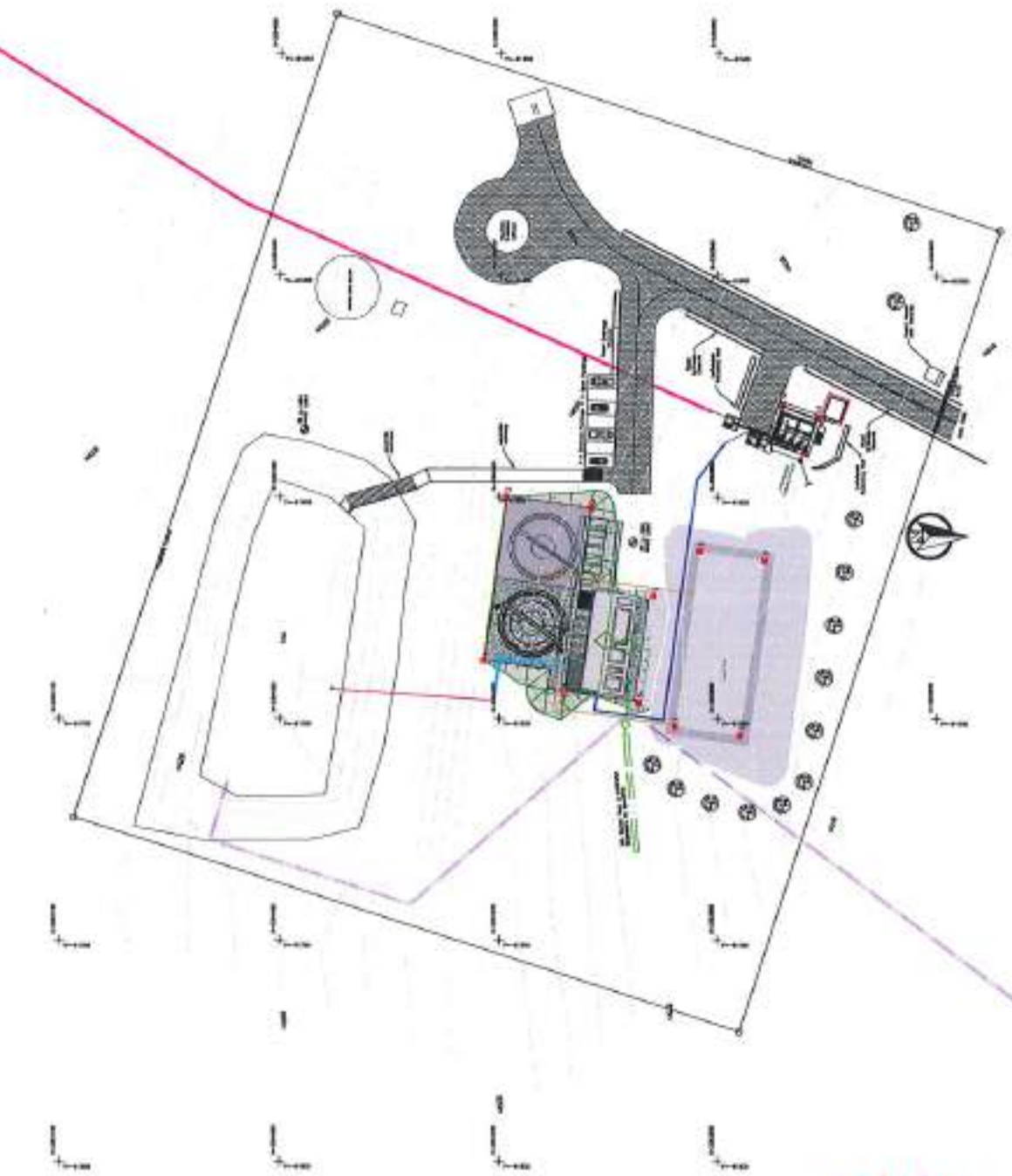
**HARRY SWIKA DISTRICT MUNICIPALITY**

**GREATER SUBURBIOLED WATER SUPPLY SCHEME**

**SITE PLAN**

Scale	1:500
Author	Impence
Check	Impence
Date	15/15/2024
Project No.	100
Client	Impence
Contract No.	

Project No. **C01**



**SITE PLAN**  
 (SCALE 1:500)

**List of Coordinates**

Point	Y Coordinate	X Coordinate	Level
1	91 894 830	-330 403 181	812.300
2	91 894 830	-330 298 118	812.300
3	91 894 830	-330 193 155	812.300
4	91 894 830	-330 88 192	812.300
5	91 894 830	-330 0 229	812.300
6	91 894 830	-329 95 266	812.300
7	91 894 830	-329 90 303	812.300
8	91 894 830	-329 85 340	812.300
9	91 894 830	-329 80 377	812.300
10	91 894 830	-329 75 414	812.300
11	91 894 830	-329 70 451	812.300
12	91 894 830	-329 65 488	812.300
13	91 894 830	-329 60 525	812.300
14	91 894 830	-329 55 562	812.300

- 1. Proposed Main Water Pipe
- 2. Proposed Sewer Pipe
- 3. Proposed Storm Water Pipe
- 4. Proposed Gas Pipe
- 5. Proposed Electricity Pipe
- 6. Proposed Telephone Pipe
- 7. Proposed Cable Pipe
- 8. Proposed Fencing

FOR TENDER

**GENERAL NOTES**

1. TO BE USED IN CONJUNCTION WITH THE SPECIFICATIONS TO THE STANDARD DRAWINGS FOR WATER SUPPLY SCHEMES.
2. ALL WORK SHALL BE IN ACCORDANCE WITH THE STANDARD DRAWINGS FOR WATER SUPPLY SCHEMES AND THE SPECIFICATIONS TO THE STANDARD DRAWINGS FOR WATER SUPPLY SCHEMES.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE RELEVANT AUTHORITIES.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE RELEVANT AUTHORITIES.
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**impqnoe**  
 CONSULTANTS  
 WATER SUPPLY SCHEMES  
 PROJECT NO. 1001/10/10  
 DATE 10/10/10

NO.	REVISIONS / COMMENTS	DATE

**MARY DWAJA DISTRICT MUNICIPALITY**

**CREATED SUMMERFIELD WATER SUPPLY SCHEME**

**SUMMERFIELD CLEAN WATER PUMP STATION**

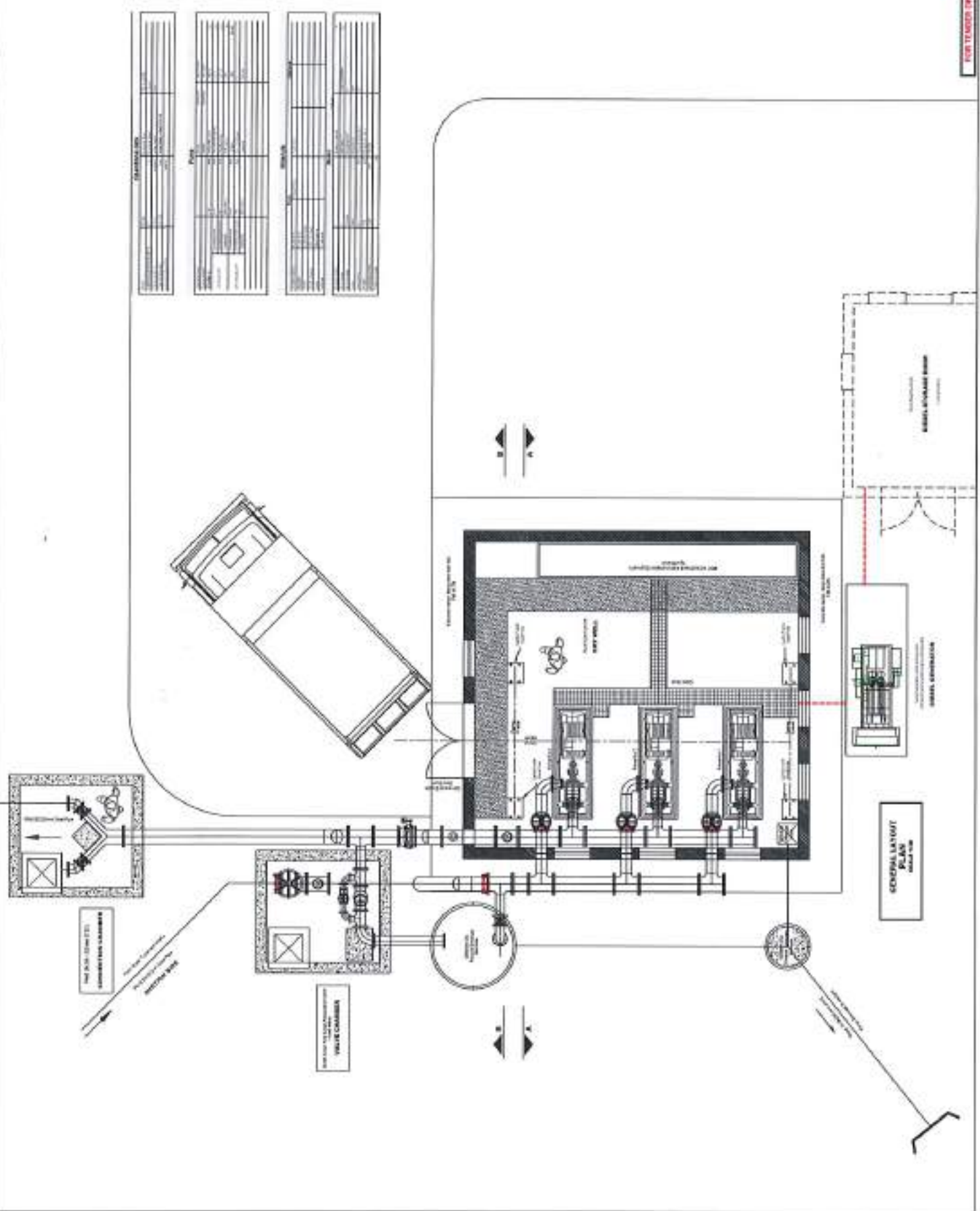
**GENERAL ARRANGEMENT**

PROJECT NO. 1001/10/10

DATE 10/10/10

FOR TENDER ONLY

ITEM NO.	DESCRIPTION	UNIT	QUANTITY
1	...	...	...
2	...	...	...
3	...	...	...
4	...	...	...



