

**CONTRACT NO. 72Q/2025/26**

SCM – 509

Approved by Branch Manager: 15/07/2024

Version: 6.4

Page 38 of 460

## CONTRACT DOCUMENT

FOR THE

**UPGRADE OF VOORTREKKER ROAD, FROM  
4TH AVENUE TO 12TH AVENUE, MAITLAND**

### THE CONTRACT

**ISSUED BY:**

**DIRECTOR: INFRASTRUCTURE  
IMPLEMENTATION, URBAN  
MOBILITY DIRECTORATE**  
Tower Block, Civic Centre  
12 Hertzog Boulevard  
CAPE TOWN  
8001

**COMPILED BY:**

For official use.

**TENDER SERIAL No.:**

**CITY  
TENDER**

OCTOBER 2025

**NAME OF TENDERING  
ENTITY**

**EMAIL ADDRESS OF  
TENDERING ENTITY**

**FAX NUMBER OF  
TENDERING ENTITY**

**NATURE OF TENDER OFFER (please indicate below)**

**Main Offer (see clause  
C.2.12)**

**Alternative Offer (see  
clause C.2.12)**

*N/A*

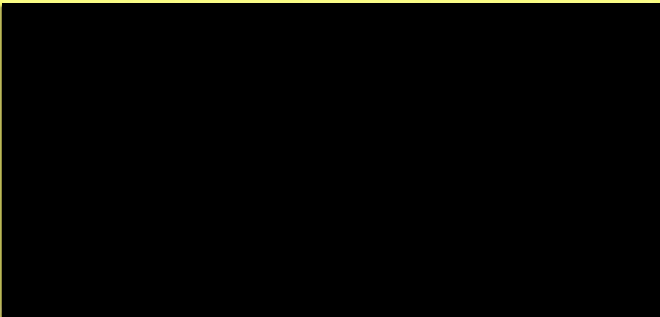


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## Part C1: Agreements and Contract Data

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**MEMORANDUM OF AGREEMENT**

**FOR**

**UPGRADE OF VOORTREKKER ROAD, FROM 4TH AVENUE TO 12TH AVENUE,  
MAITLAND**

**MADE AND ENTERED INTO BETWEEN**



**And**

| <b>CONTRACTOR</b>                                                                                                                                  |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>NAME of Company/Close Corporation or Partnership / Joint Venture/ Consortium or Sole Proprietor /Individual (The "Contractor" / "tenderer")</b> |  |
| <b>TRADING AS (if different from above)</b>                                                                                                        |  |
| <b>REGISTRATION NUMBER</b>                                                                                                                         |  |
| <b>PHYSICAL ADDRESS / CHOSEN DOMICILIUM CITANI ET EXECTUANDI OF THE CONTRACTOR</b>                                                                 |  |
| <b>AUTHORISED REPRESENTATIVE</b>                                                                                                                   |  |
| <b>CAPACITY OF AUTHORISED REPRESENTATIVE</b>                                                                                                       |  |

**(HEREINAFTER COLLECTIVELY REFERRED TO AS "THE PARTIES" AND INDIVIDUALLY A "PARTY")**





**Preamble**

**WHEREAS** the City of Cape Town is desirous to award this Tender to the successful Contractor;

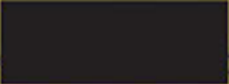
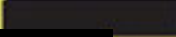
**AND WHEREAS** the City of Cape Town will consider and evaluate the offer made by the Tenderer/Contractor;

**AND WHEREAS** the Parties agree that this Contract is subject to the terms and conditions as contained in the final award of the City's Bid Adjudication Committee (BAC);

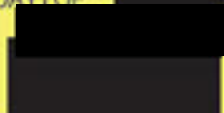
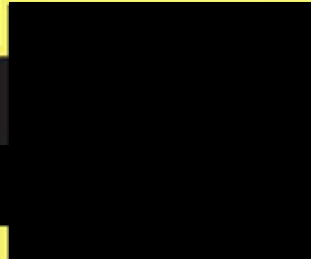
**AND WHEREAS** the Tenderer/Contractor agrees that the terms and conditions of the award will become binding upon communication of the award made by the BAC, upon the expiration of the prescribed appeal period in terms of Section 62 of the Municipal Systems Act and the furnishing of a duly counter signed contract by the City to the Contractor reflecting the BAC award.

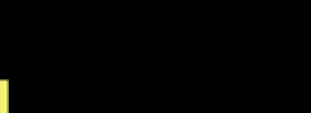
**NOW THEREFORE**, the Parties agree and confirm that the Contract contains the following:

- a) the Form of Offer and Acceptance,
- b) the Contract Specific Data within the Contract Data,
- c) the General Conditions of Contract for Construction Works, Third Edition, 2015,
- d) the Drawings,
- e) the Scope of Work,
- f) the Pricing Data, and
- g) the conditions of tender, the tender data and tender schedules

SIGNED  (PLACE) ON THE  (DAY) OF  (MONTH AND YEAR)

  
Name and Surname: 

  
Name and Surname: 

Witness 2 Signature  
Name and Surname: 

For and on behalf of the City of Cape Town  
(Duly Authorised)

Name and Surname: 

Witness 1 Signature  
Name and Surname: 

Witness 2 Signature 

CITY OF CAPE TOWN

URBAN MOBILITY DIRECTORATE: TRANSPORT INFRASTRUCTURE IMPLEMENTATION

CONTRACT NO. 72Q/2025/26

UPGRADE OF VOORTREKKER ROAD, FROM 4TH AVENUE TO 12TH AVENUE, MAITLAND

## C1.1 Form of Offer and Acceptance

### Offer

The employer, identified in the acceptance signature block, has solicited offers to enter into a contract for the procurement of:

**CONTRACT NO. 72Q/2025/26: UPGRADE OF VOORTREKKER ROAD, FROM 4TH AVENUE TO 12TH AVENUE, MAITLAND**

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.

By the representative of the tenderer, deemed to be duly authorized, signing this part of this form of offer and acceptance, the tenderer offers to perform all of the obligations and liabilities of the contractor under the contract including compliance with all its terms and conditions according to their true intent and meaning for an amount to be determined in accordance with the conditions of contract identified in the contract data.

THE OFFERED TOTAL OF THE PRICES INCLUSIVE OF VALUE ADDED TAX IS:

Rand

..... (in words);

R. .... (in figures)

This offer may be accepted by the employer by signing the acceptance part of this form of offer and acceptance and returning one copy of this document to the tenderer before the end of the period of validity stated in the tender data, whereupon the tenderer becomes the party named as the contractor in the conditions of contract identified in the contract data.

| Contractor                                          |  |
|-----------------------------------------------------|--|
| Business Name                                       |  |
| Business Registration                               |  |
| Tax number (VAT)                                    |  |
| Physical Address                                    |  |
| Signed – who by signature hereto warrants authority |  |
| Name of signatory                                   |  |
| Signed: Date                                        |  |
| Signed: Location                                    |  |
| Signed: Witness                                     |  |
| Name of Witness                                     |  |



## Acceptance

By signing this part of this form of offer and acceptance, the City of Cape Town accepts the tenderer's (now Contractor's) offer. In consideration thereof, the City of Cape Town shall pay the contractor the amount due in accordance with the conditions of contract identified in the contract data. Acceptance of the contractor's offer shall form an agreement between the City of Cape Town and the contractor upon the terms and conditions contained in this document.

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 the above listed Parts.

Deviations from and amendments to the documents listed in the tender data and any addenda thereto as listed in the returnable schedules as well as any changes to the terms of the offer agreed by the contractor and the employer during this process of offer and acceptance, are contained in the schedule of deviations attached to and forming part of this form of offer and acceptance. No amendments to or deviations from said documents are valid unless contained in this schedule of deviations.

The contractor shall within two weeks after receiving a complete copy of the contract including the schedule of deviations (if any), contact the City of Cape Town to arrange the delivery of any securities, bonds, guarantees, proof of insurance and any other documents to be provided in terms of the conditions of contract identified in the contract data. Failure to fulfil any of these obligations in accordance with those terms shall constitute a repudiation of the contract.

Notwithstanding anything contained herein, this agreement comes into effect on the date when the contractor and confirms receipt from the City of Cape Town of one complete, signed copy of this contract containing price schedule as awarded by the BAC, including the schedule of deviations (if any).

|                                                     |  |
|-----------------------------------------------------|--|
| [Redacted]                                          |  |
| Business Name                                       |  |
| Business Registration                               |  |
| Tax number (VAT)                                    |  |
| Physical Address                                    |  |
| Accepted contract sum including tax                 |  |
| Signed – who by signature hereto warrants authority |  |
| Name of signatory                                   |  |
| Signed: Date                                        |  |
| Signed: Location                                    |  |
| Signed: Witness                                     |  |
| Name of Witness                                     |  |

## Schedule of Deviations

### Notes:

1. The extent of deviations from the tender documents issued by the employer before the tender closing date is limited to those permitted in terms of the conditions of tender.
2. A tenderer's covering letter shall not be included in the final contract document. Should any matter in such letter, which constitutes a deviation as aforesaid, become the subject of agreements reached during the process of offer and acceptance, the outcome of such agreement shall be recorded here.
3. Any other matter arising from the process of offer and acceptance either as a confirmation, clarification or change to the tender documents and which it is agreed by the Parties becomes an obligation of the contract shall also be recorded here.
4. Any change or addition to the tender documents arising from the above agreements and recorded here, shall also be incorporated into the final draft of the Contract.

1 Subject ..... **Not Applicable**

Details .....

2 Subject .....

Details .....

3 Subject .....

Details .....

4 Subject .....

Details .....

**ONLY TO BE COMPLETED AT ACCEPTANCE STAGE**

By the duly authorised representatives signing this agreement, 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 returnable schedule, as well as any confirmation, clarification or changes to the terms of the offer agreed between the tenderer and the employer during this process of offer and acceptance.

It is hereby 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.



**CONTRACT 72Q/2025/26: UPGRADE OF VOORTREKKER ROAD,  
FROM 4th AVENUE TO 12TH AVENUE, MAITLAND**

**(TO BE FILLED IN BY THE CONTRACTOR)**

**Confirmation of Receipt**

The contractor identified in the offer part of the Contract hereby confirms receipt from the City of Cape Town (identified in the acceptance part) of 1 (one) complete, signed copy of the Contract containing price schedule as awarded by the BAC, including the *Schedule of Deviations* (if any) on:

The..... (Day)

Of..... (Month)

20..... (year)

At..... (Place)

For the Supplier: Signature(s) .....

Name(s) .....

Capacity .....

Signature and name of witness:

Signature ..... Name .....

**ONLY TO BE  
COMPLETED AT  
ACCEPTANCE STAGE**



CITY OF CAPE TOWN

URBAN MOBILITY DIRECTORATE: TRANSPORT INFRASTRUCTURE IMPLEMENTATION  
CONTRACT NO. 72Q/2025/26

UPGRADE OF VOORTREKKER ROAD, FROM 4TH AVENUE TO 12TH AVENUE, MAITLAND

## C1.2 Contract Data

### *Part 1: Contract Data provided by the Employer*

#### GENERAL CONDITIONS OF CONTRACT

The following standardised General Conditions of Contract:

**General Conditions of Contract for Construction Works, Third Edition, 2015**

prepared by the South African Institution of [REDACTED] apply to and form the General Conditions of Contract for this contract. Copies of these conditions of contract are obtainable from the South African Institution of Civil Engineering (SAICE) [REDACTED] Tel: [REDACTED] e-mail: [REDACTED]

Copies of the General Conditions of Contract are available for inspection and scrutiny at the offices of the Employer.

The Pro-formas bound with the General Conditions of Contract 2015, on pages 96 to 113 shall not apply to this Contract and shall be replaced with the documents bound into this Contract Document.

The General Conditions of Contract make several references to the Contract Data for specific data, which together with these conditions collectively describe the risks, liabilities and obligations of the contracting parties and the procedures for the administration of the Contract. The Contract Data shall have precedence in the interpretation of any ambiguity or inconsistency between it and the general conditions of contract.

The General Conditions of Contract shall be read in conjunction with the variations, amendments and additions set out in the Contract Specific Data below. Each item of data given below is cross-referenced to the clause in the General Conditions of Contract to which it mainly applies.

The documents forming the Contract are to be taken as mutually explanatory of one another. For the purposes of interpretation, the priority of the documents shall be in accordance with the following sequence:

- a) the Form of Offer and Acceptance,
- b) the Contract Specific Data within the Contract Data,
- c) the General Conditions of Contract for Construction Works, Third Edition, 2015,
- d) the Drawings,
- e) the Scope of Work,
- f) the Pricing Data, and
- g) the conditions of tender, the tender data and tender schedules

If an ambiguity or discrepancy is found in the documents, the Employer's Agent shall issue any necessary clarification or instruction.

#### CONTRACT SPECIFIC DATA

The following contract specific data, referring to the General Conditions of Contract for Construction Works, Third Edition, 2015, are applicable to this Contract:

##### **Clause 1.1.1.2:**

*Add the following after "Bill of Quantities":*

, also referred to as Bills of Quantities,

##### **Clause 1.1.1.13:**

The Defects Liability Period is 12 months.

**Clause 1.1.1.14:**

The time for achieving Practical Completion is **42 (forty-two) months**, inclusive of a two month mobilisation period, and 14 day period referred to in Clause 5.3.2 below, and inclusive of non-working days referred to in Clause 5.8.1 below, but exclusive of special non-working days (Clause 5.8.1).

**Clause 1.1.1.15:**

The Employer is the [REDACTED] represented by the Director : [REDACTED] and/or such other person or persons duly authorised thereto by the Employer in writing.

The name of the Employer is: [REDACTED]

and is referred to in the Contract documents by the terms "Employer", "City of Cape Town" or "Council" as the context provides.

**Clause 1.1.1.16:**

The Employer's Agent, referred to in the Contract documents, is the firm of [REDACTED] acting through a director, an associate or an official authorised thereto in writing .

The name of the Employer's Agent is: [REDACTED] or their successors duly appointed by the Employer

**Clause 1.1.1.26:**

The Pricing Strategy is a Re-measurement Contract.

Add the following Clauses after Clause 1.1.1.34:

- 1.1.1.35 "Drawings" means all drawings, calculations and technical information forming part of the Contract Documents and any modifications thereof or additions thereto from time to time approved in writing by the Employer's Agent or delivered to the Contractor by the Employer's Agent.
- 1.1.1.36 "Letter of Notification" means the letters of formal notification, signed by the Employer, of the decision of the Supply Chain Management Bid Adjudication Committee sent to all tenderers. The notification of the decision does not form part of the Employer's Acceptance of the successful tenderer's Offer and no rights shall accrue.
- 1.1.1.37 "Intellectual Property" means any and all intellectual property rights of any nature anywhere in the world whether registered, registerable or otherwise, including patents, trademarks, registered designs and domain names, applications for any of the foregoing, trade or business names, copyright and rights in the nature of copyright, design rights, rights in databases, know-how, trade secrets and any other intellectual property rights which subsist in computer software, computer programs, websites, documents, information, techniques, business methods, drawings, logos, instruction manuals, lists and procedures and particulars of customers, marketing methods and procedures and advertising literature, including the "look and feel" of any websites

**Clause 1.2.1.2:**

The address of the Employer is:

Physical address:

Postal address:

E-mail address:



**Clause 1.2.1.2:**

The address of the Employer's Agent is:

Physical address:

Postal address:

E-mail address:

**Clause 1.3:**

*Delete Clause 1.3.5 in its entirety and replace with the following:*

**1.3.5 Intellectual Property**

1.3.5.1 The Contractor acknowledges that it shall not acquire any right, title or interest in or to the Intellectual Property of the Employer.

1.3.5.2 The Contractor hereby assigns to the Employer, all Intellectual Property created, developed or otherwise brought into existence by it for the purposes of the contract, unless the Parties expressly agree otherwise in writing.

1.3.5.3 The Contractor shall be deemed to have given the Employer a non-terminable, transferable, non-exclusive, royalty-free licence to copy, use and communicate the Contractor's documents, including making and using modifications of such documents for further work required to the Works.

1.3.5.4 The Contractor shall, and warrants that it shall:

1.3.5.4.1 not be entitled to use the Employer's Intellectual Property for any purpose other than as contemplated in this contract;

1.3.5.4.2 not modify, add to, change or alter the Employer's Intellectual Property, or any information or data related thereto, nor may the Contractor produce any product as a result of, including and/or arising from any such information, data and Intellectual Property, and in the event that it does produce any such product, the product shall be, and be deemed in law to be, owned by the Employer;

1.3.5.4.3 not apply for or obtain registration of any domain name, trademark or design which is similar to any Intellectual Property of the Employer;

1.3.5.4.4 comply with all reasonable directions or instructions given to it by the Employer in relation to the form and manner of use of the Employer Intellectual Property, including without limitation, any brand guidelines which the Employer may provide to the contractor from time to time;

1.3.5.4.5 procure that its employees, directors, members and contractors comply strictly with the provisions of clauses 1.3.5.4.1 to 1.3.5.4.3 above;

unless the Employer expressly agrees thereto in writing after obtaining due internal authority.

1.3.5.5 The Contractor represents and warrants to the Employer that, in providing goods, services or both, as the case may be, for the duration of the contract, it will not infringe or make unauthorised use of the Intellectual Property rights of any third party and hereby indemnifies the Employer from any claims, liability, loss, damages, costs, and expenses arising from the infringement or unauthorised use by the contractor of any third party's Intellectual Property rights.

1.3.5.6 In the event that the contract is cancelled, terminated, ended or is declared void, any and all of the Employer's Intellectual Property, and any and all information and data related thereto, shall be immediately handed over to the Employer by the contractor and no copies thereof shall be retained by the contractor unless the Employer expressly and in writing, after obtaining due internal authority, agrees otherwise.



Add the following Clause after Clause 1.3.6:

- 1.3.7 The parties agree that this contract shall also be subject to the Employer's Supply Chain Management Policy ('SCM Policy') that was applicable on the date the bid was advertised, **save that if the Employer adopts a new SCM Policy which contemplates that any clause therein would apply to the contract emanating from this tender, such clause shall also be applicable to that contract.** Please refer to this document contained on the CCT's website.
- 1.3.8 Abuse of the supply chain management system is not permitted and may result in cancellation of the contract, restriction of the supplier, and/or the exercise by the Employer of any other rights and remedies available to it as described in the SCM Policy.
- 1.3.9 **Protection of Personal Information Act of 2013**
- 1.3.9.a By submitting a tender to the Employer, (and by concluding any ensuing related agreement with the City of Cape Town, if applicable), the Contractor thereby acknowledges and unconditionally agrees:
- 1.3.9.b that the Contractor has been informed of the purpose of the collection and processing of its personal information as defined in the Protection of Personal Information Act of 2013 ("POPIA"), which, for the avoidance of doubt is for, and in relation to, the tender process and the negotiation, conclusion, performance and enforcement of the ensuing agreement, if applicable, as well as for the Employer's reporting purposes;
- 1.3.9.c to the collection and processing of the Contractor's personal information by the Employer and agrees to make available to the Employer, all information reasonably required by the Employer for the above purposes;
- 1.3.9.d that the personal information the Employer collects from the Contractor or about the Contractor may be further processed for other activities and/or purposes which are lawful, reasonable, relevant and not excessive in relation to the purposes set out above, for which it was originally collected;
- 1.3.9.e that, the Contractor indemnifies the Employer and its officials, employees, and directors and undertakes to keep the Employer and its officials, employees, and directors indemnified in respect of any claim, loss, demands, liability, costs and expenses of whatsoever nature which may be made against the Employer (including the costs incurred in defending or contesting any such claim) in relation to the Contractor or the Contractor's employees', representatives' and/or sub-Suppliers' non-compliance with POPIA and/or the Employer's failure to obtain the Contractor's consent or to notify the Contractor of the reason for the processing of the Contractor's personal information;
- 1.3.9.f to the disclosure of the Contractor's personal information by the Employer to any third party, where the Employer has a legal or contractual obligation to disclose such personal information to the third party (or a legitimate interest exists therein);
- 1.3.9.g that, under POPIA, the Contractor may request to access, confirm, request the correction, destruction, or deletion of, or request a description of, personal information held by the Employer in relation to you, subject to applicable law; and
- 1.3.9.h that under POPIA, subject to applicable law, the Contractor also has the right to be notified of a personal information breach and the right to object to, or restrict, the Employer's processing of its personal information.
- 1.3.9.i All requests relating to data protection must be submitted in writing to:  
**The City Manager - C/o the Information Officer, Corporate Services Directorate**  
Via hand delivery at: [REDACTED]  
Via post at: [REDACTED]  
Via fax at: [REDACTED]  
Via email at: [REDACTED]
- 1.3.10 As required by section 116(2)(b) of the Local Government: Municipal Financial Management Act 56 of 2003, the CCT shall monitor the performance of the Supplier on at least a monthly basis, and the Supplier agrees to provide the CCT with its full cooperation in this regard.



### Clause 3.1

*Delete clause*

### Clause 3.2.2

*Add the following at the end of the clause:*

If, in exercising any discretion, the result of such decision would be to utilise the contingency allowance, increase the contract value or granting of time for practical completion, the Employer's Agent must obtain approval from the Employer that such funding or time is available and granted by the Employer to be awarded prior to finalising such a decision.

### Clause 3.2.3:

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

- a) Clause 3.3.1 Nomination of Employer's Agent's Representative
- b) Clause 3.3.4 Employer's Agent's authority to delegate
- c) Clause 5.8.1 Non-working times
- d) Clause 5.11.2 Suspension of the Works
- e) Clause 5.12.4 Acceleration instead of extension of time
- f) Clause 6 All actions in terms of the clause subject to 3.2.2 of Contract Data.
- h) Clause 6.10.10 Advance payment, for items not listed in the Advance Payment Schedule.
- i) Clause 10.1.5 All actions in terms of the clause subject to 3.2.2 of Contract Data..

### Clause 3.3.2.2.3:

*Delete the words "oral or" from the clause*

### Clause 3.3.2.2.4:

*Delete the words "oral or" from the clause*

### Clause 4.1:

*Add the following Clause after Clause 4.1.2:*

- 4.1.3 Where the Contract is based on an alternative tender offer submitted by the Tenderer/Contractor, he shall, notwithstanding acceptance of the offer by the Employer, be liable for any deficiency in the alternatives proposed, for any costs in ensuring that the alternatives meet the Employer's standards and requirements, and for any loss or damage arising out of such error or deficiency.

### Clause 5.3.1:

The documentation required before commencement with Works execution is:

- a) Approved Health and Safety Plan (Refer to applicable clause in the Health and Safety Specification in Part C3.5 in the Scope Work)
- b) Initial programme (Refer to Clause 5.6)
- c) Security (Refer to Clause 6.2)
- d) Evidence of Insurance (Refer to Clause 8.6)
- e) Occupational Health and Safety Agreement (Part C1.5 in Agreements and Contract Data)
- f) Letter of good standing from the Compensation Commissioner, or a licensed compensation insurer (Refer to Clause 4.3)
- g) Protection of the Environment Declaration (Part C1.6 in Agreements and Contract Data)
- h) Proof of Registration / Letter of Good Standing with the Bargaining Council for the Civil Engineering Industry (BCCEI)
- i) OHS Construction Work Permit from the Department of Labour
- k) Wayleaves and permits

*Add the following to Clause 5.3.1:*

Such instruction shall, where applicable, also be subject to the issuing, by the Provincial Director of the Department of Labour, of a construction work permit to perform the intended construction work in terms of Clause 5.3.4 below.

### Clause 5.3.2:

The time to submit the documentation required before commencement with Works execution is within 14 days.



**Clause 5.3.3:**

*Add the following to Clause 5.3.3:*

Notwithstanding the above, where a construction work permit from the Provincial Director of the Department of Labour is required, commencement of the Works shall not be deemed to take place until such construction work permit has been issued by the Provincial Director.

**Clause 5.3.4:**

*Add the following Clause after Clause 5.3.3:*

**5.3.4 Application for Construction Work Permit**

Where the Employer is required to apply to the Provincial Director of the Department of Labour for a construction work permit to perform the intended construction work, the employer shall do so as soon as possible after the appointment of the contractor has been finalised and the contractor has been appointed as principal contractor in terms of Regulation 5(1)(k) of the Construction Regulations (2014) and upon receipt of relevant documents as stated in clause 5.3.1.

Should the issuing of a construction work permit delay the Employer's Agent's instruction to commence executing the Works and this in turn causes a delay to Practical Completion by more than 60 days, then the Contractor shall be entitled to make a claim in accordance with Clause 10.1. Should, however, the issuing of a construction work permit be delayed by the submission of an unacceptable draft Health and Safety Plan, in the opinion of either the Employer's Health and Safety Agent, or the Provincial Director of the Department of Labour, no claim for an extension of time will be entertained.

**Clause 5.4.2:**

Access to and possession of the Site shall not be exclusive to the Contractor insofar as the provisions of Clause 4.8 apply, and where ongoing use by the general public is required.

*Add the following Clause after Clause 5.4.3:*

**5.4.4 The Contractor shall bear all costs and charges for special and temporary rights of way required by it in connection with access to the Site.**

**Clause 5.6.2.3:**

*Insert the following after "...approvals,":*

... permits.

**Clause 5.8.1:**

The non-working days are Sundays.

The special non-working days are:

- a) All gazetted public holidays.
- b) Year-end break(s) not exceeding 15 working days in duration.

**Clause 5.12.2.2:**

*Add the following to Clause 5.12.2.2:*

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 may be claimed in accordance with the provisions of Clause 5.12.

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 critical work.

|          |        |
|----------|--------|
| January  | 2 days |
| February | 2 days |

|           |        |
|-----------|--------|
| March     | 2 days |
| April     | 2 days |
| May       | 2 days |
| June      | 4 days |
| July      | 4 days |
| August    | 4 days |
| September | 4 days |
| October   | 2 days |
| November  | 2 days |
| December  | 2 days |

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.

It shall be further noted that where the critical path is not affected, no extension of time for abnormal climatic conditions or for any other reason will be entertained.

**Clause 5.13.1:**

The penalty for failing to complete the Works is **R20 027** per day.

*Insert the following after "actual date of Practical Completion":*

... or, in the case of termination by the Employer in terms of Clause 9.2.1, the actual date of termination.

**Clause 5.16.3:**

The latent defects period is **10** years.

