

SBD1

**PART A
 INVITATION TO BID**

YOU ARE HEREBY INVITED TO BID FOR REQUIREMENTS OF THE (SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE)					
BID NUMBER:	Q8952-2023	CLOSING DATE:	21 April 2023	CLOSING TIME:	11:00
DESCRIPTION	THE APPOINTMENT OF A CONTRACTOR FOR THE REPAIR AND 24-MONTH MAINTENANCE OF THE OZONE WATER TREATMENT INSTALLATION AT THE KIRSTENBOSCH NATIONAL BOTANICAL GARDEN, CAPE TOWN				
	<u>It is estimated that tenderers should have a CIDB contractor grading designation of CE Level 2 or higher.</u>				
NON- COMPULSORY SITE BRIEFING:					
This is a non-compulsory					
Submission of proposals: proposals must be emailed to S.SCM-Quotations@sanbi.org.za with a copy to Ms. Zozi at S.Zozi@sanbi.org.za					
Please state the Bid number as the reference number on the subject line when responding to the RFQ.					
BIDDING PROCEDURE ENQUIRIES MAY BE DIRECTED TO			TECHNICAL ENQUIRIES MAY BE DIRECTED TO:		
CONTACT PERSON	Siphokazi Zozi		CONTACT PERSON	Amjad Hendricks	
TELEPHONE NUMBER	012 843 5292		TELEPHONE NUMBER	079 523 4440	
FACSIMILE NUMBER	N/A		FACSIMILE NUMBER	N/A	
E-MAIL ADDRESS	S.Zozi@sanbi.org.za		E-MAIL ADDRESS	A.Hendricks@sanbi.org.za	
SUPPLIER INFORMATION					
NAME OF BIDDER					
POSTAL ADDRESS					
STREET ADDRESS					
TELEPHONE NUMBER	CODE		NUMBER		
CELLPHONE NUMBER					
FACSIMILE NUMBER	CODE		NUMBER		
E-MAIL ADDRESS					
VAT REGISTRATION NUMBER					
SUPPLIER COMPLIANCE STATUS	TAX COMPLIANCE SYSTEM PIN:		OR	CENTRAL SUPPLIER DATABASE No:	MAAA

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B-BBEE STATUS LEVEL VERIFICATION CERTIFICATE	TICK APPLICABLE BOX] ☐ Yes ☐ No	B-BBEE STATUS LEVEL SWORN AFFIDAVIT	[TICK APPLICABLE BOX] ☐ Yes ☐ No
[A B-BBEE STATUS LEVEL VERIFICATION CERTIFICATE/ SWORN AFFIDAVIT (FOR EMES & QSEs) MUST BE SUBMITTED IN ORDER TO QUALIFY FOR PREFERENCE POINTS FOR B-BBEE]			
ARE YOU THE ACCREDITED REPRESENTATIVE IN SOUTH AFRICA FOR THE GOODS /SERVICES /WORKS OFFERED?	☐ Yes ☐ No [IF YES ENCLOSE PROOF]	ARE YOU A FOREIGN BASED SUPPLIER FOR THE GOODS /SERVICES /WORKS OFFERED?	☐ Yes ☐ No [IF YES, ANSWER THE QUESTIONNAIRE BELOW]
QUESTIONNAIRE TO BIDDING FOREIGN SUPPLIERS			
IS THE ENTITY A RESIDENT OF THE REPUBLIC OF SOUTH AFRICA (RSA)? ☐ YES ☐ NO DOES THE ENTITY HAVE A BRANCH IN THE RSA? ☐ YES ☐ NO DOES THE ENTITY HAVE A PERMANENT ESTABLISHMENT IN THE RSA? ☐ YES ☐ NO DOES THE ENTITY HAVE ANY SOURCE OF INCOME IN THE RSA? ☐ YES ☐ NO IS THE ENTITY LIABLE IN THE RSA FOR ANY FORM OF TAXATION? ☐ YES ☐ NO IF THE ANSWER IS "NO" TO ALL OF THE ABOVE, THEN IT IS NOT A REQUIREMENT TO REGISTER FOR A TAX COMPLIANCE STATUS SYSTEM PIN CODE FROM THE SOUTH AFRICAN REVENUE SERVICE (SARS) AND IF NOT REGISTER AS PER 2.3 BELOW.			

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PART B TERMS AND CONDITIONS FOR BIDDING

1. BID SUBMISSION:	
1.1.	BIDS MUST BE DELIVERED BY THE STIPULATED TIME TO THE CORRECT ADDRESS. LATE BIDS WILL NOT BE ACCEPTED FOR CONSIDERATION.
1.2.	ALL BIDS MUST BE SUBMITTED ON THE OFFICIAL FORMS PROVIDED–(NOT TO BE RE-TYPED) OR IN THE MANNER PRESCRIBED IN THE BID DOCUMENT.
1.3.	THIS BID IS SUBJECT TO THE PREFERENTIAL PROCUREMENT POLICY FRAMEWORK ACT, 2000 AND THE PREFERENTIAL PROCUREMENT REGULATIONS, 2017, THE GENERAL CONDITIONS OF CONTRACT (GCC) AND, IF APPLICABLE, ANY OTHER SPECIAL CONDITIONS OF CONTRACT.
1.4.	THE SUCCESSFUL BIDDER WILL BE REQUIRED TO FILL IN AND SIGN A WRITTEN CONTRACT FORM (SBD7).
2. TAX COMPLIANCE REQUIREMENTS	
2.1	BIDDERS MUST ENSURE COMPLIANCE WITH THEIR TAX OBLIGATIONS.
2.2	BIDDERS ARE REQUIRED TO SUBMIT THEIR UNIQUE PERSONAL IDENTIFICATION NUMBER (PIN) ISSUED BY SARS TO ENABLE THE ORGAN OF STATE TO VERIFY THE TAXPAYER'S PROFILE AND TAX STATUS.
2.3	APPLICATION FOR TAX COMPLIANCE STATUS (TCS) PIN MAY BE MADE VIA E-FILING THROUGH THE SARS WEBSITE WWW.SARS.GOV.ZA .
2.4	BIDDERS MAY ALSO SUBMIT A PRINTED TCS CERTIFICATE TOGETHER WITH THE BID.
2.5	IN BIDS WHERE CONSORTIA / JOINT VENTURES / SUB-CONTRACTORS ARE INVOLVED, EACH PARTY MUST SUBMIT A SEPARATE TCS CERTIFICATE / PIN / CSD NUMBER.
2.6	WHERE NO TCS PIN IS AVAILABLE BUT THE BIDDER IS REGISTERED ON THE CENTRAL SUPPLIER DATABASE (CSD), A CSD NUMBER MUST BE PROVIDED.
2.7	NO BIDS WILL BE CONSIDERED FROM PERSONS IN THE SERVICE OF THE STATE, COMPANIES WITH DIRECTORS WHO ARE PERSONS IN THE SERVICE OF THE STATE, OR CLOSE CORPORATIONS WITH MEMBERS PERSONS IN THE SERVICE OF THE STATE."

NB: FAILURE TO PROVIDE / OR COMPLY WITH ANY OF THE ABOVE PARTICULARS MAY RENDER THE BID INVALID.

SIGNATURE OF BIDDER:

CAPACITY UNDER WHICH THIS BID IS SIGNED:
 (Proof of authority must be submitted e.g. company resolution)

DATE:

NB: FAILURE TO PROVIDE / OR COMPLY WITH ANY OF THE ABOVE PARTICULARS MAY RENDER THE BID INVALID

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BIDDER'S DISCLOSURE

1. PURPOSE OF THE FORM

Any person (natural or juristic) may make an offer or offers in terms of this invitation to bid. In line with the principles of transparency, accountability, impartiality, and ethics as enshrined in the Constitution of the Republic of South Africa and further expressed in various pieces of legislation, it is required for the bidder to make this declaration in respect of the details required hereunder.

Where a person/s are listed in the Register for Tender Defaulters and / or the List of Restricted Suppliers, that person will automatically be disqualified from the bid process.

2. Bidder's declaration

2.1 Is the bidder, or any of its directors / trustees / shareholders / members / partners or any person having a controlling interest¹ in the enterprise, employed by the state? **YES/NO**

2.1.1 If so, furnish particulars of the names, individual identity numbers, and, if applicable, state employee numbers of sole proprietor/ directors / trustees / shareholders / members/ partners or any person having a controlling interest in the enterprise, in table below.

Full Name	Identity Number	Name of institution	State

¹ the power, by one person or a group of persons holding the majority of the equity of an enterprise, alternatively, the person/s having the deciding vote or power to influence or to direct the course and decisions of the enterprise.

2.2 Do you, or any person connected with the bidder, have a relationship with any person who is employed by the procuring institution?

YES/NO

2.2.1 If so, furnish particulars:

.....

2.3 Does the bidder or any of its directors / trustees / shareholders / members / partners or any person having a controlling interest in the enterprise have any interest in any other related enterprise whether or not they are bidding for this contract?

YES/NO

2.3.1 If so, furnish particulars:

.....

3 DECLARATION

I, _____ the _____ undersigned,
 (name)..... in
 submitting the accompanying bid, do hereby make the following statements
 that I certify to be true and complete in every respect:

- 3.1 I have read and I understand the contents of this disclosure;
- 3.2 I understand that the accompanying bid will be disqualified if this disclosure is found not to be true and complete in every respect;
- 3.3 The bidder has arrived at the accompanying bid independently from, and without consultation, communication, agreement or arrangement with any

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- competitor. However, communication between partners in a joint venture or consortium² will not be construed as collusive bidding.
- 3.4 In addition, there have been no consultations, communications, agreements or arrangements with any competitor regarding the quality, quantity, specifications, prices, including methods, factors or formulas used to calculate prices, market allocation, the intention or decision to submit or not to submit the bid, bidding with the intention not to win the bid and conditions or delivery particulars of the products or services to which this bid invitation relates.
- 3.4 The terms of the accompanying bid have not been, and will not be, disclosed by the bidder, directly or indirectly, to any competitor, prior to the date and time of the official bid opening or of the awarding of the contract.
- 3.5 There have been no consultations, communications, agreements or arrangements made by the bidder with any official of the procuring institution in relation to this procurement process prior to and during the bidding process except to provide clarification on the bid submitted where so required by the institution; and the bidder was not involved in the drafting of the specifications or terms of reference for this bid.
- 3.6 I am aware that, in addition and without prejudice to any other remedy provided to combat any restrictive practices related to bids and contracts, bids that are suspicious will be reported to the Competition Commission for investigation and possible imposition of administrative penalties in terms of section 59 of the Competition Act No 89 of 1998 and or may be reported to the National Prosecuting Authority (NPA) for criminal investigation and or may be restricted from conducting business with the public sector for a period not exceeding ten (10) years in terms of the Prevention and Combating of Corrupt Activities Act No 12 of 2004 or any other applicable legislation.

I CERTIFY THAT THE INFORMATION FURNISHED IN PARAGRAPHS 1, 2 and 3 ABOVE IS CORRECT.

I ACCEPT THAT THE STATE MAY REJECT THE BID OR ACT AGAINST ME IN TERMS OF PARAGRAPH 6 OF PFMA SCM INSTRUCTION 03 OF 2021/22 ON PREVENTING AND COMBATING ABUSE IN THE SUPPLY CHAIN MANAGEMENT SYSTEM SHOULD THIS DECLARATION PROVE TO BE FALSE.

² Joint venture or Consortium means an association of persons for the purpose of combining their expertise, property, capital, efforts, skill and knowledge in an activity for the execution of a contract.

.....
Signature Date
.....
Position Name of bidder

SBD 6.1

**PREFERENCE POINTS CLAIM FORM IN TERMS OF THE PREFERENTIAL
PROCUREMENT REGULATIONS 2022**

This preference form must form part of all tenders invited. It contains general information and serves as a claim form for preference points for specific goals.

**NB: BEFORE COMPLETING THIS FORM, TENDERERS MUST STUDY THE
GENERAL CONDITIONS, DEFINITIONS AND DIRECTIVES
APPLICABLE IN RESPECT OF THE TENDER AND PREFERENTIAL
PROCUREMENT REGULATIONS, 2022**

1. GENERAL CONDITIONS

1.1 The following preference point systems are applicable to invitations to tender:

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

1.2 To be completed by the organ of state

- a) The applicable preference point system for this tender is the **80/20** preference point system.
- b) The **80/20 preference point system** will be applicable in this tender. The lowest/ highest acceptable tender will be used to determine the accurate system once tenders are received.

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1.3 Points for this tender (even in the case of a tender for income-generating contracts) shall be awarded for:

- (a) Price; and
- (b) Specific Goals.

1.4 To be completed by the organ of state:

The maximum points for this tender are allocated as follows:

	POINTS
PRICE	80
SPECIFIC GOALS	20
Total points for Price and SPECIFIC GOALS	100

1.5 Failure on the part of a tenderer to submit proof or documentation required in terms of this tender to claim points for specific goals with the tender, will be interpreted to mean that preference points for specific goals are not claimed.

1.6 The organ of state reserves the right to require of a tenderer, either before a tender is adjudicated or at any time subsequently, to substantiate any claim in regard to preferences, in any manner required by the organ of state.

2. DEFINITIONS

- (a) **“tender”** means a written offer in the form determined by an organ of state in response to an invitation to provide goods or services through price quotations, competitive tendering process or any other method envisaged in legislation;
- (b) **“price”** means an amount of money tendered for goods or services, and includes all applicable taxes less all unconditional discounts;
- (c) **“rand value”** means the total estimated value of a contract in Rand, calculated at the time of bid invitation, and includes all applicable taxes;
- (d) **“tender for income-generating contracts”** means a written offer in the form

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- determined by an organ of state in response to an invitation for the origination of income-generating contracts through any method envisaged in legislation that will result in a legal agreement between the organ of state and a third party that produces revenue for the organ of state, and includes, but is not limited to, leasing and disposal of assets and concession contracts, excluding direct sales and disposal of assets through public auctions; and
- (e) **“the Act”** means the Preferential Procurement Policy Framework Act, 2000 (Act No. 5 of 2000).

3. FORMULAE FOR PROCUREMENT OF GOODS AND SERVICES

3.1. POINTS AWARDED FOR PRICE

3.1.1 THE 80/20 OR 90/10 PREFERENCE POINT SYSTEMS

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

80/20	or	90/10
$P_s = 80 \left(1 - \frac{P_t - P_{min}}{P_{min}} \right) \text{ or } P_s = 90 \left(1 - \frac{P_t - P_{min}}{P_{min}} \right)$		

Where

- P_s = Points scored for price of tender under consideration
 P_t = Price of tender under consideration
 P_{min} = Price of lowest acceptable tender

3.2. FORMULAR FOR DISPOSAL OR LEASING OF STATE ASSETS AND INCOME GENERATING PROCUREMENT

3.2.1. POINTS AWARDED FOR PRICE

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

80/20	or	90/10
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$$Ps = 80 \left(1 + \frac{Pt - P_{max}}{P_{max}} \right) \text{ or } Ps = 90 \left(1 + \frac{Pt - P_{max}}{P_{max}} \right)$$

Where

Ps = Points scored for price of tender under consideration

Pt = Price of tender under consideration

Pmax = Price of highest acceptable tender

4. POINTS AWARDED FOR SPECIFIC GOALS

4.1. In terms of Regulation 4(2); 5(2); 6(2) and 7(2) of the Preferential Procurement Regulations, preference points must be awarded for specific goals stated in the tender. For the purposes of this tender the tenderer will be allocated points based on the goals stated in table 1 below as may be supported by proof/ documentation stated in the conditions of this tender:

4.2. In cases where organs of state intend to use Regulation 3(2) of the Regulations, which states that, if it is unclear whether the 80/20 or 90/10 preference point system applies, an organ of state must, in the tender documents, stipulate in the case of—

(a) an invitation for tender for income-generating contracts, that either the 80/20 or 90/10 preference point system will apply and that the highest acceptable tender will be used to determine the applicable preference point system; or

(b) any other invitation for tender, that either the 80/20 or 90/10 preference point system will apply and that the lowest acceptable tender will be used to determine the applicable preference point system,

then the organ of state must indicate the points allocated for specific goals for both the 90/10 and 80/20 preference point system.