**GENERAL NOTES**

1. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS FROM THE LOCAL AUTHORITY.
2. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE BS EN 12052-1:2003 AND BS EN 12052-2:2003 STANDARDS.
3. ALL MATERIALS SHALL BE SUPPLIED AND INSTALLED IN ACCORDANCE WITH THE BS EN 12052-1:2003 AND BS EN 12052-2:2003 STANDARDS.
4. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE BS EN 12052-1:2003 AND BS EN 12052-2:2003 STANDARDS.
5. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE BS EN 12052-1:2003 AND BS EN 12052-2:2003 STANDARDS.
6. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE BS EN 12052-1:2003 AND BS EN 12052-2:2003 STANDARDS.
7. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE BS EN 12052-1:2003 AND BS EN 12052-2:2003 STANDARDS.
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10. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE BS EN 12052-1:2003 AND BS EN 12052-2:2003 STANDARDS.
11. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE BS EN 12052-1:2003 AND BS EN 12052-2:2003 STANDARDS.
12. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE BS EN 12052-1:2003 AND BS EN 12052-2:2003 STANDARDS.
13. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE BS EN 12052-1:2003 AND BS EN 12052-2:2003 STANDARDS.
14. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE BS EN 12052-1:2003 AND BS EN 12052-2:2003 STANDARDS.
15. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE BS EN 12052-1:2003 AND BS EN 12052-2:2003 STANDARDS.
16. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE BS EN 12052-1:2003 AND BS EN 12052-2:2003 STANDARDS.
17. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE BS EN 12052-1:2003 AND BS EN 12052-2:2003 STANDARDS.
18. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE BS EN 12052-1:2003 AND BS EN 12052-2:2003 STANDARDS.
19. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE BS EN 12052-1:2003 AND BS EN 12052-2:2003 STANDARDS.
20. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE BS EN 12052-1:2003 AND BS EN 12052-2:2003 STANDARDS.

REVISED	
NO.	DATE
1	15/10/2024

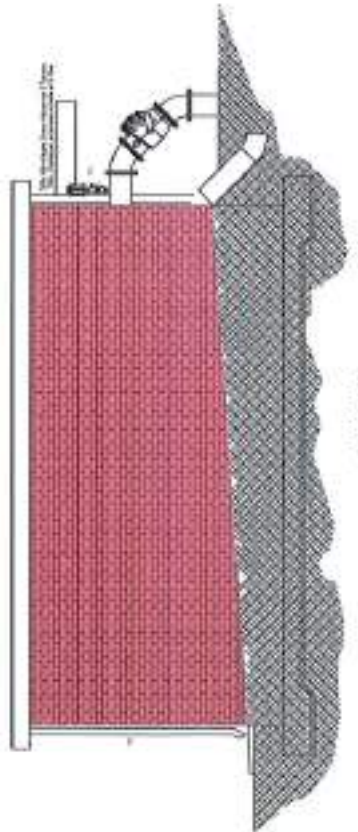
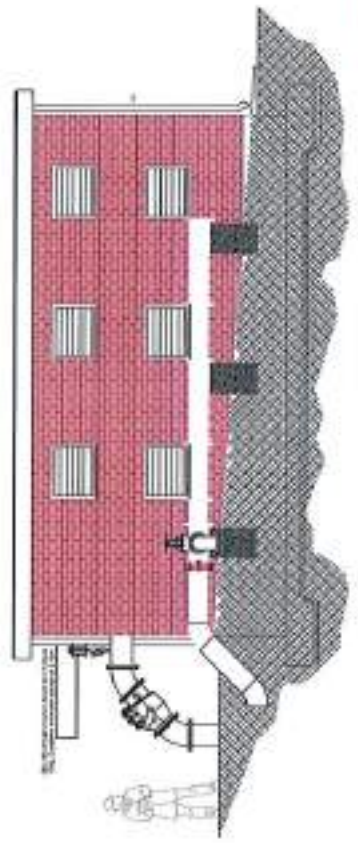
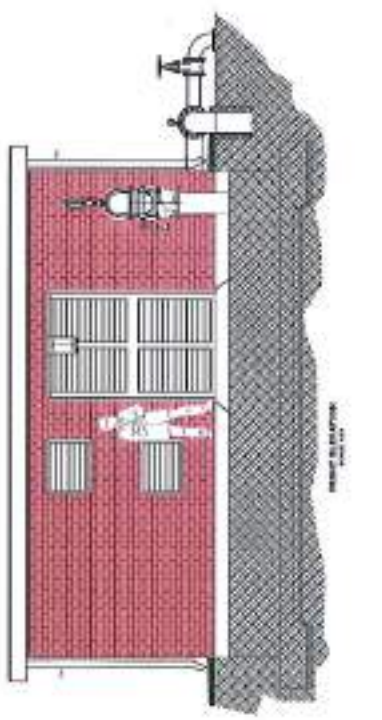
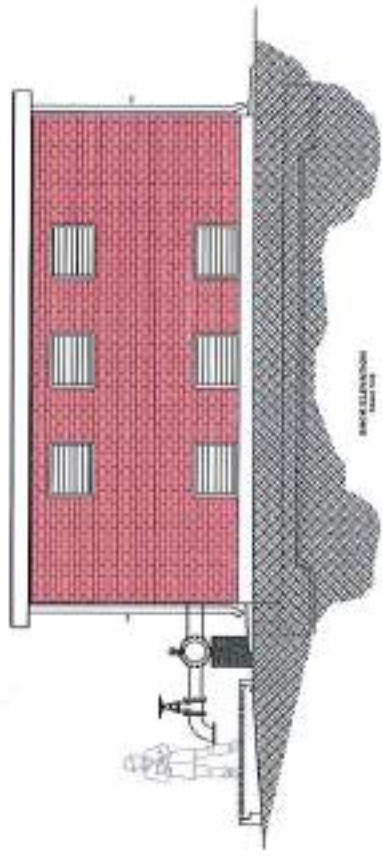
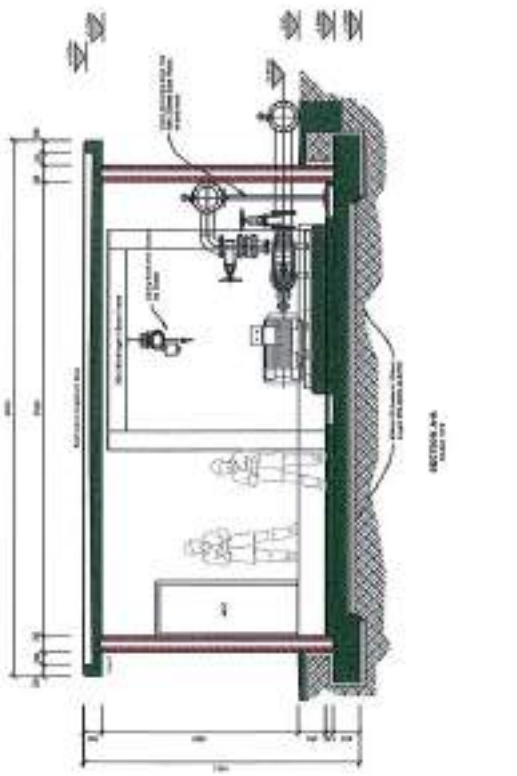
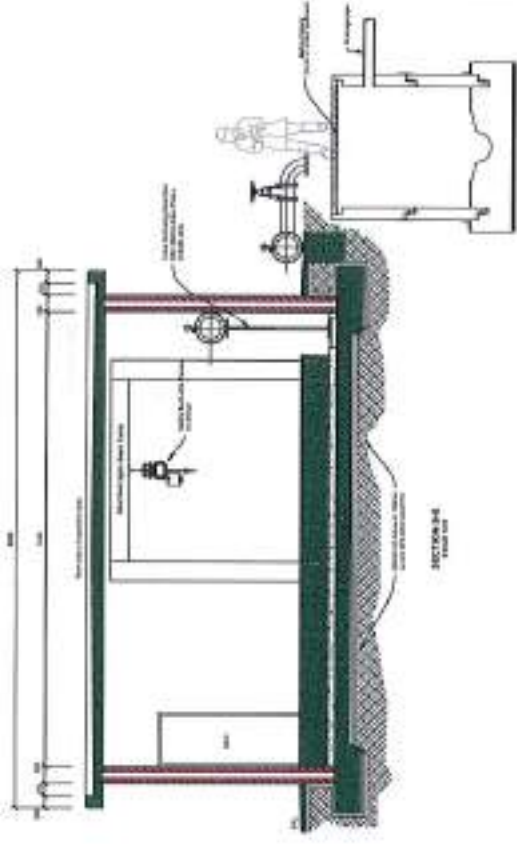
**impregne**  
Engineering & Building Solutions  
01473 722222  
www.impregne.co.uk