**Clause 6.2.1:**

The security to be provided by the Contractor shall be a performance guarantee of **7%** of the Contract Sum. The performance guarantee shall contain the precise wording of the document included in Part C1.3 of the Contract Data: **Form of Performance Guarantee**, and it shall be issued by a financial institution approved by the Employer at the date when the guarantee is issued. The list of approved financial institutions current at the date of tender is attached to the **Form of Performance Guarantee**.

**Clause 6.2.2:**

*Delete Clause 6.2.2 in its entirety.*

**Clause 6.2.3:**

*Delete Clause 6.2.3 in its entirety and replace with the following:*

The Contractor shall ensure that the performance guarantee remains valid and enforceable until the Certificate of Completion of the Works is issued.

**Clause 6.5.1.2.3:**

The percentage allowance to cover overhead charges is **10%**

**Clause 6.8.2:**

*Add the following to Clause 6.8.2:*

The Contract Price shall be subject to contract price adjustment in accordance with Clause 6.8 of the General Conditions of Contract.

If special materials are specified in Part 2 of the Contract Data then the provisions of Clause 6.8.3 of the General Conditions of Contract shall apply to such special materials.

Where applicable, in terms of the foregoing, the value of the certificates issued shall be adjusted in accordance with the Contract Price Adjustment Schedule with the following values for "Concrete works" and/or "Roads and earthworks":



The value of "x" is 0,10.

The values of the coefficients for "Concrete works" are:

a = 0,25                  b = 0,15                  c = 0,55                  d = 0,05

The values of the coefficients for "Roads and earthworks" are:

a = 0,21                  b = 0,27                  c = 0,42                  d = 0,10

The base month is one month prior to the month in which the tender closed

Furthermore, the Contract Price Adjustment Schedule shall be amended as follows:

"L" is the "Labour Index" and shall be the Consumer Price Index (CPI) for "All items (CPI Headline)", as published in the Statistical News Release, P0141: Table A – Consumer Price Index: Main Indices of Statistics South Africa.

"P" is the "Plant Index" and shall be the Construction Materials Price Index for "Plant and Equipment" as published in the Statistical News Release P0151.1, Table 4 – Mining and construction plant and equipment price index of Statistics South Africa..

"M" is the "Materials Index" and shall be the Construction Materials Price Index for selected materials, Materials for "Civil Engineering material – roads, general (excluding bitumen)," as published in the Statistical News Release P0151.1, Table 6 – Civil engineering material price indices of Statistics South Africa

"F" is the "Fuel Index" and shall be the Producer Price Index (PPI) for "Coal and Petroleum Products - Diesel", as published in the Statistical News Release P0142.1: Table 1 –PPI for final manufactured goods of Statistics South Africa.

The amount "Ac" shall be sub-divided into  $Ac_1$  and  $Ac_2$ , as appropriate, and each of these shall be multiplied by its Contract Price Adjustment Factor (CPAF), with the resultant amounts added together to produce the adjustment as envisaged in the CPA Schedule:

where

$Ac_1$  is the proportion of Ac applicable to "Concrete works", and  
 $Ac_2$  is the proportion of Ac applicable to "Roads and earthworks"

and where

$Ac_1 = T_1 - S_1 - D_1 - E_1 - G_1 - Ap_1$ , and  
 $Ac_2 = T_2 - S_2 - D_2 - E_2 - G_2 - Ap_2$

in which formulae the values associated with the symbols  $T_1$  and  $T_2$ ,...  $Ap_1$  and  $Ap_2$  shall be applicable to the proportions of T ..... Ap in "Concrete works" and "Roads and earthworks", respectively.

Furthermore, the value of the General Items shall be proportional to the value of work done and materials on Site in  $T_1$  and  $T_2$  respectively.

#### **Clause 6.8.3: Variation in the cost of special materials**

Price adjustment for variations in the cost of special materials is provided for in the Special Materials Schedule at the end of this Part 1: Contract Data provided by the Employer.

#### **Clause 4.2 of the Contract Price Adjustment Schedule**

*Delete the words "by the Contractor" that appear after "... entered in the Contract Data"*



**Clause 6.8.4:**

*Add the following to Clause 6.8.4:*

Notwithstanding the above, in the event that a public holiday is proclaimed after 28 days before the closing date for tenders, no costs other than those that can be claimed under Clause 5.12.3 shall be added to the contract price.

*Add the following after Clause 6.8.4:*

6.8.5. If price adjustment for variations in the cost of plant and materials imported from outside of South Africa is provided for in the contract data, such adjustment shall be based on the information contained on the schedule titled **"Price Basis for Imported Resources"** and as below. For the purposes of this clause the Rand value of imported Plant and Materials inserted on the schedule titled **"Price Basis for Imported Resources"** (column (F)) shall be the value in foreign currency (column (A)) converted to South African Rand (column (C)) by using the closing spot selling rate quoted by **Employer's** main banker, NEDBANK, on the Base Date (seven calendar days before tender closing date) rounded to the second decimal place (column (B)), to which shall be added any Customs Surcharge and Customs Duty applicable at that date (columns (D) and (E)).

**6.8.5.1 Adjustment for variations in rates of exchange:**

- (a) The value in foreign currency inserted in column (A) shall be subject to clause (h) below when recalculating the Rand value.
- (b) The rate of exchange inserted in column (B) shall be the closing spot selling rate quoted by **Employer's** main banker, NEDBANK, on the Base Date, rounded to the second decimal place, subject to sub-paragraph (c) below.
- (c) If the rate of exchange inserted by the Tenderer differs from the NEDBANK rate referred to above, then the NEDBANK rate shall apply and the Rand value in columns (C) and (F) shall be recalculated accordingly, without altering the price in the Schedules of Quantities for the relevant items.
- (d) If a tender from a supplier or sub-contractor provides for variations in rates of exchange, the Contractor may **only** claim for variations in rates of exchange if he binds the supplier or sub-contractor to the same provision to take out forward cover as described in sub-paragraph (e) below.
- (e) The Contractor (or supplier or sub-contractor) shall within five working days from the date of placing a firm order on an overseas supplier, cover or recover forward by way of a contract with a bank which is an authorised foreign exchange dealer, the foreign exchange component of the cost of any imported Plant and Materials inserted by the Tenderer on the schedule titled **"Price Basis for Imported Resources"**.
- (f) When the Contractor (or supplier or sub-contractor) so obtains forward cover, the Contractor shall immediately notify the Employer of the rate obtained and furnish the Employer with a copy of the foreign exchange contract note.
- (g) Based on the evidence provided in sub-paragraph (f) above, the value in Rand inserted in column (C) on the schedule titled **"Price Basis for Imported Resources"** shall be recalculated using the forward cover rate obtained, and any increase or decrease in the Rand value defined in this clause shall be adjusted accordingly, subject to sub-paragraph (h) below. Failure to provide such evidence shall result in no such recalculation shall be considered by the Employer.
- (h) The adjustments shall be calculated upon the value in foreign currency in the Contractor's (or supplier's or sub-contractor's) **forward cover contract**, provided that, should this value exceed the value in foreign currency inserted in column (A) of the schedule titled **"Price Basis for Imported Resources"**, then the value in column (A) shall be used.

**6.8.5.2 Adjustment for variations in customs surcharge and customs duty**

- (a) Any increase or decrease in the Rand value between the amounts of Customs Surcharge and Customs Duty inserted on the schedule titled **"Price Basis for Imported Resources"** and those amounts actually paid to the Customs and Excise Authorities, which are due to changes in the percentage rates applicable or to the foreign exchange rate used by the authorities, shall be adjusted accordingly.



- (b) The Tenderer shall state the Customs Duty Tariff Reference applicable to each item and the Contractor shall advise the Employer's Agent of any changes which occur.

**6.8.5.3 Adjustment for variation in labour and material Costs**

If the prices for imported Plant and Materials are not fixed, the Contractor shall in his Tender specify the formula for calculating Contract Price Adjustments normally used in the country of manufacture and the indices and relative proportions of labour and material on which his Tender prices are based. Evidence of the indices applicable shall be provided with each claim. The indices applicable 42 days before contractual dispatch date from the factory will be used for the purposes of Contract Price Adjustment.

Failure to specify a formula in the Tender shall mean that the prices are fixed or shall be deemed to be fixed.

**Clause 6.10.1.5:**

*Delete Clause 6.10.1.5 in its entirety and replace with the following:*

**6.10.1.5 The value of Plant and materials:**

- 6.10.1.5.1** up to a percentage limit of **80%** for the Plant and materials referred to in Clause 6.9.1.1 brought on to the Site but not yet built into the Permanent Works;

Provided that the Contractor has produced documentary evidence of ownership of such Plant and/or materials and has delivered to the Employer an indemnity, approved in writing by the Employer, against any claim to or in respect of such Plant and/or materials by reason of the Contractor's sequestration or liquidation, or of any defect in the Contractor's title to the Plant and/or materials;

- 6.10.1.5.2** which have been manufactured and are stored at places other than the Site, in respect of which the Employer has indicated, on the Advance Payment Schedule, that advance payment will be permitted;

- 6.10.1.5.3** for which a deposit with order is required from the Contractor by a manufacturer/supplier, only in respect of which the Employer has indicated, on the Advance Payment Schedule, that advance payment will be permitted;

The terms and conditions for advance payment are set out in Clause 6.10.10 and in the Advance Payment Schedule at the end of this Part 1: Contract Data provided by the Employer.

**Clause 6.10.1.7:**

*Add the following after the words "Clause 5.13":*

or any other fines or penalties that become due under the Contract.

**Clause 6.10.3:**

*Add the following to Clause 6.10.3:*

Notwithstanding the provision of a performance guarantee in terms of Clause 6.2.1, interim payments to the Contractor shall be subject to a retention by the Employer of an amount of **5%** of the said amounts due to the Contractor, with no limit. A guarantee in lieu of retention is not permitted.

**Clause 6.10.4:**

*Add the following to the last sentence of Clause 6.10.4:*

..., dated as at the date of delivery of the Contractor's statement to the Employer's Agent.

*Add the following to Clause 6.10.4:*

Notwithstanding the above, the Employer's Agent shall be empowered to withhold the delivery of the payment certificate until the Contractor has complied with his obligations to report in terms of Clause 4.10.2 and as described in the Scope of Work.

The Contractor may submit a fully motivated application regarding more frequent payment to the Employer's Agent to be submitted to the Employer for consideration. Requests for more frequent payments will be considered at the sole discretion of the Employer and is not a right in terms of this contract.



**Clause 6.10.10:**

*Add the following Clause after Clause 6.10.9:*

**6.10.10 Advance payment**

Subject to Clauses 6.10.1.5.2 and 6.10.1.5.3, and the Advance Payment Schedule, the Employer shall make an advance payment for Plant and materials stored at places other than the Site, or in respect of which a deposit with order is required, only once the Contractor has submitted an advance payment guarantee in accordance with this Clause, the authenticity of which has been verified by the City's Treasury Department.

Unless and until the Employer receives this guarantee, the following paragraphs shall not apply.

The Employer's Agent shall issue an Interim Payment Certificate for, or including, advance payment after receiving a statement under Clause 6.10.1 and after the Employer has received a guarantee in an amount equal to the advance payment requested. This guarantee shall be issued by a financial institution approved by the Employer, as listed in the Annexure in Part C1.3 of the Contract Data, and shall be in the form of and shall contain the precise wording of the document included in Part C1.4: **Form of Advance Payment Guarantee** and shall come into force, be administered and expire in terms thereof.

The Employer shall return the guarantee to the Contractor within 14 days after the expiry date.

The provision of the Advanced Payment Guarantee shall be at the Contractor's cost.

The term "deposit" or "deposit with order" used in the context of this Clause and elsewhere by reference to this Clause, means a sum payable by the Contractor to a manufacturer/supplier prior to the manufacture of an item of Plant or material, required at the time of placing an order, the balance of the value of the item being payable later.

**Clause 8.6.1.1.2:**

The value of Plant and materials supplied by the Employer to be included in the insurance sum is R 0.00 (Nil).

**Clause 8.6.1.1.3:**

The amount to cover professional fees for repairing damage and loss to be included in the insurance sum is R0.00 (Nil).

**Clause 8.6.1.3:**

The limit of indemnity for liability insurance is R20 000 000.00 for any single claim – the number of claims to be unlimited during the construction and defects liability periods.

**Clause 8.6.1.5:**

In addition to the insurances required in terms of General Conditions of Contract Clauses 8.6.1.1 to 8.6.1.4 the following insurance is also required:

- a) Insurance of Construction Equipment (including tools, offices and other temporary structures and contents) and other things (except those intended for incorporation into the Works) brought onto the site for a sum sufficient to provide for their replacement.
- b) Insurance in terms of the provisions of the Compensation for Occupational Injuries and Diseases Act, 130 of 1993.
- c) Motor Vehicle Liability Insurance comprising (as a minimum) "Balance of Third Party" Risks including Passenger Liability Indemnity.
- d) 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.



**Clause 8.6.5:**

*Delete the following from Clause 8.6.5:*

"and the terms thereof shall be subject to the approval of the Employer's Agent, which approval shall not be unreasonably withheld."

**Clause 8.6.6:**

*Replace clause 8.6.6 with the following:*

The Contractor shall provide evidence in the form stated in the contract data to the Employer's Agent that the required insurances are effected and that all premiums thereunder have been paid.

**Clause 9.1:**

*In Clause 9.1.6 replace "and 9.1.3" with:*

, 9.1.3 and 9.1.7

*Add the following Clause after Clause 9.1.6:*

**9.1.7 Death of Sole Proprietor/Member**

Upon the death of the Contractor who was a Sole Proprietor, or a sole member of a Close Corporation, the Contract will terminate forthwith. The Employer shall pay to the Contractor's estate any money which it considers due under the Contract in terms of Clause 9.1.5, in full and final settlement thereof.

**9.1.8 Material Irregularity during procurement process**

The Employer may terminate the contract if a material irregularity vitiates the procurement process leading to the conclusion of the contract, rendering the procurement process and the conclusion of the resulting contract unfair, inequitable, non-transparent, uncompetitive or not cost-effective, provided the Employer follows the processes as described in its SCM Policy.

**9.1.9 Reputational risk or harm to the Employer\**

The Employer, without prejudice to any other remedy for breach of contract, by written notice of default sent to the supplier, may terminate the contract if the implementation of the contract may result in reputational risk or harm to the City as a result of (inter alia):

- 9.1.9.1 reports of poor governance and/or unethical behaviour;
- 9.1.9.2 association with known notorious individuals and family of notorious individuals;
- 9.1.9.3 poor performance issues, known to the Employer;
- 9.1.9.4 negative social media reports;
- 9.1.9.5 adverse assurance (e.g. due diligence) report outcomes;
- 9.1.9.6 where the contractor has been restricted from doing business with the Employer; or
- 9.1.9.7 circumstances where the relevant vendor has employed, or is directed by, anyone who was previously employed in the service of the state (as defined in clause 1.53), where the person is or was negatively implicated in any SCM irregularity.

*Add the following Clause after Clause 9.2.3:*

**9.2.4 Employer's Elections in case of Insolvency**

In addition to anything else contained in this contract, the Employer may make either of the following elections to ensure its rights are protected and any negative impact on service delivery is mitigated:

- 9.2.4.1 At any time, terminate the Contract by giving written notice to the Supplier; or
- 9.2.4.2 accept a contractor's proposal (via the trustee / liquidator) to render delivery utilising the appropriate contractual mechanisms or takes steps to ensure its rights are protected and any negative impact on service delivery is mitigated.

**Clause 10.5.3:**

The number of ad-hoc Adjudication Board Members to be appointed is 1(one).

**ADDITIONAL CONDITIONS OF CONTRACT**

*Add the following Clause after Clause 10:*

**Clause 11 Details to be confidential**

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 the prior written consent of the Employer's Agent.



| SPECIAL MATERIALS SCHEDULE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                                                                                                                                                                                                                                                                                      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Each material dealt with as a special material in terms of Clause 4.1 of the Contract Price Adjustment Schedule of the General Conditions of Contract is stated in the list below. The provisions of Clause 6.8.3 of the General Conditions of Contract shall apply to such special materials. The base prices for the special materials (current at the time of tender) shall be as stated in the schedule below, or where required, shall be furnished by the tenderer/contractor. Only those materials listed by the Employer below shall be considered as special materials. |      |                                                                                                                                                                                                                                                                                      |
| Special Material                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Unit | Base Price                                                                                                                                                                                                                                                                           |
| Bitumen (50/70 penetration grade)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | t    | R 15 300 (Sept 2025)                                                                                                                                                                                                                                                                 |
| Bitumen (70/100 penetration grade)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | t    | R 15 300 (Sept 2025))                                                                                                                                                                                                                                                                |
| Structural steel                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | t    | The STATS SA Construction Material Price Indices, statistical release P0151.1 Table 3 applicable reinforcing and structural steel basic products index value, current at the time of tender closing, will be used as the base prices for determining the adjustment in steel prices. |
| Steel reinforcing bars                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | t    |                                                                                                                                                                                                                                                                                      |
| Steel used in the manufacture of pipes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | t    |                                                                                                                                                                                                                                                                                      |
| Steel used in the manufacture of street light poles                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | t    |                                                                                                                                                                                                                                                                                      |
| <b>Conditions:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      |                                                                                                                                                                                                                                                                                      |
| 1) When called upon to do so, the contractor shall substantiate the prices to be used to determine the adjustment in respect of the special materials listed above with acceptable documentary evidence.                                                                                                                                                                                                                                                                                                                                                                         |      |                                                                                                                                                                                                                                                                                      |
| 2) In the case of bituminous products, the Employer has provided, in the schedule above, a base rate for bitumen upon which the tendered rates will be deemed to be based, and which will be used for determining the adjustment in the price of such bituminous products.                                                                                                                                                                                                                                                                                                       |      |                                                                                                                                                                                                                                                                                      |
| 3) Where an adjustment for the variation in the price of bituminous products is claimed, the claim must be substantiated by a declaration from the manufacturer, confirming the source of bitumen used in such bituminous products at the time in question.                                                                                                                                                                                                                                                                                                                      |      |                                                                                                                                                                                                                                                                                      |
| 4) Where the source of bitumen (the refinery) is located in the Western Cape Province, or where bitumen sourced from abroad is landed at a port in the Western Cape, the cost of transporting such bitumen within the boundaries of the Western Cape shall be included in the rate for bituminous products. Extra-over rates to cover the cost of transporting bitumen from beyond the borders of the Western Cape have been measured separately in the Bill of Quantities.                                                                                                      |      |                                                                                                                                                                                                                                                                                      |
| 5) Where imported bitumen used in bituminous products is landed at a port beyond the borders of the Western Cape, the importers must clearly state whether or not their price is inclusive of transport to the Western Cape, which will determine whether extra-over transport costs are applicable, or not. The price of the imported bitumen itself must be expressed as a landed price in ZAR.                                                                                                                                                                                |      |                                                                                                                                                                                                                                                                                      |

**ADVANCE PAYMENT SCHEDULE**

This Advance Payment Schedule is to be read in conjunction with Clauses 6.10.1.5.2, 6.10.1.5.3 and 6.10.10 in the Contract Specific Data. The purpose of this schedule is to itemise specific Plant and materials not yet brought on to the Site for building into the Permanent Works and for which the Employer is prepared to make advance payments to the Contractor, subject to the conditions below.

The items of Plant and materials which have been identified by the Employer as being suitable for advance payment in terms of the Contract are listed in the table below. Should an item or items be added to the list at tender stage by a tenderer, such item(s) will not be binding on the Employer.

| Plant and materials which have been manufactured and are stored at places other than the Site: | Plant and materials yet to be manufactured and for which a deposit with order is required from the Contractor by a manufacturer/supplier, and which may be stored at places other than the Site after manufacture: |
|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                | Pipes and valves for large diameter pipelines                                                                                                                                                                      |
|                                                                                                |                                                                                                                                                                                                                    |
|                                                                                                |                                                                                                                                                                                                                    |
|                                                                                                |                                                                                                                                                                                                                    |

**Conditions:**

- 1) The Contractor can only rely on advance payment being permitted by the Employer in respect of the Plant and materials listed in the table above. The Employer may, however, permit advance payment for other Plant and materials in exceptional circumstances and at its sole discretion, during the course of the Contract, and upon reasonable request from the Contractor.
- 2) Advance payment for the purposes of deposits will only be provided up to a limit of 20% of the value of any one item being claimed.
- 3) The Contractor shall provide the Employer with documentary evidence of the terms and conditions for which a deposit with order is required by a manufacturer/supplier, together with the advance payment guarantee.
- 4) The Contractor will also be permitted to obtain advance payment for the balance of the value of the Plant and materials in respect of which he has paid a deposit, for an item which after manufacture is stored at a place other than the Site. The Contractor shall, in respect of such payment, provide an advance payment guarantee, either for such balance or, if the advance payment guarantee in respect of the deposit is to be returned by the Employer upon request, for the whole value of the item.



CITY OF CAPE TOWN

URBAN MOBILITY DIRECTORATE: TRANSPORT INFRASTRUCTURE IMPLEMENTATION

CONTRACT NO. 72Q/2025/26

UPGRADE OF VOORTREKKER ROAD, FROM 4TH AVENUE TO 12TH AVENUE, MAITLAND

## C1.2 Contract Data (continued)

### Part 2: Data provided by the Contractor

The name of the Contractor is .....

The address of the Contractor is

Physical : .....  
Address .....

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

email : .....

#### CONTRACTOR'S ANNUAL HOLIDAY PERIODS DURING CONSTRUCTION PERIOD

|                                           |            |  |          |
|-------------------------------------------|------------|--|----------|
| Year 1 contractor's annual holiday period | Start date |  | End date |
| Year 2 contractor's annual holiday period |            |  |          |
| Year 3 contractor's annual holiday period | Start date |  | End date |
| Year 4 contractor's annual holiday period | Start date |  | End date |





CITY OF CAPE TOWN

URBAN MOBILITY DIRECTORATE: TRANSPORT INFRASTRUCTURE IMPLEMENTATION

CONTRACT NO. 72Q/2025/26

UPGRADE OF VOORTREKKER ROAD, FROM 4TH AVENUE TO 12TH AVENUE, MAITLAND

## C1.3 Form of Performance Guarantee

### PERFORMANCE GUARANTEE

For use with the Conditions of Contract as described in C1.2: Contract Data Part 1: Contract Data provided by the Employer

#### GUARANTOR DETAILS AND DEFINITIONS

"Guarantor" means: .....

"Physical address: .....

"Employer" means: The City of Cape Town, URBAN MOBILITY DIRECTORATE .

"Contractor" means: .....

"Employer's Agent" means: .....

"Works" means: 72Q/2025/26 : UPGRADE OF VOORTREKKER ROAD, FROM 4th AVENUE TO 12TH AVENUE, MAITLAND .....

"Site" means: The site as defined in the Contract Data.

"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: The date of issue by the Employer's Agent of the Certificate of Completion of the Works.

#### CONTRACT DETAILS

Employer's Agent issues: Interim Payment Certificates, Final Payment Certificate and the Certificate of 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 payment in full of the Guaranteed Sum, whichever occurs first. The Employer's Agent 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 suretyship;
  - 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 Employer's Agent 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 or 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 or liquidation court order has been granted against the Contractor and that the Performance Guarantee is called up in terms of 5; and
  - 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. 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.
10. The Guarantor chooses the physical address as stated above for the service of all notices for all purposes in connection herewith.
11. 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.
12. 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.



13. 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) .....

Capacity .....

Witness signatory (1) .....

Witness signatory (2) .....

## **ANNEXURE**

### **LIST OF APPROVED FINANCIAL INSTITUTIONS**

The following financial institutions are currently (as at 28 February 2023) approved for issue of contract guarantees to the City:

#### **National Banks:**

ABSA Bank Limited  
FirstRand Bank Limited  
Investec Bank Limited  
Nedbank Limited.  
Standard Bank of SA Limited

#### **International Banks (with branches in South Africa):**

Barclays Bank PLC.  
CitibankNA  
Credit Agricole Corporate and Investment Bank  
HSBC Bank PLC  
JP Morgan Chase Bank  
Societe Generale  
Standard Chartered Bank

#### **Insurance companies:**

American International Group Inc (AIG)  
Bryte Insurance Company Limited  
Coface SA  
Compass Insurance Company Limited  
Credit Guarantee Insurance Corporation of Africa  
Guardrisk Insurance Company Limited  
Hollard Insurance Company Limited  
Infiniti Insurance Limited  
Lombard Insurance Company Limited  
Mutal and Federal Risk Financing Limited  
New National Assurance Company Limited  
PSG Konsult Ltd (previously Absa Insurance)  
Regent Insurance Company Limited  
Renasia Insurance  
Santam Limited



CITY OF CAPE TOWN

URBAN MOBILITY DIRECTORATE: TRANSPORT INFRASTRUCTURE IMPLEMENTATION

CONTRACT NO. 72Q/2025/26

UPGRADE OF VOORTREKKER ROAD, FROM 4TH AVENUE TO 12TH AVENUE, MAITLAND

## C1.4 Form of Advance Payment Guarantee

### ADVANCE PAYMENT GUARANTEE

For use with the Conditions of Contract as described in C1.2: Contract Data Part 1: Contract Data provided by the Employer

#### GUARANTOR DETAILS AND DEFINITIONS

"Guarantor" means: .....

"Physical address: .....

"Employer" means: The City of Cape Town, URBAN MOBILITY DIRECTORATE .

"Contractor" means: .....

"Employer's Agent" means: .....

"Works" means: 72Q/2025/26: UPGRADE OF VOORTREKKER ROAD, FROM 4th AVENUE TO 12TH AVENUE, MAITLAND .....

"Site" means: The site as defined in the Contract Data.

"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.

"Plant and materials" means: The Plant and materials stored at places other than the Site, or in respect of which an advance payment prior to manufacture is required, which the Employer has agreed may be subject to advance payment, such Plant and materials being listed in the Schedule of Plant and materials.

"Schedule of Plant and materials" means: A list of Plant and materials which shows the value thereof to be included in the Guaranteed Advance Payment Sum.

"Guaranteed Advance Payment Sum" means: The maximum aggregate amount of R.....

Amount in words: .....

"Expiry Date" means: The date of the payment certificate wherein the Plant and materials have been certified by the Employer's Agent as having been built into the Permanent Works.

#### CONTRACT DETAILS

Employer's Agent issues: Interim Payment Certificates and Final Payment Certificate.