Table 1: Specific goals for the tender and points claimed are indicated per the

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table below.

(Note to organs of state: Where either the 90/10 or 80/20 preference point system is applicable, corresponding points must also be indicated as such.

Note to tenderers: The tenderer must indicate how they claim points for each preference point system.)

The specific goals allocated points in terms of this tender	Number of points allocated (80/20 system) (To be completed by the organ of state)	Number of points claimed (80/20 system) (To be completed by the tenderer)
1. Categories of persons historically disadvantaged by unfair discrimination on the basis of race. 100% black ownership (Points will be allocated based on the percentage of ownership per goal. Information will be verified on CSD. CSD must be attached as proof)	10	
2. Categories of persons historically disadvantaged by unfair discrimination on the basis of gender. 100 % female ownership (Points will be allocated based on the percentage of ownership per goal. Information will be verified on CSD. CSD must be attached as proof)	10	

DECLARATION WITH REGARD TO COMPANY/FIRM

4.3. Name _____ of
 company/firm.....

4.4. Company _____ registration _____ number:

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4.5. TYPE OF COMPANY/ FIRM

- ☐ Partnership/Joint Venture / Consortium
 - ☐ One-person business/sole propriety
 - ☐ Close corporation
 - ☐ Public Company
 - ☐ Personal Liability Company
 - ☐ (Pty) Limited
 - ☐ Non-Profit Company
 - ☐ State Owned Company
- [TICK APPLICABLE BOX]

4.6. I, the undersigned, who is duly authorised to do so on behalf of the company/firm, certify that the points claimed, based on the specific goals as advised in the tender, qualifies the company/ firm for the preference(s) shown and I acknowledge that:

- i) The information furnished is true and correct;
- ii) The preference points claimed are in accordance with the General Conditions as indicated in paragraph 1 of this form;
- iii) In the event of a contract being awarded as a result of points claimed as shown in paragraphs 1.4 and 4.2, the contractor may be required to furnish documentary proof to the satisfaction of the organ of state that the claims are correct;
- iv) If the specific goals have been claimed or obtained on a fraudulent basis or any of the conditions of contract have not been fulfilled, the organ of state may, in addition to any other remedy it may have –
 - (a) disqualify the person from the tendering process;
 - (b) recover costs, losses or damages it has incurred or suffered as a result of that person's conduct;
 - (c) cancel the contract and claim any damages which it has suffered as a result of having to make less favourable arrangements due to such cancellation;

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- (d) recommend that the tenderer or contractor, its shareholders and directors, or only the shareholders and directors who acted on a fraudulent basis, be restricted from obtaining business from any organ of state for a period not exceeding 10 years, after the *audi alteram partem* (hear the other side) rule has been applied; and
- (e) forward the matter for criminal prosecution, if deemed necessary.

..... SIGNATURE(S) OF TENDERER(S)	
SURNAME AND NAME:	
DATE:	
ADDRESS:	
	
	
	

SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE



THE APPOINTMENT OF A CONTRACTOR FOR THE REPAIR AND 24-MONTH MAINTENANCE OF THE OZONE WATER TREATMENT INSTALLATION AT THE KIRSTENBOSCH NATIONAL BOTANICAL GARDEN, CAPE TOWN

QUOTATION No. Q8952-2023

21 April 2023

NAME OF TENDERER: _____

TENDER AMOUNT: _____

CLOSING DATE: 21 April 2023 _____

CLOSING TIME: 11H00 _____

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South African National Biodiversity Institute
Pretoria National Botanical Garden
2 Cussonia Avenue, Biodiversity Centre
Brummeria
Pretoria, 0184

Ukhukhula Holdings (Pty) Ltd
117 Strand Street
Cape Town
8000
Tel: 082 335 0535
Fax: 086 552 3309

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Tender Notice and Invitation to Tender

THE SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE INVITES TENDERERS FOR THE PROVISION OF:

The appointment of a contractor for the repair and 24-month maintenance of the Ozone Water Treatment Installation at the Kirstenbosch National Botanical Garden, Cape Town.

Tender documents will be available as from **04 April 2023** and will be available **ONLINE ONLY** on the SANBI website www.sanbi.org (click on "Opportunities").

No briefing session or site inspection will be held.

Submissions should be e-mailed to S.SCM-Quotations@sanbi.org.za with a copy to Ms. Zozi at S.Zozi@sanbi.org.za. For further information, contact Mr A Hendricks on e-mail A.Hendricks@sanbi.org.za.

(a) CIDB registration

Only those tenderers who are registered with the CIDB or are capable of being so prior to the evaluation of submissions, in a contractor grading designation equal to or higher than a contractor grading designation determined in accordance with the sum tendered, or a value determined in accordance with Regulation 25 (1B) or 25(7A) of the Construction Industry Development Regulations, for a **2 CE** class of construction work, are eligible to have their tenders evaluated.

Joint ventures are eligible to submit tenders provided that:

1. every member of the joint venture is registered with the CIDB;
1. the lead partner has a contractor grading designation in the **2 CE** class of construction work; and
2. the combined contractor grading designation calculated in accordance with the Construction Industry Development Regulations is equal to or higher than a contractor grading designation determined in accordance with the sum tendered for a **2 CE** class of construction work or a value determined in accordance with Regulation 25 (1B) or 25(7A) of the Construction Industry Development Regulations.

(b) National Treasury Central Supplier Database

Tenderers who are not registered on the National Treasury Central Supplier Database at close of tender, shall submit a copy of their application of registration, with their tender submission. Tenders received from such tenderers who have not submitted proof of their registration within 21 days after the closing date for tender submissions, will not be considered.

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(C) The second stage will evaluate the price and Specific goals of those bids that meet the minimum threshold for functionality. In accordance with the Preferential Procurement Regulations, 2022 pertaining to the Preferential Procurement Policy Framework Act (No. 5 of 2000), the 80/20-point system will be applied in evaluating proposals that qualify for further consideration, where price constitutes 80 points and a maximum of 20 points will be awarded based on the bidder's specific goals.

Specific Goal	Total Points
Categories of persons historically disadvantaged by unfair discrimination on the basis of race. CSD report must be attached for proof.	(10)
Categories of persons historically disadvantaged by unfair discrimination on the basis of gender. CSD report must be attached for proof.	(10)
Total	20

FORM OF OFFER AND ACCEPTANCE

PROJECT TITLE:	THE APPOINTMENT OF A CONTRACTOR FOR THE REPAIR AND 24-MONTH MAINTENANCE OF THE OZONE WATER TREATMENT INSTALLATION AT THE KIRSTENBOSCH NATIONAL BOTANICAL GARDEN, CAPE TOWN
CONTRACT NO:	Q8952-2023

The Employer, identified in the Acceptance signature block, has solicited offers to enter into a contract for the appointment of a contractor for the Repair and 24-Month Maintenance of the Ozone Water Treatment Installation at the Kirstenbosch National Botanical Garden in Cape Town.

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

The tenderer, identified in the Offer signature block, has examined the draft contract as listed in the Acceptance section and agreed to provide this Offer.

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 VAT IS:

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(in words)
Rand;

R..... (in figures)

THE OFFERED PRICES ARE AS STATED IN THE PRICING SCHEDULE

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 including the Schedule of Deviations (if any) to the tenderer before the end of the period of validity stated in the Tender Data, or other period as agreed, whereupon the tenderer becomes the party named as the **Contractor** in the conditions of contract identified in the Contract Data.

Signature(s)

Name(s)

Capacity

**For the
tenderer:**

.....

.....

.....

(Insert name and address of organisation)

Name &
signature of

Date

witness

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Acceptance

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

The terms of the Contract are contained in

- Part C1 Agreements and Contract Data *[which includes this Agreement]*
- Part C2 Pricing Data
- Part C3 Scope of Work
- Part C4 Site Information

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

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

The Tenderer shall within the time required to submit documentation in accordance with clause 5.3.2 of the Contract Data (C1.2) after receiving a completed copy of this Agreement, including the Schedule of Deviations (if any), contact the Employer's agent (whose details are given in the Contract Data) to arrange the delivery of any bonds, guarantees, proof of insurance and any other documentation to be provided in terms of the Conditions of Contract identified in the Contract Data at, or just after, the date this Agreement comes into effect. Failure to 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 working 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(s)

Name(s)

Capacity

For the

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Employer:

.....
.....
.....
.....
(Insert name and address of organisation)

Name &
signature of

.....
.....

Date

witness

.....

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Schedule of Deviations

1 Subject

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Details

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2 Subject

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Details

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3 Subject

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Details

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4 Subject

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**Stop Fraud, Theft and Corruption without Fear or Favour –
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Details

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5 Subject

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Details

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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.

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FOR THE TENDERER:

Signature(s) _____

Name(s) _____

Capacity _____

[Name and address of organisation]

Name and
signature of
witness _____ Date _____

FOR THE EMPLOYER:

Signature(s) _____

Name(s) _____

Capacity _____

[Name and address of organisation]

Name and
signature of
witness _____ Date _____

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CONFIRMATION OF RECEIPT

The Tenderer (now Contractor), identified in the Offer part of this Agreement, hereby confirms receipt from the Employer, identified in the Acceptance part of this Agreement, of one fully completed original copy of this Agreement, including the Schedule of Deviations (if any) today:

The..... [day]

of [month]

20[year]

at[place]

For the Contractor:

.....
Signature

.....
Name

.....
Capacity

Signature and name of witness:

.....
Signature

.....
Name

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PROJECT TITLE:	THE APPOINTMENT OF A CONTRACTOR FOR THE REPAIR AND 24-MONTH MAINTENANCE OF THE OZONE WATER TREATMENT INSTALLATION AT THE KIRSTENBOSCH NATIONAL BOTANICAL GARDEN, CAPE TOWN
CONTRACT NO:	Q8952-2023

C.1.2 Contract Data

C.1.2 Contract Data	
The General Conditions Of Contract For Construction Works, Third Edition (2015), published by the South African Institution of Civil Engineering, Private Bag X200, Halfway House, 1685, is applicable to this contract and is obtainable from www.saice.org.za Each item of data given below is cross-referenced to the clause in the Conditions of Contract to which it mainly applies.	
Part 1: Data provided by the Employer	
Clause	Data
1.1.1.13	Clause 1.1.1.13: Defects Liability Period The Defects Liability Period is 12 months, measured from the date of the Certificate of Completion
1.1.1.14	Clause 1.1.1.14: Due Completion Date The repair period is 4 months after access to the installation. The time for achieving Practical Completion is 24 months after the Commencement Date
1.1.1.15	The name of the Employer is The South African National Biodiversity Institute, represented by Mr C Willis and/or such persons or person duly authorised thereto be the Employer in writing.
1.2.1.2	The Employer's address for receipt of communications is: Submissions should be e-mailed to S.SCM-Quotations@sanbi.org.za with a copy to Ms. S.Zozi at S.Zozi@sanbi.org.za. For further information, contact Mr A Hendricks on e-mail A.Hendricks@sanbi.org.za. PLEASE NOTE: Emailed applications must not be more than 8MB.
1.1.1.16	The name of the Engineer is the Ukhukhula Holdings (Pty) Ltd

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1.2.1.2	The address of the Engineer is: Ukhukhula Holdings (Pty) Ltd 117 Strand Street Cape Town, 8000 Tel: 082 335 0535 Fax: 086 552 3309
1.1.1.26	Clause 1.3.: Pricing Strategy The Pricing Strategy is a re-measurement contract.
3.1.3	Clause 3.1.3: Specific Approval of the Employer Required The Engineer is required to obtain the specific approval of the Employer before executing any of the following functions or duties: 1 Clause 6.3: Variations 2 Clause 5.11.1: Suspension of the Works 3 Clause 5.12: Extension of Time for Practical Completion
5.3.1	Clause 5.3.1: Commencement of the Works The documentation required before commencement with Works execution are: Health and Safety Plan (Refer to Clause 4.3) Initial programme (Refer to Clause 5.6) Security (Refer to Clause 6.2) Insurance (Refer to Clause 8.6)
5.3.2	Clause 5.3.2: Timeframe to deliver documentation The time to submit the documentation required before commencement with Works execution is Fourteen (14) days .
5.4.2	The access and possession of Site shall not be exclusive to the Contractor but as set out in the Site Information.
5.8.1	Clause 5.8.1: Non-Working Times The non-working days are Saturdays and Sundays. The special non-working days are: 1. All gazetted public holidays falling outside the year end break. 1. The year-end break commencing on 16 December 2022 and ending on 15 January 2023.
5.12.2.	Clause 5.12.2.: Some reasons for extension of time Clause 5.12.2.2: Abnormal climatic conditions. <i>Add the following:</i>

	Regardless of the cause of any delay an extension of time will only be considered if it can be shown that the activity delayed is on the critical path indicated on the Programme of Works (Clause 5.6.1). No extension of time will be granted in respect of any delays attributed to normal climatic conditions. Normal Climatic Conditions shall be deemed to include normal rainfall and associated wet conditions and materials, strong winds and extremes of temperature. However, in the event that delays to critical activities exceed the number of working days listed below for each month, then abnormal climatic conditions shall be deemed to exist, and an extension of time shall be granted in accordance with the provisions of that Clause. The number of days quoted below shall be regarded as a fair estimate of the delays to be anticipated and allowed for under normal climatic conditions where inclement weather prevents or disrupts work on the critical path. <table><tr><td>January</td><td>9 days</td><td>May</td><td>5 days</td><td>September</td><td>6 days</td></tr><tr><td>February</td><td>9 days</td><td>June</td><td>4 days</td><td>October</td><td>9 days</td></tr><tr><td>March</td><td>10 days</td><td>July</td><td>4 days</td><td>November</td><td>9 days</td></tr><tr><td>April</td><td>8 days</td><td>August</td><td>5 days</td><td>December</td><td>10 days</td></tr></table> Claims for delays for abnormal climatic conditions shall be accompanied by substantiating facts and evidence, which shall be submitted timeously as each day or half-day delay is experienced. Should an extension of time be granted by the Engineer such extension of time will be added to the Time for Completion. It shall be further noted that where the critical path is not affected, no extension of time for <u>abnormal</u> climatic conditions or for any other reason will be entertained. Rainfall of 10mm or less per day shall be deemed to be normal climatic conditions.	January	9 days	May	5 days	September	6 days	February	9 days	June	4 days	October	9 days	March	10 days	July	4 days	November	9 days	April	8 days	August	5 days	December	10 days
January	9 days	May	5 days	September	6 days																				
February	9 days	June	4 days	October	9 days																				
March	10 days	July	4 days	November	9 days																				
April	8 days	August	5 days	December	10 days																				
5.13.1	Clause 5.13.1: Penalty for Delay The penalty for failing to complete the Works is R400 per day																								
5.16.3	Clause 5.16.3: Latent defect liability The latent defect period is three (3) months for the project.																								
6.2	Clause 6.2: Security The Form of Guarantee is to contain the wording of the pro-forma document as per the contract document. The liability of the guarantee shall be for 10% of the Approved Contract Sum.																								
6.8.2	Clause 6.8.2: Contract Price Adjustment Contract Price Adjustment: Is not applicable.																								
6.8.3	Clause 6.8.3: Variation in Cost of Special Materials Price adjustments for variations in the costs of special materials are not allowed.																								
6.10.1.5	Clause 6.10.1.5: Interim Payments - Materials on Site No percentage advance on materials on site but not yet built into the Permanent Works is allowed for, or will be paid.																								