PROJECT NO.	24-000003
PROJECT NAME	Greater Cammerfield Water Supply Scheme
CLIENT	Greater Cammerfield Water Supply Scheme
DESIGNER	Impregne Engineering & Building Solutions
DRAWN BY	J. Smith
CHECKED BY	M. Jones
DATE	15/10/2024
SHEET NO.	1
TOTAL SHEETS	1

**Greater Cammerfield Water Supply Scheme**  
ELEVATIONS & SECTION

**HARRY DIMULA DIRECT MUNICIPALITY**

PROJECT NO: 24-000003  
PROJECT NAME: Greater Cammerfield Water Supply Scheme  
CLIENT: Greater Cammerfield Water Supply Scheme  
DESIGNER: Impregne Engineering & Building Solutions  
DRAWN BY: J. Smith  
CHECKED BY: M. Jones  
DATE: 15/10/2024  
SHEET NO: 1  
TOTAL SHEETS: 1



FOR ISSUES ONLY

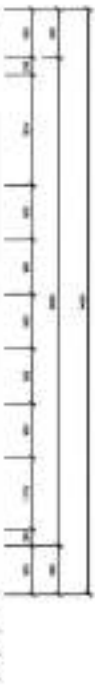
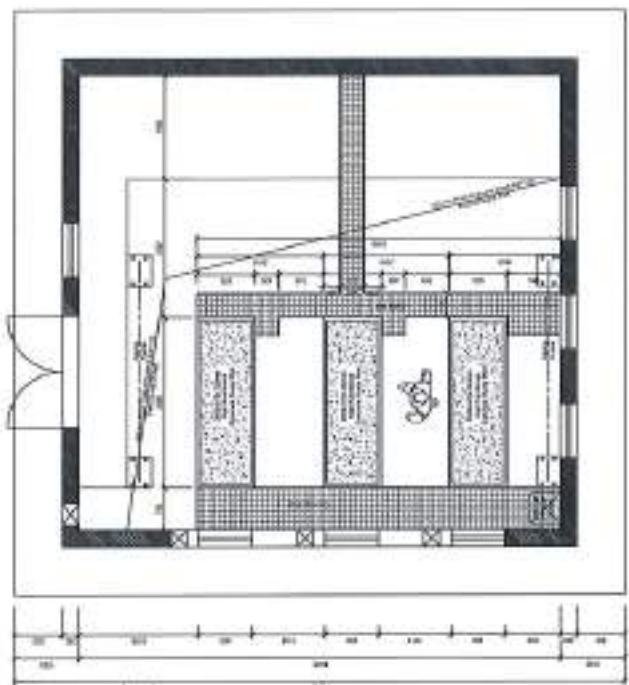
**GENERAL NOTES:**

- 1. READ ALL NOTES CAREFULLY AND COMPLETELY BEFORE BEGINNING WORK.
- 2. VERIFY ALL DIMENSIONS AND LEVELS WITH THE CONTRACT DOCUMENTS.
- 3. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE RELEVANT CODES AND STANDARDS.
- 4. PROVIDE ALL NECESSARY FORMWORK, SCAFFOLDING AND SHORING.
- 5. MAINTAIN PROPER RECORDS OF ALL WORK DONE.
- 6. PROTECT ALL EXISTING UTILITIES AND STRUCTURES.
- 7. ALL MATERIALS TO BE USED SHALL BE OF THE BEST QUALITY AND APPROVED BY THE ENGINEER.
- 8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS.
- 9. MAINTAIN ACCESS TO ALL SERVICES AND STRUCTURES AT ALL TIMES.
- 10. ALL WORK SHALL BE COMPLETED WITHIN THE SPECIFIED TIME FRAME.
- 11. THE CONTRACTOR SHALL MAINTAIN THE NEAREST ADJACENT AREAS IN GOOD ORDER AND CLEAN AT ALL TIMES.
- 12. ALL MATERIALS TO BE USED SHALL BE STORED PROPERLY AND PROTECTED FROM WEATHER.
- 13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS.
- 14. MAINTAIN ACCESS TO ALL SERVICES AND STRUCTURES AT ALL TIMES.
- 15. ALL WORK SHALL BE COMPLETED WITHIN THE SPECIFIED TIME FRAME.
- 16. THE CONTRACTOR SHALL MAINTAIN THE NEAREST ADJACENT AREAS IN GOOD ORDER AND CLEAN AT ALL TIMES.
- 17. ALL MATERIALS TO BE USED SHALL BE STORED PROPERLY AND PROTECTED FROM WEATHER.
- 18. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS.
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- 20. ALL WORK SHALL BE COMPLETED WITHIN THE SPECIFIED TIME FRAME.
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- 24. MAINTAIN ACCESS TO ALL SERVICES AND STRUCTURES AT ALL TIMES.
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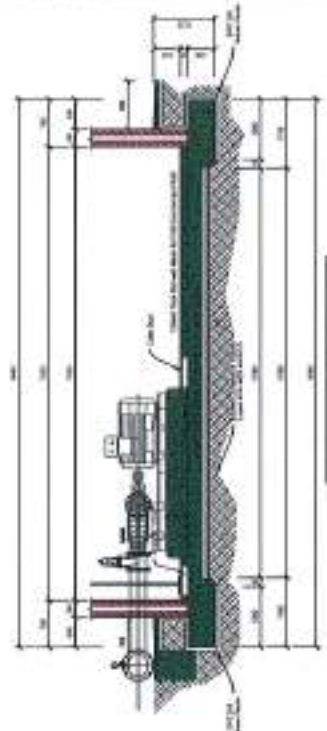
REVISED	
NO.	DESCRIPTION

**imagine** CONSULTANTS  
 CONSULTANTS  
 100, South Street, Suite 1000  
 San Francisco, CA 94111  
 Tel: 415.774.2000  
 Fax: 415.774.2001  
 www.imagine-consultants.com

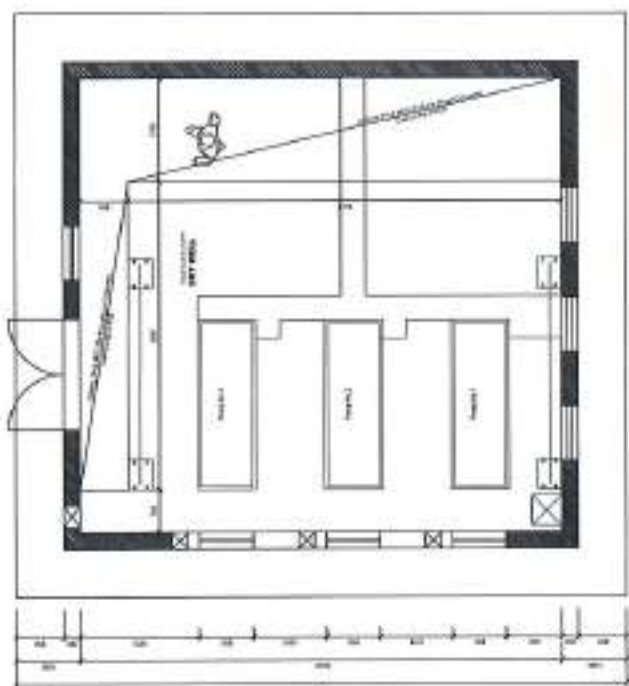
PROJECT: GREATER SUMMERSFIELD WATER SUPPLY SCHEME  
 CLIENT: NORTHERN DUBAI MUNICIPALITY  
 DRAWING NO.: 1000-2018-03-001-001  
 SHEET: 1 OF 1  
 DATE: 10/01/2018  
 DRAWN BY: J. ALI  
 CHECKED BY: M. ALI  
 APPROVED BY: M. ALI