#### ADVANCE PAYMENT GUARANTEE

1. The Guarantor's liability shall be limited to the amount of the Guaranteed Advance Payment Sum.
2. The Guarantor's period of liability shall be from and including the date of issue of this Advance Payment Guarantee and up to and including the Expiry Date or the date of payment in full of the Guaranteed Advanced Payment Sum, whichever occurs first.

3. The Guarantor hereby acknowledges that:
- 3.1 any reference in this Advance Payment 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 suretyship;
- 3.2 its obligation under this Advance Payment 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 Employer's Agent 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) calendar 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 Advance Payment Sum or 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 Advance Payment Guarantee, such demand stating that:
- 5.1 the Contract has been terminated due to the Contractor's default and that this Advance Payment Guarantee is called up in terms of 5; or
- 5.2 a provisional or final sequestration or liquidation court order has been granted against the Contractor and that the Advance Payment Guarantee is called up in terms of 5; and
- 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. 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. 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 Advance Payment Guarantee on account of any conduct alleged to be prejudicial to the Guarantor.
10. The Guarantor chooses the physical address as stated above for the service of all notices for all purposes in connection herewith.
11. This Advance Payment 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.
12. This Advance Payment 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.



13. 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) .....

Capacity .....

Witness signatory (1) .....

Witness signatory (2) .....



## Schedule of Plant and materials

For use with Advance Payment Guarantees on contracts using the General Conditions of Contract for Construction Works, Third Edition, 2015.

Employer

The City of Cape Town, URBAN MOBILITY DIRECTORATE

Contractor

Works

72Q/2025/26: UPGRADE OF VOORTREKKER ROAD, FROM 4th AVENUE TO 12TH AVENUE, MAITLAND

Payment Certificate No. ....

Advance payment is requested in respect of the following items of Plant and materials, which have been manufactured and are stored at places other than the Site, or in respect of which a deposit with order is required from the Contractor by a manufacturer/supplier:

[illegible]

Signed at ..... on the ..... day of ..... 20.....

.....  
for the Contractor

As witness

Approved by Employer's Agent

**Contract**

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**Form of Advance Payment Guarantee** C1.4

1: Agreements and Contract Data  
 1: 72Q/2025/26

CITY OF CAPE TOWN

URBAN MOBILITY DIRECTORATE: TRANSPORT INFRASTRUCTURE IMPLEMENTATION

CONTRACT NO. 72Q/2025/26

UPGRADE OF VOORTREKKER ROAD, FROM 4TH AVENUE TO 12TH AVENUE, MAITLAND

## C1.5 Occupational Health and Safety Agreement

AGREEMENT MADE AND ENTERED INTO BETWEEN THE CITY OF CAPE TOWN (HEREINAFTER CALLED THE "EMPLOYER") AND

.....  
(C.....)

IN TERMS OF SECTION 37(2) OF THE OCCUPATIONAL HEALTH AND SAFETY ACT, 85 OF 1993 AS AMENDED.

I, ....., representing

....., as an employer  
in its own right, do hereby undertake to ensure, as far as is reasonably practicable, that all work will be performed, and all equipment, machinery or plant used in such a manner as to comply with the provisions of the Occupational Health and Safety Act (OHSA) and the Regulations promulgated thereunder.

I furthermore confirm that I am/we are registered with the Compensation Commissioner and that all registration and assessment monies due to the Compensation Commissioner have been fully paid or that I/We are insured with an approved licensed compensation insurer.

COID ACT Registration No. ....

OR Compensation Insurer: ..... Policy No.: .....

I undertake to appoint, where required, suitable competent persons, in writing, in terms of the requirements of OHSA and the Regulations and to charge him/them with the duty of ensuring that the provisions of OHSA and Regulations as well as the Council's Special Conditions of Contract, Way Leave, Lock-Out and Work Permit Procedures are adhered to as far as reasonably practicable.

I further undertake to ensure that any subcontractors employed by me will enter into an occupational health and safety agreement separately, and that such subcontractors comply with the conditions set.

I hereby declare that I have read and understand the Occupational Health and Safety Specifications contained in this tender and undertake to comply therewith at all times.

I hereby also undertake to comply with the Occupational Health and Safety Specification and Plan submitted and approved in terms thereof.

Signed ..... on the ..... day of ..... 20 .....

Witness .....  
Signed at ..... on the ..... day of ..... 20 .....

Witness

for and on behalf of  
City of Cape Town



CITY OF CAPE TOWN

URBAN MOBILITY DIRECTORATE: TRANSPORT INFRASTRUCTURE IMPLEMENTATION

CONTRACT NO. 72Q/2025/26

UPGRADE OF VOORTREKKER ROAD, FROM 4TH AVENUE TO 12TH AVENUE, MAITLAND

## C1.6 Protection of the Environment Declaration

### PROTECTION OF THE ENVIRONMENT DECLARATION

The Contractor will not be given right of access to the Site until this form has been signed

CONTRACT NO.: 72Q/2025/26

CONTRACT TITLE: UPGRADE OF VOORTREKKER ROAD, FROM 4TH AVENUE TO 12TH AVENUE, MAITLAND

I/ we, [REDACTED] (Contractor) record as follows:

1. [REDACTED] I/ we am/ are aware of the increasing requirement by society that construction activities shall be carried out with due regard to their impact on the environment.
2. In view of this requirement of society and a corresponding requirement by the Employer with regard to this Contract, I/ we will, in addition to complying with the letter of the terms of the Contract dealing with protection of the environment, also take into consideration the spirit of such requirements and will, in selecting appropriate employees, plant, materials and methods of construction, in-so-far as I/ we have the choice, include in the analysis not only the technical and economic (both financial and with regard to time) aspects but also the impact on the environment of the options. In this regard, I/ we recognise and accept the need to abide by the "precautionary principle" which aims to ensure the protection of the environment by the adoption of the most environmentally sensitive construction approach in the face of uncertainty with regard to the environmental implications of construction.
3. I/ we declare that I/ we have read and understood the contents of the Environmental Management Programme (which is comprised of the Environmental Management Specification and its Annexures) for this Contract, and that I/ we understand my/our responsibilities in terms of enforcing and implementing the Environmental Management Programme. I/ we also declare that I/ we have made appropriate provision in my/ our pricing of the Bills of Quantities items for the Environmental Management Programme.
4. I/ we acknowledge and accept the right of the Employer to deduct, should he so wish, from any amounts due to me/ us, such amounts (hereinafter referred to as fines) as the Employer's Agent shall certify as being warranted in view of my/ our failure to comply with the terms of the Contract dealing with protection of the environment, subject to the following:
  - 4.1 The Employer's Agent, in determining the amount of such fine, shall take into account, *inter alia*, the nature of the offence, the seriousness of its impact on the environment, the degree of prior compliance/non-compliance, the extent of the Contractor's overall compliance with environmental protection requirements and, in particular, the extent to which he considers it necessary to impose a sanction in order to eliminate/reduce future occurrences
  - 4.2 The Employer's Agent shall, with respect to any fine imposed, provide me/ us with a written statement giving details of the offence, the facts on which the Employer's Agent has based his assessment and the terms of the Contract (by reference to the specific clause) which has been contravened.

Signature

R

Date

CITY OF CAPE TOWN

URBAN MOBILITY DIRECTORATE: TRANSPORT INFRASTRUCTURE IMPLEMENTATION

CONTRACT NO. 72Q/2025/26

UPGRADE OF VOORTREKKER ROAD, FROM 4TH AVENUE TO 12TH AVENUE, MAITLAND

## C1.7 Insurance Broker's Warranty

Pro Forma



*Letterhead of Contractor's Insurance Broker*

Date \_\_\_\_\_

CITY OF CAPE TOWN  
City Manager  
Civic Centre  
12 Hertzog Boulevard  
Cape Town  
8000

Dear Sir

CONTRACT NO.: 72Q/2025/26

CONTRACT TITLE: UPGRADE OF VOORTREKKER ROAD, FROM 4TH AVENUE TO 12TH AVENUE,  
MAITLAND

NAME OF CONTRACTOR: \_\_\_\_\_

I, the undersigned, do hereby confirm and warrant that all the insurances required in terms of the abovementioned contract have been issued and/or in the case of blanket/umbrella policies, have been endorsed to reflect the interests of the CITY OF CAPE TOWN with regard to the abovementioned contract, and that all the insurances and endorsements, etc., are all in accordance with the requirements of the contract.

I furthermore confirm that all premiums in the above regard have been paid.

Yours faithfully

Signed: \_\_\_\_\_

For: \_\_\_\_\_

CITY OF CAPE TOWN

URBAN MOBILITY DIRECTORATE: TRANSPORT INFRASTRUCTURE IMPLEMENTATION

CONTRACT NO. 72Q/2025/26

UPGRADE OF VOORTREKKER ROAD, FROM 4TH AVENUE TO 12TH AVENUE, MAITLAND

## C1.8 Contract of Temporary Employment as Community Liaison Officer

Construction Contract No.: .....

PROJECT .....

AGREEMENT made between the CONTRACTOR ..... and the Community Liaison Officer..... hereafter referred to as the CLO, for the appointment and employment of a CLO for the duration of the work in respect of the above named construction contract.

### 1. THE PARTIES HAVE AGREED THAT

The CLO will be employed by the CONTRACTOR on a temporary basis for the duration of the work from the date of signing this agreement to the date of practical completion as defined in the Contract, subject to all the conditions set out below.

### 2. THE DUTIES OF THE COMMUNITY LIAISON OFFICER SHALL BE:

1. to keep the community informed on the progress of the project;
2. to keep the Contractor informed on relevant Community affairs and possible grievances;
3. to manage the recruitment of workers from the Sub-Council Job-Seekers Database;
4. to assist the Contractor's supervisory staff in the management of the workers.

### 3. THE FOLLOWING CONDITIONS OF EMPLOYMENT SHALL APPLY:

The Conditions of Temporary Employment as applicable on this Contract for the workers recruited from the Community shall apply equally to the CLO, except that the rate of remuneration shall be R..... per working day. These conditions that apply are listed below as they appear in the Contract of Temporary Employment:

- 3.1 If required to work on a statutory public holiday or Sunday the payment will be double the amount stated in the previous paragraph.
- 3.2 Maximum hours of work:
  - (i) 9¼ hours per day
  - (ii) 45 hours per week;
  - (iii) 5 days per week;
  - (iv) 5 hours without an interval, whereupon there shall be an interval of at least 30 minutes;
  - (v) A spread-over period of 12 hours.
- 3.3 The CLO shall be entitled to payment where he is prevented from working by reasons which are within the control of the Contractor.
- 3.4 On days when it is raining the Contractor may, before 9 a.m., decide not to open the site and there will be no pay.

If the Contractor closes the site between 9 a.m. and 1 p.m., the CLO will be paid half the daily wage.

If the site works later than 1 p.m., the CLO will be paid the full daily wage.



- 3.5 Workers and the CLO will not be permitted to work under conditions of:
- (i) undisciplined or unruly behaviour;
  - (ii) insubordination to Team Leader, Supervisors or Management;
  - (iii) abuse of intoxicating substances;
  - (iv) criminal actions by the employee;
  - (v) strike action or political stayaways.
- 3.6 Workers, including the CLO, may be dismissed after two official written warnings for the following behaviour:
- (i) undisciplined or unruly behaviour;
  - (ii) insubordination to Team Leader, Supervisors or Management;
  - (iii) abuse of intoxicating substances;
  - (iv) wilful or negligent damage to or loss of machines or equipment.
- The Contractor shall ensure that he has statements from at least two witnesses concerning any of the above situations.  
The Contractor shall inform the CLO within 24 hours of any warning issued to workers employed from the Job-Seekers Database.
- 3.7 The CLO will be paid on a Friday afternoon every two weeks, one week in arrears.
- 3.8 The CLO shall be given a statement with each payment on which is recorded:
- (i) the name of the Contractor;
  - (ii) the CLO's name;
  - (iii) the number of days worked by the CLO;
  - (iv) the rate per day;
  - (v) the details of any deductions made;
  - (vi) the actual amount paid to the CLO.
- 3.9 No deduction shall be made from the remuneration except where the CLO consents in writing or unless the Contractor is permitted or required to do so by law or the order of any competent court.
- 3.10 The CLO shall be supplied free of charge with all health and safety equipment required by the Occupation Health and Safety Act. The equipment shall remain the property of the Contractor.
- 3.11 The Contractor must give the CLO at least one week's notice of the termination of the Contract of Temporary Employment. If this is not done, the CLO must be paid earnings for five days. This condition does not apply if the CLO is dismissed.
- 3.12 At the end of the period of temporary employment, the Contractor shall provide a Certificate of Service recording the Contractor's name, the CLO's name and address, the period of service, the type of work on which the CLO was engaged and the rate of remuneration on termination.

#### 4. TERMINATION OF AGREEMENT

- 4.1 If the CLO can no longer perform and execute his/her duties as detailed in this agreement, this agreement will be terminated without prejudice to any rights under this agreement.

#### 5. THE CONDITIONS OF THIS AGREEMENT

- 5.1 The parties expressly declare that this agreement contains all the conditions negotiated between them, and no condition or stipulation not contained herein shall be binding upon the parties.

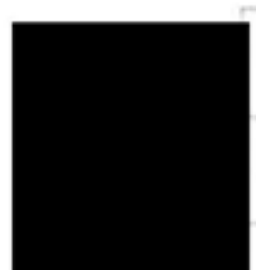
#### 6. THUS AGREED AND SIGNED BY THE PARTIES:

Contractor: .....

Community Liaison officer: .....

Date: .....

二 三 四 五 六 七 八 九 十 十一 十二 十三 十四 十五 十六 十七 十八 十九 二十 二十一 二十二 二十三 二十四 二十五 二十六 二十七 二十八 二十九 三十 三十一 三十二 三十三 三十四 三十五 三十六 三十七 三十八 三十九 四十 四十一 四十二 四十三 四十四 四十五 四十六 四十七 四十八 四十九 五十 五十一 五十二 五十三 五十四 五十五 五十六 五十七 五十八 五十九 六十 六十一 六十二 六十三 六十四 六十五 六十六 六十七 六十八 六十九 七十 七十一 七十二 七十三 七十四 七十五 七十六 七十七 七十八 七十九 八十 八十一 八十二 八十三 八十四 八十五 八十六 八十七 八十八 八十九 九十 九十一 九十二 九十三 九十四 九十五 九十六 九十七 九十八 九十九 一百



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CONTRACT NO. 72Q/2025/26

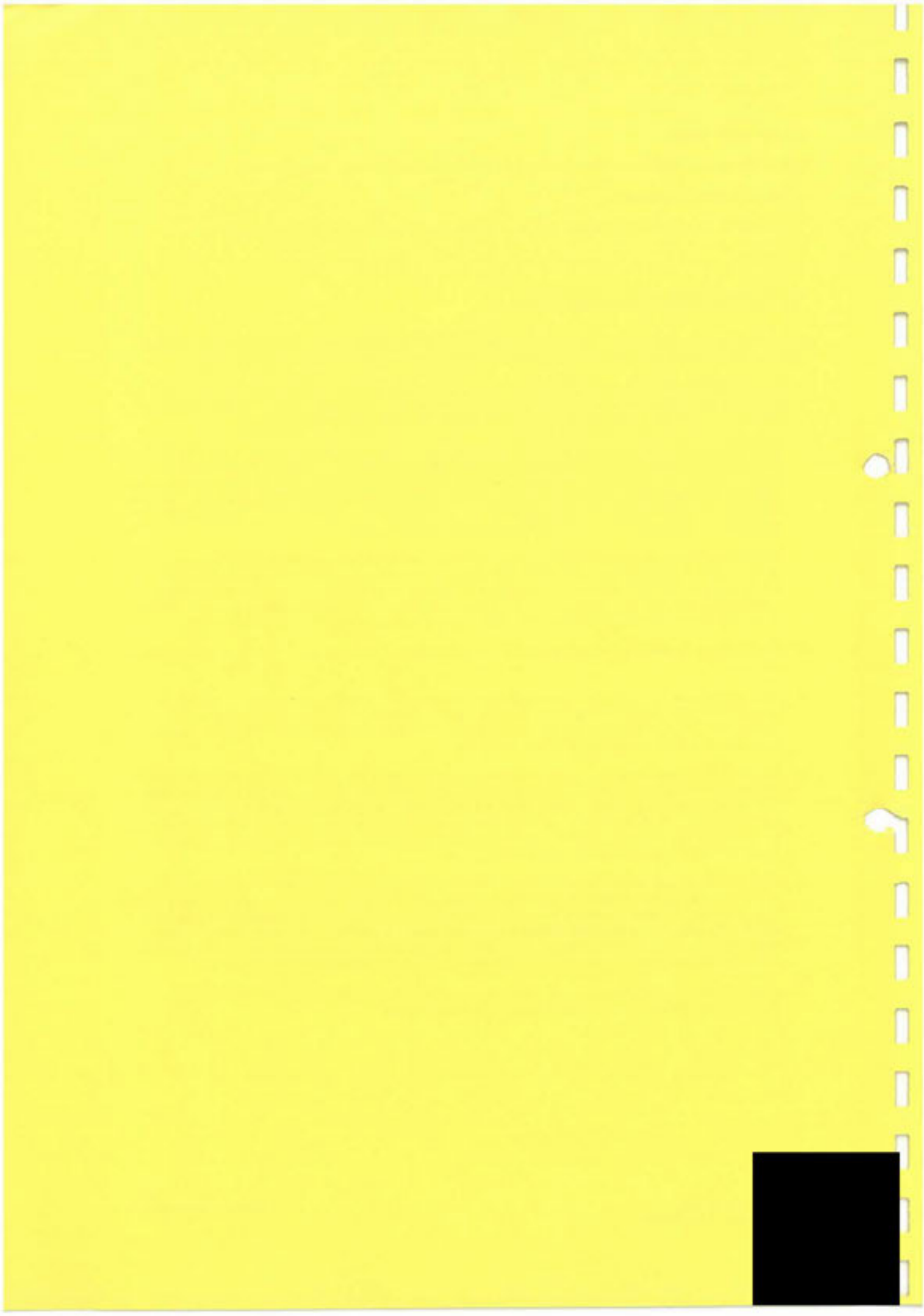
UPGRADE OF VOORTREKKER ROAD, FROM 4TH AVENUE TO 12TH AVENUE, MAITLAND

## C2.1 Pricing Assumptions

Pricing Assumptions mean the criteria as set out below, read together with all Parts of this contract document, which it will be assumed in the contract, that the tenderer has taken into account when developing his prices.

1. The method of measurement published by the South African Bureau of Standards in clause 8 of the Standardised Specifications for Civil Engineering Construction is applicable, subject to the variations and amendments contained in the section "Applicable SANS 1200 standardised specifications".
2. Descriptions in the Bills of Quantities are abbreviated and comply generally with those in the Standardised Specifications. Clause 8 of each Standardised Specification, read together with the relevant clauses of the Scope of Work, set out what ancillary or associated activities are included in the rates for the operations specified. Should any requirements of the measurement and payment clause of the applicable Standardised Specification, or the Scope of Work, conflict with the terms of the Schedule, the requirements of the Standardised Specification or Scope of Work, as applicable, shall prevail.
3. The measurement and payment clauses in a specification in which further information regarding the scheduled items is given, are referenced under "Item" (pay items) in the Bills of Quantities. The referenced clauses are not necessarily the only sources of information in respect of scheduled items. Further information and specifications may be found elsewhere in the contract documents. Standardised Specifications are identified by the digits which follow SANS in the SANS 1200 series of specifications, e.g. G for SANS 1200 G.
4. Unless otherwise stated, items are measured net in accordance with the drawings, and no allowance is made for waste.
5. The quantities set out in the Bills of Quantities are the estimated quantities of the Contract Works, but the Contractor will be required to undertake whatever quantities may be directed by the Employer's Agent from time to time. The Contract Price for the completed contract shall be computed from the actual quantities of work done, valued at the relevant unit rates and prices.
6. The prices and rates to be inserted in the Bills of Quantities are to be the full inclusive prices for the work described under the several items. Such prices and rates shall cover all costs and expenses that may be required in and for the execution of the work described, and shall cover the cost of all general risks, liabilities, and obligations set forth or implied in the documents on which the tender is based, as well as overhead charges and profit. Reasonable prices shall be inserted as these will be used as a basis for assessment of payment for additional work that may have to be carried out.
7. A price or rate should be entered against each item in the Bills of Quantities, whether the quantities are stated or not. An item against which no rate is/are entered, or if anything other than a rate or a nil rate (for example, a zero, a dash or the word "included" or abbreviations thereof) is entered against an item, it will also be regarded as a nil rate having been entered against that item, i.e. that there is no charge for that item. The Tenderer may be requested to clarify nil rates, or items regarded as having nil rates; and the Employer may also perform a risk analysis with regard to the reasonableness of such rates.
8. Except where rates only are required, insert all amounts to be included in the total tendered price in the "Amount" column and show the corresponding total tendered price.





9. The units of measurement described in the Bills of Quantities are metric units. Abbreviations which may be used in these Bills of Quantities are as follows:

|                      |   |                       |          |   |                  |
|----------------------|---|-----------------------|----------|---|------------------|
| mm                   | = | millimetre            | h        | = | hour             |
| m                    | = | metre                 | kg       | = | kilogram         |
| km                   | = | kilometre             | t        | = | ton (1000 kg)    |
| m <sup>2</sup>       | = | square metre          | No.      | = | number           |
| m <sup>2</sup> .pass | = | square metre-pass     | sum      | = | lump sum         |
| ha                   | = | hectare               | MN       | = | meganewton       |
| m <sup>3</sup>       | = | cubic metre           | MN.m     | = | meganewton-metre |
| m <sup>3</sup> .km   | = | cubic metre-kilometre | P C sum  | = | Prime Cost sum   |
| l                    | = | litre                 | Prov sum | = | Provisional sum  |
| kl                   | = | kilolitre             | %        | = | per cent         |
| MPa                  | = | megapascal            | kW       | = | kilowatt         |

10. Where fractions of a cent occur in calculations of prices and amounts, they shall be rounded up/down to the nearest whole cent.
11. The Tenderer is referred to C.2.24 in Part T1.2 Tender Data regarding the pricing of Deviations and/or Qualifications.
11. Clause C.2.13.11 c) in Part T1.2 Tender Data shall be applicable to the submission of Bills of Quantities which have been priced electronically, and which the Tenderer wishes to submit as a printed version with his/her tender in the place of handwritten priced Bills of Quantities.

If there is found to be any variance between the printed version and the original issued document, the original shall stand. However, where Addenda have been issued which amend the Bills of Quantities, then the printed Bills of Quantities shall take these into account.

The pages of the issued Bills of Quantities should not be removed from the tender document.

12. Tenderers are referred to Clause 8 Measurement and Payment in the Environmental Management (EM) Specification in Part C3.5 in the Scope of Work for the basic principles of measurement and pricing of the EM Specification.
13. All descriptions or clauses where trade names or proprietary products are specified, are deemed to include the phrase "or equal approved"
14. Tenderers are referred to Clause 6.8.2 in Part C1.2 Contract Data regarding contract price adjustment.