6.10.3	Clause 6.10.3: Retention Money The percentage retention on the amounts due to the Contractor is 10% (ten percent). The limit of retention is 5% of the Contract Sum, including allowances for contingencies. This reduces to 2,5% upon the issue of the Certificate of Completion. The remaining 2,5% retention will be released upon the issue of the Final - Approval Certificate upon lapse of the defects liability period. Security plus Retention amount will not exceed 15% of the Contract Sum
6.10.4	Clause 6.10.4: Delivery, dissatisfaction with and payment of payment certificate <i>Replace “28 days” in the second last sentence with “30 days”</i>
6.10.6	Clause 6.10.6: Set-Off and Delayed Payments A guarantee in lieu of retention is not permitted.
6.10.6.2	Clause 6.10.6.2: Set-Off and Delayed Payments <i>Replace the words “prime overdraft rate certified by the Contractor’s banker” with the words “interest rate as determined by the Minister of Finance, from time to time, in terms of section 80(1)(b) of the Public Finance Management Act, 1999 (Act No. 1 of 1999), will apply”</i>
6.10.8	Clause 6.10.8: Contractor’s completion statement <i>Replace “28 days” in the last sentence with “30 days”</i>
6.10.9	Clause 6.10.9: Final payment certificate <i>Replace “28 days” in the last sentence with “30 days”</i>
6.12	Clause 6.12: Additional <i>Add Clause 6.12 as follows:</i> In respect of any amount owed by the Contractor to the Employer, the Contractor shall pay the Employer interest at the rate as determined by the Minister of Finance, from time to time, in terms of section 80(1)(b) of the Public Finance Management Act, 1999 (Act No. 1 of 1999), will apply
8.6.1	Clause 8.6.1: Insurance <i>Add the following:</i> Damage to the Works (a) Without in any way limiting the Contractor’s obligations in terms of the Contract, the Contractor shall bear the full risk of damage to and/or destruction of the Works by whatever cause during construction of the Works and hereby indemnifies and holds harmless the Employer against any

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	such damage. The Contractor shall take such precautions and security measures and other steps for the protection and security of the Works, as he may deem necessary. (a) The Contractor shall at all times proceed immediately to remove or dispose of any debris arising from damage to or destruction of the Works and to rebuild, restore, replace and/or repair the Works. (b) The Employer shall carry the risk of damage to or destruction of the Works and material paid for by the Employer that is the result, whether direct or indirect or proximate or remote, of the excepted risks as set out in Clause 8.6.2. (d) Where the Employer bears the risk in terms of this Contract, the Contractor shall, if requested to do so, reinstate any damage or destroyed portions of the Works and the costs of such reinstatement shall be measured and valued in terms of Clause 6.7 hereof.
8.6.1.1.2	Clause 8.6.1.1.2: Insurance The value of the materials supplied by the Employer to be included in the insurance sum is -Nil.
8.6.1.1.3	Clause 8.6.1.1.3: Insurance The amount to cover professional fees for repairing damage and loss to be included in the insurance sum is -Nil.
8.6.1.3	Clause 8.6.1.3: Insurance The limit of indemnity for liability insurance is R1 000 000.00 for any single claim – the number of claims to be unlimited during the construction.
8.6.1.5	Clause 8.6.1.5: Additional Insurance Additional Insurance is required for the following: a) Where the contract involves manufacturing and/or fabrication of the works or part thereof at premises other than the Site, the Contractor shall satisfy the Employer that all materials and equipment for incorporation in the works are adequately insured during manufacture and/or fabrication. In the event of the Employer having an insurable interest in such works during manufacture or fabrication then such interest shall be noted by endorsement to the Contractor's Policies of Insurance. a) The insurance policy held by the Contractor shall cover “wet risks” because a portion of the works will be in the confines of an existing river.
10.5, 10.6, 10.7	Clause 10.5, 10.6, 10.7: Dispute Resolution Dispute resolution shall be by Arbitration.
11	Clause 12: Confidentiality The Contractor shall treat the details of the Works comprised in this Contract as private and confidential (save in so far as may be necessary for the purposes hereof) and shall not publish or disclose the same or any particulars thereof in any trade or technical paper elsewhere without prior written consent of the Engineer.
12	Clause 13: Amendments in writing

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	No amendments of this Contract or of any provisions or terms hereof and no waiver or relaxation or suspension of any of the provisions or terms of this Contract shall be of any force or effect unless reduced to writing and signed by both the parties hereto.
--	---

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PART 2: DATA PROVIDED BY THE CONTRACTOR

Clause

1.1.1.9 The Contractor is

1.2.1.2 The Contractor's address for receipt of communications is:

Physical address:

Postal address:

.....

.....

.....

.....

.....

.....

.....

.....

Telephone:

Fax:

Email:.....

C1.3 Form of Guarantee

PERFORMANCE GUARANTEE

For use with the General Conditions of Contract for Construction Works, Third Edition (2015),

GUARANTOR DETAILS AND DEFINITIONS

“Guarantor”
 means:.....

Physical
 Address:.....

“Employer”
 means:.....

“Contractor”
 means:.....

“Engineer”
 means:.....

“Works”
 means:.....

“Site”
 means:.....

“Contract” means: The Agreement made in terms of the Form of Offer and Acceptance and such amendments or additions to the Contract as may be agreed in writing between the parties.

“Contract Sum” means: The accepted amount inclusive of tax of
 R.....

Amount in
 words:.....

“Guaranteed Sum” means: The maximum aggregate amount of
 R.....

Amount in
 words:.....

“Expiry Date”
 means:.....

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CONTRACT DETAILS

Engineer issues: Interim Payment Certificates, Final Payment Certificate and the Certificate Completion of the Works as defined in the Contract.

PERFORMANCE GUARANTEE

1. The Guarantor's liability shall be limited to the amount of the Guaranteed Sum.
2. The Guarantor's period of liability shall be from and including the date of issue of this Performance Guarantee and up to and including the Expiry Date or the date of issue by the Engineer of the Certificate of Completion of the Works or the date of payment in full of the Guaranteed Sum, whichever occurs first. The Engineer and/or the Employer shall advise the Guarantor in writing of the date on which the Certificate of Completion of the Works has been issued.
3. The Guarantor hereby acknowledges that:
 - 3.1 any reference in this Performance Guarantee to the Contract is made for the purpose of convenience and shall not be construed as any intention whatsoever to create an accessory obligation or any intention whatsoever to create a surety ship;
 - 3.2 its obligation under this Performance Guarantee is restricted to the payment of money.
4. Subject to the Guarantor's maximum liability referred to in 1, the Guarantor hereby undertakes to pay the Employer the sum certified upon receipt of the documents identified in 4.1 to 4.3:
 - 4.1 A copy of a first written demand issued by the Employer to the Contractor stating that payment of a sum certified by the Engineer in an Interim or Final Payment Certificate has not been made in terms of the Contract and failing such payment within seven (7) calendar days, the Employer intends to call upon the Guarantor to make payment in terms of 4.2;
 - 4.2 A first written demand issued by the Employer to the Guarantor at the Guarantor's physical address with a copy to the Contractor stating that a period of seven (7) days has elapsed since the first written demand in terms of 4.1 and the sum certified has still not been paid;
 - 4.3 A copy of the aforesaid payment certificate which entitles the Employer to receive payment in terms of the Contract of the sum certified in 4.
5. Subject to the Guarantor's maximum liability referred to in 1, the Guarantor undertakes to pay to the Employer the Guaranteed Sum of the full outstanding balance upon receipt of a first written demand from the Employer to the Guarantor at the Guarantor's physical address calling up this Performance Guarantee, such demand stating that:
 - 5.1 the Contract has been terminated due to the Contractor's default and that this Performance Guarantee is called up in terms of 5; or
 - 5.2 a provisional or final sequestration of liquidation court order has been granted against the Contractor and that the Performance Guarantee is called up in terms of 5; and

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- 5.3 the aforesaid written demand is accompanied by a copy of the notice of termination and/or the provisional/final sequestration and/or the provisional liquidation court order.
6. It is recorded that the aggregate amount of payments required to be made by the Guarantor in terms of 4 and 5 shall not exceed the Guarantor's maximum liability in terms of 1.
7. Where the Guarantor has made payment in terms of 5, the Employer shall upon the date of issue of the Final Payment Certificate submit an expense account to the Guarantor showing how all monies received in terms of this Performance Guarantee have been expended and shall refund to the Guarantor any resulting surplus. All monies refunded to the Guarantor in terms of this Performance Guarantee shall bear interest at the prime overdraft rate of the Employer's bank compounded monthly and calculated from the date payment was made by the Guarantor to the Employer until the date of refund.
8. Payment by the Guarantor in terms of 4 or 5 shall be made within seven (7) calendar days upon receipt of the first written demand to the Guarantor.
9. Payment by the Guarantor in terms of 5 will only be made against the return of the original Performance Guarantee by the Employer.
10. The Employer shall have the absolute right to arrange his affairs with the Contractor in any manner which the Employer may deem fit and the Guarantor shall not have the right to claim his release from this Performance Guarantee on account of any conduct alleged to be prejudicial to the Guarantor.
11. The Guarantor chooses the physical address as stated above for the service of all notices for all purposes in connection herewith.
12. This Performance Guarantee is neither negotiable nor transferable and shall expire in terms of 2, where after no claims will be considered by the Guarantor. The original of this Guarantee shall be returned to the Guarantor after it has expired.
13. This Performance Guarantee, with the required demand notices in terms of 4 or 5, shall be regarded as a liquid document for the purposes of obtaining a court order.
14. Where this Performance Guarantee is issued in the Republic of South Africa the Guarantor hereby consents in terms of Section 45 of the Magistrate's Courts Act No 32 of 1944, as amended, to the jurisdiction of the Magistrate's Court of any district having jurisdiction in terms of Section 28 of the said Act, notwithstanding that the amount of the claim may exceed the jurisdiction of the Magistrate's Court.

Signed _____ at

.....

.

Date.....

...

Guarantor's _____ signatory (1)

.....

Capacity _____

.....

Guarantor's signatory (2)

.....

PROJECT TITLE:	THE APPOINTMENT OF A CONTRACTOR FOR THE REPAIR AND 24-MONTH MAINTENANCE OF THE OZONE WATER TREATMENT INSTALLATION AT THE KIRSTENBOSCH NATIONAL BOTANICAL GARDEN, CAPE TOWN
CONTRACT NO:	Q8952-2023

C2 Pricing Data

1. GENERAL INFORMATION

- a. Bills of Quantities
 The **bills of quantities** forms part of and must be read and priced in conjunction with all the other documents forming part of the **contract documents**, the Standard Conditions of Tender, Conditions of Contract, Specifications, Drawings and all other relevant documentation.
- b. Value Added Tax
 The **contract sum** must include for Value Added Tax (VAT). All rates, provisional sums, etc. in the **bills of quantities** must however be net (exclusive of VAT) with VAT calculated and added to the total value thereof in the Final Summary.
- c. Fixed Price Contract
 Tenderers are to take note that contract price adjustments are not applicable to this contract. Tenderers should therefore make provision in the **contract sum**, schedule of rates, etc., for possible price increases during the contract period, as no claims in this regard shall be entertained.

2. PRICING INFORMATION

1. These schedules of quantities contain sequentially numbered pages as indicated in the contents list. Tenderers are required to check that the pages in their schedules of quantities are complete. If any pages are duplicated or omitted, or if any quantity or typing is unclear or if the schedules of quantities contain any obvious errors, the tenderer shall immediately notify the engineer so that the problem may be rectified. No responsibility for any errors arising from any of the above shall be accepted by the engineer.
2. The schedules of quantities form part of and shall be read in conjunction with the specification, which contains full description of the work required to be performed and the materials and equipment to be supplied and used in the execution of the works. Tenderers shall refer to the specification for the full meaning and description of work to be executed and materials and equipment to be supplied or used in the execution of the work.
3. Tenders shall be submitted with schedules of quantities completed in full. Non or partial completion of the schedules of quantities shall render tenders liable for disqualification.
4. The total tender price as carried forward to the bid form, after correction for arithmetic extension errors, etc. shall be the contract price as awarded to the successful tenderer. Tenderers are requested to check multiplication and addition of the schedules of quantities. The rate submitted shall be regarded as the price offered per item.

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5. No changes, additions or omissions to the contents of the schedules of quantities shall be permitted. If any changes, additions or omissions are made these shall not be recognised and the original wording of the schedules of quantities shall apply.
6. The priced schedules of quantities of tender shall be checked by the principal agent. The principal agent reserves the right to request adjustments to one or more individual tender prices and to rectify contradictions and thereby alter the total tender price as submitted. The acceptance of this tender does not preclude the principal agent from querying or requesting of the contractor to adjust the rates at any stage during the contract period or any extension thereto.
7. The responsibility of the accuracy of the quantities included in the schedules, remains with the person who prepared the schedules. The tenderer is relieved from the responsibility of the measurement of quantities at tender stage and the tender amounts shall be for the quantities as listed in the schedules. It is however expected from the tenderer to include for minor construction items such as would be required for the complete execution of works in accordance with the specification.
8. The quantities in these schedules of quantities shall not be used for the ordering of materials.
9. Changes in the scope of works included in the schedule of quantities shall be permitted and shall be measured and priced at the tariffs as included in the schedules of quantities and shall form an addition to or omission from the total of the schedule of quantities. Any changes not covered by any rates in the schedules of quantities shall be agreed and priced as non-schedule items in accordance with the conditions of contract.
10. The extent and value of variations shall be in accordance with the conditions of contract. Variations to the works prior to the execution thereof shall be priced as above. Variations to work already executed shall not necessarily be priced in accordance with the schedule of quantities and shall be judged individually on merit.
11. Except where the separate rate for the material and labour components of any item is specifically called for, the unit price of such item shall be deemed to include the supply and installation of that item.

The description of any items shall, except where otherwise specified, allow for the purchase, delivery, off-loading, storage, packing, lifting, placing, positioning and fixing in position, cutting and wastage, dies and patterns, models and equipment, temporary work, return of packing material, fixing costs, profit or other obligations of the contract arising out of the conditions of contract.

All items prices shall exclude VAT but include any other tax or levy as applicable.