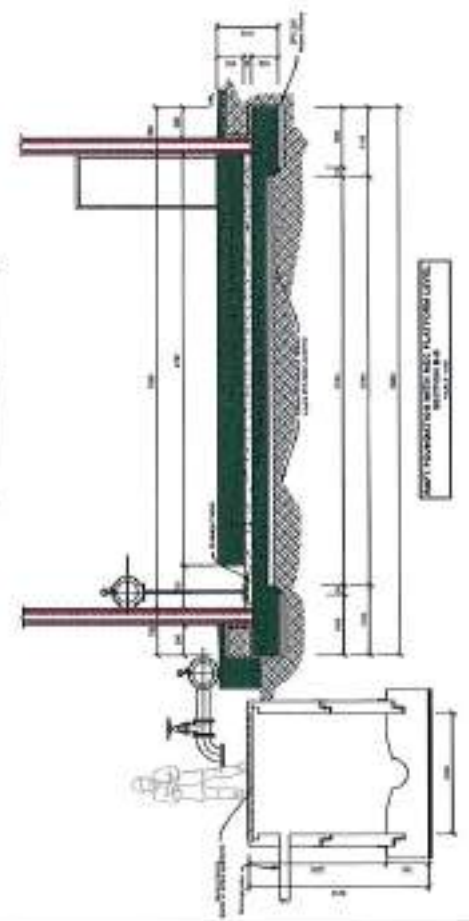
PUMP FOUNDATION WITH PUMP PLATFORM LEVEL  
 FLOOR PLAN  
 SECTION 100



PUMP FOUNDATION WITH PUMP PLATFORM LEVEL  
 SECTION 100



PUMP FOUNDATION WITH WELL PLATFORM LEVEL  
 FLOOR PLAN  
 SECTION 100



PUMP FOUNDATION WITH WELL PLATFORM LEVEL  
 SECTION 100

FOR OFFICIAL USE ONLY

**GENERAL NOTES**

1. REFER TO DRAWING TITLE & DIMENSIONS.
2. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
3. ALL CONCRETE WORK SHALL BE TO THE SATISFACTION OF THE SUPERVISOR.
4. ALL CONCRETE SHALL BE CAST AND CURED IN ACCORDANCE WITH THE SPECIFICATIONS OF THE SUPPLIER.
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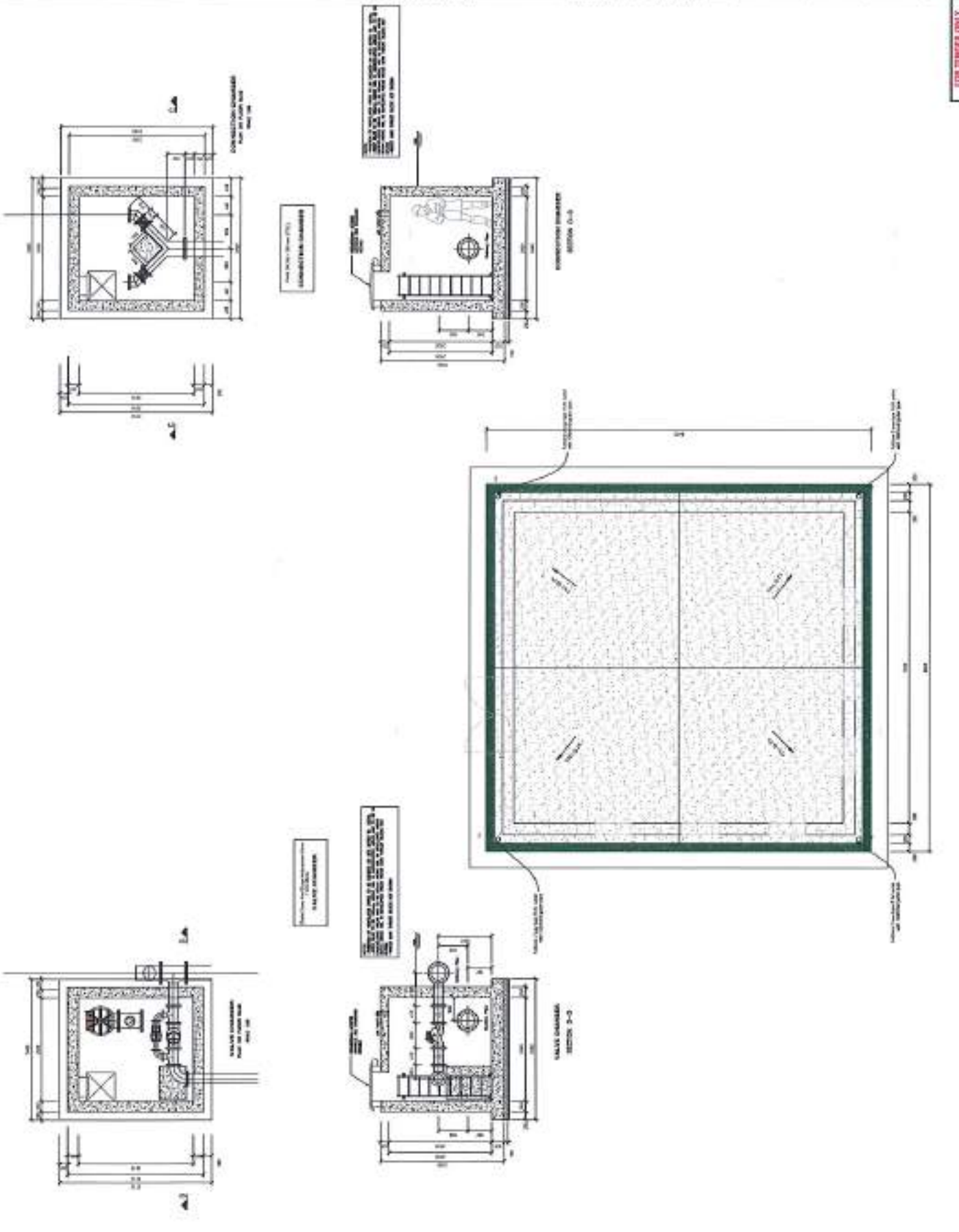
**imagine**  
 CONSULTING ENGINEERS  
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**PROJECT**  
 GREATER NIMMERELD  
 WATER SUPPLY SCHEME

**CLIENT**  
 HARTY DAVILA  
 DISTRICT  
 MUNICIPALITY

**CONCRETE DETAILS**

**FOR TENDER ONLY**





- GENERAL NOTES**
1. All work shall be in accordance with the specifications and standards of the City of Nairobi.
  2. All materials shall be of the highest quality and shall be approved by the Engineer before use.
  3. All work shall be done in accordance with the approved drawings and specifications.
  4. All work shall be done in accordance with the approved drawings and specifications.
  5. All work shall be done in accordance with the approved drawings and specifications.
  6. All work shall be done in accordance with the approved drawings and specifications.
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**imagine**  
 CONSULTANTS  
 P.O. BOX 10000 NAIROBI  
 TEL: 011 254 20 272 2000  
 FAX: 011 254 20 272 2001  
 WWW.IMAGINEKENYA.CO.KE