The following bills in Part C2.2 Bills of Quantities are deemed applicable to the following categories for the purposes of Contract Price Adjustment:

| NO. | BILL                                        | CPA CATEGORY         |
|-----|---------------------------------------------|----------------------|
| 1.  | GENERAL ITEMS                               | To be proportioned   |
| 2.  | ROADWORKS                                   | Roads and earthworks |
| 3.  | SERVICES                                    | Roads and earthworks |
| 4.  | WATER MAINS                                 | Roads and earthworks |
| 5.  | ELECTRICAL STREET LIGHTING                  | Roads and earthworks |
| 6.  | TRAFFIC SIGNALISATION                       | Roads and earthworks |
| 7.  | CEMETRY WALL & FENCING                      | Concrete work        |
| 8.  | WATER BOX CHAMBERS                          | Concrete work        |
| 9.  | ELECTRICAL MV/LV INFRASTRUCTURE RELOCATIONS | Roads and earthworks |

2

2





C1.2: GENERAL REQUIREMENTS

| Item   |          |     | Description                                                                                       | Unit                        | Quantity |
|--------|----------|-----|---------------------------------------------------------------------------------------------------|-----------------------------|----------|
| C 1.2  |          |     | <b>GENERAL REQUIREMENTS AND PROVISIONS</b>                                                        |                             |          |
| C1.2.1 |          |     | <b>Environmental Management:</b>                                                                  |                             |          |
|        | C1.2.1.1 |     | Monitoring of compliance with and reporting on the EMP                                            | month (mo.)                 |          |
|        | C1.2.1.2 |     | Dedicated environmental officer                                                                   | month (mo.)                 |          |
| C1.2.2 |          |     | <b>Programming and Reporting:</b>                                                                 |                             |          |
|        | C1.2.2.3 |     | Submission of a Scheme 2 Initial Programme                                                        | lump sum                    |          |
|        | C1.2.2.4 |     | Submission of a Scheme 2 Full Programme                                                           | lump sum                    |          |
|        | C1.2.2.5 |     | Reviewing and updating a Scheme 2 programme every month                                           | month (mo.)                 |          |
|        | C1.2.2.6 |     | Preparation and submission of all information and reports specified in the Contract Documentation | month (mo.)                 |          |
| C1.2.4 |          |     | <b>Stakeholder liaison</b>                                                                        | month (mo.)                 |          |
| C1.2.5 |          |     | <b>Safety:</b>                                                                                    |                             |          |
|        | C1.2.5.1 |     | Health and safety plan                                                                            | lump sum                    |          |
|        | C1.2.5.2 |     | Implementation of health and safety plan                                                          | month (mo.)                 |          |
| C1.2.6 |          |     | <b>Work adjacent to properties:</b>                                                               |                             |          |
|        | C1.2.6.1 |     | Survey of adjacent properties                                                                     | number (No.)                |          |
|        | C1.2.6.2 |     | Preventive and / or mitigation measures                                                           | provisional sum (Prov. Sum) |          |
|        | C1.2.6.3 |     | Handling cost, profit and all other charges in respect of item C1.2.6.2                           | %                           |          |
| C1.2.8 |          |     | <b>Dayworks:</b>                                                                                  |                             |          |
|        | C1.2.8.1 |     | <b>Personnel:</b>                                                                                 |                             |          |
|        |          | (a) | Unskilled labourer                                                                                | hour (h)                    |          |
|        |          | (b) | Semi-skilled labourer                                                                             | hour (h)                    |          |
|        |          | (c) | Skilled labourer                                                                                  | hour (h)                    |          |
|        |          | (d) | Gang leader                                                                                       | hour (h)                    |          |

Total Carried Forward



CITY OF CAPE TOWN  
TRANSPORT INFRASTRUCTURE IMPLEMENTATION,  
URBAN MOBILITY DIRECTORATE  
CONTRACT NO. 72Q/2025/26  
SCHEDULE 1 : GENERAL

### C1.3: CONTRACTOR'S SITE ESTABLISHMENT AND GENERAL OBLIGATIONS

| Item                         |           |       | Description                                                                                                                                   | Unit                        | Quantity | Rate | Amount |
|------------------------------|-----------|-------|-----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|----------|------|--------|
| C1.3                         |           |       | <b>CONTRACTOR'S SITE ESTABLISHMENT AND GENERAL OBLIGATIONS</b>                                                                                |                             |          |      |        |
| PC1.3.1                      |           |       | <b>The Contractor's general obligations:</b>                                                                                                  |                             |          |      |        |
|                              | C1.3.1.1  |       | Fixed obligations                                                                                                                             | lump sum                    |          |      |        |
|                              | C1.3.1.2  |       | Value-related obligations                                                                                                                     | lump sum                    |          |      |        |
|                              | PC1.3.1.3 |       | Time-related obligations                                                                                                                      |                             |          |      |        |
|                              |           | (a)   | Mobilisation period                                                                                                                           | month (mo.)                 |          |      |        |
|                              |           | (b)   | Execution of the works                                                                                                                        | month (mo.)                 |          |      |        |
|                              |           | (c)   | Extra over Subitem PC1.3.1.3 (b) for working on Sundays and other special non-working days on the written instruction of the Employer's Agent | Days                        |          |      |        |
|                              |           | (d)   | Extra over Subitem PC1.3.1.3 (b) for working at night (including provision of lighting) on the written instruction of the Employer's Agent    | Days                        |          |      |        |
| C1.3.2                       |           |       | <b>Contract sign boards</b>                                                                                                                   | square metre (m²)           |          |      |        |
| PC1.3.3                      |           |       | <b>Provisional Sums:</b>                                                                                                                      |                             |          |      |        |
|                              |           | (a)   | Protection, relocation or reinstatement of existing services                                                                                  |                             |          |      |        |
|                              |           | (i)   | Dark Fibre Africa                                                                                                                             | provisional sum (Prov. Sum) |          |      |        |
|                              |           | (ii)  | Liquid Telecom (Neotel)                                                                                                                       | provisional sum (Prov. Sum) |          |      |        |
|                              |           | (iii) | Telkom (Open Serve)                                                                                                                           | provisional sum (Prov. Sum) |          |      |        |
|                              |           | (iv)  | City of Cape Town IS&T                                                                                                                        | provisional sum (Prov. Sum) |          |      |        |
|                              |           | (b)   | Handling costs and profit in respect of Subitems PC1.3.3 (a)(i) to (viii)                                                                     | %                           |          |      |        |
| <b>Total Carried Forward</b> |           |       |                                                                                                                                               |                             |          |      |        |



**CITY OF CAPE TOWN  
TRANSPORT INFRASTRUCTURE IMPLEMENTATION,  
URBAN MOBILITY DIRECTORATE  
CONTRACT NO. 72Q/2025/26  
SCHEDULE 1 : GENERAL**

### C1.3: CONTRACTOR'S SITE ESTABLISHMENT AND GENERAL OBLIGATIONS

| Item                             | Description | Unit                                                                                                           | Quantity                    | Rate | Amount |
|----------------------------------|-------------|----------------------------------------------------------------------------------------------------------------|-----------------------------|------|--------|
| Brought Forward                  |             |                                                                                                                |                             |      |        |
|                                  | (c)         | Advertising in the Press                                                                                       | provisional sum (Prov. Sum) |      |        |
|                                  | (d)         | Handling costs and profit in respect of Subitem PC1.3.3 (c)                                                    | %                           |      |        |
|                                  | (e)         | Relocation, removal and installation of survey beacons                                                         | provisional sum (Prov. Sum) |      |        |
| 3.5.7.01                         |             | <b>Community participation:</b>                                                                                |                             |      |        |
|                                  | (a)         | Cost of community participation and public liaison                                                             | provisional sum (Prov. Sum) |      |        |
|                                  | (b)         | Handling costs and profit in respect of subitem 3.5.7.01(a)                                                    | %                           |      |        |
| 3.5.7.02                         |             | <b>Community Liaison Officer:</b>                                                                              |                             |      |        |
|                                  | (a)         | Remuneration of 2 (two) Community Liaison Officers                                                             | prime cost sum (PC Sum)     |      |        |
|                                  | (b)         | Contractor's charges to allow for handling costs and profit in respect of subitem 3.5.7.02(a)                  | %                           |      |        |
| 3.5.7.03                         |             | <b>Formal Training:</b>                                                                                        |                             |      |        |
|                                  | (a)         | Cost to company of temporary local labourers for off-site training during which no productive work is executed | prime cost sum (PC Sum)     |      |        |
|                                  | (b)         | Contractor's charges to allow for handling costs and profit in respect of subitem 3.5.7.03(a)                  | %                           |      |        |
|                                  | (c)         | Formal training courses for temporary local labourers                                                          | prime cost sum (PC Sum)     |      |        |
|                                  | (d)         | Contractor's charges to allow for handling costs and profit in respect of subitem 3.5.7.03(c)                  | %                           |      |        |
| 3.5.7.04                         |             | The Contractor's obligations in respect of training                                                            | lump sum                    |      |        |
| 3.5.7.05                         |             | Site records                                                                                                   | lump sum                    |      |        |
| Total Carried Forward To Summary |             |                                                                                                                |                             |      |        |

C1.4: FACILITIES FOR THE ENGINEER

| Item                  |           |  | Description                                              | Unit              | Quantity | Rate | Amount |
|-----------------------|-----------|--|----------------------------------------------------------|-------------------|----------|------|--------|
| C1.4                  |           |  | <b>FACILITIES FOR THE ENGINEER</b>                       |                   |          |      |        |
| C1.4.1                |           |  | <b>Site accommodation:</b>                               |                   |          |      |        |
|                       | C1.4.1.1  |  | Offices and conference room                              | square metre (m²) |          |      |        |
|                       | C1.4.1.6  |  | Car ports                                                | number (No.)      |          |      |        |
|                       | C1.4.1.7  |  | Ablution unit (equipped as specified)                    | number (No.)      |          |      |        |
|                       | C1.4.1.9  |  | Kitchen unit (equipped as specified)                     | number (No.)      |          |      |        |
| C1.4.2                |           |  | <b>Items measured by area:</b>                           |                   |          |      |        |
|                       | C1.4.2.1  |  | Shelving as specified, complete with brackets            | square metre (m²) |          |      |        |
|                       | C1.4.2.2  |  | Work benches with a concrete slab top                    | square metre (m²) |          |      |        |
|                       | C1.4.2.3  |  | Work-benches with a wooden top                           | square metre (m²) |          |      |        |
|                       | C1.4.2.5  |  | Concrete footings and pedestals for laboratory equipment | square metre (m²) |          |      |        |
|                       | C1.4.2.6  |  | Roller blinds, opaque type                               | square metre (m²) |          |      |        |
|                       | C1.4.2.7  |  | Venetian blinds                                          | square metre (m²) |          |      |        |
|                       | C1.4.2.8  |  | Notice boards                                            | square metre (m²) |          |      |        |
|                       | C1.4.2.9  |  | White boards                                             | square metre (m²) |          |      |        |
|                       | C1.4.2.10 |  | Galvanised wire mesh fencing for store rooms             | square metre (m²) |          |      |        |
|                       | C1.4.2.11 |  | Galvanised wire mesh store room gate with a padlock      | square metre (m²) |          |      |        |
| C1.4.3                |           |  | <b>Items measured by number:</b>                         |                   |          |      |        |
|                       | C1.4.3.1  |  | Office swivel chair                                      | number (No.)      |          |      |        |
|                       | C1.4.3.2  |  | Office chair                                             | number (No.)      |          |      |        |
|                       | C1.4.3.3  |  | Draughtsman's stool                                      | number (No.)      |          |      |        |
| Total Carried Forward |           |  |                                                          |                   |          |      |        |



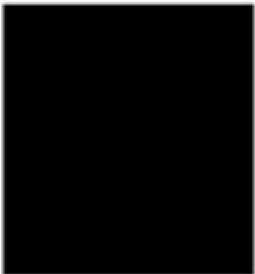




C1.4: FACILITIES FOR THE ENGINEER

| Item                             |  |      | Description                                                                           | Unit                    | Quantity | Rate | Amount |
|----------------------------------|--|------|---------------------------------------------------------------------------------------|-------------------------|----------|------|--------|
| Brought Forward                  |  |      |                                                                                       |                         |          |      |        |
|                                  |  | (i)  | Provision for payment to Commercial Laboratory for acceptance testing by the Engineer | prime cost sum (PC Sum) |          |      |        |
|                                  |  | (ii) | Contractor's charge in respect of PC1.4.9 (i)                                         | %                       |          |      |        |
| Total Carried Forward To Summary |  |      |                                                                                       |                         |          |      |        |

| SUMMARY OF SECTIONS                           |                                                                  |
|-----------------------------------------------|------------------------------------------------------------------|
| Secti                                         | Description                                                      |
| C1.2                                          | C1.2: GENERAL REQUIREMENTS AND                                   |
| C1.3                                          | C1.3: CONTRACTOR'S SITE ESTABLISHMENT<br>AND GENERAL OBLIGATIONS |
| C1.4                                          | C1.4: FACILITIES FOR THE ENGINEER                                |
| Total Carried Forward To Summary Of Schedules |                                                                  |





C1.5: ACCOMMODATION OF TRAFFIC

| Item                  |                   |     | Description                                                                                                                                                                                | Unit              | Quantity | Rate | Amount |
|-----------------------|-------------------|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------|------|--------|
| C1.5                  |                   |     | <b>ACCOMMODATION OF TRAFFIC</b>                                                                                                                                                            |                   |          |      |        |
| C1.5.1                |                   |     | <b>Accommodation of pedestrian and non-motorised traffic:</b>                                                                                                                              |                   |          |      |        |
|                       | C1.5.1.1          |     | Accommodation of pedestrian and non-motorised traffic                                                                                                                                      | month (mo.)       |          |      |        |
| C1.5.2                |                   |     | <b>Accommodation of vehicular traffic</b>                                                                                                                                                  | month (mo.)       |          |      |        |
| C1.5.3                |                   |     | <b>Liaison with traffic authorities</b>                                                                                                                                                    | month (mo.)       |          |      |        |
| C1.5.4                |                   |     | <b>Construction of temporary deviations</b>                                                                                                                                                |                   |          |      |        |
|                       | C1.5.4 / C4.4.2.1 |     | Pavement Layer Material:                                                                                                                                                                   |                   |          |      |        |
|                       |                   | (c) | Type G3 material                                                                                                                                                                           | cubic metre (m³)  |          |      |        |
|                       |                   | (e) | Type G5B material                                                                                                                                                                          | cubic metre (m³)  |          |      |        |
|                       | C1.5.4 / C5.3.2.1 |     | Construction of layers using conventional construction method                                                                                                                              |                   |          |      |        |
|                       |                   | (w) | G3 crushed stone base layer (150mm thick) compacted to 98 % of MDD                                                                                                                         | cubic metre (m³)  |          |      |        |
|                       |                   | (p) | G5B crushed rock/boulder subbase layer (150mm thick) compacted to 97 % of MDD                                                                                                              | cubic metre (m³)  |          |      |        |
|                       | C1.5.4 / C8.1.1.1 |     | MC -30 cut-back bitumen                                                                                                                                                                    | litre (l)         |          |      |        |
|                       | C1.5.4 / C9.1.3.1 |     | Stable – grade 30 % net bitumen emulsion as specified. Applied with a calibrated distributor                                                                                               | litre (l)         |          |      |        |
|                       | C1.5.4 / C9.1.3.2 |     | Applied in restricted areas using a portable pressure sprayer                                                                                                                              | litre (l)         |          |      |        |
|                       | C1.5.4 / C9.1.3.3 |     | Applied by hand using brushes on all exposed transverse and longitudinal construction joints                                                                                               | litre (l)         |          |      |        |
|                       | C1.5.4 / C9.1.5.1 | (e) | Sand skeletal mix – continuously graded as defined (40mm thick interlayer, with 50/70 penetration grade bitumen, NMPS of 10mm, at design level III, placed with a suitably approved paver) | square metre (m²) |          |      |        |
| C1.5.5                |                   |     | <b>Maintenance of temporary deviations:</b>                                                                                                                                                |                   |          |      |        |
|                       | C1.5.5.4          |     | Collection of rubbish / litter                                                                                                                                                             | kilometre (km)    |          |      |        |
|                       | C1.5.5.5          |     | Base patching using crushed stone material stabilised with bitumen emulsion and cement                                                                                                     | cubic metre (m³)  |          |      |        |
| Total Carried Forward |                   |     |                                                                                                                                                                                            |                   |          |      |        |

CITY OF CAPE TOWN  
 TRANSPORT INFRASTRUCTURE IMPLEMENTATION,  
 URBAN MOBILITY DIRECTORATE  
 CONTRACT NO. 72Q/2025/26  
 SCHEDULE 2: ROADWORKS

C1.5: ACCOMMODATION OF TRAFFIC

| Item                  |          |      | Description                                                                                                        | Unit           | Quantity | Rate | Amount |
|-----------------------|----------|------|--------------------------------------------------------------------------------------------------------------------|----------------|----------|------|--------|
| Brought Forward       |          |      |                                                                                                                    |                |          |      |        |
| C1.5.6                | C1.5.5.6 |      | Base and / or surface patching using cold premixed asphalt                                                         | kilogram (kg)  |          |      |        |
|                       | C1.5.5.7 |      | Base and / or surface patching using hot plant mixed asphalt                                                       | tonne (t)      |          |      |        |
|                       |          |      | Removal of temporary deviations                                                                                    | kilometre (km) |          |      |        |
| C1.5.7                |          |      | Temporary traffic control facilities:                                                                              |                |          |      |        |
|                       | C1.5.7.1 |      | Delineators including mounting bases and ballast:                                                                  |                |          |      |        |
|                       |          | (a)  | Single sided, reversible left or right (200mm x 800mm)                                                             | number (No.)   |          |      |        |
|                       |          | (b)  | Double sided, reversible left or right (200mm x 800mm)                                                             | number (No.)   |          |      |        |
|                       | C1.5.7.2 |      | Traffic cones, minimum height 750 mm                                                                               | number (No.)   |          |      |        |
|                       | C1.5.7.3 |      | Flagmen                                                                                                            | man-shift      |          |      |        |
|                       | C1.5.7.4 |      | Traffic controllers                                                                                                | man-shift      |          |      |        |
|                       | C1.5.7.5 |      | Provision of illuminated traffic signs:                                                                            |                |          |      |        |
|                       |          | (a)  | Sign mounted flashing amber lights (2 lights with the specified power supply) mounted on a backing board which is: |                |          |      |        |
|                       |          | (i)  | 900 mm wide x 150 mm high                                                                                          | number (No.)   |          |      |        |
|                       |          | (ii) | 1 200 mm wide x 200 mm high                                                                                        | number (No.)   |          |      |        |
|                       |          | (b)  | Flashing LED illuminated arrow board                                                                               | number (No.)   |          |      |        |
|                       |          | (c)  | Illuminated road sign – R & TR series (900mm)                                                                      | number (No.)   |          |      |        |
|                       |          | (d)  | Illuminated road sign – TW series (900mm)                                                                          | number (No.)   |          |      |        |
|                       | C1.5.7.6 |      | Maintenance of illuminated traffic signs:                                                                          |                |          |      |        |
|                       |          | (c)  | Illuminated road sign – R & TR series (900mm)                                                                      | month (mo.)    |          |      |        |
|                       |          | (d)  | Illuminated road sign – TW series (900mm)                                                                          | month (mo.)    |          |      |        |
| Total Carried Forward |          |      |                                                                                                                    |                |          |      |        |

C1.5: ACCOMMODATION OF TRAFFIC

| Item                             |           |     | Description                                                                                              | Unit                        | Quantity | Rate | Amount |
|----------------------------------|-----------|-----|----------------------------------------------------------------------------------------------------------|-----------------------------|----------|------|--------|
| Brought Forward                  |           |     |                                                                                                          |                             |          |      |        |
| C1.5.7.9                         |           |     | Cleaning of traffic control facilities                                                                   | month (mo.)                 |          |      |        |
| C1.5.8                           |           |     | Traffic safety                                                                                           | man-month                   |          |      |        |
| C1.5.9                           |           |     | Traffic safety vehicle                                                                                   | month (mo.)                 |          |      |        |
| C1.5.11                          |           |     | Provision of safety equipment for visitors                                                               |                             |          |      |        |
|                                  | C1.5.11.1 |     | Provision of reflective safety vests for visitors                                                        | number (No.)                |          |      |        |
|                                  | C1.5.11.2 |     | Provision of hard hats for visitors                                                                      | number (No.)                |          |      |        |
| C1.5.12                          |           |     | Additional traffic accommodation facilities ordered by the Engineer:                                     |                             |          |      |        |
|                                  | C1.5.12.1 |     | Provision of additional traffic accommodation facilities                                                 | provisional sum (Prov. Sum) |          |      |        |
|                                  | C1.5.12.2 |     | Handling cost, profit and all other charges in respect of item C1.5.12.1                                 | %                           |          |      |        |
| C1.5/C11.4.3                     |           |     | Project specific concrete barrier systems                                                                |                             |          |      |        |
| PC1.5/PC11.4.3.2                 |           | (a) | Movable barriers, precast concrete NJ Type established on site, relocated as required and de-established | metre (m)                   |          |      |        |
|                                  |           | (b) | Relocation of length of concrete barriers within 1km freehaul distance                                   | metre (m)                   |          |      |        |
| PC1.5.13                         |           |     | Dismantle, store, refurbish and reinstall steel bus shelters                                             | number (No.)                |          |      |        |
| Total Carried Forward To Summary |           |     |                                                                                                          |                             |          |      |        |



C1.6: CLEAR AND GRUBBING

| Item                             |           |  | Description                                                                                                 | Unit                        | Quantity | Rate | Amount |
|----------------------------------|-----------|--|-------------------------------------------------------------------------------------------------------------|-----------------------------|----------|------|--------|
| C1.6                             |           |  | <b>CLEAR AND GRUBBING</b>                                                                                   |                             |          |      |        |
| C1.6.1                           |           |  | <b>Clearing</b>                                                                                             |                             |          |      |        |
|                                  | C1.6.1.1  |  | Clearing with machines and some hand labour where necessary                                                 | hectare (ha)                |          |      |        |
|                                  | C1.6.1.2  |  | Clearing with hand labour only when labour enhanced work is specified                                       | hectare (ha)                |          |      |        |
| C1.6.2                           |           |  | <b>Grubbing</b>                                                                                             |                             |          |      |        |
|                                  | C1.6.2.1  |  | Grubbing with machines and some hand labour where necessary                                                 | hectare (ha)                |          |      |        |
|                                  | C1.6.2.2  |  | Grubbing with hand labour when labour enhancement work is specified or it is not practical to use a machine | hectare (ha)                |          |      |        |
| C1.6.3                           |           |  | <b>Removal and grubbing of large trees and tree stumps:</b>                                                 |                             |          |      |        |
|                                  | C1.6.3.1  |  | Girth equal to or exceeding 1,0m up to and including 2,0m                                                   | number (No.)                |          |      |        |
|                                  | C1.6.3.2  |  | Girth exceeding 2,0m up to and including 3,0m                                                               | number (No.)                |          |      |        |
|                                  | C1.6.3.3  |  | Girth exceeding 3,0m                                                                                        | number (No.)                |          |      |        |
| PC1.6.4                          |           |  | <b>Removal of buildings and structures</b>                                                                  |                             |          |      |        |
|                                  | C1.6.4.1  |  | Erf 24541-RE, Maitland Cemetery existing building add-on structures, 5.5x3x3m shed and 7mx2.5x3m canopy     | lump sum                    |          |      |        |
|                                  | C1.6.4.2  |  | Erf 24544-RE, Maitland Cemetery Caretaker's Cottage Mislc.buildings / ruins                                 | lump sum                    |          |      |        |
| C1.6.7                           |           |  | <b>Re-clearing of previously cleared areas</b>                                                              | hectare (ha)                |          |      |        |
| C1.6.10                          |           |  | <b>Disposal of hazardous waste material:</b>                                                                |                             |          |      |        |
|                                  | C1.6.10.1 |  | Disposal of hazardous waste material at an approved hazardous waste material facility                       | provisional sum (Prov. Sum) |          |      |        |
|                                  | C1.6.10.2 |  | Handling cost, profit and all other charges in respect of item C1.6.10.1                                    | %                           |          |      |        |
| Total Carried Forward To Summary |           |  |                                                                                                             |                             |          |      |        |



CITY OF CAPE TOWN  
 TRANSPORT INFRASTRUCTURE IMPLEMENTATION,  
 URBAN MOBILITY DIRECTORATE  
 CONTRACT NO. 72Q/2025/26  
 SCHEDULE 2: ROADWORKS

C3.1: DRAINS

| Item                  |          |     | Description                                                                                                             | Unit             | Quantity | Rate | Amount |
|-----------------------|----------|-----|-------------------------------------------------------------------------------------------------------------------------|------------------|----------|------|--------|
| C3.1                  |          |     | <b>DRAINS</b>                                                                                                           |                  |          |      |        |
| C3.1.1                |          |     | <b>Excavation for open drains:</b>                                                                                      |                  |          |      |        |
|                       | C3.1.1.1 |     | Excavating all material situated within the following depth ranges below the surface level using conventional methods:  |                  |          |      |        |
|                       |          | (a) | 0m to 1,5m                                                                                                              | cubic metre (m³) |          |      |        |
|                       |          | (b) | Exceeding 1,5m and up to 3,0m                                                                                           | cubic metre (m³) |          |      |        |
|                       | C3.1.1.4 |     | Excavating soft material situated 0m to 1,5m below the surface level using labour enhanced construction methods         | cubic metre (m³) |          |      |        |
|                       | C3.1.1.5 |     | Excavating intermediate material situated 0m to 1,5m below the surface level using labour enhanced construction methods | cubic metre (m³) |          |      |        |
| C3.1.2                |          |     | <b>Clearing, shaping and disposal of accumulated sediment in existing unlined open drains</b>                           |                  |          |      |        |
|                       | C3.1.2.1 |     | Using conventional methods                                                                                              | cubic metre (m³) |          |      |        |
|                       | C3.1.2.2 |     | Using labour enhanced construction methods                                                                              | cubic metre (m³) |          |      |        |
| C3.1.3                |          |     | <b>Excavation, clearing and disposal of accumulated sediment in existing lined drains and drainage systems</b>          |                  |          |      |        |
|                       | C3.1.3.1 |     | Using conventional methods (up to 1,5m):                                                                                |                  |          |      |        |
|                       |          | (a) | Manholes and inlet and outlet structures                                                                                | cubic metre (m³) |          |      |        |
|                       |          | (b) | Culvert barrels                                                                                                         | cubic metre (m³) |          |      |        |
|                       |          | (c) | Concrete or other lined side drains                                                                                     | cubic metre (m³) |          |      |        |
|                       | C3.1.3.3 |     | Using labour enhanced construction methods:                                                                             |                  |          |      |        |
|                       |          | (a) | Manholes and inlet and outlet structures                                                                                | cubic metre (m³) |          |      |        |
|                       |          | (b) | Culvert barrels                                                                                                         | cubic metre (m³) |          |      |        |
|                       |          | (c) | Concrete or other lined side drains                                                                                     | cubic metre (m³) |          |      |        |
| Total Carried Forward |          |     |                                                                                                                         |                  |          |      |        |

| Item                  |             |     | Description                                                                                                                                  | Unit             | Quantity | Rate | Amount |
|-----------------------|-------------|-----|----------------------------------------------------------------------------------------------------------------------------------------------|------------------|----------|------|--------|
| Brought Forward       |             |     |                                                                                                                                              |                  |          |      |        |
| PC3.1.4               |             |     | <b>Excavation and disposal of material for subsoil drainage systems:</b>                                                                     |                  |          |      |        |
|                       | C3.1.4.1    |     | Excavating in all material situated within the following depth ranges below the surface:                                                     |                  |          |      |        |
|                       |             | (a) | 0m to 1,5m                                                                                                                                   | cubic metre (m³) |          |      |        |
|                       |             | (b) | Exceeding 1,5m and up to 3,0m                                                                                                                | cubic metre (m³) |          |      |        |
|                       | PC3.1.4.1.1 |     | Extra-over item C3.1.4.1 (a) and (b) for hand excavation in close proximity to existing services in order to comply with wayleave conditions | cubic metre (m³) |          |      |        |
|                       | C3.1.4.2    |     | Excavating soft material situated within 0m to 1,5m below the surface level using labour enhanced construction methods                       | cubic metre (m³) |          |      |        |
|                       | C3.1.4.3    |     | Excavating intermediate material situated within 0m to 1,5m below the surface level using labour enhanced construction methods               | cubic metre (m³) |          |      |        |
| C3.1.5                |             |     | <b>Impermeable backfilling to subsoil drainage systems</b>                                                                                   |                  |          |      |        |
|                       | C3.1.5.1    |     | Un-stabilised natural gravel obtained from approved sources on the site                                                                      | cubic metre (m³) |          |      |        |
|                       | C3.1.5.2    |     | G5 material obtained from commercial sources                                                                                                 | cubic metre (m³) |          |      |        |
|                       | C3.1.5.3    |     | Extra over items C3.1.5.1 and C3.1.5.2 for stabilisation with 4,0% CEM II (32.5) cement                                                      | cubic metre (m³) |          |      |        |
| C3.1.7                |             |     | <b>Natural permeable material in subsoil drainage systems (approved crushed stone):</b>                                                      |                  |          |      |        |
|                       | C3.1.7.2    |     | Crushed stone obtained from commercial sources (Coarse grade, 20mm)                                                                          | cubic metre (m³) |          |      |        |
| C3.1.8                |             |     | <b>Natural permeable material in subsoil drainage systems (approved natural sand):</b>                                                       |                  |          |      |        |
|                       | C3.1.8.2    |     | Natural sand from commercial sources (Medium grade)                                                                                          | cubic metre (m³) |          |      |        |
| C3.1.9                |             |     | <b>Pipes in subsoil drainage systems:</b>                                                                                                    |                  |          |      |        |
|                       | C3.1.9.2    |     | HDPE flexible pipes with smooth bore complete with couplings                                                                                 |                  |          |      |        |
|                       |             | (i) | 110mm internal dia. perforated or slotted                                                                                                    | metre (m)        |          |      |        |
| Total Carried Forward |             |     |                                                                                                                                              |                  |          |      |        |

| Item                             |           |      | Description                                                               | Unit                        | Quantity | Rate | Amount |
|----------------------------------|-----------|------|---------------------------------------------------------------------------|-----------------------------|----------|------|--------|
| Brought Forward                  |           |      |                                                                           |                             |          |      |        |
| C3.1.11                          |           | (i)  | 160mm internal dia. perforated or slotted                                 | metre (m)                   |          |      |        |
|                                  |           | (ii) | 110mm internal diameter, normal                                           | metre (m)                   |          |      |        |
|                                  |           | (iv) | 160mm internal diameter, normal                                           | metre (m)                   |          |      |        |
|                                  |           |      | Geotextiles (Non woven needle punched type A2 or equivalent)              | square metre (sqm)          |          |      |        |
| C3.1.14                          | C3.1.14.1 |      | Caps for subsoil drain pipes:                                             |                             |          |      |        |
|                                  |           |      | Concrete caps                                                             | number (No.)                |          |      |        |
| C3.1.15                          |           |      | Repairing or replacing existing drainage systems                          | provisional sum (Prov. Sum) |          |      |        |
| C3.1.20                          |           |      | Breaking into existing drainage structures and install subsoil drain pipe | number (No.)                |          |      |        |
| C3.1.22                          |           |      | Test flushing of subsoil drain pipe systems                               | number (No.)                |          |      |        |
| C3.1.23                          |           |      | Subsoil drain outlet marker (type or drawing specified)                   | number (No.)                |          |      |        |
| C3.1.24                          |           |      | Submission of as built drawings by the Contractor                         | lump sum                    |          |      |        |
| Total Carried Forward To Summary |           |      |                                                                           |                             |          |      |        |