All items are measured to the net final quantity as indicated on the drawings with the completed work in the position as indicated on the drawing. All prices and rates shall allow for wastage for whatever reason, irrespective of any other standard measurement which may be currently used elsewhere.

12. Should the contractor identify any additional issues or items which in his opinion are necessary for the complete and proper execution of the works, he shall identify such items in a covering letter attached to his tender and submit rates for these items. Mistakes in the physical measurement of items in the schedules of quantities shall be rectified but no claim shall be considered for the non-measurement of doubtful or minor items or claims resulting of criticism of method of measurement used or descriptions given. The priced schedule of quantities shall not be adjusted on the grounds of the items which in the opinion of the tenderer should have been brought into account unless so detailed in the accompanying letter.
13. The schedule of quantities shall be adjusted to reflect the quantities of materials used on

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completion of whole or part of the works as a result of remeasurement, qualification or variations. The remeasured quantities shall form the basis for the calculation of payment certificates. The schedules of quantities are not intended for the ordering of materials, etc. and the contractor is advised to extract the quantities for the ordering of materials directly from the drawings and specification. Any order placed directly from the schedules of quantities shall be solely at the contractor's risk.

14. The unit rates as entered in the schedule of quantities with the exclusion of dayworks items shall in all cases include any present and applicable sales tax or similar statutory duties.

SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE

KIRSTENBOSCH NATIONAL BOTANICAL GARDEN: SANBI: REPAIR, SERVICING AND MAINTENANCE OF OZONE PURIFICATION WATER SYSTEM AND BOREHOLES (24-MONTHS)

SCHEDULE OF QUANTITIES

NB TENDERERS MUST COMPLETE THE SCHEDULE OF QUANTITIES IN BLACK INK

General Conditions of Contract for Works of Civil Engineering Construction (GCC 2015: 3rd Edition)

SCHEDULE 1: GENERAL

PAYMENT REFERS TO	ITEM NO	DESCRIPTION	UNIT	QUAN-TITY	RATE	AMOUNT
G 8.2.1	1.00	<u>GENERAL</u>				
	1.01	Scheduled fixed-charge and value-related items:				
		.01 Fixed preliminary and general charges	-	-	sum	
G 8.9	1.02	Special testing				
		.01 Special testing as required by the	-	PC	sum	6,000.00
		.02 Attendance and profit	%	6,000	%	
G 8.13	1.03	Occupational Health and Safety				
		.01 Compliance with OHS Act and Construction Regulations	-	-	sum	
OZ.08	1.04	Supply complete schematical plan - boreholes, pipe routes, cable routes, reservoirs and ozone plants				
		.01 Kirstenbosch Botanical Garden	site	1		
OZ.06	1.05	Maintenance Control Plan				
		Compile complete maintenance control plan as specified in OZ 10.02 including monthly maintenance control sheets and recording				
		.01 Kirstenbosch Botanical Garden	site	1		
OZ.07	1.06	Site Maintenance Record Keeping (monthly maintenance report for all schedules, checklists, reports, etc as detailed in specification OZ 09.09 and maintenance control plan)				
		.01 Kirstenbosch Botanical Garden	month	24		
	Carried forward					

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SCHEDULE 1: GENERAL

[illegible]

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SCHEDULE 2: REPAIR AND SERVICING OF OZONE GENERATOR PLANT AND BOREHOLES

PAYMENT REFERS TO	ITEM NO	DESCRIPTION	UNIT	QUAN-TITY	RATE	AMOUNT
EA.02	2.00	<u>BOREHOLES</u>				
		Cleaning				
		.01 Clean area around boreholes (5m x 5m) of vegetation and growth				
		.01 Appelboom Borehole	number	1		
		.02 Skool Borehole	number	1		
		.03 Brandbaan Borehole	number	1		
		.04 Protea Borehole	number	1		
		.02 Clean area around reservoirs (2m wide strip) of vegetation and growth				
		.01 Nursery Reservoir (13,4m x 6,6m)	number	1		
		.02 Round Ozone Reservoir (12m dia)	number	1		
EA.01	2.01	.03 Concrete Reservoir (16,3m x 9,8m)	number	1		
		.04 Manor House Reservoir (8,3m dia)	number	1		
		Testing of Boreholes				
		.01 Pump testing of Borehole	number	4		
		.02 Removal of existing equipment	number	4		
		.03 Installation of temporary pumps	number	4		
EA.01(a)		.04 Ground water sampling	number	4		
EA.01(b)		.05 Compilation of Borehole report	number	4		
EA.01(d)		.06 Reinstallation of pumping equipment	number	4		
EA.01(e)						
EA.01(f)						
EA.03.01	2.02	Decommissioning and removal, servicing and reconditioning of submersible pumping equipment				
		.01 Borehole submersible pump	number	2		
		Carried forward				

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SCHEDULE 2: REPAIR AND SERVICING OF OZONE GENERATOR PLANT AND BOREHOLES

PAYMENT REFERS TO	ITEM NO	DESCRIPTION	UNIT	QUAN-TITY	RATE	AMOUNT
	Brought forward					
SB.01	2.03	Water distribution pipelines				
		.01 Provision of materials for pipes, bends, tees, reducers, couplings and valves				
		.01 uPVC class 12 pressure pipes to SABS 966 with integral "LYNG" mechanical rubber ring joints:				
		.01 75 mm dia	m	15		
OZ	2.04	WATER TREATMENT				
		.01 Develop schematic flow diagram and operation and maintenance manuals as described in Specification SB and OZ	-	-	sum	
		.02 Remove existing water circulation pumps, service and hand-over to SANBI Kirstenbosch	number	2		
OZ.01	2.05	20g/hr Ozone Generator at Manor House Reservoir. Reservoir size of 95kl				
		.01 Allow for the repair/servicing of the existing 20g/hr Ozone generator at the Manor House Reservoir (as installed by Optima Process Engineering during 2018).	-	PC	sum	15,000.00
		.02 Attendance and profit on item .01 above	%	15,000	%	
		.03 Supply, install and commission new 20g/hr Ozone generator complete with all electrical connections, PC board, controls, electrical supply cable, distribution board, breakers, contactors, meters, etc. and pipework.	number	1		
		.04 Commissioning and Testing of ozone unit	number	1		
	Carried forward					

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SCHEDULE 2: REPAIR AND SERVICING OF OZONE GENERATOR PLANT AND BOREHOLES

PAYMENT REFERS TO	ITEM NO	DESCRIPTION	UNIT	QUAN-TITY	RATE	AMOUNT
		Brought forward				
OZ	2.06	100g/hr Ozone Generator at Round Reservoir. Reservoir size of 232kl .01 Allow for the repair/servicing of the existing 100g/hr Ozone generator at the Round Reservoir (as installed by Optima Process Engineering during 2018). .02 Attendance and profit on item .01 above	- %	PC 12,000	sum%	12,000.00
OZ	2.07	100g/hr Ozone Generator at Nursery Reservoir. Reservoir size of 265kl. Installation, testing and commissioning including all pipework and fittings				
OZ.01		.01 Supply, install and commission new 100g/hr Ozone generator complete with all electrical connections, PC board, controls, 80m electrical supply cable, distribution board, breakers, contactors, meters, etc. and pipework.	number	1		
FN	2.08	Supply, installation, testing and commissioning of stainless steel submersible pumps including all pipe work and fittings, electrical connections, etc. .01 1.3kW, 21kl/h with stainless steel base, pump body, -shaft and -impeller submersible pump	number	3		
	2.09	Service and repair Float-level switches	number	6		
	2.10	Service Motor Control Centres	number	2		
	2.11	Replace Float-level switches	number	2		
	2.12	Telemetry System .01 Allow the sum of R 24,000.00 for the repair and commissioning of the existing Telemetry equipment .02 Charge required by Contractor on item .01 above	- %	PC 24,000.00	sum%	24,000.00
TOTAL SCHEDULE 2: CARRIED TO SUMMARY: REPAIR AND SERVICING WORK						

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SCHEDULE 3: MAINTENANCE AND PERIODICAL SERVICING

PAYMENT REFERS TO	ITEM NO	DESCRIPTION	UNIT	QUAN-TITY	RATE	AMOUNT
	3.00	<u>MAINTENANCE AND PERIODICAL SERVICING</u>				
OZ.03	3.01	Maintenance and Servicing of Installations:				
		.01 Monthly Maintenance Service of all units - Water Ozone Installation	month	24		
OZ.05	3.02	Breakdown Call-Out				
		.01 Emergency Breakdown (48 Hours) response time	No	18		
		.02 Allow the sum of R 24,000.00 for breakdown parts/components not covered by the initial 12-month warranty or not included as part of service item 3.01.01 above	-	PC	sum	24,000.00
		.03 Charge required by Contractor on item 3.02.02 above	%	24,000.00	%	
OZ.04	3.03	Payment Reduction				
		Payment reductions shall be applied per hour (or part thereof) that the installation is not working - calculated from the moment a breakdown has been logged and the contractor notified, and measured until the plant is restored to full working condition				
		.01 Downtime per hour or part thereof (exceeding 72 hours)	hour	-	- R 100.00	Rate only
	3.04	Periodical services not included in monthly maintenance items as specification OZ table OZ08.04/1:				
OZ		.01 Six monthly major service of complete ozone installation including cleaning of high voltage glass tubes	number	4		
EA.03.02		.02 Servicing of submersible borehole pumps	number	4		
EA.03.02		.03 Servicing of water submersible pumps	number	6		
	3.05	Potable Water Tests				
EJ.02		.01 Water quality tests to be performed by an approved authorised person on at least a monthly basis	number	24		
	TOTAL SCHEDULE 3: CARRIED TO SUMMARY: MAINTENANCE AND PERIODICAL SERVICING					

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SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE

KIRSTENBOSCH NATIONAL BOTANICAL GARDEN: SANBI: REPAIR, SERVICING AND MAINTENANCE OF OZONE PURIFICATION WATER SYSTEM AND BOREHOLES (24-MONTHS)

CALCULATION OF TENDER SUM

SCHEDULE 1: GENERAL R

SCHEDULE 2: REPAIR AND SERVICING OF OZONE GENERATOR PLANT AND BOREHOLES R

SCHEDULE 3: MAINTENANCE AND PERIODICAL SERVICING R

SUBTOTAL R

VALUE-ADDED TAX (VAT)

The tenderer shall add 15% of the subtotal for value-added tax R

TOTAL R

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PROJECT TITLE:	THE APPOINTMENT OF A CONTRACTOR FOR THE REPAIR AND 24-MONTH MAINTENANCE OF THE OZONE WATER TREATMENT INSTALLATION AT THE KIRSTENBOSCH NATIONAL BOTANICAL GARDEN, CAPE TOWN
CONTRACT NO:	Q8952-2023

C3 Scope of Work

SCOPE OF WORK

EMPLOYER'S OBJECTIVES

The Employer's objective is the Repair and 24-Month Maintenance of the Ozone Water Treatment Installation at the Kirstenbosch National Botanical Garden in Cape Town.

OVERVIEW OF THE WORKS

The Repair and 24-Month Maintenance of the Ozone Water Treatment Installation at the Kirstenbosch National Botanical Garden in Cape Town will include:

- Servicing and repair of existing Ozone Generation Installations (Installed by *Optima Process Engineering*)
- Replacement of circulation pumps with stainless steel submersible circulation pumps
- Installation of a new Ozone Generation plant including submersible circulation pump
- Testing of existing boreholes
- Borehole water quality tests
- Potable Water Quality Testing and Monitoring

LOCATION OF THE WORKS

The works is located at the Kirstenbosch National Botanical Garden, Cape Town:

- Nursery Reservoir: 33° 59' 12.6" S 18° 25' 39.1" E
- Round Ozone Reservoir: 33° 59' 12.5" S 18° 25' 40.7" E
- Manor House Reservoir: 33° 59' 26.1" S 18° 25' 34.4" E

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DESCRIPTION OF SITE AND ACCESS

The garden is easily accessible via public roads. Access to the reservoirs will be granted upon prior arrangement with the SANBI maintenance personnel.

TEMPORARY WORKS

All design and the construction of any temporary works must be approved by the Engineer.

DESCRIPTION OF THE WORKS

1.1. GENERAL

Should any requirement or provision of the Project Specification conflict with any requirement or provision of any other specification section or clause that are applicable to the Contract or any drawing, the prevailing specification will be in the following order:

- a. Particular Specification
- b. Project specifications
- c. Drawings
- d. General Specification

1.2. SCOPE OF CONTRACT

The contract shall comprise the supply of all labour, materials, workmanship, machinery, equipment, transport, attendance on others and everything stated or implied which is, or may be, necessary in and for the entire completion of all the following works:

- Repair of existing Ozone Generation Installations
- Servicing of existing Ozone Generation Installations
- Replacement of circulation pumps with stainless steel submersible circulation pumps
- Installation of a new Ozone Generation plant including submersible circulation pump
- Testing of existing boreholes
- Frequent water tests of reservoir water quality to ensure adequate ozone generation operation
- Monthly servicing of ozone generation units and associated pumps, pipework, control panels and electrical installations.
- Maintenance of the entire Ozone Generation Installation for a period of 24-months.
- Compliance to regulations relating to Health and Safety and the Environmental Management Acts.

1.3. CONSTRUCTION WORKS SPECIFICATIONS

PORTION A

SANS 1200 General Requirements
SANS 241-1 Drinking water Part 1: Microbiological, physical, aesthetic and chemical determinants

EA Borehole Pump Systems
EJ Potable Water Quality Testing
G Variations and Additions to Standardised Specifications
OZ Ozone Generation Installation
SB Operation and Maintenance Manuals
SD Training

EA BOREHOLE PUMP SYSTEMS

EA 01 SCOPE

This specification covers the decommissioning, removal, service and reconditioning, installation, testing, commissioning and maintenance of borehole pumping equipment, motor control devices and low-voltage cables. It also includes the pump testing of all boreholes to determine the borehole yield and optimum use of each borehole. The function of borehole pump systems shall be delivery of raw water at a specified flow rate and head to the required location.

EA 02 STANDARD SPECIFICATIONS

EA 02.01 GENERAL STANDARD SPECIFICATIONS, REGULATIONS AND CODES

The latest edition, including all amendments up to date of tender, of the following specifications, publications and codes of practice shall be read in conjunction with this specification and shall be deemed to form part thereof:

- BS 5316, Part 1 - Acceptance tests for centrifugal, mixed flow and axial pumps
- SANS 1222 - Enclosures for electrical equipment classified by IP code
- BS 4999 - General requirements for rotating electrical machines
- ISO 281/1 - Rolling bearings – dynamic load ratings and rating life.

EA 03 DESCRIPTION OF SERVICING AND TESTING WORK

EA 03.01 PUMP TESTING OF BOREHOLES

This section covers the requirements of the pump testing of the boreholes.

EA 03.01.01 Testing

It will be the responsibility of the Contractor to arrive on site with all equipment and materials required to complete the work without interruption.

The Contractor shall provide suitable plant to enable the installed pumping equipment to be removed and reinstalled. This includes the removal and reinstallation of motorised pumps and may also include the recovery of existing pumping equipment previously lowered into a borehole.

(a) Arrival-on-site actions

The Contractor shall firstly establish whether or not the borehole is equipped. If so, the Contractor will be required to:

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- (1) Remove the equipment, taking care not to damage either the equipment or the installation,
- (2) inspect the equipment for defects, and
- (3) note down all particulars regarding the equipment and the installation.