**HERRY GRANA DISTRICT MUNICIPALITY**

**GREATER SUNNINGFIELD WATER SUPPLY SCHEME**

**OLIVIERFIELD CLEARWATER PUMP STATION**

**PUMPWORK ARRANGEMENT AND SCHEDULE**

DATE: \_\_\_\_\_

SCALE: \_\_\_\_\_

PROJECT NO: \_\_\_\_\_

CLIENT: \_\_\_\_\_

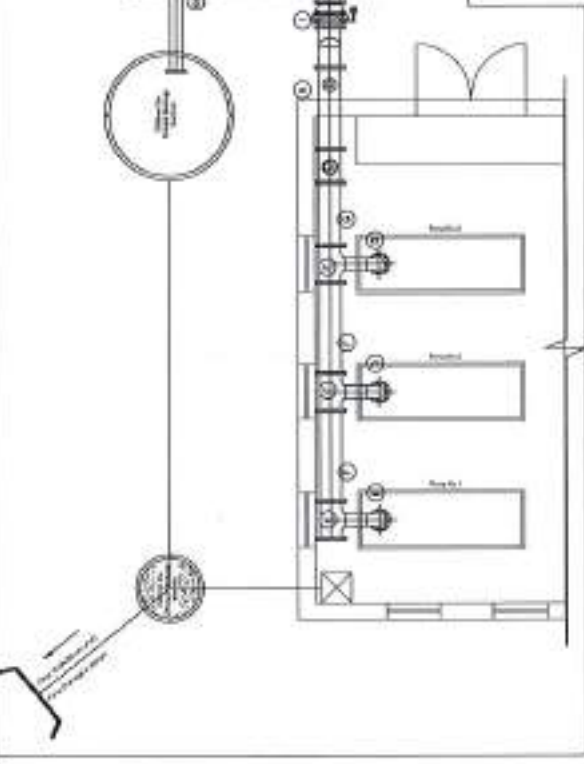
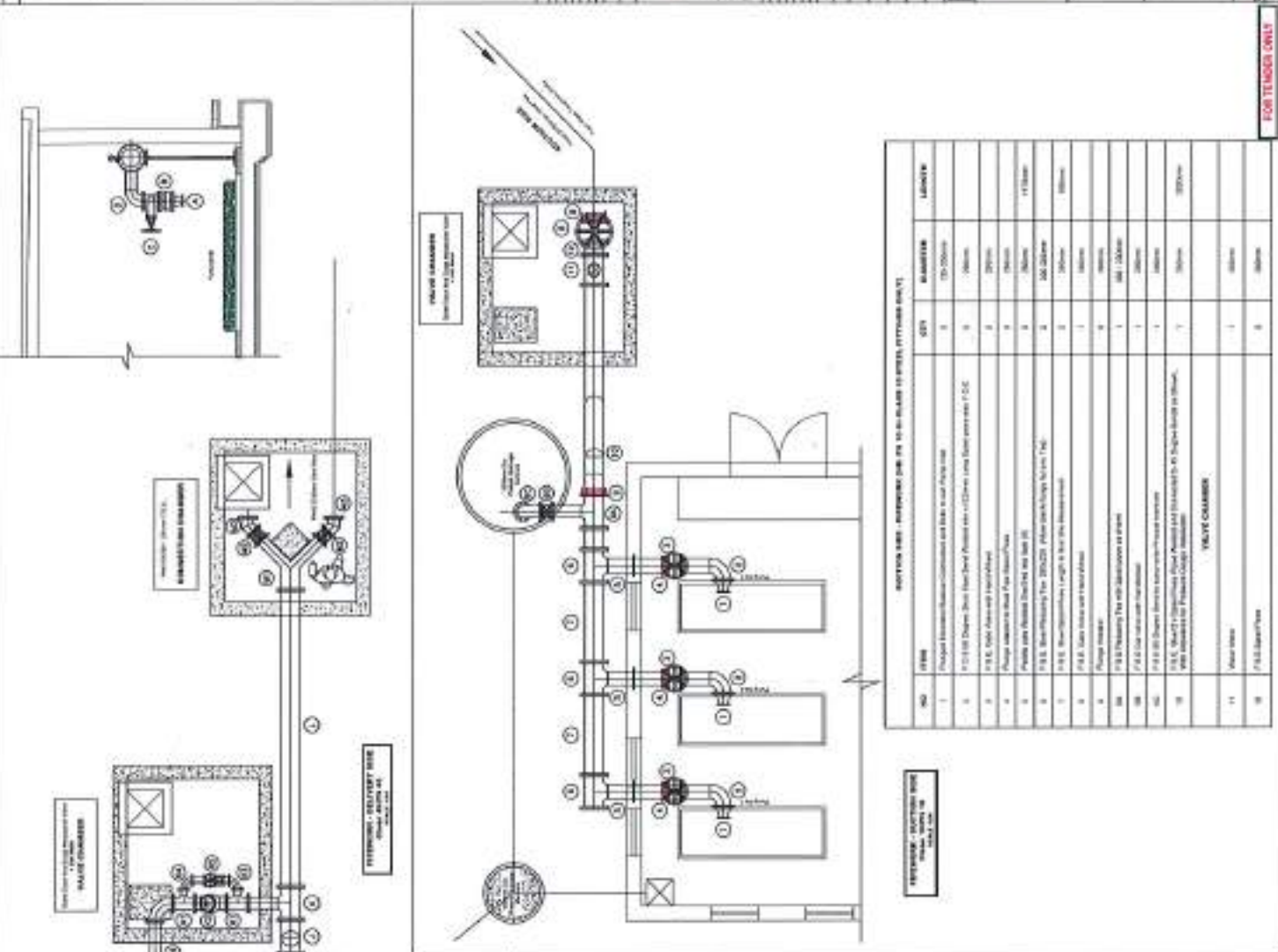
DESIGNER: \_\_\_\_\_

DRAWN BY: \_\_\_\_\_

CHECKED BY: \_\_\_\_\_

APPROVED BY: \_\_\_\_\_

DATE: \_\_\_\_\_



**RELIABILITY INDEX - PUMPWORK (PARTIAL OR FULL) OF STEEL SYSTEMS ONLY**

NO	ITEM	QTY	UNIT	REMARKS
1	1" x 10' Cast Iron Pipe	1	10000	
2	1" x 10' Cast Iron Pipe	1	10000	
3	1" x 10' Cast Iron Pipe	1	10000	
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99	1" x 10' Cast Iron Pipe	1	10000	
100	1" x 10' Cast Iron Pipe	1	10000	

FOR TENDERS ONLY

**GENERAL NOTES**

1. ALL DIMENSIONS UNLESS OTHERWISE SPECIFIED ARE IN METERS.
2. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.
3. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.
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19. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.
20. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.

**PROJECT**

**CREATING SLIMFIELD WATER SUPPLY SCHEME**

**SUMMERFIELD CULVERT PUMP STATION**

**DETAILS**

**DATE:** 20/08/2024

**SCALE:** 1:100

**PROJECT NO.:** 2024/001

**CLIENT:** HARVEY GONZA DISTRICT MUNICIPALITY

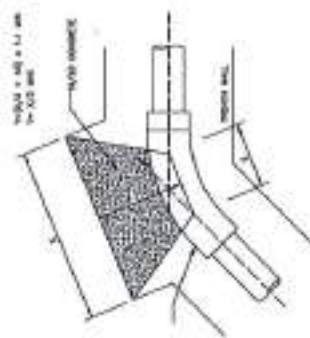
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**PROJECT MANAGER:** [Name]

**DESIGNER:** [Name]

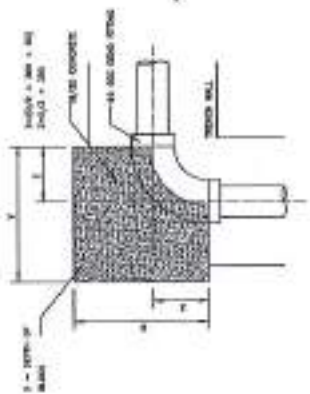
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**APPROVED:** [Name]



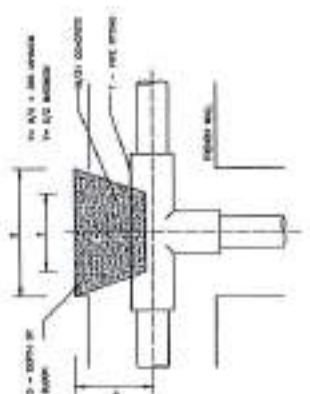
**45 DEGREE BRICK THRUST BLOCK FOR PRESSURE PIPELINE**

PIPE DIA. (mm)	1	2	3	4	5
150	300	300	300	300	300
200	350	350	350	350	350
250	400	400	400	400	400
300	450	450	450	450	450
350	500	500	500	500	500
400	550	550	550	550	550
450	600	600	600	600	600
500	650	650	650	650	650
550	700	700	700	700	700
600	750	750	750	750	750
650	800	800	800	800	800
700	850	850	850	850	850
750	900	900	900	900	900
800	950	950	950	950	950
850	1000	1000	1000	1000	1000
900	1050	1050	1050	1050	1050
950	1100	1100	1100	1100	1100
1000	1150	1150	1150	1150	1150
1050	1200	1200	1200	1200	1200
1100	1250	1250	1250	1250	1250
1150	1300	1300	1300	1300	1300
1200	1350	1350	1350	1350	1350



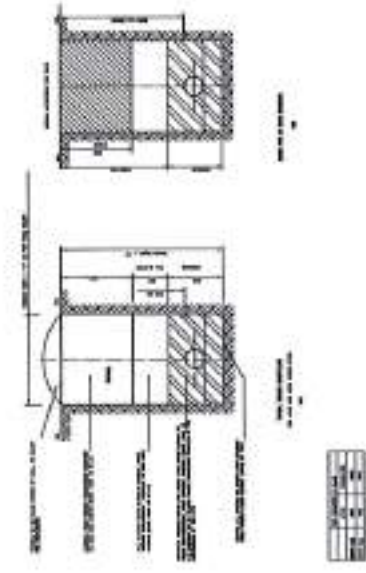
**90 DEGREE BRICK THRUST BLOCK FOR PRESSURE PIPELINE**

PIPE DIA. (mm)	1	2	3	4	5
150	150	150	150	150	150
200	200	200	200	200	200
250	250	250	250	250	250
300	300	300	300	300	300
350	350	350	350	350	350
400	400	400	400	400	400
450	450	450	450	450	450
500	500	500	500	500	500
550	550	550	550	550	550
600	600	600	600	600	600
650	650	650	650	650	650
700	700	700	700	700	700
750	750	750	750	750	750
800	800	800	800	800	800
850	850	850	850	850	850
900	900	900	900	900	900
950	950	950	950	950	950
1000	1000	1000	1000	1000	1000
1050	1050	1050	1050	1050	1050
1100	1100	1100	1100	1100	1100
1150	1150	1150	1150	1150	1150
1200	1200	1200	1200	1200	1200
1250	1250	1250	1250	1250	1250
1300	1300	1300	1300	1300	1300
1350	1350	1350	1350	1350	1350
1400	1400	1400	1400	1400	1400
1450	1450	1450	1450	1450	1450
1500	1500	1500	1500	1500	1500



**60 DEGREE BRICK THRUST BLOCK FOR PRESSURE PIPELINE**

PIPE DIA. (mm)	1	2	3	4	5
150	300	300	300	300	300
200	350	350	350	350	350
250	400	400	400	400	400
300	450	450	450	450	450
350	500	500	500	500	500
400	550	550	550	550	550
450	600	600	600	600	600
500	650	650	650	650	650
550	700	700	700	700	700
600	750	750	750	750	750
650	800	800	800	800	800
700	850	850	850	850	850
750	900	900	900	900	900
800	950	950	950	950	950
850	1000	1000	1000	1000	1000
900	1050	1050	1050	1050	1050
950	1100	1100	1100	1100	1100
1000	1150	1150	1150	1150	1150
1050	1200	1200	1200	1200	1200
1100	1250	1250	1250	1250	1250
1150	1300	1300	1300	1300	1300
1200	1350	1350	1350	1350	1350
1250	1400	1400	1400	1400	1400
1300	1450	1450	1450	1450	1450
1350	1500	1500	1500	1500	1500
1400	1550	1550	1550	1550	1550
1450	1600	1600	1600	1600	1600
1500	1650	1650	1650	1650	1650