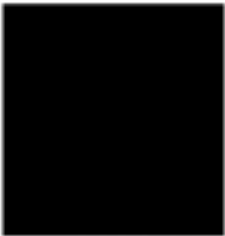
C3.3 CONCRETE KERBING AND CHANNELING

| Item                             |            |     | Description                                                                                           | Unit              | Quantity | Rate | Amount |
|----------------------------------|------------|-----|-------------------------------------------------------------------------------------------------------|-------------------|----------|------|--------|
| Brought Forward                  |            |     |                                                                                                       |                   |          |      |        |
| C3.3.3                           |            | (b) | Cast in situ v-channel                                                                                | metre (m)         |          |      |        |
|                                  |            |     | Extra over items C3.3.1 and C3.3.2 for concrete kerbing or concrete kerbing and channeling on curves: |                   |          |      |        |
|                                  | C3.3.3.1   |     | On curves of radii more than or equal to 5,0 m but less than 20,0 m                                   | metre (m)         |          |      |        |
|                                  | C3.3.3.2   |     | On curves with radii more than or equal to 1,0 m but less than 5,0 m                                  | metre (m)         |          |      |        |
|                                  | C3.3.3.3   |     | On curves with radii less than 1,0 m                                                                  | metre (m)         |          |      |        |
| C3.3.4                           |            |     | Extra over item C3.3.2 for drop kerbs at pedestrian crossings and driveways                           | metre (m)         |          |      |        |
| C3.3.16                          |            |     | Demolition and removal of existing kerbs and / or channel (specify maximum size)                      | cubic metre (m³)  |          |      |        |
| PC3.3.19                         |            |     | Precast concrete bollard, 230mm diameter, 1200mm long, exposed aggregate finish                       | number (No.)      |          |      |        |
| PC3.3.20                         |            |     | Inlet, outlet, transition and similar structures (measured by components)                             |                   |          |      |        |
|                                  | PC3.3.20.1 |     | Concrete class C25/30-20                                                                              | cubic metre (m³)  |          |      |        |
|                                  | PC3.3.20.2 |     | Formwork                                                                                              |                   |          |      |        |
|                                  |            | (a) | F1 surface finish                                                                                     | square metre (m²) |          |      |        |
|                                  |            | (b) | F2 surface finish                                                                                     | square metre (m²) |          |      |        |
|                                  |            | (c) | Class U2 surface finish                                                                               | square metre (m²) |          |      |        |
|                                  | PC3.3.20.3 |     | Reinforced Steel                                                                                      |                   |          |      |        |
|                                  |            | (a) | Rebar Steel, sizes Y8 to Y16 bars, high yield                                                         | ton (t)           |          |      |        |
| PC3.3.21                         |            |     | Remove and Reuse existing Granite/Sandstone kerbing—channelling consisting of:                        |                   |          |      |        |
|                                  | PC3.3.21.1 | (a) | Kerbing                                                                                               | metre (m)         |          |      |        |
|                                  | PC3.3.21.2 | (b) | Channelling                                                                                           | metre (m)         |          |      |        |
| Total Carried Forward To Summary |            |     |                                                                                                       |                   |          |      |        |



C4.1: BORROW MATERIALS

| Item                             |           |     |  | Description                                                                     | Unit             | Quantity | Rate | Amount |
|----------------------------------|-----------|-----|--|---------------------------------------------------------------------------------|------------------|----------|------|--------|
| Brought Forward                  |           |     |  |                                                                                 |                  |          |      |        |
| C4.1.13                          |           |     |  | Removing surplus material from the stockpile                                    | cubic metre (m³) |          |      |        |
| C4.1.15                          |           |     |  | Shaping and finishing the borrow pit and quarry areas, and the stockpile sites  |                  |          |      |        |
|                                  | C4.1.15.1 |     |  | Shaping and finishing the borrow pit and quarry areas, and the stockpile sites: |                  |          |      |        |
|                                  |           | (c) |  | Stockpile sites                                                                 | cubic metre (m³) |          |      |        |
| Total Carried Forward To Summary |           |     |  |                                                                                 |                  |          |      |        |







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C4.3: EXISTING ROAD MATERIALS

| Item                  |          |     | Description                                                                                                      | Unit                        | Quantity | Rate | Amount |
|-----------------------|----------|-----|------------------------------------------------------------------------------------------------------------------|-----------------------------|----------|------|--------|
| C4.3                  |          |     | <b>EXISTING ROAD MATERIALS</b>                                                                                   |                             |          |      |        |
| C4.3.1                |          |     | <b>Additional material investigations</b>                                                                        |                             |          |      |        |
|                       | C4.3.1.1 |     | Cost of additional core drilling and trial pits, sampling of asphalt and laboratory testing                      | provisional sum (Prov. Sum) |          |      |        |
|                       | C4.3.1.2 |     | Handling cost and profit in respect of item C4.3.1.1                                                             | %                           |          |      |        |
| C4.3.4                |          |     | <b>Saw-cutting existing materials within the following average depth ranges</b>                                  |                             |          |      |        |
|                       | C4.3.4.1 |     | Asphalt material:                                                                                                |                             |          |      |        |
|                       |          | (a) | Up to 50 mm                                                                                                      | metre (m)                   |          |      |        |
|                       |          | (b) | Exceeding 50mm and up to 100mm                                                                                   | metre (m)                   |          |      |        |
|                       |          | (c) | Exceeding 100mm and up to 150mm                                                                                  | metre (m)                   |          |      |        |
|                       | C4.3.4.2 |     | Crushed stone and gravel material:                                                                               |                             |          |      |        |
|                       |          | (a) | Up to 100 mm                                                                                                     | metre (m)                   |          |      |        |
|                       |          | (b) | Exceeding 100mm and up to 200mm                                                                                  | metre (m)                   |          |      |        |
|                       | C4.3.4.3 |     | Cemented material:                                                                                               |                             |          |      |        |
|                       |          | (a) | Up to 100 mm                                                                                                     | metre (m)                   |          |      |        |
|                       |          | (b) | Exceeding 100mm and up to 200mm                                                                                  | metre (m)                   |          |      |        |
| C4.3.5                |          |     | <b>Providing the milling machine on the site</b>                                                                 |                             |          |      |        |
|                       | C4.3.5.2 |     | Large milling machine with a cutting width exceeding 1,2m                                                        | number (No.)                |          |      |        |
| C4.3.6                |          |     | <b>Milling and removal of existing asphalt layers with an average milling depth (Contractor takes ownership)</b> |                             |          |      |        |
|                       | C4.3.6.1 |     | Not exceeding 50mm                                                                                               | cubic metre (m³)            |          |      |        |
|                       | C4.3.6.2 |     | Exceeding 50mm but not exceeding 100mm                                                                           | cubic metre (m³)            |          |      |        |
| C4.3.9                |          |     | <b>Excavating material by using conventional road construction equipment</b>                                     |                             |          |      |        |
|                       | C4.3.9.1 |     | Asphalt material                                                                                                 | cubic metre (m³)            |          |      |        |
|                       | C4.3.9.2 |     | Crushed stone and macadam materials                                                                              | cubic metre (m³)            |          |      |        |
| Total Carried Forward |          |     |                                                                                                                  |                             |          |      |        |

C4.3: EXISTING ROAD MATERIALS

| Item                             |           |     |       | Description                                                                           | Unit              | Quantity | Rate | Amount |
|----------------------------------|-----------|-----|-------|---------------------------------------------------------------------------------------|-------------------|----------|------|--------|
| Brought Forward                  |           |     |       |                                                                                       |                   |          |      |        |
| C4.3.13                          | C4.3.9.3  |     |       | Cemented material                                                                     | cubic metre (m³)  |          |      |        |
|                                  | C4.3.9.4  |     |       | Natural gravel and sand materials                                                     | cubic metre (m³)  |          |      |        |
|                                  |           |     |       | Lifting of existing paving blocks (73mm concrete paving blocks)                       |                   |          |      |        |
|                                  | C4.3.13.1 |     |       | Using construction equipment                                                          | square metre (m²) |          |      |        |
| C4.3.14                          |           |     |       | Removing of existing road edging and services structures                              |                   |          |      |        |
|                                  | C4.3.14.2 |     |       | Removing of existing road edging using labour enhanced methods of construction:       |                   |          |      |        |
| PC4.3.15                         |           | (a) |       | Kerbing and edge beams:                                                               |                   |          |      |        |
|                                  |           |     | (i)   | In situ concrete kerbing and edge beams                                               | cubic metre (m³)  |          |      |        |
|                                  |           |     | (ii)  | Precast concrete kerbing                                                              | metre (m)         |          |      |        |
|                                  |           |     | (iii) | Precast concrete kerbing and channel                                                  | metre (m)         |          |      |        |
|                                  |           |     |       | Stockpiling of road layer materials                                                   |                   |          |      |        |
| C4.3.20                          | C4.3.15.1 |     |       | Asphalt material                                                                      | cubic metre (m³)  |          |      |        |
|                                  | C4.3.15.2 |     |       | Crushed stone material                                                                | cubic metre (m³)  |          |      |        |
|                                  | C4.3.15.3 |     |       | Cemented material                                                                     | cubic metre (m³)  |          |      |        |
|                                  | C4.3.15.4 |     |       | Natural gravel material                                                               | cubic metre (m³)  |          |      |        |
| PC4.3.21                         |           |     |       | Spoiling of paving blocks and road edging in spoil sites designated by the Contractor |                   |          |      |        |
|                                  | C4.3.20.1 |     |       | Paving blocks                                                                         | cubic metre (m³)  |          |      |        |
|                                  | C4.3.20.2 |     |       | Precast and in situ concrete kerbing, edge beams and channels and precast kerbing     | cubic metre (m³)  |          |      |        |
|                                  |           |     |       | Mixing of reclaimed asphalt millings with granular material                           | cubic metre (m³)  |          |      |        |
| Total Carried Forward To Summary |           |     |       |                                                                                       |                   |          |      |        |



C4.4: COMMERCIAL MATERIALS

| Item                             |          |  | Description                                          | Unit                        | Quantity | Rate | Amount |
|----------------------------------|----------|--|------------------------------------------------------|-----------------------------|----------|------|--------|
| Brought Forward                  |          |  |                                                      |                             |          |      |        |
|                                  | C4.4.7.1 |  | Cost of sampling and material testing                | provisional sum (Prov. Sum) |          |      |        |
|                                  | C4.4.7.2 |  | Handling cost and profit in respect of item C4.4.7.1 | %                           |          |      |        |
| Total Carried Forward To Summary |          |  |                                                      |                             |          |      |        |











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C5.3: ROAD PAVEMENT LAYERS

| Item                             |           |  | Description                                                                                        | Unit                        | Quantity | Rate | Amount |
|----------------------------------|-----------|--|----------------------------------------------------------------------------------------------------|-----------------------------|----------|------|--------|
| Brought Forward                  |           |  |                                                                                                    |                             |          |      | .00    |
| C5.3.11                          | C5.1.10.1 |  | Stabilised layer                                                                                   | cubic metre (m³)            |          |      | .00    |
|                                  |           |  | Riding quality measurements:                                                                       |                             |          |      |        |
|                                  | C5.3.11.1 |  | Using a 3,0m straight edge                                                                         | kilometre (km)              |          |      | .00    |
|                                  | C5.3.11.2 |  | Using a rolling straight edge                                                                      | kilometre (km)              |          |      | .00    |
| C5.3.12                          |           |  | Surface regularity payment adjustments                                                             | provisional sum (Prov. Sum) |          |      | .00    |
| 8.1.1                            |           |  | Prime coat:                                                                                        |                             |          |      |        |
|                                  | C8.1.1.3  |  | Inverted bitumen emulsion                                                                          | litre (l)                   |          |      | .00    |
| C5/C8.1.3                        |           |  | Extra over item C8.1.3 for applying the prime coat in areas accessible only to hand held equipment | litre (l)                   |          |      | .00    |
| Total Carried Forward To Summary |           |  |                                                                                                    |                             |          |      |        |



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| Item                             |          |     |     | Description                                                                                                                          | Unit             | Quantity | Rate | Amount |
|----------------------------------|----------|-----|-----|--------------------------------------------------------------------------------------------------------------------------------------|------------------|----------|------|--------|
| C5.4                             |          |     |     | <b>STABILISATION</b>                                                                                                                 |                  |          |      |        |
| C5.4.2                           |          |     |     | <b>Chemical stabilisation</b>                                                                                                        |                  |          |      |        |
|                                  | C5.4.2.1 |     |     | Chemical stabilisation (350mm thickness) of pavement layers (G5B)                                                                    |                  |          |      |        |
|                                  |          | (a) |     | (i) General lanes                                                                                                                    |                  |          |      |        |
|                                  |          |     |     | 350mm thick C3                                                                                                                       | cubic metre (m³) |          |      | 0.00   |
| C5.4.5                           |          |     |     | <b>Cementitious stabilisation agents for pavement layers</b>                                                                         |                  |          |      |        |
|                                  | C5.4.5.2 |     |     | Addition of cementitious stabilisation agents for pavement layers and spreading the agent using bags and labour enhancement methods. |                  |          |      |        |
|                                  |          | (a) |     | Cement                                                                                                                               |                  |          |      |        |
|                                  |          |     | (i) | 350mm thick C3                                                                                                                       | tonne (t)        |          |      | 00     |
| C5.4.10                          |          |     |     | Provision and application of water for curing                                                                                        | kilolitre (kL)   |          |      | 00     |
| Total Carried Forward To Summary |          |     |     |                                                                                                                                      |                  |          |      |        |

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C6.2 SEGMENTAL BLOCK PAVING LAYERS

| Item                             |           |  | Description                                                                                                   | Unit                    | Quantity | Rate | Amount |
|----------------------------------|-----------|--|---------------------------------------------------------------------------------------------------------------|-------------------------|----------|------|--------|
| PC6.2                            |           |  | SEGMENTAL BLOCK PAVING LAYERS                                                                                 |                         |          |      |        |
| PC6.2.1                          |           |  | Segmental block paving to SANS 1058 & 1575:                                                                   |                         |          |      |        |
|                                  | C6.2.1.1  |  | Concrete block paving (Class 30/2.0, interlocker type and 200x100mm / 80mm thick), grey colour or equivalent  | square metre (m²)       |          |      |        |
|                                  | C6.2.1.2  |  | Clay paving (PA Class, bond type and 200x100mm / 65mm thick) De Hoop red or equivalent to herringbone pattern | square metre (m²)       |          |      |        |
|                                  | C6.2.1.3  |  | Concrete cobbles (Class 30/2.0, bond type and 110x110mm / 60 thick) grey colour or equivalent                 | square metre (m²)       |          |      |        |
| C6.2.2                           |           |  | Cast-in-situ concrete edge and intermediate beams (30Mpa/20mm)                                                | cubic metre (m³)        |          |      |        |
| C6.2.3                           |           |  | Provision and application of approved herbicide and ant poison:                                               |                         |          |      |        |
|                                  | C6.2.3.1  |  | Provision of materials                                                                                        | prime cost sum (PC Sum) |          |      |        |
|                                  | C6.2.3.2  |  | Contractor's charges and profit added to the prime cost sum                                                   | %                       |          |      |        |
| C6.2.4                           |           |  | Re-sanding of joints in segmental block paving:                                                               |                         |          |      |        |
|                                  | C6.2.4.1  |  | Concrete block paving (Class 30/2.0, interlocker type and 200x100mm / 80mm thick), grey colour or equivalent  | square metre (m²)       |          |      |        |
|                                  | C6.2.4.2  |  | Clay paving (PA Class, bond type and 200x100mm / 65mm thick) De Hoop red or equivalent                        | square metre (m²)       |          |      |        |
|                                  | C6.2.4.3  |  | Concrete cobbles (Class 30/2.0, bond type and 110x110mm / 60 thick) grey colour or equivalent                 | square metre (m²)       |          |      |        |
| PC6.2.5                          |           |  | Extra over items for cutting to pavers for edges                                                              |                         |          |      |        |
|                                  | PC6.2.5.1 |  | Extra over item C6.2.1 for cutting pavers to suit straight edge, including wastage                            | metre (m)               |          |      |        |
| Total Carried Forward To Summary |           |  |                                                                                                               |                         |          |      |        |

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C9.1: ASPHALT LAYERS

| Item                  |                     |       | Description                                                                                                                                                                  | Unit      | Quantity | Rate | Amount |
|-----------------------|---------------------|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|----------|------|--------|
| C9.1                  |                     |       | <b>ASPHALT LAYERS</b>                                                                                                                                                        |           |          |      |        |
| C9.1.1                |                     |       | <b>Asphalt mix designs</b>                                                                                                                                                   |           |          |      |        |
|                       | C9.1.1.1 & C9.1.1.2 |       | Sand/Stone skeletal mixes:                                                                                                                                                   |           |          |      |        |
|                       |                     | (a)   | Continuously graded base or surfacing using virgin aggregate                                                                                                                 |           |          |      |        |
|                       |                     | (i)   | Base using 50/70 penetration grade bitumen, at design level II                                                                                                               | lump sum  |          |      |        |
|                       |                     | (ii)  | Surfacing using A-E2 binder, at design level II                                                                                                                              | lump sum  |          |      |        |
|                       |                     | (iii) | Surfacing using A-P1 binder, at design level III                                                                                                                             | lump sum  |          |      |        |
|                       |                     | (iv)  | Surfacing using 50/70 penetration grade bitumen, at design level IB                                                                                                          | lump sum  |          |      |        |
|                       |                     | (v)   | Surfacing using 70/100 penetration grade bitumen, at design level IA                                                                                                         | lump sum  |          |      |        |
|                       |                     | (b)   | Continuously graded base or surfacing with 30% reclaimed asphalt                                                                                                             |           |          |      |        |
|                       |                     | (i)   | Base using 50/70 penetration grade bitumen, at design level II                                                                                                               | lump sum  |          |      |        |
|                       |                     | (ii)  | Surfacing using A-E2 binder, at design level II                                                                                                                              | lump sum  |          |      |        |
|                       |                     | (iii) | Surfacing using A-P1 binder, at design level III                                                                                                                             | lump sum  |          |      |        |
|                       |                     | (iv)  | Surfacing using 50/70 penetration grade bitumen, at design level IB                                                                                                          | lump sum  |          |      |        |
|                       |                     | (v)   | Surfacing using 70/100 penetration grade bitumen, at design level IA                                                                                                         | lump sum  |          |      |        |
| C9.1.3                |                     |       | <b>Application of bond coat</b>                                                                                                                                              |           |          |      |        |
|                       | C9.1.3.1            |       | Stable – grade 30 % net bitumen emulsion as specified. Applied with a calibrated distributor                                                                                 | litre (l) |          |      |        |
|                       | C9.1.3.2            |       | Applied in restricted areas using a portable pressure sprayer                                                                                                                | litre (l) |          |      |        |
|                       | C9.1.3.3            |       | Applied by hand using brushes on all exposed transverse and longitudinal construction joints                                                                                 | litre (l) |          |      |        |
| C9.1.4                |                     |       | <b>Asphalt base</b>                                                                                                                                                          |           |          |      |        |
|                       | C9.1.4.1            |       | New construction                                                                                                                                                             |           |          |      |        |
|                       |                     | (a)   | Stone skeletal mix - continuously graded as defined (50/70 penetration grade bitumen, NMPS of 14mm virgin aggregate, design level II, placed with a suitably approved paver) |           |          |      |        |
| Total Carried Forward |                     |       |                                                                                                                                                                              |           |          |      |        |

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 SCHEDULE 2: ROADWORKS

C9.1: ASPHALT LAYERS

| Item                  |           |                                                                                                                                                                        | Description                                                                                                                                                                        | Unit                            | Quantity | Rate | Amount |
|-----------------------|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|----------|------|--------|
| Brought Forward       |           |                                                                                                                                                                        |                                                                                                                                                                                    |                                 |          |      |        |
| C9.1.5                | C9.1.5.1  | (i)                                                                                                                                                                    | 80mm thick to roadway                                                                                                                                                              | square metre (m²)               |          |      |        |
|                       |           | (d)                                                                                                                                                                    | Any of the above mix types where the use of reclaimed asphalt has been specified (maximum 30 % reclaimed asphalt)                                                                  |                                 |          |      |        |
|                       |           | (ii)                                                                                                                                                                   | Stone skeletal mix - 80mm thick to roadway, continuously graded as defined (50/70 penetration grade bitumen, NMPS of 14mm, design level II, placed with a suitably approved paver) | square metre (m²)               |          |      |        |
|                       |           |                                                                                                                                                                        | <b>Asphalt surfacing</b>                                                                                                                                                           |                                 |          |      |        |
|                       |           |                                                                                                                                                                        | New construction                                                                                                                                                                   |                                 |          |      |        |
| C9.1.6                | C9.1.7.1  | (e)                                                                                                                                                                    | Sand skeletal mix – continuously graded as defined using virgin aggregate                                                                                                          |                                 |          |      |        |
|                       |           | (i)                                                                                                                                                                    | 40mm thick to roadway, using A-E2 binder, NMPS of 10mm, design level II, placed with a suitably approved paver                                                                     | square metre (m²)               |          |      |        |
|                       |           | (ii)                                                                                                                                                                   | 40mm thick to intersections, using A-P1 binder, NMPS of 10mm, design level III, placed with a suitably approved paver                                                              | square metre (m²)               |          |      |        |
| C9.1.7                | C9.1.10.1 | (iii)                                                                                                                                                                  | 30mm thick to sidewalk, using 70/100 penetration grade bitumen, NMPS of 7,1mm, design level IA, placed by hand                                                                     | square metre (m²)               |          |      |        |
|                       |           | Extra over pay items C9.1.4.1 and C9.1.5.1 for placing small quantities of asphalt of less than 10 tons specially produced as specified in terms of Clause A9.1.7.1(d) |                                                                                                                                                                                    |                                 | ton (t)  |      |        |
|                       |           | Placing and compacting asphalt in restricted areas                                                                                                                     |                                                                                                                                                                                    |                                 |          |      |        |
| C9.1.10               | C9.1.10.1 | Extra over payment items C9.1.4.1 and C9.1.5.1                                                                                                                         |                                                                                                                                                                                    |                                 |          |      |        |
|                       |           | (b)                                                                                                                                                                    | Sand/Stone skeletal mix - continuously graded surfacing, using A-E2 / AP1 binder, NMPS of 10-14mm, design level II, placed with a paver / by hand to roadway                       | square metre (m²)               |          |      |        |
|                       |           | (c)                                                                                                                                                                    | Sand skeletal mix - continuously graded surfacing, using 70/100 penetration grade bitumen, NMPS of 7,1mm, design level IA, placed by hand to sidewalks                             | square metre (m²)               |          |      |        |
|                       |           |                                                                                                                                                                        | <b>Variation rates</b>                                                                                                                                                             |                                 |          |      |        |
|                       |           |                                                                                                                                                                        | Bitumen                                                                                                                                                                            |                                 |          |      |        |
|                       |           |                                                                                                                                                                        | (ii)                                                                                                                                                                               | 50/70 penetration grade bitumen | ton (t)  |      |        |
| Total Carried Forward |           |                                                                                                                                                                        |                                                                                                                                                                                    |                                 |          |      |        |

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 URBAN MOBILITY DIRECTORATE  
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 SCHEDULE 2: ROADWORKS