The latter shall include but not be limited to the make and type of pump (and motor if motorised), the depth to which the pump was installed, the power rating of the motor and the diameter, length and quantity of pump column sections.

The Contractor shall next establish whether there are any other boreholes in the vicinity that need to be tested. Should this be the case, the following information shall be gathered and recorded for each borehole:

- (1) The straight-line distance (in metres) between each such borehole to be tested;
- (2) whether the borehole is equipped, open or sealed and, if equipped,
- (3) whether the installation is operational or not.

Depending on the degree of access available to such a borehole, the Contractor shall improve the access until it is adequate to reach the borehole and establish whether there is water in the borehole and if so, measure and record:

- (1) The depth to the ground-water rest level;
- (2) the height of the borehole collar above ground level, and
- (3) the depth of the borehole.

The final activities to be carried out prior to the actual installation of the test pump into the borehole to be tested shall comprise measuring and recording:

- (1) The diameter of the borehole;
- (2) the depth of the borehole as determined by means of a weighted line or plumb bob, and
- (3) the depth to the ground-water rest level in the borehole, with reference to a date level.

(b) Test pump installation

The conduit tube shall be attached and secured to the first section of pump column behind the pump element and the test pump installed to the required

depth, attaching and securing the conduit tube to the riser main every 2 to 3 metre. If the pump installation depth has not been specified by the Engineer beforehand, then the depth must be determined on the basis of the guidelines provided.

GUIDELINES FOR TEST PUMP INSTALLATION DEPTH IF NOT SPECIFIED

DEPTH OF WATER IN BOREHOLE	TEST PUMP INSTALLATION DEPTH
Less than 5 m	Do not install the test pump
Between 5 m and 30 m	± 2 m above the bottom of the borehole
Between 30 m and 60 m	± 3 m above the bottom of the borehole
Between 60 m and 90 m	± 4 m above the bottom of the borehole
More than 90 m	± 5 m above the bottom of the borehole
NOTE: 1. Depth of water in borehole is calculated as the difference between the total depth of the borehole and the depth to the ground-water rest level as measured. 2. $\pm$ denotes a variation of not more than 0,5 m either way.	

(c) Equipment set-up and pre-test actions

Where possible, the discharge pipe must be laid in a downhill direction from the borehole to be tested, provided this will take the pipe in the direction of or past another borehole located in the vicinity of the borehole to be tested. In such instances, lay the discharge pipe in a downhill direction that will take its furthest end as far as possible away from any other borehole in the vicinity.

In field situations where the terrain is extremely flat, the length of the discharge pipe shall be extended from 50 m to at least 300 m if any possibility exists that the discharged water may infiltrate to the ground-water resource within the radius of influence of the test. The dip meter should be inserted into the installed conduit tube and run down this tube to the bottom. Make sure that it passes freely down the full length of the tube. If the dip meter used is not graduated to an accuracy of 0,01 m, the position is to be marked on the dip meter cable indicating the depth to the ground-water rest level, and the end of the graduated tape attached at this position on the cable ensuring that the zero mark of the graduated tape corresponds exactly to this mark. Slowly lower the dip meter and graduated tape down the conduit tube, in the process securing the tape to the dip meter cable every 2 to 3 metre. Ensure that there is no slack between each point where the tape is secured to the dip meter cable. Also make sure that the dip meter cable and graduated tape combination passes freely along the full length of the conduit tube.

(d) Final pre-test measurements

The Contractor shall ensure that all the basic information required on the field data sheet is collected and recorded as completely as possible. The basic information data entry fields can be used as a checklist for information to be measured/collected and recorded. The Contractor shall not guess any information which has not been measured.

Payment for this work shall be incorporated into the payment for data recording as described below.

(e) Data recording

(i) Discharge measurements

The measurement of discharge (yield or pumping rate) must be consistently accurate and reliable and shall be appropriate to meet this requirement. Where volumetric calculation methods are applied, time will be measured using a stopwatch and the container volume must be accurately known. The volumetrically measured yields recorded on the field data sheets shall be based on the average obtained from a set of three sequential measurements. Guidelines

for the number and periodicity of discharge rate measurements for each type of test are given below.

NUMBER OF PERIODICITY OF DISCHARGE RATE MEASUREMENTS

TYPE OF TEST	DISCHARGE RATE MEASUREMENTS	
	NUMBER	PERIODICITY
Calibration test	2 per step	At ± 5 and ± 10 minutes into each step
Stepped discharge test	5 per step	At ± 5 , ± 15 , ± 30 , ± 60 and ± 90 minutes into each step
Constant discharge test	See periodicity column	At ± 5 , ± 15 , ± 30 , ± 60 , ± 90 and ± 120 minutes into test and every 60 minutes thereafter for the full duration of pumping

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(ii) Water-level measurements

Rigid guidelines for the periodicity of water-level measurements for each type of test are given in table EA 04.02.01/3. This information can be found duplicated on the field data sheets which must be filled in as a record of all data collection activities carried out for a pumping test. The type of water-level measurement values required to be recorded on the field data sheets are the actual (or true) draw down values. These values represent measurements which reflect the depth of the water level below the ground-water rest level depth, ie which already take into account the ground-water rest level depth below the reference measuring point. It shall be noted that the more basic type of measurement which reports the depth of the dynamic water level as a distance below the reference measuring point, ie which combines the depth of the water level below the ground-water rest level depth and the depth of the ground-water rest level below the reference measuring point, gives only an apparent (or false) draw down value. All water-level measurements must be measured to an accuracy of at least 0,01 m (10 mm). The water-level data shall be plotted on the semi-logarithmic graph paper provided with each set of field data sheets. The plotting of the data shall be done as the test proceeds, ie each water-level measurement shall be plotted on the graph as soon as possible after measuring. The field data sheets and accompanying water-level graphs shall be shown to authorised supervisory personnel at request and shall be up-to-date at the time of such request.

(iii) Other information

The Contractor shall also record any extraordinary observations made during the test. These may include:

- (1) Changes in the colour of the discharged water;
- (2) changes in the turbidity of the discharged water;
- (3) the presence of air in the discharged water, and
- (4) rainfall events which occur during a test.

PERIODICITY (IN MINUTES) OF MEASUREMENTS DURING PUMPING TESTS

CALIBRATION TEST	STEPPED DISCHARGE TEST	CONSTANT DISCHARGE TEST	RECOVERY TEST
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
7	7	7	7
9	9	9	9
12	12	12	12
15	15	15	15
	20	20	20
	25	25	25
	30	30	30
	40	40	40
	50	50	50
	60	60	60
	70	70	70
	80	80	80
	90	90	90
	100	120	120
		150	150
		180	180
		210	210
		240	240

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EA 03.01.02

Equipment and materials

This represents the test unit and all ancillary equipment and materials required to accurately and efficiently perform borehole testing. Details are provided below.

(a) Test unit

The test unit shall comprise a positive displacement (PD) type pump element and a pump head driven by a motor fitted with an accelerator, gearbox and clutch. The unit must be in good working order and capable of maintaining a minimum of 72 hours of continuous operation.

The unit must be capable of delivering water at a rate in excess of the expected maximum yield of the borehole to be tested. It may be acceptable under certain circumstances to employ a submersible pump for testing purposes. This must, however, be identified in the tender enquiry document. It is imperative that any submersible pump used for testing purposes be equipped with a non-return valve fitted at the bottom of the pump column (rising main).

(b) Discharge piping

Discharge piping comprises both the pipe (rising main or pump column) which brings the water to surface and the pipe (discharge hose) used to lead the pumped water away from the borehole being tested. The Contractor shall supply sufficient rising main to set the test pump at a depth of at least 100 m below the surface. It may, however, be required under certain circumstances to set the test pump at a greater depth in the borehole. Where necessary it shall be discussed with the Engineer prior to the installation of the test pump. The pump column must be of uniform diameter throughout. The Contractor shall also provide at least 50 m discharge piping. This must be free of leaks for its entire length. It may again, under certain circumstances, be required to discharge the pumped water at a point further away than 50 m (possibly in excess of 300 m) from the borehole being tested. In such instances, a similar procedure to that discussed above in regard to the rising main must be followed.

(c) Discharge measuring equipment/Instrumentation

This equipment/instrumentation must be adequate to accurately measure the pumping rate within the range of yields expected from successful project boreholes. If volumetric methods are used, a stopwatch for measuring time to an accuracy of at least one-tenth of a second is required. The full capacity of each container shall be determined accurately. The Contractor shall also ensure that a container stands level when used for discharge measurements. Guidelines regarding the use of different size containers for volumetric discharge rate measurements in specific yield ranges are given in table below. Other acceptable instruments that may be used for discharge measuring are: (1) an orifice weir and (2) a flow meter. The use of these instruments is subject to various application criteria.

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(i) Orifice weirs

These must be installed in a horizontal position at the end of the discharge pipe. The orifice plate opening must be sharp, clean, bevelled to 45 degrees and have a diameter less than 80 per cent of the diameter of the approach tube to which it is fixed. The orifice plate must be vertical and centred on the end of the approach tube. There must be no leakage around the perimeter of the orifice plate mounting. The piezometer tube must not contain entrained air bubbles at the time of pressure head measurement. The latter measurement must be at least three times the diameter of the orifice.

YIELD RANGE VERSUS CONTAINER SIZE FOR VOLUMETRIC MEASUREMENTS

YIELD RANGE	CONTAINER SIZE
Less than 2 litre/s	20 litre
2 litre/s to 5 litre/s	50 litre
5 litre/s to 20 litre/s	210 litre
20 litre/s to 30 litre/s	500 litre
30 litre/s to 50 litre/s	1000 litre
More than 50 litre/s	Other suitable methods

The orifice weir equipment must be calibrated for various combinations of approach tube and orifice diameters so that pressure head readings can be converted to accurate discharge measurements.

(ii) Flow meters

Flow meters must be calibrated and of similar diameter to that of the discharge pipe. The latter must be straight and of uniform diameter for a distance of four times the diameter of the pipe before the position of the meter. There must be no turbulent flow or entrained air in the discharge pipe before the meter. The discharged water must be free of solid material carried in suspension.

It is recognised that some water leakage will generally occur especially at the borehead during pumping. This is acceptable provided that: (1) such leakage does not interfere with any water-level monitoring and (2) the total amount of leakage to the end of the discharge pipeline does not exceed one per cent of the pumping rate as measured at the end of this pipeline.

(d) Water-level measuring equipment/instrumentation

The Contractor shall provide at least three water-level measuring devices which are each capable of providing an accuracy of at least 0,01 m (10 mm) and are of sufficient length to match the pump installation depth. If ungraduated electrical contact meters (dip meters) are used for this purpose, each such instrument must be equipped with a measuring tape of an acceptable length and approved standard and which is graduated to an accuracy of at least 0,01 m (10 mm). These instruments must be in good working order and number at least one spare for each two on site.

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The Contractor shall further provide conduit tubing of sufficient length to match the pump installation depth. The diameter of this tube must be large enough (minimum 15 mm) to allow free movement of the dip meter probe and cable therein. The tubing must be made of material strong enough to withstand reasonable pressure on its sidewall which might cause a constriction. The tube must be open at its lower end to allow the free entrance of water into the tube. This is facilitated by perforating the bottom section of the conduit tube sidewall. Precautions shall also be taken to prevent the dip meter probe from passing beyond the bottom end of the conduit tube and, as a result of entanglement, not able to be withdrawn.

(e) Other materials

No pumping test should commence without field data sheets on which to record all data and information relevant to the test pumping activities in an acceptable format. These can either be provided by the Contractor or the Engineer.

EA 04 TESTING AND COMMISSIONING

- (a) At least one of each type or size of pump supplied shall be subject to a delivery flow rate test. Flow rate or volumetric flow testing facilities will be supplied by others, unless otherwise specified in the detail specification.
- (b) The operating point of each pump shall be determined.
- (c) Efficiency tests will only be performed when specified in the detail specification.
- (d) NPSH tests will only be performed when specified in the detail specification.

During the day 1 commissioning tests the pump operating point shall be determined by observing the following:

- (a) Pump delivery and suction pressures, and
- (b) Electric motor power consumption.

If no efficiency tests are required in the detail specification then the motor power consumption shall be calculated from the voltage and current measurements obtained during the commissioning test.

The Contractor shall supply the necessary adaptors, fittings and pressure gauges to measure the suction and delivery pressures. If no gauge fittings exist on the suction side, then the suction pressure conditions will be calculated from the system properties.

- (a) Testing will be done in accordance with BS 5316 Part 1, class C tests.
- (b) Power consumption of electric motors shall be as determined by the three-wattmeter method where efficiency tests are required in the detail specification.

- (a) All tests will be performed in situ.
- (b) The pumped medium or liquid specified as the process liquid in the detail specifications shall be utilised during the tests. The Contractor shall obtain from the pump manufacturer the test point for clean water corresponding to the specified duty point for the pumped liquid, in

order to relate the measured performance to the pump supplier's curves which are based on water.

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EA 05 MEASUREMENT AND PAYMENT

EA.01 PUMP TESTING OF BOREHOLESUnit: number

The unit of measurement shall be the number of boreholes tested on the written instructions of the Engineer.

The tendered rate shall include full compensation for all labour, equipment and material required for the complete testing of the boreholes in accordance with the specification.

Extra over EA.01 for:

(a) The removal of existing equipment.....Unit: number

The unit of measurement shall be the number of boreholes from which all the equipment is removed. The tendered rate shall include full compensation for the removal of existing operational pumps and motors and all associated pipework.

(b) Installation of temporary pumpsUnit: number

The unit of measurement shall be the number of temporary pumps installed and later retrieved. The tendered rate shall be fully inclusive of the pump and pipes required to effectively test the boreholes in accordance with the specifications.

(d) Ground-water samplingUnit: number

The unit of measurement shall be the number of boreholes of which the water is sampled. The tendered rate shall be fully inclusive of the requirements of the specification irrespective of the number of samples taken from a borehole. To be tested in accordance of the requirements listed in specification EJ: Potable Water Quality Testing.

(e) Compilation of borehole report.....Unit: number

The unit of measurement shall be the number of boreholes regarding which approved reports is compiled. The tendered rate shall be fully inclusive of the work required to compile and produce six copies of each borehole recommendation report.

(f) Reinstallation of existing pumping equipment.....Unit: number

The unit of measurement shall be the number of boreholes in which removed equipment is re-installed. The tendered rate shall cover the reinstallation of existing pumping equipment in a borehole following test pumping of the borehole. The existing pumping equipment shall be reinstalled and left in working condition as it was found before removal unless the Contractor is instructed otherwise by the Engineer.

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EA.02 **CLEAN AREA AROUND BOREHOLE**.....Unit: number

The unit of measurement shall be the number of boreholes around which the area is cleaned and levelled.

The tendered rate shall cover full compensation for the cleaning of an area 5m x 5m around each borehole.

EA.03 SERVICING OF EQUIPMENT

EA.03.01 De-commissioning and removal of submersible pumping equipment Unit: number

The unit of measurement shall be the number of submersible pumps and motors de-commissioned and removed.

The tendered rates shall include full compensation for tools, transport, site handling and labour necessary for the complete de-commissioning and removal of pumping equipment.