FOR TENDER ONLY

**GENERAL NOTES**

1. All work shall be done in accordance with the relevant specifications and standards.
2. All materials shall be of good quality and shall be approved by the Engineer.
3. All work shall be done in accordance with the relevant specifications and standards.
4. All work shall be done in accordance with the relevant specifications and standards.
5. All work shall be done in accordance with the relevant specifications and standards.
6. All work shall be done in accordance with the relevant specifications and standards.
7. All work shall be done in accordance with the relevant specifications and standards.
8. All work shall be done in accordance with the relevant specifications and standards.
9. All work shall be done in accordance with the relevant specifications and standards.
10. All work shall be done in accordance with the relevant specifications and standards.
11. All work shall be done in accordance with the relevant specifications and standards.
12. All work shall be done in accordance with the relevant specifications and standards.
13. All work shall be done in accordance with the relevant specifications and standards.
14. All work shall be done in accordance with the relevant specifications and standards.
15. All work shall be done in accordance with the relevant specifications and standards.
16. All work shall be done in accordance with the relevant specifications and standards.
17. All work shall be done in accordance with the relevant specifications and standards.
18. All work shall be done in accordance with the relevant specifications and standards.
19. All work shall be done in accordance with the relevant specifications and standards.
20. All work shall be done in accordance with the relevant specifications and standards.

PROJECT	WATER SUPPLY SCHEME
LOCATION	WATER SUPPLY SCHEME
DATE	2010/01/01
DRAWN BY	...
CHECKED BY	...
APPROVED BY	...

**imagine**  
 CONSULTANTS  
 100, ...  
 ...  
 ...

PROJECT NO: ...  
 DRAWING NO: ...  
 SHEET NO: ...

DATE: ...

SCALE: ...

PROJECT: ...

CLIENT: ...

DESIGNER: ...

CHECKER: ...

APPROVED: ...

**HARIST GAVILA DISTRICT MUNICIPALITY**

**GREATER SUMMERFIELD WATER SUPPLY SCHEME**

**SUMMERFIELD CLEARWATER PUMP STATION**

**STRUCTURAL REINFORCEMENT**

PROJECT NO: ...

DRAWING NO: ...

SHEET NO: ...

DATE: ...

SCALE: ...

PROJECT: ...

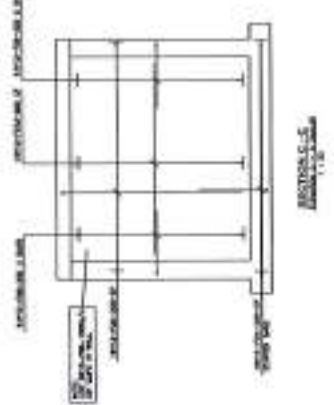
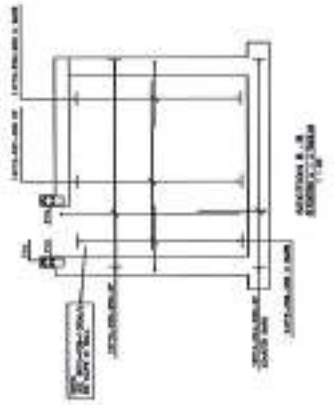
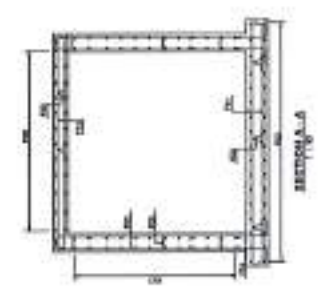
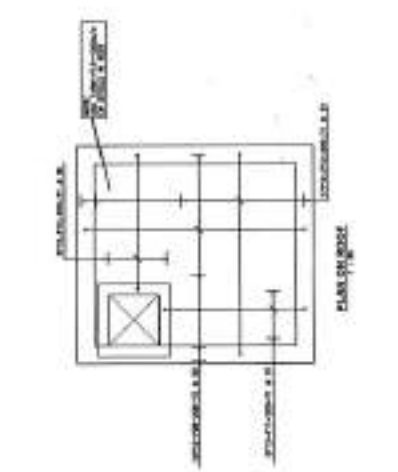
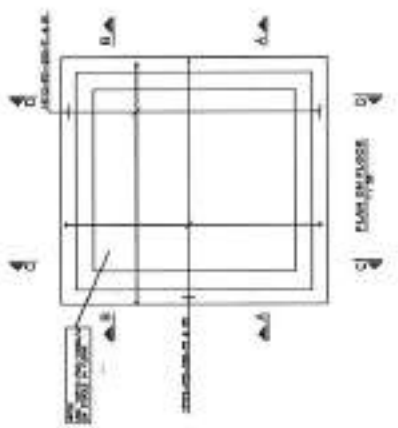
CLIENT: ...

DESIGNER: ...

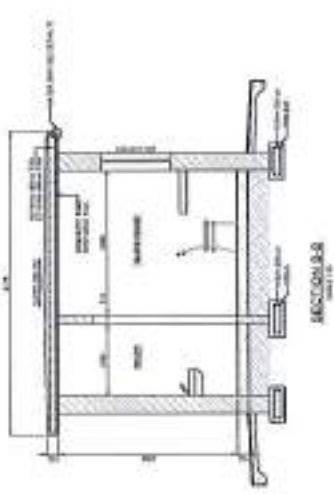
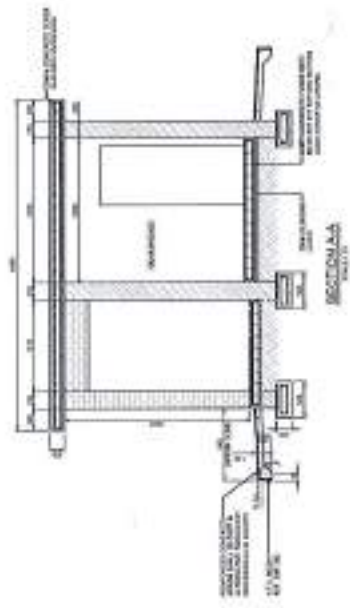
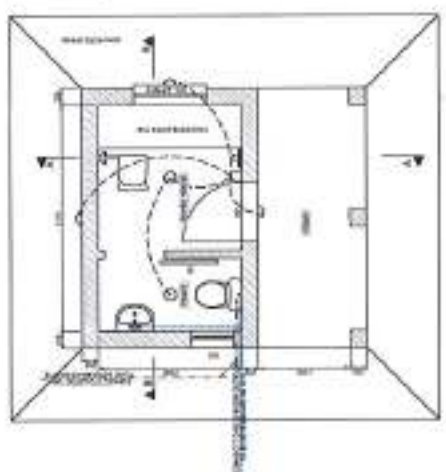
CHECKER: ...

APPROVED: ...

NO	DESCRIPTION	QTY	UNIT	REMARKS
1	...	...	...	...
2	...	...	...	...
3	...	...	...	...
4	...	...	...	...
5	...	...	...	...
6	...	...	...	...
7	...	...	...	...
8	...	...	...	...
9	...	...	...	...
10	...	...	...	...
11	...	...	...	...
12	...	...	...	...
13	...	...	...	...
14	...	...	...	...
15	...	...	...	...
16	...	...	...	...
17	...	...	...	...
18	...	...	...	...
19	...	...	...	...
20	...	...	...	...



- NOTES:**
1. CHECK REINFORCEMENT COMPLETION.
  2. CHECK OF MATERIALS AND TESTS AND REPORT.
  3. ALL WORK TO BE ACCORDING TO THE DRAWING.
  4. ALL WORK TO BE DONE IN ACCORDANCE WITH THE RELEVANT SPECIFICATIONS AND STANDARDS.
  5. CHECK THE REINFORCEMENT.
  6. CHECK THE CLEARANCE.
  7. CHECK THE POSITION OF THE REINFORCEMENT.
  8. CHECK THE POSITION OF THE REINFORCEMENT.
  9. CHECK THE POSITION OF THE REINFORCEMENT.
  10. CHECK THE POSITION OF THE REINFORCEMENT.
  11. CHECK THE POSITION OF THE REINFORCEMENT.
  12. CHECK THE POSITION OF THE REINFORCEMENT.
  13. CHECK THE POSITION OF THE REINFORCEMENT.
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  15. CHECK THE POSITION OF THE REINFORCEMENT.
  16. CHECK THE POSITION OF THE REINFORCEMENT.
  17. CHECK THE POSITION OF THE REINFORCEMENT.
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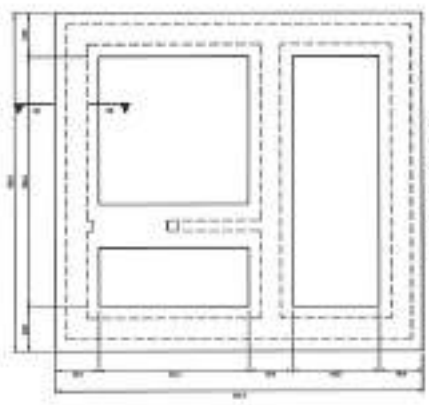