C9.1: ASPHALT LAYERS

| Item                             |            |       | Description                                                                                                                                                                                 | Unit              | Quantity | Rate | Amount |
|----------------------------------|------------|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------|------|--------|
| Brought Forward                  |            |       |                                                                                                                                                                                             |                   |          |      |        |
| C9.1.13                          |            | (iii) | 70/100 penetration grade bitumen                                                                                                                                                            | ton (t)           |          |      |        |
|                                  |            | (iv)  | A-E2 binder                                                                                                                                                                                 | ton (t)           |          |      |        |
|                                  |            | (v)   | AP1 binder                                                                                                                                                                                  | ton (t)           |          |      |        |
|                                  | C9.1.10.2  |       | Aggregate                                                                                                                                                                                   | ton (t)           |          |      |        |
|                                  | C9.1.10.3  |       | Active filler (lime unless stated in Contract Documentation)                                                                                                                                | ton (t)           |          |      |        |
|                                  | C9.1.10.6  |       | Bituminous bond coat – net bitumen (Stable-grade 30% net bitumen emulsion)                                                                                                                  | ton (t)           |          |      |        |
|                                  |            |       | <b>Coring of asphalt layers</b>                                                                                                                                                             |                   |          |      |        |
|                                  | C9.1.13.1  |       | 100mm diameter                                                                                                                                                                              | number (No.)      |          |      |        |
|                                  | C9.1.13.2  |       | 150 mm diameter                                                                                                                                                                             | number (No.)      |          |      |        |
|                                  | PC9.1.17   |       | Asphalt reinforcement interlayers, supply and install                                                                                                                                       |                   |          |      |        |
|                                  | PC9.1.17.1 |       | High strength, open fibreglass grid, custom knitted in a stable construction and coated with an elastomeric polymer and a pressure sensitive adhesive backing - Glasgrid 8511 or equivalent | square metre (m²) |          |      |        |
| Total Carried Forward To Summary |            |       |                                                                                                                                                                                             |                   |          |      |        |



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URBAN MOBILITY DIRECTORATE  
CONTRACT NO. 72Q/2025/26  
SCHEDULE 2: ROADWORKS**

C11.6: ROAD SIGNS

| Item                  |           |     | Description                                                                                                                                                                                         | Unit              | Quantity | Rate | Amount |
|-----------------------|-----------|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------|------|--------|
| C11.6                 |           |     | <b>ROAD SIGNS</b>                                                                                                                                                                                   |                   |          |      |        |
| C11.6.1               |           |     | Road signboards with painted or coloured semi-matt background. Symbols, lettering and borders in semi-matt black or in Class I retro-reflective material, where the sign board is constructed from: |                   |          |      |        |
|                       | C11.6.1.3 |     | Prepainted galvanized steel plate:                                                                                                                                                                  |                   |          |      |        |
|                       |           | (a) | Area 0 to 0,5 m²                                                                                                                                                                                    | square metre (m²) |          |      |        |
|                       |           | (b) | Area exceeding 0,5 m² but not 2,0 m²                                                                                                                                                                | square metre (m²) |          |      |        |
|                       |           | (c) | Area exceeding 2,0 m² but not 10 m²                                                                                                                                                                 | square metre (m²) |          |      |        |
|                       |           | (d) | Area exceeding 10 m²                                                                                                                                                                                | square metre (m²) |          |      |        |
|                       | C11.6.1.4 |     | Prepainted galvanized steel profiles (200 mm high panels):                                                                                                                                          |                   |          |      |        |
|                       |           | (a) | Area 0 to 0,5 m²                                                                                                                                                                                    | square metre (m²) |          |      |        |
|                       |           | (b) | Area exceeding 0,5 m² but not 2,0 m²                                                                                                                                                                | square metre (m²) |          |      |        |
|                       |           | (c) | Area exceeding 2,0 m² but not 10 m²                                                                                                                                                                 | square metre (m²) |          |      |        |
|                       |           | (d) | Area exceeding 10 m²                                                                                                                                                                                | square metre (m²) |          |      |        |
|                       | C11.6.1.6 |     | Extra over items C11.6.1.1 to C11.6.1.4 for attaching signboards to overhead gantry structures and overhead to bridges                                                                              | square metre (m²) |          |      |        |
|                       | C11.6.1.7 |     | Regulatory signs, permanent:                                                                                                                                                                        |                   |          |      |        |
|                       |           | (a) | 600 mm diameter (Pre-painted galvanised steel plate, semi matt background retro-reflective class I)                                                                                                 | number (No.)      |          |      |        |
|                       |           | (b) | 900 mm diameter (Pre-painted galvanised steel plate, semi matt background retro-reflective class I)                                                                                                 | number (No.)      |          |      |        |
|                       |           | (c) | 1200 mm diameter (Pre-painted galvanised steel plate, semi matt background retro-reflective class I)                                                                                                | number (No.)      |          |      |        |
|                       | C11.6.1.8 |     | Regulatory signs, temporary:                                                                                                                                                                        |                   |          |      |        |
| Total Carried Forward |           |     |                                                                                                                                                                                                     |                   |          |      |        |

| Item                  |            | Description                                                                                                                                       |                                                                                                      | Unit                                                                                            | Quantity     | Rate | Amount |  |
|-----------------------|------------|---------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|--------------|------|--------|--|
| Brought Forward       |            |                                                                                                                                                   |                                                                                                      |                                                                                                 |              |      |        |  |
|                       | C11.6.1.9  | (a)                                                                                                                                               | 800 mm diameter (Pre-painted galvanised steel plate, semi matt background retro-reflective class I)  | number (No.)                                                                                    |              |      |        |  |
|                       |            | (b)                                                                                                                                               | 900 mm diameter (Pre-painted galvanised steel plate, semi matt background retro-reflective class I)  | number (No.)                                                                                    |              |      |        |  |
|                       |            | (c)                                                                                                                                               | 1200 mm diameter (Pre-painted galvanised steel plate, semi matt background retro-reflective class I) | number (No.)                                                                                    |              |      |        |  |
|                       | C11.6.1.10 |                                                                                                                                                   | Warning signs, permanent:                                                                            |                                                                                                 |              |      |        |  |
|                       |            | (a)                                                                                                                                               | 600 mm size (Pre-painted galvanised steel plate, semi matt background retro-reflective class I)      | number (No.)                                                                                    |              |      |        |  |
|                       |            | (b)                                                                                                                                               | 900 mm size (Pre-painted galvanised steel plate, semi matt background retro-reflective class I)      | number (No.)                                                                                    |              |      |        |  |
|                       |            | (c)                                                                                                                                               | 1200 mm size (Pre-painted galvanised steel plate, semi matt background retro-reflective class I)     | number (No.)                                                                                    |              |      |        |  |
|                       |            | (d)                                                                                                                                               | 1500 mm size (Pre-painted galvanised steel plate, semi matt background retro-reflective class I)     | number (No.)                                                                                    |              |      |        |  |
|                       |            | C11.6.1.11                                                                                                                                        |                                                                                                      | Warning signs, temporary:                                                                       |              |      |        |  |
|                       |            |                                                                                                                                                   | (a)                                                                                                  | 600 mm size (Pre-painted galvanised steel plate, semi matt background retro-reflective class I) | number (No.) |      |        |  |
|                       | (b)        |                                                                                                                                                   | 900 mm size (Pre-painted galvanised steel plate, semi matt background retro-reflective class I)      | number (No.)                                                                                    |              |      |        |  |
|                       |            | (c)                                                                                                                                               | 1200 mm size (Pre-painted galvanised steel plate, semi matt background retro-reflective class I)     | number (No.)                                                                                    |              |      |        |  |
|                       |            | (d)                                                                                                                                               | 1500 mm size (Pre-painted galvanised steel plate, semi matt background retro-reflective class I)     | number (No.)                                                                                    |              |      |        |  |
|                       |            | Supplementary plates to permanent regulatory or warning signs (Pre-painted galvanised steel plate, semi matt background retro-reflective class I) | square metre (m²)                                                                                    |                                                                                                 |              |      |        |  |
| Total Carried Forward |            |                                                                                                                                                   |                                                                                                      |                                                                                                 |              |      |        |  |

| Item                  |            |     | Description                                                                                                                                       | Unit              | Quantity | Rate | Amount |
|-----------------------|------------|-----|---------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------|------|--------|
| Brought Forward       |            |     |                                                                                                                                                   |                   |          |      |        |
| C11.6.2               | C11.6.1.12 |     | Supplementary plates to temporary regulatory or warning signs (Pre-painted galvanised steel plate, semi matt background retro-reflective class I) | square metre (m²) |          |      |        |
|                       |            |     | Extra over on item C11.6.1 for using:                                                                                                             |                   |          |      |        |
|                       | C11.6.2.1  |     | Background of retro-reflective material:                                                                                                          |                   |          |      |        |
|                       |            | (a) | Class I                                                                                                                                           | square metre (m²) |          |      |        |
|                       |            | (b) | Class III                                                                                                                                         | square metre (m²) |          |      |        |
|                       |            | (c) | Class IV specify a) or b)                                                                                                                         | square metre (m²) |          |      |        |
|                       | C11.6.2.2  |     | Lettering, symbols, numbers, arrows, emblems and borders of retro-reflective material:                                                            |                   |          |      |        |
|                       |            | (a) | Class III                                                                                                                                         | square metre (m²) |          |      |        |
|                       |            | (b) | Class IV specify a) or b)                                                                                                                         | square metre (m²) |          |      |        |
|                       |            |     | Road sign supports (overhead road sign structures excluded):                                                                                      |                   |          |      |        |
| PC11.6.3              | PC11.6.3.1 |     | Steel tubing                                                                                                                                      |                   |          |      |        |
|                       |            | (a) | 76mm diameter and 3.5mm thickness                                                                                                                 | metre (m)         |          |      |        |
|                       |            | (b) | 140mm diameter and 4.5mm thickness                                                                                                                | metre (m)         |          |      |        |
|                       |            | (c) | 165mm diameter and 4.5mm thickness                                                                                                                | metre (m)         |          |      |        |
|                       | C11.6.3.2  |     | Timber (diameter and type indicated)                                                                                                              |                   |          |      |        |
|                       |            | (a) | 125mm dia. treated                                                                                                                                | metre (m)         |          |      |        |
|                       |            | (b) | 150 mm dia. treated                                                                                                                               | metre (m)         |          |      |        |
|                       |            | (c) | 200 mm dia. treated                                                                                                                               | metre (m)         |          |      |        |
| C11.6.5               |            |     | Excavation and backfilling for road sign supports (not applicable to kilometre posts):                                                            |                   |          |      |        |
|                       | C11.6.5.1  |     | Excavating soft material and backfilling                                                                                                          | cubic metre (m³)  |          |      |        |
|                       | C11.6.5.2  |     | Excavating soft or intermediate material and backfilling using labour enhanced construction methods                                               | cubic metre (m³)  |          |      |        |
| Total Carried Forward |            |     |                                                                                                                                                   |                   |          |      |        |

| Item                  |           | Description                                                                    | Unit              | Quantity | Rate | Amount |
|-----------------------|-----------|--------------------------------------------------------------------------------|-------------------|----------|------|--------|
| Brought Forward       |           |                                                                                |                   |          |      |        |
| C11.6.6               | C11.6.5.3 | Extra over item C11.6.5.1 and 2 for cement-treated soil backfill               | cubic metre (m³)  |          |      |        |
|                       | C11.6.5.4 | Extra over item C11.6.5.1 for hard material excavation                         | cubic metre (m³)  |          |      |        |
|                       | C11.6.5.5 | Imported backfill material from commercial sources                             | cubic metre (m³)  |          |      |        |
|                       |           | <b>Dismantling, storing and re-erecting road signs with a surface area of:</b> |                   |          |      |        |
| C11.6.7               | C11.6.6.1 | Area 0 to 0,5 m²                                                               | square metre (m²) |          |      |        |
|                       | C11.6.6.2 | Area exceeding 0,5 m² but not 2,0 m²                                           | square metre (m²) |          |      |        |
|                       | C11.6.6.3 | Exceeding 2,0 m² but not 10 m²                                                 | square metre (m²) |          |      |        |
|                       | C11.6.6.4 | Exceeding 10 m²                                                                | square metre (m²) |          |      |        |
| C11.6.8               |           | <b>Dismantling and storing of road signs and overhead signs:</b>               |                   |          |      |        |
|                       | C11.6.7.1 | Dismantling and storing of road signs with a surface area of:                  |                   |          |      |        |
|                       | (a)       | Area 0 to 0,5 m²                                                               | square metre (m²) |          |      |        |
|                       | (b)       | Area exceeding 0,5 m² but not 2,0 m²                                           | square metre (m²) |          |      |        |
|                       | (c)       | Exceeding 2,0 m² but not 10 m²                                                 | square metre (m²) |          |      |        |
|                       | (d)       | Exceeding 10 m²                                                                | square metre (m²) |          |      |        |
|                       | C11.6.7.2 | Dismantling and storing of overhead signs with a surface area of:              |                   |          |      |        |
|                       | (a)       | Area exceeding 0 m² but not 2,0 m²                                             | square metre (m²) |          |      |        |
|                       | (b)       | Exceeding 2,0 m² but not 10 m²                                                 | square metre (m²) |          |      |        |
|                       | (c)       | Exceeding 10 m²                                                                | square metre (m²) |          |      |        |
| C11.6.8               |           | <b>Dark grey plates at culverts / structures:</b>                              |                   |          |      |        |
| Total Carried Forward |           |                                                                                |                   |          |      |        |

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C11.6: ROAD SIGNS

| Item                             |             |  | Description                                               | Unit                        | Quantity | Rate | Amount |
|----------------------------------|-------------|--|-----------------------------------------------------------|-----------------------------|----------|------|--------|
| Brought Forward                  |             |  |                                                           |                             |          |      |        |
| C11.6.10                         | C11.6.8.1   |  | Size 150 x 600mm (Steel Post Class VI Retro Reflective)   | number (No.)                |          |      |        |
|                                  | C11.6.8.2   |  | Size 200 x 800 mm (Steel Post Class VI Retro Reflective)  | number (No.)                |          |      |        |
|                                  | C11.6.8.3   |  | Size 300 x 1200 mm (Steel Post Class VI Retro Reflective) | number (No.)                |          |      |        |
|                                  |             |  | Disposing of road signs with a surface area of:           |                             |          |      |        |
|                                  | C11.6.10.1  |  | Area 0 to 0,5 m²                                          | square metre (m²)           |          |      |        |
|                                  | C11.6.10.2  |  | Area exceeding 0,5 m² but not 2,0 m²                      | square metre (m²)           |          |      |        |
|                                  | C11.6.10.3  |  | Exceeding 2,0 m² but not 10 m²                            | square metre (m²)           |          |      |        |
|                                  | C11.6.10.4  |  | Exceeding 10 m²                                           | square metre (m²)           |          |      |        |
| C11.6.11                         |             |  | Disposing of overhead road signs:                         |                             |          |      |        |
|                                  | C11.6.11.1  |  | Up to 10 m²                                               | square metre (m²)           |          |      |        |
|                                  | C11.6.11.2  |  | Exceeding 10 m²                                           | square metre (m²)           |          |      |        |
| PC11.6.12                        |             |  | Cleaning of road sign board faces                         | square metre (m²)           |          |      |        |
| PC11.6.13                        |             |  | Extra work for road signs:                                |                             |          |      |        |
|                                  | PC11.6.13.1 |  | Additional work instructed by the Employer's Agent        | provisional sum (Prov. Sum) |          |      |        |
|                                  | PC11.6.13.2 |  | Handling costs and profit in respect of Subitem           | %                           |          |      |        |
| Total Carried Forward To Summary |             |  |                                                           |                             |          |      |        |







C11.7: ROAD MARKINGS AND ROAD STUDS

| Item                             |             | Description                                  | Unit              | Quantity | Rate | Amount |
|----------------------------------|-------------|----------------------------------------------|-------------------|----------|------|--------|
| Brought Forward                  |             |                                              |                   |          |      |        |
| PC11.7.12                        | C11.7.10.2  | Water-jetting                                | square metre (m²) |          |      |        |
|                                  | C11.7.10.3  | Overpainting as temporary measure            | square metre (m²) |          |      |        |
|                                  |             | Painting of kerbs                            |                   |          |      |        |
|                                  | PC11.7.12.1 | Alternate black and white road marking paint | metre (m)         |          |      |        |
|                                  | PC11.7.12.2 | Retro-reflective road marking paint          | metre (m)         |          |      |        |
| Total Carried Forward To Summary |             |                                              |                   |          |      |        |





C11.9: FINISHING THE ROAD AND ROAD RESERVE AND TREATING OLD ROADS

| Item                  |           |     | Description                                                                                            | Unit              | Quantity | Rate | Amount |
|-----------------------|-----------|-----|--------------------------------------------------------------------------------------------------------|-------------------|----------|------|--------|
| C11.9                 |           |     | <b>FINISHING THE ROAD AND ROAD RESERVE AND TREATING OLD ROADS</b>                                      |                   |          |      |        |
| C11.9.1               |           |     | <b>Finishing the road and road reserve:</b>                                                            |                   |          |      |        |
|                       | C11.9.1.1 |     | Dual carriageway road                                                                                  | kilometre (km)    |          |      |        |
|                       | C11.9.1.2 |     | Single carriageway road                                                                                | kilometre (km)    |          |      |        |
| C11.9.2               |           |     | <b>Treatment of old roads and temporary deviations:</b>                                                |                   |          |      |        |
|                       | C11.9.2.1 |     | Conventional construction methods                                                                      | kilometre (km)    |          |      |        |
|                       | C11.9.2.2 |     | By hand only                                                                                           | kilometre (km)    |          |      |        |
| C11.9.3               |           |     | <b>Tactile pavers:</b>                                                                                 |                   |          |      |        |
|                       |           |     | Supply and install                                                                                     |                   |          |      |        |
|                       |           | (a) | Hazard warning blocks:                                                                                 |                   |          |      |        |
|                       |           |     | 440x440x70mm pre-cast concrete paver ex 'Ubuntu Concrete Works' or equivalent, colour 'Dark Charcoal'. | number (No.)      |          |      |        |
|                       |           | (b) | Directional tactile pavers:                                                                            |                   |          |      |        |
|                       |           |     | 440x440x70mm pre-cast concrete paver ex 'Ubuntu Concrete Works' or equivalent, colour 'Dark Charcoal'. | number (No.)      |          |      |        |
|                       |           | (c) | Cyclist Directional pavers:                                                                            |                   |          |      |        |
|                       |           |     | 440x440x70mm pre-cast concrete paver ex 'Ubuntu Concrete Works' or equivalent, colour 'Dark Charcoal'. | number (No.)      |          |      |        |
|                       |           | (d) | Cyclist Information pavers:                                                                            |                   |          |      |        |
|                       |           |     | 440x440x70mm pre-cast concrete paver ex 'Ubuntu Concrete Works' or equivalent, colour 'Dark Charcoal'. | number (No.)      |          |      |        |
|                       |           | (e) | Pedestrian Information pavers                                                                          |                   |          |      |        |
|                       |           |     | 440x440x70mm pre-cast concrete paver ex 'Ubuntu Concrete Works' or equivalent, colour 'Dark Charcoal'. | number (No.)      |          |      |        |
| C12.13.01             |           |     | <b>Patented earth retaining systems and other types of blocks</b>                                      |                   |          |      |        |
|                       |           | (f) | Segmental block retaining wall inclined, L13 block or equivalent                                       | square metre (m²) |          |      |        |
| Total Carried Forward |           |     |                                                                                                        |                   |          |      |        |



C11.9: FINISHING THE ROAD AND ROAD RESERVE AND TREATING OLD ROADS

| Item                             |  |      | Description                                                      | Unit              | Quantity | Rate | Amount |
|----------------------------------|--|------|------------------------------------------------------------------|-------------------|----------|------|--------|
| Brought Forward                  |  |      |                                                                  |                   |          |      |        |
| C12.13.02                        |  | (ii) | Segmental block retaining wall vertical, L13 block or equivalent | square metre (m²) |          |      |        |
|                                  |  |      | Excavation for concrete bases for earth retaining systems        |                   |          |      |        |
|                                  |  | (a)  | In soft material                                                 | cubic metre (m³)  |          |      |        |
|                                  |  | (b)  | Extra-over subitem C12.13.02 (a) for excavation in hard material | cubic metre (m³)  |          |      |        |
| C12.13.03                        |  |      | Concrete bases for earth retaining systems                       | cubic metre (m³)  |          |      |        |
| C12.13.04                        |  |      | High tensile steel reinforcement                                 | ton (t)           |          |      |        |
| C12.13.05                        |  |      | Filter fabric Grade A2                                           | square metre (m²) |          |      |        |
| C12.13.06                        |  |      | Sand infill, minimum G7 material                                 | cubic metre (m³)  |          |      |        |
| Total Carried Forward To Summary |  |      |                                                                  |                   |          |      |        |



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| SUMMARY OF SECTIONS                           |                                                                   | Amount |
|-----------------------------------------------|-------------------------------------------------------------------|--------|
| Section                                       | Description                                                       |        |
| C1.5                                          | C1.5: ACCOMMODATION OF TRAFFIC                                    |        |
| C1.6                                          | C1.6: CLEAR AND GRUBBING                                          |        |
| C3.1                                          | C3.1: DRAINS                                                      |        |
| C3.3                                          | C3.3 CONCRETE KERBING AND CHANNELING                              |        |
| C4.1                                          | C4.1: BORROW MATERIALS                                            |        |
| C4.2                                          | C4.2: CUT MATERIALS                                               |        |
| C4.3                                          | C4.3: EXISTING ROAD MATERIALS                                     |        |
| C4.4                                          | C4.4: COMMERCIAL MATERIALS                                        |        |
| C5.1                                          | C5.1: ROADBED                                                     |        |
| C5.2                                          | C5.2: FILL                                                        |        |
| C5.3                                          | C5.3: ROAD PAVEMENT LAYERS                                        |        |
| C5.4                                          | C5.4: STABILISATION                                               |        |
| C6.2                                          | C6.2 SEGMENTAL BLOCK PAVING LAYERS                                |        |
| C9.1                                          | C9.1: ASPHALT LAYERS                                              |        |
| C11.6                                         | C11.6: ROAD SIGNS                                                 |        |
| C11.7                                         | C11.7: ROAD MARKINGS AND ROAD STUDS                               |        |
| C11.8                                         | C11.8 LANDSCAPING AND PLANTING PLANTS                             |        |
| C11.9                                         | C11.9: FINISHING THE ROAD AND ROAD RESERVE AND TREATING OLD ROADS |        |
| Total Carried Forward To Summary Of Schedules |                                                                   |        |

SECTION 1200 C: SITE CLEARANCE

| Item                  |            |  | Description                                                                                                                            | Unit                            | Quantity | Rate | Amount |
|-----------------------|------------|--|----------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|----------|------|--------|
| 1.0                   | SANS1200 C |  | SECTION: SITE CLEARANCE                                                                                                                |                                 |          |      |        |
| 1.1                   |            |  | CLEAR SITE                                                                                                                             |                                 |          |      |        |
| 1.1.1                 | PSC 8.2.7  |  | Dismantle and remove pipelines (not encased in concrete), electricity transmission lines, cables, etc.                                 |                                 |          |      |        |
|                       |            |  | (a) Stormwater pipelines 150mm dia to 300mm diameter                                                                                   | metre (m)                       |          |      |        |
|                       |            |  | (b) Stormwater pipelines 300mm dia to 600mm diameter                                                                                   | metre (m)                       |          |      |        |
|                       |            |  | (c) Foul sewer gravity pipeline, up to 375mm diameter                                                                                  | metre (m)                       |          |      |        |
|                       |            |  | (d) Water pipelines of all material up to 250mm diameter                                                                               | metre (m)                       |          |      |        |
|                       |            |  | (e) Large water supply pipeline, cast iron, 750mm diameter                                                                             | metre (m)                       |          |      |        |
| 1.1.2                 | PSC 8.2.12 |  | a) Provision for removal of existing pipes containing asbestos by a registered asbestos contractor (RAC) to nearest approved dump site | provisional sum (Prov. Sum)     |          |      |        |
| 1.1.2.1               |            |  | b) Contractor's mark-up on (a)                                                                                                         | %                               | #        |      |        |
| 1.1.3                 | 8.2.7      |  | Dismantle and remove pipelines encased in concrete                                                                                     | metre (m)                       |          |      |        |
| 1.1.4                 | 8.2.8      |  | Demolish and remove structures and structural steelwork items                                                                          |                                 |          |      |        |
|                       |            |  | a) Concrete bollards, incl. bases                                                                                                      | number (No.)                    |          |      |        |
|                       |            |  | b) Existing reinforced concrete chamber walls/slabs, boundary/retaining walls, thrust blocks, foundations                              | cubic metre (m³)                |          |      |        |
| 1.1.5                 | 8.2.9      |  | Transport demolished materials and debris to unspecified sites and dump (provisional)                                                  | cubic metre-kilometre (m³ - km) | 2        |      |        |
| 1.1.6                 | PSC 8.2.13 |  | Demolish and remove existing headwalls, manholes, chutes and catchpits and spoil material off-site                                     |                                 |          |      |        |
|                       |            |  | (a) Manholes and chambers of all types and sizes, depths as follows:                                                                   |                                 |          |      |        |
|                       |            |  | (i) Over 1,0m and up to 2,0m                                                                                                           | number (No.)                    |          |      |        |
| Total Carried Forward |            |  |                                                                                                                                        |                                 |          |      |        |

SECTION 1200 C: SITE CLEARANCE

| Item                             |     |        | Description                                                                               | Unit             | Quantity | Rate | Amount |
|----------------------------------|-----|--------|-------------------------------------------------------------------------------------------|------------------|----------|------|--------|
| Brought Forward                  |     |        |                                                                                           |                  |          |      |        |
|                                  |     |        | (ii) Over 2,0m and up to 3,0m                                                             | number (No.)     |          |      |        |
|                                  |     |        | (b) Catchpits, depths as follows:                                                         |                  |          |      |        |
|                                  |     |        | (i) Over 1,0m and up to 2,0m                                                              | number (No.)     |          |      |        |
|                                  |     |        | (c) Headwalls and outlets of all types and sizes                                          |                  |          |      |        |
|                                  |     |        | (i) 100mm diam. to 300mm diam.                                                            | number (No.)     |          |      |        |
| 1.1.7                            | PSC | 8.2.15 | Expose existing services, ducts and cables by hand excavation, including restrictive work | cubic metre (m³) |          |      |        |
| Total Carried Forward To Summary |     |        |                                                                                           |                  |          |      |        |