EA.03.02 Servicing of submersible borehole pumps Unit: number

The unit of measurement shall be the number of pumps serviced. The tendered rate shall include full compensation for servicing (including all consumables), cleaning, corrosion protection (including pump and motor base), adjusting, aligning, including disassembling and re-assembling. The tendered rate shall include all labour, tools, equipment and spare parts that form part of servicing as set out in the operating and maintenance manuals or as specified by the supplier.

EA.03.03 Reconditioning of pumping equipment Unit: number

The unit of measurement shall be the number of pumps and motors reconditioned.

The tendered rates shall include full compensation for replacement of components and materials and for, tools, transport, site handling and labour necessary for the complete reconditioning of pumping equipment to conform to all the requirements in this document.

EA.03.04 Commissioning Unit: number

The unit of measurement shall be the number of borehole installations commissioned.

The tendered rate shall include full compensation for all labour and equipment supplied and for the re-installation and commissioning of each borehole installation.

EJ POTABLE WATER QUALITY TESTING

EJ 01 SCOPE

This specification covers requirements for potable water quality.

EJ 02 GENERAL STANDARD SPECIFICATIONS, REGULATIONS AND CODES

The latest edition, including all amendments up to date of tender, of the following specifications, publications and codes of practice shall be read in conjunction with this specification and shall be deemed to form part thereof:

SANS 241-1:2015 - Water quality tests

EJ 03 TESTING BY AUTHORITIES

EJ 03.01 POTABLE WATER QUALITY TESTS

An approved testing authority, such as the SABS, shall measure the content of the potable water monthly (or as instructed for by the Engineer). The sample shall be submitted to the testing authority according to prescription. The water distributed to consumers shall comply with the SANS 241-1:2015 Specification for the standards of drinking water. Only class 1 (recommended operational limit) water shall be distributed for human consumption.

The following analysis shall be performed by an approved authority on at least a monthly basis on the water delivered to the consumers in the following prescribed format:

	Risk	STANDARD LIMITS
Physical and Aesthetic Determinands		
Colour (mg/l as Pt-Co)	Aesthetic	≤15
Conductivity (at 25 °C)	Aesthetic	≤170
Total Dissolved Solids (mg/l)	Aesthetic	≤1200
Turbidity (NTU)	Operational ^a	≤1
	Aesthetic	≤5
pH (at 25 °C) ^b	Operational	≥5 to ≤9.7
Chemical Determinands – Macro Determinands		
Free Chlorine (mg/l as Cl ₂) ^d	Chronic Health	≤5
Monochloramine (mg/l) ^{cd}	Chronic Health	≤3
Nitrate (mg/l as N) ^{ef}	Acute Health	≤11
Nitrite (mg/l as N) ^{efg}	Acute Health	≤0.9
Combined Nitrate plus Nitrite (mg/l) ^{efg}	Acute Health	≤1
Sulphate (mg/l as SO ₄ ²⁻)	Acute Health	≤500
	Aesthetic	≤250
Fluoride (mg/l as F ⁻)	Chronic Health	≤1.5
Ammonia (mg/l as N)	Aesthetic	≤1.5
Chloride (mg/l as Cl ⁻)	Aesthetic	≤300
Sodium (mg/l as Na)	Aesthetic	≤200
Zinc (mg/l as Zn)	Aesthetic	≤5
Chemical Determinands – Micro Determinands		
Antimony (µg/l as Sb)	Chronic Health	≤20
Arsenic (µg/l as As)	Chronic Health	≤10
Barium (µg/l as Ba)	Chronic Health	≤700
Boron (µg/l as B)	Chronic Health	≤2400
Cadmium (µg/l as Cd)	Chronic Health	≤3
Total Chromium (µg/l as Cr)	Chronic Health	≤50
Copper (µg/l as Cu)	Chronic Health	≤2000
Cyanide (recoverable) (µg/l as CN ⁻)	Acute Health	≤200
Iron (µg/l as Fe)	Chronic Health	≤2000
	Aesthetic	≤300
Lead (µg/l as Pb)	Chronic Health	≤10

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In addition to the SANS 241-1:2015 Specification for the standards of drinking water, the following tests shall also be conducted to comply with WHO standards and recommendations:

DETERMINANTS CONSTITUENTS

- Colour (Pt/Co Units)
- Odour – Instrumentation (TON)
- Nitrate (NO₃) + Nitrite (NO₂) as N

BIOLOGICAL ACTIVITY

- Total Heterotrophic Plate Count (THPC) (Colonies per ml)
- Total Coliforms (Colonies per 100-ml)
- Total Faecal Coliforms (Colonies per 100-ml)
- Total Macro-biological Count (Organisms per 1000-ml)
- Moulds & Yeasts (Pos-Neg Test)

WATER TREATMENT CRITICAL PARAMETERS

- Total Organic Carbon (TOC)
- Dissolved Organic Carbon (DOC)
- Tannoids (Tannic Acids – Total)

EJ 04 MEASUREMENT AND PAYMENT

EJ.01 POTABLE WATER QUALITY TESTSUnit: number (no)

The unit of measurement for the potable water quality tests shall be the number of completed tests performed *by an authorised testing authority* as per SANS 241 as detailed in specification EJ.03.01.

The tendered rate shall include full compensation for sampling, testing, transport and reporting to the Engineer.

G VARIATIONS AND ADDITIONS TO THE STANDARDISED SPECIFICATIONS FOR THIS CONTRACT, AS WELL AS TECHNICAL SPECIFICATIONS

The following variations and additions to the SABS 1200 Standardised Specifications referred to in the last clause of Portion 1 apply to this Contract. The prefix PS indicates an amendment to SABS 1200. The letters and numbers following these prefixes respectively indicate the relevant Standardised Specification and clause numbers in SABS 1200.

G GENERAL

G 1 SCOPE

REPLACE SUBCLAUSE 1.1 WITH THE FOLLOWING:

"1.1 This specification covers requirements, principles and responsibilities of a general nature that are normally applicable to all Civil Engineering Contracts, as well as the requirements for the Contractor's establishment on the Site."

G 2 INTERPRETATIONS

G 2.3 DEFINITIONS

(a) General

ADD THE FOLLOWING DEFINITIONS:

"General conditions: The General Conditions of Contract specified for use with this Contract, and the Special Conditions of Contract.

Specified: As specified in the standardised specifications, the Drawings or the Project Specifications.

Permanent Works: as defined in Subclause 1(1)(p) of the General Conditions of Contract shall for the purpose of this Contract, be regarded as the repair work.

(c) Measurement and payment

REPLACE THE DEFINITIONS FOR "fixed charge", WITH THE FOLLOWING:

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"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.

G 2.4 **ABBREVIATIONS**

- (a) Abbreviations relating to standard documents

ADD THE FOLLOWING ABBREVIATION:

"CKS: SABS Co-ordinating Specification."

G 3 MATERIALS

G 3.1 QUALITY

ADD THE FOLLOWING:

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

ADD THE FOLLOWING SUBCLAUSE:

G 3.3 ORDERING OF MATERIALS

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

G 4 PLANT

G 4.2 CONTRACTOR'S OFFICES, STORES AND SERVICES

ADD THE FOLLOWING PARAGRAPH BEFORE THE FIRST PARAGRAPH:

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

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

ADD THE FOLLOWING TO THE SECOND PARAGRAPH:

"One chemical toilet per 10 workmen shall be provided and must be screened from public view and its use shall be enforced.

The Contractor shall, where applicable, make the necessary arrangements for the removal of night soil."

G 5 CONSTRUCTION

■ G 5.4 PROTECTION OF OVERHEAD AND UNDERGROUND SERVICES

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

■ “G 5.4 LOCATION AND PROTECTION OF EXISTING SERVICES

■ G 5.4.1 Location of existing services

Before underground or excavation work is carried out, the Contractor shall ascertain the presence and position of all services likely to be damaged or interfered with by his activities. He shall obtain up-to-date plans from the Engineer for this purpose, showing the position of services in the area where he intends to work. As services can often not be reliably located from such plans, the Contractor shall determine the exact position of such services by means of suitable detecting equipment and afterwards by careful hand excavation where necessary in order to expose the services at the positions of possible interference by his activities. This procedure shall also be followed in respect of services not shown on the plans but believed to be present.

All such services, the positions of which have been located at the critical points, shall be designated as 'known' services and their positions shall be indicated on a separate set of Drawings, a copy of which shall be furnished to the Engineer.

While he is occupying the Site, the Contractor shall be liable for all damage caused by him to known services as well as for consequential damage, whether caused directly by his operations or by the lack of proper protection.

■ G 5.4.2 Protection during repair and maintenance work

The Contractor shall exercise all the necessary care to prevent damage to known services during repair and maintenance work. Where applicable, major excavating equipment and other Plant shall not be operated dangerously close to these services. Where necessary, excavation in close proximity to

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these services shall be carefully carried out with suitable hand tools, excluding picks wherever their use could damage the services. No additional payment will apply to such more difficult work.

Services left exposed shall be suitably protected from damage.

G 5.4.3 **Alterations and repairs to existing services**

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

When existing services are damaged by the Contractor, he shall immediately inform the Engineer, or when this is not possible, the relevant authority, and obtain instructions as to who should carry out repairs. In urgent cases the Contractor shall take the necessary steps to minimise damage to and interruption of the service. No repairs of telecommunication cables or electric power lines and cables shall be attempted.

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

ADD THE FOLLOWING SUBCLAUSE:

"G 5.9 **SITE MEETINGS**

The Contractor will be required to attend regular site meetings, normally held once a month to discuss general progress, quality of work, problems, claims, payments, etc, but not matters concerning the day-to-day running of the Contract."

G 6 **TOLERANCES**

ADD THE FOLLOWING SUBCLAUSE:

"G 6.4 **GENERAL**

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

Except where the contrary is specified or when clearly not applicable, all quantities for measurement and payment shall be determined from the 'authorised' dimensions. These are specified dimensions or those shown on the Drawings or, if changed, as finally prescribed by the Engineer, without any allowance for the specified tolerances. Except if otherwise specified, all measurements for determining quantities for payment will be based on the 'authorised' dimensions.

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

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

G 8 MEASUREMENT AND PAYMENT

G 8.1 MEASUREMENT

G 8.1.2 Preliminary and general items or section

G 8.1.2.2 Tendered sums

REPLACE THE CONTENTS OF THIS SUBCLAUSE WITH THE FOLLOWING:

"The Contractor's tendered sums under item G 8.3 shall cover all charges for

- risks, costs and obligations in terms of the General Conditions of Contract and of this standardised specification, except where provision is made in these Project Specifications to cover compensation for any of these items;
- head-office and site overheads and supervision;
- profit and financing costs;
- expenses of a general nature not specifically related to any item or items of permanent or temporary work;
- providing facilities on site for the contractor's personnel

G 8.2 PAYMENT

G 8.2.1 Fixed-charge and value-related items

REPLACE THE CONTENTS OF THIS SUBCLAUSE WITH THE FOLLOWING:

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

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

G 8.3 SCHEDULED FIXED-CHARGE ITEMS

REPLACE THE ITEMS WITH THE FOLLOWING:

"G 8.3.1 Fixed preliminary and general chargesUnit : Sum

G 8.8 TEMPORARY WORKS

REPLACE ITEM 8.8.4 WITH THE FOLLOWING:

"G 8.8.4 Location and protection of existing services:

G 8.8.4.1 Provision of detecting devices for:

(a) Water and sewer pipesUnit : Sum

(b) Electrical and other cablesUnit : Sum

The tendered sums shall cover the cost of providing and operating suitable equipment for as long as it is needed to locate all the existing services likely to be affected by the construction activities. Alternatively, an approved specialist firm may be employed to carry out the work.

G 8.8.4.2 Hand excavation necessary for locating and exposing existing services in all material:

(a) In roadways Unit: m³

(b) In all other areas Unit: m³

The rates shall cover the cost of excavating by means of hand tools within authorised dimensions, for all precautionary measures to protect the services from damage during excavation and backfilling, and for subsequent backfilling and compacting. Compaction of material in all areas except in roadways shall be to 90% of the modified AASHTO density.

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The rate for hand excavation in roadways shall include compensation for compacting excavated or selected backfill material to 93% of modified AASHTO density.

The tendered rates shall also include for keeping excavations safe, for dealing with surface and subsurface water, for removing surplus excavated material from the Site, for transporting all material, and for supplying adequate supervision during both excavation and backfilling operations."

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ADD THE FOLLOWING ITEMS:

"G 8.9 ADDITIONAL TESTS:

- (a) Additional tests required by the EngineerUnit : Sum
- (b) Attendance and profit Unit : %

An amount has been allowed in the Schedule of Quantities under subitem (a) to cover the cost of additional tests required by the Engineer. The Engineer will have the sole authority to spend the amount or part thereof.

The tendered percentage under subitem (b) will be paid to the Contractor on the value of each payment made to the testing authority.

Note in connection with subitem (a):

The Contractor is responsible for both the cost of normal testing and for the cost of any additional test that indicates that the Specifications have not been complied with.

G 8.13 COMPLIANCE WITH OHS ACT AND CONSTRUCTION REGULATIONS..... Unit: sum

The tendered sum shall include full compensation to the Contractor for compliance with all the requirements of the OHS Act and the Construction Regulations 2003 at all times during the repair *and* maintenance phase, as described in the Project Specifications. The successful tenderer shall provide the Engineer with a complete breakdown of this tendered sum.

This sum will be paid to the Contractor in equal monthly amounts for the entire duration of the contract period.

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OZ **OZONE GENERATING INSTALLATION**

OZ 01 **SCOPE**

This specification covers the installation, servicing, testing, commissioning and maintenance of ozone installation, pumping equipment, motor control devices, low-voltage cables and distribution boards at Kirstenbosch National Botanical Garden. The function of pump systems shall be the circulation of borehole water at a specified flow rate inside the three reservoirs at the Kirstenbosch National Botanical Garden.

OZ 02 **AS-BUILT INFORMATION AND OPERATING AND MAINTENANCE MANUALS**

The Contractor shall be responsible for the development of a schematic flow diagram and operating and maintenance manuals.

This shall be done in accordance with Additional Specification SB: Operating and Maintenance Manuals.

OZ 03 **PUMP DESIGN AND REQUIREMENTS**

- (a) The pump shaft shall be manufactured from stainless steel and shall be sealed where it enters the casing with double mechanical face seals.
- (b) The impeller shall be suitable for pumping the type of clear water as required.
- (c) The impeller shall be manufactured from stainless steel.
- (d) The impeller shall be statically, dynamically and hydraulically balanced. No holes may be drilled in the impeller to balance it with regard to mass distribution.
- (e) Only permanently sealed ball or roller bearings shall be installed.
- (f) Bearings shall have a B-10 life rating of 100 000 hours.
- (g) The pump shall be a currently catalogued product.
- (h) Performance curves shall be based on a reproducible and certified test carried out in an approved testing facility, such as the SABS.
- (i) The flow rate at break-off point of the curve for the impeller selected shall be at least 1.5 times that of the maximum flow rate specified.
- (j) The head at zero delivery of the curve of the impeller selected shall be at least 1.2 times the maximum head in the pump's operational range.