NO.	DESCRIPTION	QUANTITY		UNIT	TOTAL
		REQD.	PROV.		
1	CONCRETE PUMP ROOM	1	1	SQ. FT.	1
2	CONCRETE MOTOR ROOM	1	1	SQ. FT.	1
3	CONCRETE CONTROL ROOM	1	1	SQ. FT.	1
4	CONCRETE PUMP	1	1	NO.	1
5	CONCRETE MOTOR	1	1	NO.	1
6	CONCRETE VALVE	1	1	NO.	1
7	CONCRETE ELECTRICAL PANEL	1	1	NO.	1
8	CONCRETE MANHOLE	1	1	NO.	1
9	CONCRETE ELECTRICAL CONDUIT	1	1	NO.	1
10	CONCRETE ELECTRICAL PANEL	1	1	NO.	1
11	CONCRETE MANHOLE	1	1	NO.	1
12	CONCRETE ELECTRICAL CONDUIT	1	1	NO.	1
13	CONCRETE ELECTRICAL PANEL	1	1	NO.	1
14	CONCRETE MANHOLE	1	1	NO.	1
15	CONCRETE ELECTRICAL CONDUIT	1	1	NO.	1
16	CONCRETE ELECTRICAL PANEL	1	1	NO.	1
17	CONCRETE MANHOLE	1	1	NO.	1
18	CONCRETE ELECTRICAL CONDUIT	1	1	NO.	1
19	CONCRETE ELECTRICAL PANEL	1	1	NO.	1
20	CONCRETE MANHOLE	1	1	NO.	1
21	CONCRETE ELECTRICAL CONDUIT	1	1	NO.	1
22	CONCRETE ELECTRICAL PANEL	1	1	NO.	1
23	CONCRETE MANHOLE	1	1	NO.	1
24	CONCRETE ELECTRICAL CONDUIT	1	1	NO.	1
25	CONCRETE ELECTRICAL PANEL	1	1	NO.	1
26	CONCRETE MANHOLE	1	1	NO.	1
27	CONCRETE ELECTRICAL CONDUIT	1	1	NO.	1
28	CONCRETE ELECTRICAL PANEL	1	1	NO.	1
29	CONCRETE MANHOLE	1	1	NO.	1
30	CONCRETE ELECTRICAL CONDUIT	1	1	NO.	1
31	CONCRETE ELECTRICAL PANEL	1	1	NO.	1
32	CONCRETE MANHOLE	1	1	NO.	1
33	CONCRETE ELECTRICAL CONDUIT	1	1	NO.	1
34	CONCRETE ELECTRICAL PANEL	1	1	NO.	1
35	CONCRETE MANHOLE	1	1	NO.	1
36	CONCRETE ELECTRICAL CONDUIT	1	1	NO.	1
37	CONCRETE ELECTRICAL PANEL	1	1	NO.	1
38	CONCRETE MANHOLE	1	1	NO.	1
39	CONCRETE ELECTRICAL CONDUIT	1	1	NO.	1
40	CONCRETE ELECTRICAL PANEL	1	1	NO.	1
41	CONCRETE MANHOLE	1	1	NO.	1
42	CONCRETE ELECTRICAL CONDUIT	1	1	NO.	1
43	CONCRETE ELECTRICAL PANEL	1	1	NO.	1
44	CONCRETE MANHOLE	1	1	NO.	1
45	CONCRETE ELECTRICAL CONDUIT	1	1	NO.	1
46	CONCRETE ELECTRICAL PANEL	1	1	NO.	1
47	CONCRETE MANHOLE	1	1	NO.	1
48	CONCRETE ELECTRICAL CONDUIT	1	1	NO.	1
49	CONCRETE ELECTRICAL PANEL	1	1	NO.	1
50	CONCRETE MANHOLE	1	1	NO.	1

PROJECT: **GREATER BLANCKENFELD WATER SUPPLY SYSTEM**  
 CLIENT: **HARVEY GUNALA DISTRICT MUNICIPALITY**  
 DRAWING NO.: **14-00108-001**  
 SHEET NO.: **4** OF **5**  
 DATE: **21/03/2017**  
 DRAWN BY: **...**  
 CHECKED BY: **...**  
 APPROVED BY: **...**

**impande**  
 CONSULTING ENGINEERS  
 1000 ...  
 011 ...  
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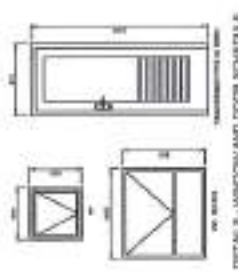
FOR TENDER ONLY



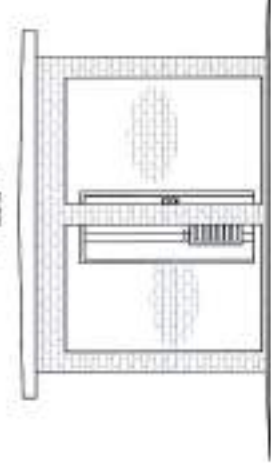
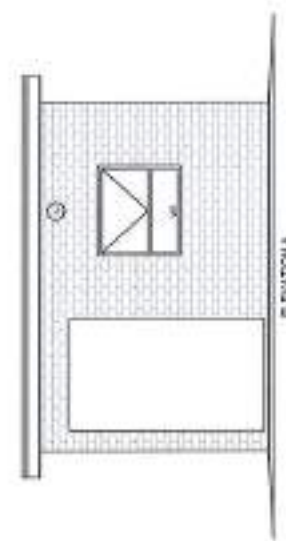
FOUNDATION LAYOUT (UNIT)



SECTION A-A (UNIT)



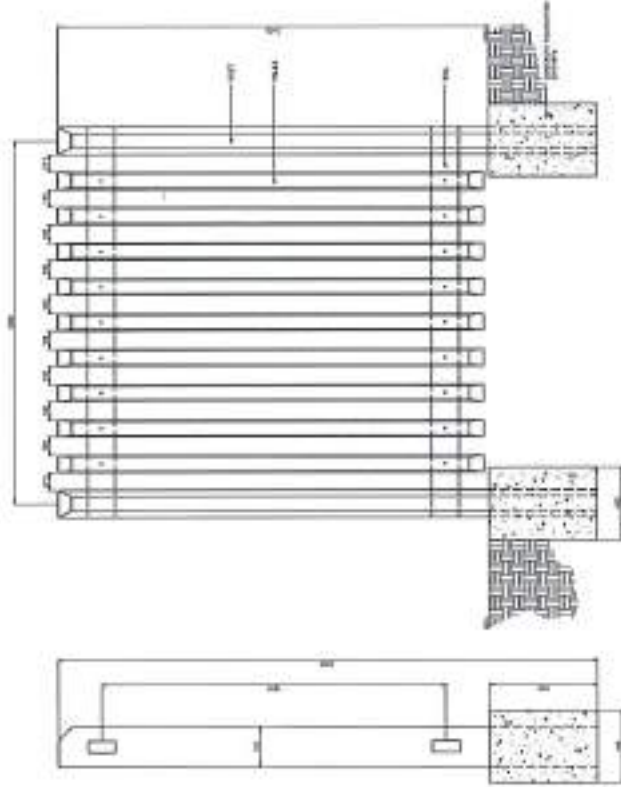
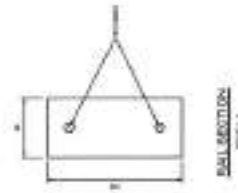
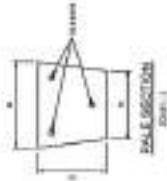
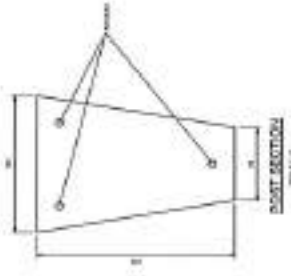
DETAILS: WINDOW AND DOOR REVERSALS



NO.	REV.	DESCRIPTION	DATE
1		ISSUED FOR TENDER	10/05/2024
2		FOR INFORMATION	10/05/2024
3		FOR INFORMATION	10/05/2024
4		FOR INFORMATION	10/05/2024
5		FOR INFORMATION	10/05/2024
6		FOR INFORMATION	10/05/2024
7		FOR INFORMATION	10/05/2024
8		FOR INFORMATION	10/05/2024
9		FOR INFORMATION	10/05/2024
10		FOR INFORMATION	10/05/2024