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SECTION 1200 DB: PIPE TRENCHES SERVICES

| Item                  |             |  | Description                                                                                                                                                                                           | Unit             | Quantity | Rate | Amount |
|-----------------------|-------------|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|----------|------|--------|
| 2.0                   | SANS1200 DB |  | <b>SECTION: PIPE TRENCHES SERVICES</b>                                                                                                                                                                |                  |          |      |        |
| 2.1                   | 8.3.2(a)    |  | <b>EXCAVATION (SEWER AND STORMWATER)</b><br><br>Excavate in all materials for trenches backfill, compact, and dispose of surplus/unsuitable material, for pipes: 100 mm diam. for total trench depth: |                  |          |      |        |
| 2.1.1                 |             |  | Exceeding 0,0 m but not exceeding 1,0 m                                                                                                                                                               | cubic metre (m³) |          |      |        |
| 2.1.2                 |             |  | Exceeding 1,0 m but not exceeding 2,0 m                                                                                                                                                               | cubic metre (m³) |          |      |        |
|                       |             |  | Over 100 up to 300 mm diam. for total trench depth:                                                                                                                                                   |                  |          |      |        |
| 2.1.3                 |             |  | Exceeding 0,0 m but not exceeding 1,0 m                                                                                                                                                               | cubic metre (m³) |          |      |        |
| 2.1.4                 |             |  | Exceeding 1,0 m but not exceeding 2,0 m                                                                                                                                                               | cubic metre (m³) |          |      |        |
| 2.1.5                 |             |  | Exceeding 2,0 m but not exceeding 3,0 m                                                                                                                                                               | cubic metre (m³) |          |      |        |
|                       |             |  | Over 300 up to 600 mm diam. for total trench depth:                                                                                                                                                   |                  |          |      |        |
| 2.1.6                 |             |  | Exceeding 0,0 m but not exceeding 1,0 m                                                                                                                                                               | cubic metre (m³) |          |      |        |
| 2.1.7                 |             |  | Exceeding 1,0 m but not exceeding 2,0 m                                                                                                                                                               | cubic metre (m³) |          |      |        |
| 2.1.8                 |             |  | Exceeding 2,0 m but not exceeding 3,0 m                                                                                                                                                               | cubic metre (m³) |          |      |        |
| 2.2                   | 8.3.2(b)    |  | <b>Extra-over items 2.1 incl. for (prov):</b>                                                                                                                                                         |                  |          |      |        |
| 2.2.1                 |             |  | Intermediate excavation                                                                                                                                                                               | cubic metre (m³) |          |      |        |
| 2.3                   | 8.3.2(c)    |  | <b>Excavate and dispose of unsuitable material from trench bottom (Provisional)</b>                                                                                                                   | cubic metre (m³) |          |      |        |
| 2.4                   |             |  | <b>EXCAVATION, ANCILLARIES Make up deficiency in backfill material (Provisional)</b>                                                                                                                  |                  |          |      |        |
| 2.4.1                 | 8.3.3.1(a)  |  | from other necessary excavations on site                                                                                                                                                              | cubic metre (m³) |          |      |        |
| 2.4.2                 | 8.3.3.1(c)  |  | by importation from commercial or off-site sources selected by the Contractor                                                                                                                         | cubic metre (m³) |          |      |        |
| 2.5                   | PSDB 8.3.4  |  | <b>Particular Items</b>                                                                                                                                                                               |                  |          |      |        |
| Total Carried Forward |             |  |                                                                                                                                                                                                       |                  |          |      |        |



CITY OF CAPE TOWN  
TRANSPORT INFRASTRUCTURE IMPLEMENTATION,  
URBAN MOBILITY DIRECTORATE  
CONTRACT NO. 72Q/2025/26  
SCHEDULE 3: SERVICES

SECTION 1200 DB: PIPE TRENCHES SERVICES

| Item                  |                            | Description                                                                                                                                                                                                       | Unit                              | Quantity | Rate | Amount |
|-----------------------|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|----------|------|--------|
| Brought Forward       |                            |                                                                                                                                                                                                                   |                                   |          |      |        |
| 2.5.1                 | 8.3.4                      | a) Shoring trench in all cases for depths:                                                                                                                                                                        |                                   |          |      |        |
|                       |                            | i) 1.0m - 2,0m                                                                                                                                                                                                    | metre (m)                         |          |      |        |
|                       |                            | ii) 2,0m - 3,0m                                                                                                                                                                                                   | metre (m)                         |          |      |        |
| 2.5.2                 | PSDB<br>8.3.4 (c)          | c) Temporary works : Control / over pump<br>sewerage water from existing manhole to another<br>manhole as per dwg 701-1601 to 1603                                                                                |                                   |          |      |        |
|                       |                            | 1) Provide equipment, incl. establish major pump,<br>supply and control panel                                                                                                                                     | number<br>(No.)                   |          |      |        |
|                       |                            | 2) Operate and maintain                                                                                                                                                                                           | Days                              |          |      |        |
|                       |                            | 3) Remove equipment                                                                                                                                                                                               | number<br>(No.)                   |          |      |        |
| 2.5.4                 | PSDB<br>8.3.4 (d)          | d) Provision of stone bedding and filter fabric layer<br>for unstable trench bottom                                                                                                                               |                                   |          |      |        |
|                       |                            | (i) 20mm stone bedding                                                                                                                                                                                            | cubic metre<br>(m³)               |          |      |        |
|                       |                            | (ii) A6 geotextile or equivalent approved                                                                                                                                                                         | square<br>metre (m²)              |          |      |        |
| 2.5.5                 |                            | e) Provision of liquid waste (sewer) transport and<br>disposal by approved service provider                                                                                                                       |                                   |          |      |        |
|                       |                            | (i) Honey sucker vacuum truck, min size 10kl                                                                                                                                                                      | hour (h)                          |          |      |        |
|                       |                            | (ii) Volume of liquid waste (sewer) to be disposed to<br>a suitable facility by service provider                                                                                                                  | cubic metre<br>(m³)               |          |      |        |
| 2.5.6                 |                            | f) Provision for vertical sheet piling, where required                                                                                                                                                            |                                   |          |      |        |
|                       |                            | (i) Allowance to provide for establishment, setting<br>up, driving of piling vertical sheets, extraction, sheet<br>rental, props and supports including necessary<br>grouting, as per the Engineer's requirements | provisional<br>sum (Prov.<br>Sum) |          |      |        |
|                       |                            | (ii) Contractor's mark up on (i)                                                                                                                                                                                  | %                                 |          |      |        |
| 2.6                   | 8.3.5<br><br>PSDB<br>8.3.5 | <b>EXISTING SERVICES</b><br><br>Services across and in trenches<br><br>Location of services                                                                                                                       |                                   |          |      |        |
| 2.6.1                 |                            | (i) The use of GPR equipment or equivalent to<br>detect underground services                                                                                                                                      | hour (h)                          |          |      |        |
| Total Carried Forward |                            |                                                                                                                                                                                                                   |                                   |          |      |        |

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CITY OF CAPE TOWN  
TRANSPORT INFRASTRUCTURE IMPLEMENTATION,  
URBAN MOBILITY DIRECTORATE  
CONTRACT NO. 72Q/2025/26  
SCHEDULE 3: SERVICES

## SECTION 1200 DB: PIPE TRENCHES SERVICES

| Item                             |          | Description                        | Unit         | Quantity | Rate | Amount |
|----------------------------------|----------|------------------------------------|--------------|----------|------|--------|
| Brought Forward                  |          |                                    |              |          |      |        |
| 2.6.2                            | 8.3.5(a) | Services that intersect a trench   |              |          |      |        |
|                                  |          | (a) Cables, up to 100mm diam. each | number (No.) |          |      |        |
|                                  |          | (b) Sewer pipes up to 250 mm diam. | number (No.) |          |      |        |
|                                  |          | (c) Water mains up to 300 mm diam. | number (No.) |          |      |        |
|                                  |          | (d) Stormwater pipes up to 750 mm  | number (No.) |          |      |        |
|                                  |          | (e) Ducts, up to 160mm diam.       | number (No.) |          |      |        |
| 2.6.3                            | 8.3.5(b) | Services that adjoin a trench      |              |          |      |        |
|                                  |          | (a) Cables, up to 100mm diam. each | metre (m)    |          |      |        |
|                                  |          | (b) Sewer pipes up to 250 mm diam. | metre (m)    |          |      |        |
|                                  |          | (c) Water mains up to 300 mm diam. | metre (m)    |          |      |        |
|                                  |          | (e) Ducts, up to 160mm diam.       | metre (m)    |          |      |        |
| Total Carried Forward To Summary |          |                                    |              |          |      |        |

SECTION 1200 LB: BEDDING

| Item                             |                |  | Description                                              | Unit                | Quantity | Rate | Amount |
|----------------------------------|----------------|--|----------------------------------------------------------|---------------------|----------|------|--------|
| 3.0                              | SANS1200<br>LB |  | SECTION: BEDDING                                         |                     |          |      |        |
|                                  |                |  | PROVISION OF BEDDING (SEWER AND<br>STORMWATER)           |                     |          |      |        |
| 3.1                              |                |  | Available from trench within 0,5 km (Subclause<br>3.4.1) |                     |          |      |        |
|                                  | 8.2.1          |  | a) Selected granular material                            | cubic metre<br>(m³) |          |      |        |
|                                  |                |  | b) Selected fill material                                | cubic metre<br>(m³) |          |      |        |
|                                  |                |  | Imported from                                            |                     |          |      |        |
| 3.2                              | 8.2.2.3        |  | c) Commercial sources (Provisional)                      |                     |          |      |        |
|                                  |                |  | 1) Selected granular material                            | cubic metre<br>(m³) |          |      |        |
|                                  |                |  | 2) Selected fill material                                | cubic metre<br>(m³) |          |      |        |
| Total Carried Forward To Summary |                |  |                                                          |                     |          |      |        |



SECTION 1200 LC: CABLE DUCTS

| Item                  |                |  | Description                                                                              | Unit         | Quantity | Rate | Amount |
|-----------------------|----------------|--|------------------------------------------------------------------------------------------|--------------|----------|------|--------|
| 4.0                   | SANS1200<br>LC |  | <b>SECTION: CABLE DUCTS</b>                                                              |              |          |      |        |
|                       | 8.2.2          |  | <b>EXCAVATION</b>                                                                        |              |          |      |        |
| 4.1                   |                |  | Excavate in all material for trenches, backfill, compact and dispose of surplus material |              |          |      |        |
|                       |                |  | (i) Trenches for 1x110 diam. duct                                                        | metre (m)    |          |      |        |
|                       |                |  | (ii) Trenches for 2x110 diam. duct                                                       | metre (m)    |          |      |        |
|                       |                |  | (iii) Trenches for 1x160 diam. duct                                                      | metre (m)    |          |      |        |
|                       |                |  | (iv) Trenches for 2x160 diam. duct                                                       | metre (m)    |          |      |        |
|                       |                |  | (v) Trenches for 6x110 diam. duct & 2x160 diam. duct combination                         | metre (m)    |          |      |        |
|                       |                |  | (vi) Trenches for 6x110 diam. duct combination                                           | metre (m)    |          |      |        |
|                       |                |  | (vii) Trenches for 7x110 diam. duct combination                                          | metre (m)    |          |      |        |
|                       | DB 1200        |  | <b>EXISTING SERVICES</b>                                                                 |              |          |      |        |
| 4.2                   | 8.3.5          |  | <b>Services across and in trenches</b>                                                   |              |          |      |        |
| 4.2.1                 | PSDB<br>8.3.5  |  | Location of services                                                                     |              |          |      |        |
|                       |                |  | (i) The use of GPR equipment or equivalent to detect underground services                | hour (h)     |          |      |        |
| 4.2.2                 | DB<br>8.3.5(a) |  | Services that intersect a trench                                                         |              |          |      |        |
|                       |                |  | (a) Cables, up to 100mm diam. each                                                       | number (No.) |          |      |        |
|                       |                |  | (b) Sewer pipes up to 250 mm diam.                                                       | number (No.) |          |      |        |
|                       |                |  | (c) Water mains up to 750 mm diam.                                                       | number (No.) |          |      |        |
|                       |                |  | (d) Stormwater pipes up to 750 mm                                                        | number (No.) |          |      |        |
|                       |                |  | (e) Ducts, up to 160mm diam.                                                             | number (No.) |          |      |        |
| 4.2.3                 | DB<br>8.3.5(b) |  | Services that adjoin a trench                                                            |              |          |      |        |
|                       |                |  | (a) Cables, up to 100mm diam. each                                                       | metre (m)    |          |      |        |
|                       |                |  | (b) Sewer pipes up to 250 mm diam.                                                       | metre (m)    |          |      |        |
| Total Carried Forward |                |  |                                                                                          |              |          |      |        |

SECTION 1200 LC: CABLE DUCTS

| Item                  |                |  | Description                                                                                                                                         | Unit             | Quantity | Rate | Amount |
|-----------------------|----------------|--|-----------------------------------------------------------------------------------------------------------------------------------------------------|------------------|----------|------|--------|
| Brought Forward       |                |  |                                                                                                                                                     |                  |          |      |        |
| 4.3                   | PSLC<br>8.2.5  |  | (c) Water mains up to 300 mm diam.<br>(d) Stormwater pipes up to 750 mm<br>(e) Ducts, up to 160mm diam.<br><b>SUPPLY, LAY, BED, AND PROVE DUCTS</b> | metre (m)        |          |      |        |
| 4.3.1                 |                |  | All ducts to be uPVC SANS 61386-24 with sleeve type couplings and draw wire, as per drawings                                                        |                  |          |      |        |
|                       |                |  | (i) Group of 1 No. 1 x 110 mm diam. uPVC pipes - Class 12                                                                                           | metre (m)        |          |      |        |
|                       |                |  | (ii) Group of 1 No. 2 x 110 mm diam. uPVC pipes                                                                                                     | metre (m)        |          |      |        |
|                       |                |  | (iii) Group of 1 No. 1 x 160 mm diam. uPVC pipes                                                                                                    | metre (m)        |          |      |        |
|                       |                |  | (iv) Group of 1 No. 2 x 160 mm diam. uPVC pipes                                                                                                     | metre (m)        |          |      |        |
|                       |                |  | (v) Group of 1 No. 6x110 diam. duct & 2x160 diam. duct combination                                                                                  | metre (m)        |          |      |        |
|                       |                |  | (vi) Group of 1 No. 6 x 110 mm diam. uPVC pipes                                                                                                     | metre (m)        |          |      |        |
|                       |                |  | (vii) Group of 1 No. 7 x 110 mm diam. uPVC pipes                                                                                                    | metre (m)        |          |      |        |
| 4.4                   | 8.2.6          |  | <b>IMPORT BEDDING MATERIAL (provisional)</b>                                                                                                        |                  |          |      |        |
|                       |                |  | (i) Non plastic bedding sand                                                                                                                        | cubic metre (m³) |          |      |        |
|                       | PSLC<br>8.2.7  |  | <b>DRAW PITS/MANHOLES COMPLETE ACCORDING TO THE STANDARD DETAILS</b>                                                                                |                  |          |      |        |
|                       |                |  | (i) Type A, 1.46m x 1.46m standard access chamber, 1m deep                                                                                          | number (No.)     |          |      |        |
|                       |                |  | (ii) Type B, 2.5m x 3m x 1.5m telecom concrete access chamber                                                                                       | number (No.)     |          |      |        |
|                       |                |  | (iii) Type C, 4.5m x 1.29m x 1m telecom brick access chamber                                                                                        | number (No.)     |          |      |        |
| 4.6                   | PSLC<br>8.2.10 |  | <b>CABLE PROTECTION</b>                                                                                                                             |                  |          |      |        |
| 4.6.1                 |                |  | Installation of concrete slabs for protection of existing and new services (Provisional)                                                            |                  |          |      |        |
| Total Carried Forward |                |  |                                                                                                                                                     |                  |          |      |        |

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SECTION 1200 LC: CABLE DUCTS

| Item                             |             |  | Description                                                                      | Unit             | Quantity | Rate | Amount |
|----------------------------------|-------------|--|----------------------------------------------------------------------------------|------------------|----------|------|--------|
| Brought Forward                  |             |  |                                                                                  |                  |          |      |        |
|                                  |             |  | (i) 1.5m x 0.9m, Type A                                                          | number (No.)     |          |      |        |
|                                  |             |  | (ii) 1.0m x 0.9m, Type B                                                         | number (No.)     |          |      |        |
| 4.7                              | PSLC 8.2.11 |  | Concrete encasement of existing and proposed ducts, 15MPa/20mm, where instructed | cubic metre (m³) |          |      |        |
| 4.9                              | PSLC 8.2.13 |  | Steel reinforcement for electrical chambers and protection slabs                 |                  |          |      |        |
|                                  |             |  | (i) High tensile steel bars                                                      | ton (t)          |          |      |        |
|                                  |             |  | (ii) Welded steel fabric / mesh                                                  | ton (t)          |          |      |        |
| Total Carried Forward To Summary |             |  |                                                                                  |                  |          |      |        |

SECTION 1200 LD: SEWERS

| Item                             |                  |  | Description                                                                                          | Unit         | Quantity | Rate | Amount |
|----------------------------------|------------------|--|------------------------------------------------------------------------------------------------------|--------------|----------|------|--------|
| 5.0                              | SANS             |  | SECTION : SEWERS                                                                                     |              |          |      |        |
| 5.1                              | 1200 LD          |  | PIPEWORK                                                                                             |              |          |      |        |
| 5.1.1                            | 8.2.1            |  | Supply, lay, joint, bed uPVC SDR34 sewer pipes                                                       |              |          |      |        |
|                                  |                  |  | (a) 150 mm diam.                                                                                     | metre (m)    |          |      |        |
|                                  |                  |  | (b) 200 mm diam.                                                                                     | metre (m)    |          |      |        |
| 5.1.2                            | 8.2.1            |  | Supply, lay, joint, bed concrete spigot and socket class 75D sewer pipes                             |              |          |      |        |
|                                  |                  |  | (a) 375 mm diam.                                                                                     | metre (m)    |          |      |        |
| 5.2                              | 1200 LD<br>8.2.3 |  | MANHOLES, ETC. Manholes to Dwg No. 701-2501 complete with cover and frame, for depths over and up to |              |          |      |        |
|                                  |                  |  | (a) 1,0 m to 2 m                                                                                     | number (No.) |          |      |        |
|                                  |                  |  | (b) 2,0 m to 3 m                                                                                     | number (No.) |          |      |        |
|                                  |                  |  | (c) 3,0 m to 4 m                                                                                     | number (No.) |          |      |        |
| 5.3                              |                  |  | SUNDRIES                                                                                             |              |          |      |        |
| 5.3.1                            | 8.2.11           |  | Break into and connect to existing manhole including flexible joints and make good all benching      | number (No.) |          |      |        |
| 5.3.2                            | 8.2.12           |  | Raising or lowering of existing manholes                                                             | number (No.) |          |      |        |
| Total Carried Forward To Summary |                  |  |                                                                                                      |              |          |      |        |

SECTION 1200 LE: STORMWATER DRAINAGE

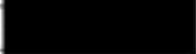
| Item                  |                |  | Description                                                                                                      | Unit                 | Quantity | Rate | Amount |
|-----------------------|----------------|--|------------------------------------------------------------------------------------------------------------------|----------------------|----------|------|--------|
| 6.0                   | SANS1200<br>LE |  | <b>SECTION: STORMWATER DRAINAGE</b>                                                                              |                      |          |      |        |
|                       |                |  | <b>PIPES</b>                                                                                                     |                      |          |      |        |
| 6.1                   | 8.2.1          |  | Supply, handle, lay, bed Class C concrete pipe<br>Type 100D, spigot and socket                                   |                      |          |      |        |
|                       |                |  | a) 300 mm diameter                                                                                               | metre (m)            |          |      |        |
|                       |                |  | b) 375 mm diameter                                                                                               | metre (m)            |          |      |        |
|                       |                |  | c) 450 mm diameter                                                                                               | metre (m)            |          |      |        |
| 6.2                   | PSLE<br>8.2.8  |  | <b>MANHOLES</b> Construct new manholes complete<br>with covers and frames, as per the dwgs. 701-<br>2601 to 2603 |                      |          |      |        |
|                       |                |  | a) Manhole Type A, standard precast ring type, for<br>pipes up to 450mm diam.                                    | number<br>(No.)      |          |      |        |
| 6.3                   | PSLE<br>8.2.8  |  | <b>CATCHPITS</b> Construct complete with grid inlets,<br>as per dwgs. 701-2601 to 2602                           |                      |          |      |        |
|                       |                |  | a) Catchpit, kerb & grid inlet type                                                                              | number<br>(No.)      |          |      |        |
| 6.4                   | 8.2.13         |  | The raising and lowering of existing manholes                                                                    | number<br>(No.)      |          |      |        |
| 6.5                   |                |  | <b>Additional Brickwork and Plastering, Benching,</b><br><b>where instructed by the Engineer</b>                 |                      |          |      |        |
|                       | 8.2.9(a)       |  | (a) 115 mm thick                                                                                                 | square<br>metre (m²) |          |      |        |
|                       |                |  | (b) 230 mm thick                                                                                                 | square<br>metre (m²) |          |      |        |
|                       |                |  | (c) 345 mm thick                                                                                                 | square<br>metre (m²) |          |      |        |
|                       | 8.2.9(b)       |  | (d) Plaster (not less than 10 mm and not more than<br>15 mm thick)                                               | square<br>metre (m²) |          |      |        |
|                       | 8.2.9(c)       |  | (e) Benching in prescribed mix 20 concrete with<br>granolithic rendering                                         | square<br>metre (m²) |          |      |        |
| 6.6                   | 1200 GA        |  | <b>Steel Reinforcement for all chambers</b>                                                                      |                      |          |      |        |
|                       | 8.3.1          |  | a) High Tensile Steel                                                                                            | kilogram<br>(kg)     |          |      |        |
|                       | 8.3.2          |  | b) Welded steel mesh                                                                                             | kilogram<br>(kg)     |          |      |        |
| 6.7                   | 1200 GA<br>8.4 |  | <b>Concrete, -30Mpa/20mm</b>                                                                                     | cubic metre<br>(m³)  |          |      |        |
| Total Carried Forward |                |  |                                                                                                                  |                      |          |      |        |

SECTION 1200 LE: STORMWATER DRAINAGE

| Item                             |         |  |  | Description        | Unit              | Quantity | Rate | Amount |
|----------------------------------|---------|--|--|--------------------|-------------------|----------|------|--------|
| Brought Forward                  |         |  |  |                    |                   |          |      |        |
| 6.8                              | 1200 GA |  |  | Formwork, vertical | square metre (m²) |          |      |        |
| 8.2                              |         |  |  |                    |                   |          |      |        |
| Total Carried Forward To Summary |         |  |  |                    |                   |          |      |        |



CITY OF CAPE TOWN  
TRANSPORT INFRASTRUCTURE IMPLEMENTATION,  
URBAN MOBILITY DIRECTORATE  
CONTRACT NO. 72Q/2025/26  
SCHEDULE 3: SERVICES

| SUMMARY OF SECTIONS                           |                                         | Amount                                                                              |
|-----------------------------------------------|-----------------------------------------|-------------------------------------------------------------------------------------|
| Section                                       | Description                             |                                                                                     |
| 1200 C                                        | SECTION 1200 C: SITE CLEARANCE          |  |
| 1200 DB                                       | SECTION 1200 DB: PIPE TRENCHES SERVICES |                                                                                     |
| 1200 LB                                       | SECTION 1200 LB: BEDDING                |                                                                                     |
| 1200LC                                        | SECTION 1200 LC: CABLE DUCTS            |                                                                                     |
| 1200LD                                        | SECTION 1200 LD: SEWERS                 |                                                                                     |
| 1200LE                                        | SECTION 1200 LE: STORMWATER DRAINAGE    |                                                                                     |
| Total Carried Forward To Summary Of Schedules |                                         |  |



SECTION 1: EARTHWORKS (PIPE TRENCHES)

| Item                  |                     |  | Description                                                                                           | Unit             | Quantity | Rate | Amount |
|-----------------------|---------------------|--|-------------------------------------------------------------------------------------------------------|------------------|----------|------|--------|
|                       |                     |  | <b>SECTION 1: EARTHWORKS (PIPE TRENCHES)</b>                                                          |                  |          |      |        |
|                       |                     |  | <b>EXCAVATION (WATER MAIN)</b>                                                                        |                  |          |      |        |
| L1                    | 1200DB & PSDb 8.3.2 |  | Excavate in all materials by machine for trenches, backfill, compact, and dispose of surplus material |                  |          |      |        |
|                       | PSDB 8.3.2 a        |  | Over 100 up to 350 mm diam. for total trench depth:                                                   |                  |          |      |        |
| L1.1                  |                     |  | a) Exceeding 0,0 m but not exceeding 1,0 m                                                            | cubic metre (m³) |          |      |        |
| L1.2                  |                     |  | b) Exceeding 1,0 m but not exceeding 2,0 m                                                            | cubic metre (m³) |          |      |        |
|                       |                     |  | Over 350 up to 800 mm diam. for total trench depth:                                                   |                  |          |      |        |
| L1.3                  |                     |  | a) Exceeding 0,0 m but not exceeding 1,0 m                                                            | cubic metre (m³) |          |      |        |
| L1.4                  |                     |  | b) Exceeding 1,0 m but not exceeding 2,0 m                                                            | cubic metre (m³) |          |      |        |
| L2                    | PSDB 8.3.2 b        |  | Extra-over items L1.1 to L1.4 incl. for (provisional):                                                |                  |          |      |        |
| L2.1                  |                     |  | i) Intermediate material                                                                              | cubic metre (m³) |          |      |        |
| L2.2                  |                     |  | ii) Hard rock                                                                                         | cubic metre (m³) |          |      |        |
| L2.3                  |                     |  | iii) using pneumatic tools or other techniques where blasting is not permitted                        | cubic metre (m³) |          |      |        |
| L                     | PSDB 8.3.2 c        |  | Excavate and dispose of unsuitable material from trench bottom (Provisional)                          | cubic metre (m³) |          |      |        |
| L4                    | PSDB 8.3.2 d        |  | Excavate in all materials by hand for trenches, backfill, compact, and dispose of surplus material    |                  |          |      |        |
|                       |                     |  | Over 100 up to 500 mm diam. for total trench depth:                                                   |                  |          |      |        |
| L4.1                  |                     |  | a) Exceeding 0,0 m but not exceeding 1,0 m                                                            | cubic metre (m³) |          |      |        |
| L4.2                  |                     |  | b) Exceeding 1,0 m but not exceeding 2,0 m                                                            | cubic metre (m³) |          |      |        |
| L4.3                  |                     |  | c) Exceeding 2,0 m but not exceeding 3,0 m                                                            | cubic metre (m³) |          |      |        |
| Total Carried Forward |                     |  |                                                                                                       |                  |          |      |        |

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#### SECTION 1: EARTHWORKS (PIPE TRENCHES)

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SECTION 1: EARTHWORKS (PIPE TRENCHES)