- (k) Each pump shall be clearly labelled. The label shall be a 0,5 mm thick stainless-steel plate of dimensions 100 mm x 50 mm. The label shall be fixed to the pump exterior with an approved adhesive or other method after the completion of corrosion protection on the pump. It may be bent to follow the shape of the pump exterior but shall not be bent to accommodate sharp folds. Under no circumstances shall the stainless-steel plate of the label influence, damage or otherwise have a detrimental effect on the corrosion protection system. The label shall include the following information:

- pump rates
- pump head
- power required
- NPSH (r) rotational speed
- impeller detail.

- (l) All new submersible pumps shall be supplied with a length of power cable to suit the installation.

- (m) Materials:

Materials in general

All parts of the pump shall be manufactured of the most suitable material to prevent wear as far as possible (stainless steel). Full specification in this respect shall accompany the tender.

Design in general

All parts of the pump shall be designed so as to ensure easy dismantling for inspection and repair.

Casings

Pumps casings shall be of stainless steel.

Impellers

The pump impellers shall be manufactured from stainless steel.

Pump seals

The pump seals shall be fitted with air cooled, mechanical seals with tungsten carbide or ceramic seats.

Pump Shafts

Pump shafts shall be manufactured from stainless steel.

OZ 04 **PROTECTION AND CONTROL DEVICES**

The pumps and ozone generator shall be controlled by a motor control centre as part of the installation.

OZ 05 **OZONE GENERATOR INSTALLATION AND PUMPS**

OZ 05.01 **General Description**

The ozone generator and the submersible pump shall be installed next to and/or inside *the* reservoir and shall be controlled by a motor control centre.

The controls will be accessible from the panel and will be divided in two halves one side for the submersible pumps and the other side for the ozone. One section of the control panel must be allocated for the incoming breaker and cables.

The ozone generator systems and submersible pumps shall ensure the effective treatment of three reservoirs (95kl Manor House, 232kl round and 265kl nursery) supplied by borehole water. The ozone shall be able to treat and disinfect the water prior to its further use. The ozone generating system shall provide between 20 – 100 grams per hour of ozone (depending on reservoir size) into the raw water to be purified to drinking water standards.

The ozone generating plant shall consist of the following:

PHYSICAL/CHEMICAL CHARACTERISTICS

- Boiling point: -170°F (-112°C)
- Specific gravity: 1.614
- Vapor pressure: >1atm
- Melting point: -313°F (-192°C) [1 mm Hg & -292.7°F (-180.4°C)]
- Vapor density: 1.65
- Evaporation rate: Not applicable (Air = 1), (H₂O = 1)
- Solubility in water: Almost insoluble
- Water reactive: Not applicable [0.0003 g/100 mL at 68°F (20°C)]
- Appearance and odour: Colourless/blueish gas with pH: Not applicable
pungent odour detectable at 0.01 to 0.04 ppm,
sharp disagreeable odour at 1 ppm

The ozone plant shall be able to operate in both manual and automatic mode. In the manual mode the ozone plant shall start by means of the push button ON/OFF switches incorporating LED lights. The ozone plant shall however be stopped or not start if the submersible pumps are not running.

OZ 06 **OPERATIONAL PHILOSOPHY**

It is estimated that the present weekly demand for drinking water at the Kirstenbosch National Botanical Garden is approximately 412kl/week.

OZ 07 **MAINTENANCE**

OZ 07.01 **GENERAL**

Maintenance and Servicing of the specified systems, pumps and/or parts shall all be referred to as "Maintenance and Servicing of an Installation". Maintenance and periodical servicing of all installations shall ensure reliable functioning and optimum service life thereof.

Monthly maintenance and servicing responsibilities for each installation, including all units and components as specified, shall commence with access to the site. Maintenance of an installation shall be performed in accordance with the Technical Specifications, Manufacturer Specifications, Operating and Maintenance Manuals (where applicable) and Maintenance Control Plan.

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Remuneration for maintaining "installations" (systems, pumps and/or parts of the infrastructure) in good functional condition as well as servicing of various installations is provided for in the Schedules of Quantities by means of monthly payment items and scheduled servicing items.

Maintenance shall be carried out and shall include routine preventative maintenance according to the manufacturer's specification to be set out in the operating and maintenance manual, as well as unforeseen repair work or replacement.

The remuneration for monthly maintenance of pumping equipment and systems shall be deemed included in the tendered rate per month as priced in the BOQ.

OZ 07.02 MAINTENANCE REQUIREMENTS

OZ 07.03 CONTRACTOR'S RESPONSIBILITIES

The Contractor shall maintain and service the installation for the 24-month contract period.

Maintenance implies and shall include monthly routine preventative maintenance, corrective maintenance, as well as breakdown maintenance on all components of the specified installations.

The maintenance control plan (MCP) will be developed by the Contractor at the start of the contract, to schedule the frequency of routine inspections and format of reports. The Contractor shall carry out inspections on the equipment as detailed in the Specifications and the maintenance control plan. Each inspection, test or breakdown shall be recorded in an approved format and listed in a monthly report (part of the maintenance control plan).

The specifications, maintenance control plan, and (where applicable) the Operating and Maintenance Manuals, shall be used as a basis for routine preventative maintenance.

OZ 07.04 COMPONENTS INCLUDED IN MAINTENANCE AND SERVICING SCOPE

The following main sections with its subsections as set out in the Specifications where applicable will each be deemed "an installation". Maintenance and servicing, as specified, will be applicable to the Water Ozone Installation, Pumps and Boreholes at the following areas:

- Nursery Reservoir (265kl)
- Appelboom Borehole (2,880 l/hr)
- Round Ozone Reservoir (232kl)
- Skool Borehole (3,960 l/hr)
- Concrete Reservoir (463kl)
- Brandbaan Borehole (1,411 l/hr)
- Manor House Reservoir (95kl)
- Protea Borehole (6,000 l/hr)

Furthermore, breakdowns can be logged for items requiring attention, which will also be attended to by the contractor.

In general, additional corrective maintenance work may be instructed for by the Engineer or his representative and are to be performed during the contractor's monthly maintenance visit *at rates as*

scheduled in the bills of quantities – No *additional* fixed or time related Preliminary and General Charges will be applicable to such work.

ay at any time inspect any part of the entire installation. During Maintenance and Servicing work, the Engineer shall at his discretion order special tests to be carried out on installations to verify the satisfactory functional condition of the installation.

OZ 07.05 COMMENCEMENT OF MAINTENANCE PERIOD

Maintenance responsibilities for an installation shall include maintenance of all individual units, equipment or components and shall commence immediately at the start of the Contract.

OZ 07.06 **PREVENTATIVE MAINTENANCE: DEFINITION**

This entails the rendering of services and servicing of equipment according to a predetermined maintenance control plan to:

- (a) replace and service components of equipment, units or parts thereof for each installation at prescheduled moments regardless of condition;
- (b) readjust, reset, clean, corrosion protect all components of equipment, units or parts thereof for each installation, and
- (c) all implied actions to maintain installations in a perfect functional condition.

Routine preventative maintenance shall be aimed at minimisation of breakdowns.

OZ 07.07 **BREAKDOWN MAINTENANCE: DEFINITION**

This entails repair and/or replacement of defective equipment, units or parts of installations following a breakdown that leaves the installation inoperable or unsafe, and subsequent action to restore installations to the perfect functional condition as specified, within the maximum down-time allowed.

OZ 07.08 **SERVICING**

This entails mandatory periodical services included for payment in the bills of quantities which shall be measured separately for payment and performed on the intervals as instructed for by the Engineer.

OZ 07.09 **SITE MAINTENANCE RECORD KEEPING**

The Contractor shall provide and maintain hard-cover A4 maintenance files for each installation for the duration of the Contract. All schedules, checklists, breakdown reports, preventative maintenance records, component replacement records and monthly reports shall be filed.

OZ 08 **MAINTENANCE CONTROL**

OZ 08.01 **SCOPE**

Maintenance quality control shall be the responsibility of the Contractor. The Contractor shall introduce a **maintenance control plan** to ensure that preventative, corrective and breakdown maintenance, and servicing are performed as described in the Specifications.

OZ 08.02 **MAINTENANCE CONTROL PLAN**

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The maintenance control plan shall be bound in a neat, A4-sized, ring bound document with a cover page and back cover. The contents of the document shall be indexed. In drawing up the document, the Contractor may reproduce relevant paragraphs and clauses from any of the specifications forming part of the Contract documents.

The maintenance control plan shall at least contain the following:

- (a) A summary of the maintenance and servicing work to be carried out under the contract.
- (b) Details of how the Contractor intends to carry out the various types of maintenance and servicing work especially breakdown maintenance should breakdowns occur.
- (c) Programme of preventative maintenance actions on a monthly basis.
- (d) Resources allocated for the various actions as per item (c) above (incorporating possible staff shortages during public holidays and festive periods).
- (e) A list of organisations and persons directly involved with the Contract or those whose requirements have to be taken into account during the 24-month contract period such as the User Client, the Consulting Engineer, the Contractor, the Local Authority, etc. Each person's position within his organisation as well as the applicable phone numbers shall be given.
- (f) Reports to be submitted after every routine inspection (all reports, checklist, breakdowns records, consumption sheets, etc. for each system of an installation shall be kept on the site in a hard cover file)
- (g) Procedures to address complaints and logged breakdowns;
- (h) Monthly reports, summarising all inspections, together with inspection data such as nature of test, names of persons carrying out tests and inspection results. Detail of services, corrective maintenance actions and replacements, together with testing of equipment shall also be reflected in this report.

The maintenance control plan shall be upgraded when its contents are no longer representative of the actual conditions.

OZ 08.03

MAXIMUM MAINTENANCE DOWN-TIME

After a complaint has been logged and forwarded to the Contractor, the Contractor shall be expected to minimise the maintenance down-time until the system component is fully operational to the satisfaction of the Engineer. Should the Contractor not respond within the maximum down-time, the Engineer may arrange, at the cost of the Contractor, for the necessary repair work to be done by others.

Should the actual down-time exceed the maximum down-time the Contractor shall be liable to a payment reduction for the difference between actual down-time and maximum down-time. This is reflected in the table below:

REQUIRED MAINTENANCE	MAXIMUM DOWN-TIME ALLOWED	PAYMENT REDUCTION IF EXCEEDED
Breakdown	72 hours	<i>R 100/hour</i>

"Maximum down-time" shall mean the period of time allowed to repair a breakdown, and "actual down-time" shall mean the measured period from the instant when the breakdown was logged with the Contractor until the installation has been repaired to its functional specification.

Breakdowns shall be repaired within 72 hours after it was logged with the Contractor. The Contractor will be remunerated for the call-out by means of a re-measurable payment item as measured in the schedule of quantities.

OZ 08.04

ROUTINE PREVENTATIVE MAINTENANCE

When submitting the maintenance control plan (MCP), the Contractor shall schedule "routine preventative maintenance visits" to the site. A "routine preventative maintenance visit" shall be scheduled for the intervals as indicated in the table below. The duration of a "routine preventative maintenance visit" will depend on the time required to complete all routine preventative maintenance, corrective maintenance as well as breakdowns during the course of the month as specified. The Engineer will carry out a site inspection on any arbitrary day and measure the quality of maintenance and servicing.

INSTALLATION	FREQUENCY OF ROUTINE MAINTENANCE VISIT
KIRSTENBOSCH OZONE INSTALLATION	Monthly

The routine preventative maintenance work to be carried out shall include but not be limited to the items listed in table OZ 08.04/1 below.

These actions and findings shall be logged and reported on the relevant approved schedules and reports.

TABLE OZ 08.04/1

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NO	MAINTENANCE ACTIONS	MAINTENANCE FREQUENCY
1	Visually inspect and report on complete system	Monthly
2	Check overall system for water or ozone leaks – report and repair	Monthly
3	Do a visual check on the clear silicon pipe to verify that process water has not backed into the ozone tubing	Monthly
4	When the pump is running, pull out the ozone tubing at the venturi's and check for suction on the venturi's	Monthly
5	Smell the end of the silicone tubing to detect the slightly acrid ozone smell	Monthly
6	Check ozone tubing for deterioration and report	Monthly
7	Check the air drier crystals (if present) and regenerate if necessary	Monthly
8	Check Fan Filters and clean as required	Monthly
9	Monthly tests of installation	Monthly
10	Check, inspect, report and repair all leaks	Monthly
11	Inspect the generator for obvious external damage	Monthly
12	Ensure that all ozone supply lines to the process are properly connected	Monthly
13	Ensure that the electrical connections are correct	Monthly
14	The supplier should do a biannual first-line maintenance inspection where the process will not be interfered with. This inspection will be on items such as non-return valves, tubing, and an overall evaluation on ozone production and service.	Biannually
15	The supplier should do yearly maintenance on the machine. If necessary, this could involve the machine to be serviced at the supplier workshop (worst case scenario)	Annually

OZ 09 MEASUREMENT AND PAYMENT

OZ.01 SUPPLY, DELIVERY AND INSTALLATION OF EQUIPMENT.....Unit:
 number

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The unit of measurement shall be the number of ozone generating and ancillary equipment units supplied, delivered and installed.

The tendered rates shall include full compensation for the design, manufacture, corrosion protection, patent rights, pre-delivery testing and test certificates, transport for delivery to site and off-loading, including all handling of the equipment. The equipment shall include all required installation materials, labour and consumables to render a complete and working installation.

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The "footprint" of **all the reservoirs** must be shown.

(c) General

All survey data shall be captured in electronic format (DXF or DWG). Drawings shall be drawn to scale.

TITLE BLOCK

The standard drawing sheet layout and title block of SANBI must be used.

Complete all the relevant fields in the title block with reference to the name of the specific Botanical Garden in the appropriate block. The words SCHEMATIC PLAN should form part of the drawing title.

Drawing Number

The drawing number should consist of a three-part identifier:

- Botanical Garden designator: RFQ number
- Drawing number: Numbering will start at 1
- Revision number: Will start at 01

Typical example: RFQ: SANBI: Q7883/2022 Rev 01

DRAFTING CONVENTIONS

The Schematic Plan should be created following engineering conventions and standards in order to represent a clear drawing simplifying the huge amount of visual information.

Paper Prints

Preference is given to size A1 plans, but for reporting size A3 will be used and the information should still be legible in this format.

Scale

The Schematic Plan must be drawn according to scale and the following scales can be used:

- 1:200 or 1:500 or 1:1000

Plan Orientation

The Botanical Garden should be rotated on the plan so that the north point arrow are pointing in the direction of either the upper left or upper right quadrants of the plan. The north point arrow to be placed in the top right-hand corner of the drawing space.

Contours

Contours should not be printed on the final Key Plan.

Surfaced Areas

Surfaced roads should be indicated by two solid lines as well as paved areas. Two long broken lines should be used to indicate gravel roads.

Lettering and Font Styles

Use the standard font style and font size for engineering drawings and do not use stylized fonts.

Create all text in upper case letters, except for certain unit designations such as km, m, mm, kVA, etc.

SB OPERATING AND MAINTENANCE MANUALS

SB 01 SCOPE

The Contractor shall be responsible for the compilation and updating of complete sets of Operating and Maintenance Manuals. A separate Operating and Maintenance Manual shall be supplied for each installation where required.

SB 02 PROCEDURE FOR SUBMISSION OF MANUALS

SB 02.01 SUBMISSION OF DRAFT MANUALS

A draft copy of each Operating and Maintenance Manual shall be submitted to the Engineer prior to safety inspection of the installation.