<p><b>Imparion</b> CONSTRUCTION MANAGEMENT SOLUTIONS</p> <p>100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200</p>		<p>PROJECT NO: 24/001/18-001-00-00</p> <p>DATE: 10/05/2024</p> <p>SCALE: 1/10</p>
<p>CLIENT: HARVEY NISSEN</p> <p>PROJECT: SUMMERFIELD WATER SUPPLY SCHEME</p> <p>LOCATION: SUMMERFIELD CLEARWATER PUMP STATION BURENHOUSE</p>		<p>DESIGNER: HARVEY NISSEN DISTRICT MUNICIPALITY</p>
<p>PROJECT: SUMMERFIELD WATER SUPPLY SCHEME</p> <p>LOCATION: SUMMERFIELD CLEARWATER PUMP STATION BURENHOUSE</p>		<p>DATE: 10/05/2024</p> <p>SCALE: 1/10</p>

FOR TENDER ONLY



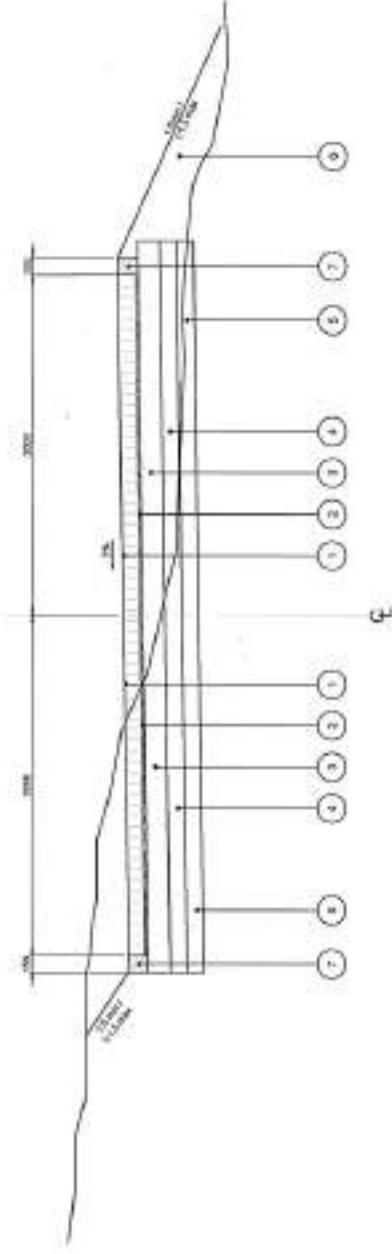
<p><b>Impango</b> Infrastructure &amp; Project Management Private Limited 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000</p>	
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**HARRY OBIOLA CONTRACTORS**  
 Greater Lagos State  
 Greater Lagos State  
 Greater Lagos State

**GREATER LAGOS STATE WATER SUPPLY SCHEME**  
**LAGOS STATE WATER SUPPLY SCHEME**  
**LAGOS STATE WATER SUPPLY SCHEME**

PROJECT: **LAGOS STATE WATER SUPPLY SCHEME**  
 DRAWING NO: **LAGOS STATE WATER SUPPLY SCHEME**  
 DATE: **LAGOS STATE WATER SUPPLY SCHEME**

FOR TENDER ONLY



ROAD IN FULL  
**TYPICAL ROAD CROSS SECTION FOR ACCESS**  
 ROAD  
 1:1

**ROAD LAYER MATERIAL CLASSIFICATION**

LAYER NO.	THICKNESS (mm)	DESCRIPTION	% COMPACTED (AS PER DENSITY)	MIN. OR AT MAX. (mm)	MAX. (mm)	MIN. (mm)
1	40	CONCRETE PAVING (GRADE TYPE 1.1)	-	-	-	-
2	20	BEDDING SAND	-	-	-	-
3	150	0.5-3mm GRAVEL - NATURAL OR PAV. (7% CONCENTRATION OF FINES)	85%	0.15-0.5 (AS PER S.M.S.)	6	24
4	100	REFLECTIVE CURVE LAYER	85%	28	12	28
5	150	ROADBED LAYER (AS PER S.M.S.)	85%	7	18	28
6	-	BASE SUB-FILL	85%	7	12	24
7	-	PAV. BEAM	-	-	-	-
8	-	NON-VITRULITE FILL IN	-	-	-	-

NOTES:  
 1. REFER TO BE LAY ON 100mm SAND CEMENT (2:1) MOTAR BEDDING

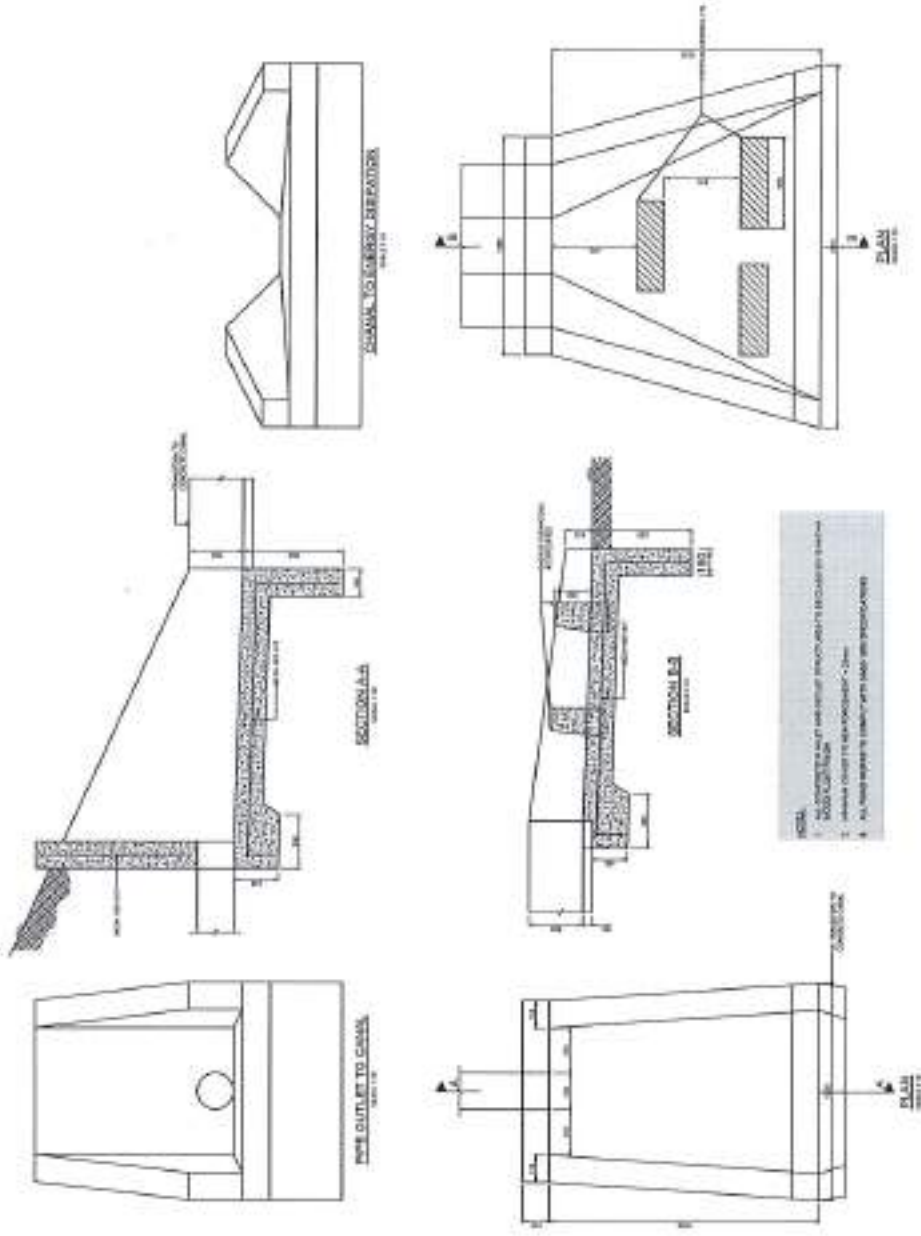
IMPAGINE CONSULTANTS 11, 12 & 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.	

FOR TENDER ONLY



GREATER BAMBERG FIELD  
 WATER SUPPLY SCHEME  
 SEMBERFIELD CLEARWATER  
 PUMP STATION  
 ROAD TYPICAL  
 CROSS SECTION

DATE: 10/10/2011  
 DRAWN BY: [Name]  
 CHECKED BY: [Name]  
 PROJECT NO: 100001-00011-102



<b>Imparide</b> CONSULTING ENGINEERS 100/100 BROADWAY, SUITE 1000 TORONTO, ONTARIO M5X 1C4 TEL: (416) 593-8888 FAX: (416) 593-8889 WWW.IMPARIDE.COM	
PROJECT: <b>STORMWATER PUMP STATION</b>	DRAWING NO: <b>STW-01</b>
CLIENT: <b>HARVEST USMULA DISTRICT MUNICIPALITY</b>	DATE: <b>2024-03-15</b>
DESIGNER: <b>[Name]</b>	CHECKER: <b>[Name]</b>
APPROVED BY: <b>[Signature]</b>	SCALE: <b>1:1</b>
<b>HARVEST USMULA DISTRICT MUNICIPALITY</b>	
<b>GREATER SUMMERFIELD WATER SUPPLY SCHEME</b>	
<b>SUMMERFIELD ELEVATOR PUMP STATION</b>	
<b>STORMWATER DETAILS</b>	
SHEET NO: <b>1</b>	TOTAL SHEETS: <b>1</b>

FOR TENDER ONLY