Where an installation has an existing Operating and Maintenance Manual, the Contractor shall check whether its contents are still applicable and accurate. When drawing up a new Operating and Maintenance Manual for the installation, the Contractor shall incorporate all such existing applicable data. The existing Operating and Maintenance Manual shall then be replaced provided written permission to do so has been obtained from the Engineer.

The manuals will be reviewed and checked by the Engineer and returned to the Contractor with comments, where necessary. The Contractor shall make the necessary changes and amendments to the manuals to incorporate the Engineer's comments.

SB 02.02 DEVELOPMENT OF FINAL MANUALS

A final draft copy of each Operating and Maintenance Manual shall be submitted to the Engineer at least one week prior to commencement of Day 1 tests on commissioning. This set of manuals will not be accepted without the Contractor's verification of the information contained in the manuals and the professional language editing thereof. The Engineer shall return the manuals to the Contractor, who shall make the final corrections. The Engineer will, however, not be responsible for the quality control on manuals. Approval of final Operating and Maintenance Manuals shall be a prerequisite for issuing of a Certificate of Practical Completion for repair of the installation.

After the Engineer has approved the final Operating and Maintenance Manuals, the Contractor shall provide the Engineer with five (5) sets of the manuals. Approval of the final Operating and Maintenance Manuals shall be a prerequisite for issuing of a Certificate of Completion.

SB 03 **FORMAT OF OPERATING AND MAINTENANCE MANUALS**

- (a) Manuals shall be bound in hardcover lever-arch files with plastic coatings. The files shall be clearly labelled on the front cover, as well as on the back band, with the following information:
 - (i) The title "Operating and Maintenance Manuals"
 - (ii) Name of the installation
 - (iii) Name of the contract and contract number
 - (iv) The Contractor's name, address and contact telephone number and e-mail (logo optional)
 - (v) Month and year in which the manuals are finally handed over to the Employer
 - (vi) Name of the User Client
- (b) Pamphlets and bound leaflets/booklets from suppliers or manufacturers shall be placed in plastic pockets.
- (c) Drawings and diagrams larger than A3 shall be folded and placed in plastic pockets to be easily removed or stored.
- (d) The sections of the manuals specified below shall be clearly partitioned.
- (e) Cross-referencing between drawings/diagrams and text shall be in a clear and consequent format.
- (f) The Operating and Maintenance Manuals shall be supplied in English.
- (g) An electronic copy of the final manual shall be handed to the engineer upon approval of the operation and maintenance manual.

SB 04 **CONTENTS**

SB 04.01 **TABLE OF CONTENTS**

The table of contents shall appear on the second page and shall consist of the headings of the various sections in the manual and the relevant page numbers.

The table of contents shall essentially contain at least the following:

1. Introduction
 - 1.1 Scope of the manual
 - 1.2 General arrangement of the manual
 - 1.3 Description of installation
 - 1.4 Specifications
2. List of drawings and diagrams
3. Parts and components
4. Operating procedures
5. Maintenance
6. Breakdown maintenance and repair
7. List of Appendices.

SB 04.02 **INTRODUCTION**

The introduction shall contain at least the following:

SB 04.02.01 **Scope of the manual**

A summary shall explain the scope of the contents.

SB 04.02.02 **General arrangement of the manual**

A brief description shall explain the way in which the manual is arranged.

SB 04.02.03 **Description of installation**

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This section shall give a functional description of the complete installation covered by the manual.

SB 04.03 DRAWINGS AND DIAGRAMS

SB 04.03.01 Schematic flow diagrams

Schematic flow diagrams of the system and/or functional unit shall be included in the Operating and Maintenance Manuals for easy reference by the operators of the installation. Diagrams shall be drawn not only for parts of an installation that have been repaired, but also for the complete installation.

SB 04.04 PARTS AND COMPONENTS

SB 04.04.01 Equipment data sheets

A data sheet shall be drawn up for each piece of equipment and/or machine forming part of the installation and shall contain the following information:

- (a) Equipment tag number
- (b) Equipment description
- (c) Model/make/manufacture
- (d) Supplier/Reconditioning details
- (e) Ordering details
- (f) Details of fixed components
- (g) Maintenance references (refer to supplier/reconditioning technical manual).

SB 04.05 OPERATING PROCEDURES

The operating instructions shall be a step-by-step description of the manual start-up and shut-down procedure.

The functioning of the installation shall be clearly described, using a flow diagram depicting the interrelationships among the various subassemblies. The subassemblies shall be described by descriptive drawings.

The operation tasks shall be clearly explained with reference to dangerous situations that might occur. Hazardous operations shall be explained in detail and cover all the applicable safety precautions.

SB 04.06 MAINTENANCE

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SB 04.06.01 Purpose of maintenance

The maintenance process shall be explained, and the main responsibilities described.

SB 04.06.02 Preventative maintenance

maintenance schedule shall be included in this section. This schedule shall be in table format and shall include a summary of all the maintenance actions required for each different system and/or functional unit covered by this manual, in order to give a single summary of all routine preventative maintenance actions required for the complete installation.

The schedule shall indicate weekly, fortnightly, monthly and yearly maintenance actions.

The frequency of routine preventative maintenance actions shall be indicated very clearly.

The Contractor shall provide the maintenance requirements as prescribed by the manufacturer. The type of maintenance shall be clearly indicated. The description of the maintenance to be performed shall include at least the part name, location of the part in either the assembly or subassembly, the model number, the quantity of the particular part or component to be maintained, the type of maintenance, and notes on the maintenance procedure.

A brief description shall accompany the maintenance schedule, indicating special tools to be used, maintenance and test equipment required for the test procedures. Any special tools necessary for maintenance shall be specified in terms of name, model, size, manufacturer, supplier (name, telephone number, fax number, contact person), coating (if any) and notes on the use of the equipment.

Remarks on the system readiness checks of each subassembly shall be explained in detail. Routine inspection and maintenance processes shall be described. It shall be very clear what needs to be done, how to perform the necessary task and any dangers that are present.

SB 04.06.03 Troubleshooting

An explanation shall be given to assist the maintenance personnel in analysing and resolving malfunctions that might occur. Various scenarios with possible causes and rectification procedures shall be explained.

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SB 04.07 BREAKDOWN MAINTENANCE AND REPAIR

The Contractor shall describe the complete procedure to be followed in the event of a breakdown. It shall be very clear what the operating personnel should look for, how to eliminate any dangers due to the breakdown (e.g., electricity must be shut off in the event of problems with the wiring) and who should be contacted. The Contractor shall supply the names and telephone numbers of at least two contact persons who may be contacted in the event of a breakdown.

The Contractor shall specify the actions expected of maintenance personnel in the event of a breakdown.

The Contractor shall also specify the testing procedures to be followed before the system can be put into operation again. Every procedure shall be described clearly and all the potential dangers pointed out, as well as the precautions that have to be taken.

SB 05 MEASUREMENT AND PAYMENT

SB.01 COMPILE AND SUPPLY A COMPLETE SET OF OPERATING AND MAINTENANCE MANUALSUnit : site installation

The unit of measurement shall be an amount for each complete set **(five copies)** of Operating and Maintenance Manuals provided for the applicable installation per site. Operating and Maintenance Manuals for different installations shall be measured separately in the Schedule of Quantities.

The tendered sum shall include full compensation for all technical research, gathering of information, compilation of manufacturer's instructions, compilation of drawings and diagrams, and for writing of all the descriptions, instructions and functional procedures, as well as language editing, in order to provide a clear and correct set of Operating and Maintenance Manuals.

The tendered sum shall also include full compensation for all expenses such as paper, copy work, binding and printing necessary for the completion of the manuals.

The tendered sum shall also include full compensation for the compilation of draft sets of operating and maintenance manuals in accordance with the specification, and for incorporation of all comments and corrective requirements.

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SD **GENERAL TRAINING**

SD 01 **SCOPE**

The Contractor shall be responsible for providing training to SANBI maintenance personnel. This specification includes all requirements for methods to be employed, the syllabus required by the User Client, the syllabus required for maintenance managers and workers and the method of measurement and payment.

SD 02 **TRAINING OF USER CLIENT PERSONNEL**

The Contractor's training shall include training of the User Client's personnel to acquaint them with the operation and maintenance of the installations. The training sessions shall comprise lectures and on-site (hands-on) demonstrations. The Contractor shall liaise with the Engineer to prepare for the correct number of trainees.

SD 03 **TRAINING OF PERSONNEL**

The training of maintenance managers shall include the following aspects:

- (a) Awareness of safety, health and personal hygiene in terms of the requirements of the Occupational Health and Safety Act, 1993 (Act 85 of 1993);
- (b) functioning of the installation, including all its systems, services, parts, etc;
- (c) all specific tasks related to routine preventative maintenance;
- (d) interpretation and understanding of Operating and Maintenance Manuals with specific reference to requirements in cases of corrective and breakdown maintenance.

PORTION B

PA HEALTH AND SAFETY SPECIFICATION

PA1 DESCRIPTION OF WORK

The Contract shall comprise the supply of all labour, materials, workmanship, machinery, equipment, transport, attendance on others and everything stated or implied which is, or may be, necessary in and for the entire completion of all the following works:

- Repair of existing Ozone Generation Installations
- Servicing of existing Ozone Generation Installations
- Replacement of circulation pumps with stainless steel submersible circulation pumps
- Installation of a new Ozone Generation plant including submersible circulation pump
- Testing of existing boreholes
- Frequent water tests of reservoir water quality to ensure adequate ozone generation operation
- Monthly servicing of ozone generation units and associated pumps, pipework, control panels and electrical installations.
- Maintenance of the entire Ozone Generation Installation for a period of 24-months.

PA2 DESCRIPTION OF THE SITE

The site is located at Kirstenbosch National Botanical Garden, Cape Town

PA3 APPLICATION OF CONSTRUCTION REGULATIONS 2014

The intended construction work falls within the scope of “construction work” as defined in the Construction Regulations, 2014 made under the Occupational Health and Safety Act no. 85 of 1995, as amended (“the Act”).

PA4 POTENTIAL SOURCES OF RISK

The following potential sources of risk to the health and safety of persons on the site have been identified, and must, as a minimum, be appropriately addressed by the Principal Contractor in the Principal Contractor’s Health and Safety Plan. In addition, the Principal Contractor must perform its own risk assessments to enable it to take the necessary precautions to protect the health and safety of persons on the site, to comply with the Principal Contractor’s obligations under the Act and all Regulations made there under, including the Construction Regulations. All such precautionary measures and procedures must be included in the Principal Contractor’s Health and Safety Plan, which must be submitted to the Client for review and approval and where applicable should include:

- Excavation work

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- Explosive powered tools
 - Construction vehicles and mobile equipment
 - Electrical installations and electrical machinery
 - Use and temporary storage of flammable liquids
 - Housekeeping
 - Stacking and storage practices
 - Fire risks and fire precautions
 - Welfare facilities on the site
 - Air compressors
 - Noise
 - Portable electrical tools
 - Compressed gases and vessels under pressure
 - Intoxicated persons on site
 - Existing underground water, electricity and other services
 - Use of ladders
 - Inadequate or fragile coverings
 - Testing of pipelines
- The contractor's attention is drawn to large forces existing on pipelines, specials and supports during pressure testing, and shall ensure that structures are properly secured during testing to withstand the pressures and forces.

PA5 HEALTH AND SAFETY MANAGEMENT SYSTEM

Health and Safety Philosophy

The Client is required to ensure a working environment which, as far as reasonably practicable, is safe and without risk to the health of persons on the site.

PA5.1 Contractor Health and Safety Management System

The Principal Contractor will ensure and demonstrate to the Client that he, and all contractors to be appointed on this construction project, has adequately allowed for the cost of health and safety measures which may be required during the construction work.

PA5.2 Appointment of Client's Health and Safety Adviser

The Client will appoint a Health and Safety Adviser who will visit the site regularly to monitor and audit the execution of the contractor's Health and Safety Plans on behalf of the Client, without thereby limiting the contractor's own responsibility for health and safety, or attracting any vicarious responsibility or liability for the contractor's acts or omissions.

PA5.3 Occupational Health and Safety Act Section 37(2) Agreements

The Principal Contractor, as well as all contractors, must sign the Client's Section 37(2) agreement before commencement of their particular work.

For purposes of general communication regarding construction work progress, the Client appoints the Engineer.

PA6 CONTRACTOR HEALTH AND SAFETY PLANS

Each contractor and sub-contractor working on the site must prepare a Health and Safety Plan to address and manage all applicable sources of risk as per items under point 4 of this specification as well as any other sources of risk which are identified during the contractor's own risk assessments.

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The Principal Contractor shall incorporate these into a single Health and Safety Plan for the execution of the entire contract works ("the Health and Safety Plan"). Should any further risks be identified in the course of the construction work, such risks must be assessed and addressed in amended Health and Safety Plans which must then be submitted to the Client for approval.

The Health and Safety Plan must also address the following matters:

- i) Legal appointments required by the Act and any Regulations under the Act.
- ii) Procedures for compliance with all requirements of the Act and in particular Sections 8 and 9 of the Act.
- iii) Undertaking and procedure to stop any work which endangers the safety or health of any person.
- iv) System for recording and reporting of incidents both internal and external to the Department of Labour.
- v) Copy of the Act and its Regulations to be kept on the site and to be readily available to employees.
- vi) Incident register to be kept on the site.
- vii) Employment of only persons who are competent and have the necessary knowledge, training, qualifications and experience to perform the required construction work safely and effectively.
- viii) Appointment of only competent, knowledgeable, trained, qualified and experienced persons to supervise the construction work.
- ix) Procedures and arrangements for first aid facilities on the site.
- x) Procedures and arrangements for prompt reporting of injuries and other losses / incidents.
- xi) Emergency plans to deal effectively with potential site emergencies.
- xii) Use of effective processes for the identification and close out of root causes of incidents and accidents.
- xiii) Attendance by all contractors of monthly site health and safety meetings.
- xiv) Demonstration by all contractors of their health and safety monitoring and auditing systems to ensure compliance with their Health and Safety Plans, as part of their Health and Safety Plans.
- xv) Effective site health and safety induction programme for all workers on the site.

PA7 ADDITIONAL DUTIES OF PRINCIPAL CONTRACTOR

- i) The Principal Contractor must notify the Department of Labour of the intention to carry out construction work.
- ii) The Principal Contractor must coordinate the activities of all contractors and sub-contractors in the interest of health and safety.
- iii) The Principal Contractor must carry out all other duties described in Regulation 5 of the Construction Regulations 2003.
- iv) The Principal Contractor must register in terms of the Compensation for Occupational Injuries and Diseases Act or any other compensation funds approved by the Commissioner for its workmen, and provide to the Client proof thereof and also that it is in good standing with the Compensation Commissioner or approved insurer.

PA8 GENERAL

- i) Nothing contained in or omitted from this Health and Safety Specification, or the Health and Safety Plan based on this specification, shall relieve the Principal Contractor of any of its obligations or liabilities.
- ii) The Client shall not be liable for any civil claim because of anything contained in or omitted from this Health and Safety Specification.

PA9 MEASUREMENT AND PAYMENT

In addition to the allowance that the contractor would normally make in his rates for Health and Safety Aspects, the contractor shall price for all things necessary required to fulfil the requirements of the OHS Act and Regulations in the items scheduled in Schedule 1, General A.