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SECTION 1: EARTHWORKS (PIPE TRENCHES)

| Item                             |         | Description |  | Unit                                            | Quantity | Rate | Amount |
|----------------------------------|---------|-------------|--|-------------------------------------------------|----------|------|--------|
| Brought Forward                  |         |             |  |                                                 |          |      |        |
| L13.2                            | 8.2.2.3 |             |  | b) Selected fill material                       |          |      |        |
|                                  |         |             |  | Imported from                                   |          |      |        |
|                                  |         |             |  | c) Commercial sources (Provisional)             |          |      |        |
|                                  |         |             |  | 1) Selected granular material (min G7 material) |          |      |        |
|                                  |         |             |  | 2) Selected fill material                       |          |      |        |
| Total Carried Forward To Summary |         |             |  |                                                 |          |      |        |



SECTION 2: MEDIUM PRESSURE PIPELINES

| Item                  |                     |  | Description                                                                                                                          | Unit      | Quantity | Rate | Amount |
|-----------------------|---------------------|--|--------------------------------------------------------------------------------------------------------------------------------------|-----------|----------|------|--------|
|                       | SANS1200<br>L & PSL |  | <b>SECTION 2: MEDIUM PRESSURE PIPELINES</b>                                                                                          |           |          |      |        |
|                       |                     |  | PIPEWORK (NEW PIPES)                                                                                                                 |           |          |      |        |
| L2                    | PSL8.2.1            |  | <b>Supply of Pipes only</b>                                                                                                          |           |          |      |        |
| L2.1                  |                     |  | Supply of uPVC Pressure Pipes to SANS 966 (Class 12) (SAPPMA certified)                                                              |           |          |      |        |
| L2.1.1                |                     |  | a) 110 mm diam.                                                                                                                      | metre (m) |          |      |        |
| L2.1.2                |                     |  | b) 160 mm diam.                                                                                                                      | metre (m) |          |      |        |
| L2.1.3                |                     |  | c) 250 mm diam.                                                                                                                      | metre (m) |          |      |        |
| L2.2                  |                     |  | Supply of HDPE Pressure Pipes to SANS 4427 (SAPPMA certified)                                                                        |           |          |      |        |
| L2.2.1                |                     |  | a) 315 mm diam. HDPE PE 100 PN16                                                                                                     | metre (m) |          |      |        |
| L3                    |                     |  | <b>Handle, lay and bed (class C), with spigot and socket joints, test and disinfect. (Pipes measured separately)</b>                 |           |          |      |        |
| L3.1                  |                     |  | uPVC Pressure Pipes to SANS 966 (Class 12) (SAPPMA certified)                                                                        |           |          |      |        |
| L3.1.1                |                     |  | a) 110 mm diam.                                                                                                                      | metre (m) |          |      |        |
| L3.1.2                |                     |  | b) 160 mm diam.                                                                                                                      | metre (m) |          |      |        |
| L3.1.3                |                     |  | c) 250 mm diam.                                                                                                                      | metre (m) |          |      |        |
| L3.2                  |                     |  | HDPE Pressure Pipes to SANS 4427 (SAPPMA certified)                                                                                  |           |          |      |        |
| L3.2.1                |                     |  | a) 315 mm diam. for bypass connection                                                                                                | metre (m) |          |      |        |
| L4                    | PSL8.2.1<br>a) / b) |  | <b>Supply, handle, lay and bed (class B) steel CML pipes with field welded spigot &amp; socket (bell) joints, test and disinfect</b> |           |          |      |        |
|                       |                     |  | Steel Cement Mortar Lined (CML) pipes in accordance with SANS 719:2011 and PSL3.4, following diameters and Class:                    |           |          |      |        |
|                       |                     |  | Pipe min thickness of 8mm. Internal Coating: blast furnace slag cement mortar (BFSCM) in accordance with ISO 4179, min 15mm thick    |           |          |      |        |
|                       |                     |  | External Sheathing: Cement Mortar, 25mm thick with wire reinforcing tack welded to pipe                                              |           |          |      |        |
| L4.1                  |                     |  | a) 750 mm diam. Class X42, with field welded spigot and socket (bell) joints included                                                | metre (m) |          |      |        |
| Total Carried Forward |                     |  |                                                                                                                                      |           |          |      |        |

## SECTION 2: MEDIUM PRESSURE PIPELINES

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SECTION 2: MEDIUM PRESSURE PIPELINES

| Item                  |  |  | Description                                                             | Unit         | Quantity | Rate | Amount |
|-----------------------|--|--|-------------------------------------------------------------------------|--------------|----------|------|--------|
| Brought Forward       |  |  |                                                                         |              |          |      |        |
| L5.1.4.1              |  |  | a) 250 mm diam. cast iron, socketed                                     | number (No.) |          |      |        |
| L5.2                  |  |  | TEES                                                                    |              |          |      |        |
| L5.2.1                |  |  | a) 110 x 160 mm cast iron, socketed                                     | number (No.) |          |      |        |
| L5.2.2                |  |  | b) 250 x 160 mm cast iron, socketed                                     | number (No.) |          |      |        |
| L5.2.3                |  |  | c) 250 x 250 mm cast iron, socketed                                     | number (No.) |          |      |        |
| L5.2.4                |  |  | d) 750 x 750 mm steel CML, CL X42, flanged                              | number (No.) |          |      |        |
| L5.2.5                |  |  | e) 750 x 750 mm steel CML, CL x42, plain ended with flanged branch      | number (No.) |          |      |        |
| L5.2.6                |  |  | f) 750 x 250 mm steel CML, CL X42, plain ended with flanged branch      | number (No.) |          |      |        |
| L5.2.7                |  |  | g) 750 x 250 mm steel CML, CL X42, flanged                              | number (No.) |          |      |        |
| L5.2.8                |  |  | h) 750 x 400 mm steel CML, CL X42, flanged                              | number (No.) |          |      |        |
| L5.2.9                |  |  | i) 750 x 400 mm steel CML, CL X42, plain ended with flanged branch      | number (No.) |          |      |        |
| L5.3                  |  |  | SCOUR TEE                                                               |              |          |      |        |
| L5.3.1                |  |  | a) 750 x 250 mm dia. steel CML, CL X42, plain ended with flanged branch | number (No.) |          |      |        |
| L5.4                  |  |  | HYDRANT TEES                                                            |              |          |      |        |
| L5.4.1                |  |  | a) 160 x 100 mm diam. cast iron, socketed with flanged branch           | number (No.) |          |      |        |
| L5.4.2                |  |  | b) 250 x 100 mm diam. cast iron, socketed with flanged branch           | number (No.) |          |      |        |
| L5.5                  |  |  | REDUCERS                                                                |              |          |      |        |
| L5.5.1                |  |  | a) 160 x 110 mm diam. cast iron, socketed                               | number (No.) |          |      |        |
| L5.5.2                |  |  | b) 160 x 110 mm diam. cast iron, flanged                                | number (No.) |          |      |        |
| L5.5.3                |  |  | c) 250 x 160 mm diam. cast iron, socketed                               | number (No.) |          |      |        |
| Total Carried Forward |  |  |                                                                         |              |          |      |        |



SECTION 2: MEDIUM PRESSURE PIPELINES

| Item                  |  |  | Description                                      | Unit         | Quantity | Rate | Amount |
|-----------------------|--|--|--------------------------------------------------|--------------|----------|------|--------|
| Brought Forward       |  |  |                                                  |              |          |      |        |
| L5.5.4                |  |  | d) 250 x 160 mm diam. cast iron, flanged         | number (No.) |          |      |        |
| L5.5.5                |  |  | e) 750 x 600 mm diam. steel CML, CL X42, flanged | number (No.) |          |      |        |
| L5.6                  |  |  | END CAPS                                         |              |          |      |        |
| L5.6.1                |  |  | a) 110 mm diam. cast iron                        | number (No.) |          |      |        |
| L5.6.2                |  |  | b) 160 mm diam. cast iron                        | number (No.) |          |      |        |
| L5.6.3                |  |  | c) 250 mm diam. cast iron                        | number (No.) |          |      |        |
| L5.6.4                |  |  | d) 750 mm diam. steel                            | number (No.) |          |      |        |
| L5.8                  |  |  | FLANGE ADAPTORS                                  |              |          |      |        |
| L5.8.1                |  |  | a) 110 x 110 mm diam.                            | number (No.) |          |      |        |
| L5.8.2                |  |  | b) 160 x 110 mm diam.                            | number (No.) |          |      |        |
| L5.8.3                |  |  | c) 160 x 160 mm diam.                            | number (No.) |          |      |        |
| L5.8.4                |  |  | d) 750 x 750 mm diam.                            | number (No.) |          |      |        |
| L5.10                 |  |  | PIPE COUPLINGS                                   |              |          |      |        |
| L5.10.1               |  |  | a) 110mm diam. VJ coupling or equivalent         | number (No.) |          |      |        |
| L5.10.2               |  |  | b) 160mm diam. VJ coupling or equivalent         | number (No.) |          |      |        |
| L5.10.3               |  |  | c) 250mm diam. VJ coupling or equivalent         | number (No.) |          |      |        |
| L5.10.4               |  |  | d) 750mm diam. VJ coupling or equivalent         | number (No.) |          |      |        |
| L5.12                 |  |  | BLANK FLANGES                                    |              |          |      |        |
| L5.12.1.1             |  |  | a) 750 mm diam. steel                            | number (No.) |          |      |        |
| L5.13                 |  |  | DISMANTLING JOINTS                               |              |          |      |        |
| L5.13.1               |  |  | a) 100 mm diam. flanged                          | number (No.) |          |      |        |
| Total Carried Forward |  |  |                                                  |              |          |      |        |

## SECTION 2: MEDIUM PRESSURE PIPELINES



## SECTION 2: MEDIUM PRESSURE PIPELINES



SECTION 2: MEDIUM PRESSURE PIPELINES

| Item                             |        | Description                                                                                                               | Unit         | Quantity | Rate | Amount |
|----------------------------------|--------|---------------------------------------------------------------------------------------------------------------------------|--------------|----------|------|--------|
| Brought Forward                  |        |                                                                                                                           |              |          |      |        |
| L11.1.2                          |        | b) Marker posts                                                                                                           | number (No.) |          |      |        |
| L11.2                            |        | Kerb Markers                                                                                                              |              |          |      |        |
| L11.2.1                          |        | Cut kerb face and paint blue, yellow or red depending on region preference to mark hydrants, valves and house connections |              |          |      |        |
| L11.2.1.1                        |        | a) Hydrants                                                                                                               | number (No.) |          |      |        |
| L11.2.1.2                        |        | b) Valves                                                                                                                 | number (No.) |          |      |        |
| L11.3                            | 8.2.16 | Tie into existing pipes up to 350mm diam. incl. all additional costs excl. scheduled fittings/couplings                   | number (No.) |          |      |        |
| L11.4                            | 8.2.17 | Tie into existng DN750 CI pipe incl. all additional costs excl. scheduled fittings/couplings                              | number (No.) |          |      |        |
| Total Carried Forward To Summary |        |                                                                                                                           |              |          |      |        |

| SUMMARY OF SECTIONS                           |                                       |        |
|-----------------------------------------------|---------------------------------------|--------|
| Sectl                                         | Description                           | Amount |
| 1                                             | SECTION 1: EARTHWORKS (PIPE TRENCHES) |        |
| 2                                             | SECTION 2: MEDIUM PRESSURE PIPELINES  |        |
| Total Carried Forward To Summary Of Schedules |                                       |        |





CITY OF CAPE TOWN  
TRANSPORT INFRASTRUCTURE IMPLEMENTATION  
URBAN MOBILITY DIRECTORATE  
CONTRACT NO. 72Q/2025/26  
SCHEDULE 5: ELECTRICAL STREET LIGHTING

## ITEM 1: PRELIMINARY AND GENERAL

[illegible]



CITY OF CAPE TOWN  
TRANSPORT INFRASTRUCTURE IMPLEMENTATION  
URBAN MOBILITY DIRECTORATE  
CONTRACT NO. 72Q/2025/26  
SCHEDULE 5: ELECTRICAL STREET LIGHTING

## ITEM 2: UNDERGROUND NETWORKS

| ITEM NO                          | PAYMENT | DESCRIPTION                                                                                                                                                                                                                   | UNIT         | QTY | RATE | AMOUNT |
|----------------------------------|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----|------|--------|
| Brought Forward                  |         |                                                                                                                                                                                                                               |              |     |      |        |
| 2.3.2.2                          | 3.1.1   | A 6m galvanised steel kicker pipe and mounted with associated buckle and metal straps to the street lighting pole for a street lighting kiosk with one incoming supply and three outgoing supply according to CoCt standards. |              |     |      |        |
|                                  | 3.1.1   | Street lighting poles are mounted 6m from the ground to the bottom of the kiosk                                                                                                                                               | number (No.) |     |      |        |
|                                  | SSC     |                                                                                                                                                                                                                               |              |     |      |        |
| 2.3.3                            | 8.3.6.6 | Termination of Street Light cable with CCG glands                                                                                                                                                                             |              |     |      |        |
| 2.3.3.1                          | 8.3.6.6 | 25mm <sup>2</sup> x 4C (Al)                                                                                                                                                                                                   | number (No.) |     |      |        |
| 2.3.3.2                          | 8.3.6.6 | 35mm <sup>2</sup> x 4C (Al)                                                                                                                                                                                                   | number (No.) |     |      |        |
| 2.3.4                            | 8.3.6.8 | Termination of S/L cable in S/L poles with Dinky Connectors                                                                                                                                                                   |              |     |      |        |
| 2.3.4.1                          | 8.3.6.8 | 25mm <sup>2</sup> x 4C (Al)                                                                                                                                                                                                   | number (No.) |     |      |        |
| 2.3.4.2                          |         | Jointing of 25mm <sup>2</sup> x 4C (Al) or any existing street lighting cable (copper or aluminium) to provide a temporary supply (Engineer approval required prior to material procurement)                                  | number (No.) |     |      |        |
| 2.4                              | 8.3.1   | GENERAL CABLE INSTALLATION                                                                                                                                                                                                    |              |     |      |        |
| 2.4.1                            | 8.3.2   | Plastic warning tape                                                                                                                                                                                                          | m            |     |      |        |
| Total Carried Forward To Summary |         |                                                                                                                                                                                                                               |              |     |      |        |

CITY OF CAPE TOWN  
 TRANSPORT INFRASTRUCTURE IMPLEMENTATION  
 URBAN MOBILITY DIRECTORATE  
 CONTRACT NO. 72Q/2025/26  
 SCHEDULE 5: ELECTRICAL STREET LIGHTING

ITEM 3: EXCAVATIONS

| ITEM NO                          | PAYMENT | DESCRIPTION                                                                                                                                                                                                                  | UNIT                          | QTY | RATE | AMOUNT |
|----------------------------------|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|-----|------|--------|
| 3.1                              | SSE     | ITEM 3: EXCAVATIONS                                                                                                                                                                                                          |                               |     |      |        |
| 3.1.1                            | 8.3.2.1 | Excavation by hand in all material for trenches, backfilling, compaction and removal of surplus material                                                                                                                     |                               |     |      |        |
| 3.1.1                            | 8.3.2.1 | 0.5 m x 0.75 m deep for service/street light and LV distribution cables                                                                                                                                                      | m                             |     |      |        |
|                                  | 8.3.2.1 | 0.5 m x 0.75 m deep for removing the Existing street lighting cables. Removed Cable to be delivered to the City of Cape Storage or depot                                                                                     | m                             |     |      |        |
|                                  | SSC     |                                                                                                                                                                                                                              |                               |     |      |        |
| 3.1.2                            | 8.3.1.2 | Pulling 25mm <sup>2</sup> x 4C (Al) cable through duct on the bridge                                                                                                                                                         | m                             |     |      |        |
|                                  | SSF     |                                                                                                                                                                                                                              |                               |     |      |        |
| 3.1.3                            | 8.3.2   | Delivery of Street lighting poles to City of Cape Town Storage or depot                                                                                                                                                      | m                             |     |      |        |
| 3.1.4                            | 8.3.2   | Street light pole holes for 7.2m, 11m and 13.5m poles                                                                                                                                                                        | number (No.)                  |     |      |        |
| 3.1.5                            | 8.3.2   | Removal of existing Street light pole.                                                                                                                                                                                       | number (No.)                  |     |      |        |
|                                  | SSE     |                                                                                                                                                                                                                              |                               |     |      |        |
| 3.2                              | 8.3.2.1 | Extra-over for import of clean backfill sand, inclusive of removal of surplus insitu material. Engineer approval required prior to material procurement.                                                                     | cubic metre (m <sup>3</sup> ) |     |      |        |
| 3.3                              | 8.3.4   | Tracing and protection of existing services crossing excavations                                                                                                                                                             | number (No.)                  |     |      |        |
| 3.4                              | 8.3.5   | Tracing and protection of existing services parallel to excavations                                                                                                                                                          | m                             |     |      |        |
| 3.6                              | 8.3.7   | Troxler Test                                                                                                                                                                                                                 | number (No.)                  |     |      |        |
| 3.7                              |         | Welding of Street lighting pole covers According to City of Cape Town Specifications (Galvanising spray for the welded pole cover should be included in pricing). (Engineer approval required prior to material procurement) | number (No.)                  |     |      |        |
| Total Carried Forward To Summary |         |                                                                                                                                                                                                                              |                               |     |      |        |

CITY OF CAPE TOWN  
 TRANSPORT INFRASTRUCTURE IMPLEMENTATION  
 URBAN MOBILITY DIRECTORATE  
 CONTRACT NO. 72Q/2025/26  
 SCHEDULE 5: ELECTRICAL STREET LIGHTING

ITEM 4: STREET AND AREA LIGHTNING

| ITEM NO                          | PAYMENT | DESCRIPTION                                                                                                                                                                                                                                                                                                                                                          | UNIT         | QTY  | RATE   | AMOUNT   |
|----------------------------------|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|------|--------|----------|
|                                  | SSF     | <b>ITEM 4: STREET AND AREA LIGHTNING</b><br><br>(Please note that a COC is to be provided for all street lighting installations and modifications and is deemed included in the rates tendered)                                                                                                                                                                      |              |      |        |          |
| 4.1                              | 8.3.1   | Pegging of pole positions                                                                                                                                                                                                                                                                                                                                            | number (No.) | 48.0 | 100.00 | 4 800.00 |
| 4.2                              | 8.3.2   | <b>Supply and installation of street light poles</b>                                                                                                                                                                                                                                                                                                                 |              |      |        |          |
| 4.2.1                            | 8.3.2   | Supply and installation of street light poles 7,2 m streetlight poles galvanised steel pole - SL 37 to City of Cape Town specification                                                                                                                                                                                                                               | number (No.) |      |        |          |
| 4.2.2                            | 8.3.2   | Supply and installation of street light poles 13,5 m streetlight poles galvanised steel pole - SL 33 to City of Cape Town specification                                                                                                                                                                                                                              | number (No.) |      |        |          |
|                                  | 8.3.5   | 52W BEKA LEDLUM XP1 (Optic package 5307) unpainted and 10A, Bussmann Type FA subprotection fuse in marked fuseholder (10A) mounted on wooden backboard behind the access. City of Cape Town requires all new luminaires to be fitted with a 7-pin NEMA socket and external sandwich type surge protection.                                                           | number (No.) |      |        |          |
| 4.3.2                            | 8.3.5   | 113W BEKA LEDLUM XP2 (Optic package 5399) unpainted and 10A, Bussmann Type FA subprotection fuse in marked fuseholder (10A) mounted on wooden backboard behind the access opening in pole. Sticker on luminaire to indicate wattage. City of Cape Town requires all new luminaires to be fitted with a 7-pin NEMA socket and external sandwich type surge protection | number (No.) |      |        |          |
| 4.3.3                            | 8.3.5   | 85W BEKA LEDLUM XP2 (Optic package 5307) unpainted and 10A, Bussmann Type FA subprotection fuse in marked fuseholder (10A) mounted on wooden backboard behind the access opening in pole. Sticker on luminaire to indicate wattage. City of Cape Town requires all new luminaires to be fitted with a 7-pin NEMA socket and external sandwich type surge protection  | number (No.) |      |        |          |
|                                  | SSF     |                                                                                                                                                                                                                                                                                                                                                                      |              |      |        |          |
| 4.4                              | 8.3.4.1 | Supply and install short side entry luminaire adaptor (SL-36)                                                                                                                                                                                                                                                                                                        | number (No.) |      |        |          |
| 4.4.1                            | 8.3.4.1 | Supply and install double or Back to Back short side entry luminaire adaptor (SL-36)                                                                                                                                                                                                                                                                                 | number (No.) |      |        |          |
| 4.4.2                            | 8.3.4.1 | Supply and install short side entry luminaire adaptor (SL-52)                                                                                                                                                                                                                                                                                                        | number (No.) |      |        |          |
| Total Carried Forward To Summary |         |                                                                                                                                                                                                                                                                                                                                                                      |              |      |        |          |

| ITEM 5: EARTHING                 |                |                                                                                                                         |              |             |      |             |
|----------------------------------|----------------|-------------------------------------------------------------------------------------------------------------------------|--------------|-------------|------|-------------|
| ITEM NO                          | PAYMENT        | DESCRIPTION                                                                                                             | UNIT         | QTY         | RATE | AMOUNT      |
| 5.1                              | SSG<br>8.3.2.4 | ITEM 5: EARTHING<br>Supply, install and connect earth spike to street light, CCTV and General Services kiosk (Complete) | number (No.) | <div></div> |      |             |
| 5.2                              | 8.3.4.1        | Earth resistance test (At all end of runs and at minisub)                                                               | number (No.) |             |      |             |
| Total Carried Forward To Summary |                |                                                                                                                         |              |             |      | <div></div> |





CITY OF CAPE TOWN  
 TRANSPORT INFRASTRUCTURE IMPLEMENTATION  
 URBAN MOBILITY DIRECTORATE  
 CONTRACT NO. 72Q/2025/26  
 SCHEDULE 5: ELECTRICAL STREET LIGHTING

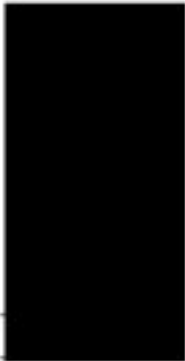
ITEM 6: TRAFFIC LIGHT SUPPLY POINT

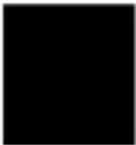
| ITEM NO               | PAYMENT | DESCRIPTION                                                                                                                                                                                                           | UNIT                          | QTY | RATE | AMOUNT |
|-----------------------|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|-----|------|--------|
|                       | SSC     | <b>ITEM 6: TRAFFIC LIGHT SUPPLY POINT</b>                                                                                                                                                                             |                               |     |      |        |
| 6.1                   | 8.3.1.2 | Supply, lay and test LV cables 600/1000V PVC PVC SWA PVC with SABS 1507 mark. Engineer approval required prior to material procurement.                                                                               |                               |     |      |        |
| 6.1.1                 | 8.3.1.2 | Between 35mm <sup>2</sup> x 4C (Al) and 70mm <sup>2</sup> x 4C (Al)                                                                                                                                                   | m                             |     |      |        |
| 6.2                   | 8.3.5.1 | Supply and installation of Distribution Kiosks, CoCT Approved Steel Metering kiosks 'Kiosks to be 3CR12 Steel as per CoCT Standards. Engineer approval required prior to material procurement.                        |                               |     |      |        |
| 6.2.1                 | 8.3.5.1 | 12-Way kiosk - 3 x 80A 1P curve 1 QF-1(26) DIN rail mounted c.b.s.                                                                                                                                                    | number (No.)                  |     |      |        |
|                       | 8.3.5.2 | Supply and install 80A 1P curve 1 QF-1(26) DIN rail mounted c.b.s. inside existing CoCT Kiosk. Engineer approval required prior to material procurement.                                                              | number (No.)                  |     |      |        |
| 6.3                   | 8.3.6.6 | Termination of LV cable with CCG glands Mechanical Torque shear lugs used for the LV Aluminium cable terminations into the kiosks to conform to IEC61238-1. Engineer approval required prior to material procurement. |                               |     |      |        |
| 6.3.1                 | 8.3.6.6 | Between 35mm <sup>2</sup> x 4C (Al) and 70mm <sup>2</sup> x 4C (Al)                                                                                                                                                   | number (No.)                  |     |      |        |
| 6.4                   | 8.3.1   | GENERAL CABLE INSTALLATION                                                                                                                                                                                            |                               |     |      |        |
| 6.4.1                 | 8.3.2   | Plastic warning tape                                                                                                                                                                                                  | m                             |     |      |        |
|                       | SSE     |                                                                                                                                                                                                                       |                               |     |      |        |
| 6.5                   | 8.3.2.1 | <b>EXCAVATIONS: Excavation by hand in all material for trenches, backfilling, compaction and removal of surplus material</b>                                                                                          |                               |     |      |        |
| 6.5.1                 | 8.3.2.1 | 0.5 m x 0.75 m deep for service/street light and LV distribution cables                                                                                                                                               | m                             |     |      |        |
| 6.5.2                 | 8.3.2.1 | Extra-over for import of clean backfill sand, inclusive of removal of surplus insitu material (Engineer to approve before hand)                                                                                       | cubic metre (m <sup>3</sup> ) |     |      |        |
| 6.5.3                 | 8.3.2.2 | Extra-over for excavating for LV and SC cables over existing services                                                                                                                                                 | m                             |     |      |        |
| 6.5.4                 | 8.3.4   | Tracing and protection of existing services crossing excavations                                                                                                                                                      | m                             |     |      |        |
| 6.5.5                 | 8.3.5   | Tracing and protection of existing services parallel excavations                                                                                                                                                      | m                             |     |      |        |
| 6.6                   | 8.3.6   | Reinstate made up surfaces                                                                                                                                                                                            |                               |     |      |        |
| Total Carried Forward |         |                                                                                                                                                                                                                       |                               |     |      |        |

| ITEM NO                          | PAYMENT | DESCRIPTION                                                            | UNIT              | QTY | RATE | AMOUNT |
|----------------------------------|---------|------------------------------------------------------------------------|-------------------|-----|------|--------|
| Brought Forward                  |         |                                                                        |                   |     |      |        |
| 6.6.1                            | 8.3.6   | Paving (Engineer to approve before hand)                               | square metre (m²) |     |      |        |
| 6.6.2                            | 8.3.6   | Cutting and Reinstating of Tar (Engineer to approve before hand)       | square metre (m²) |     |      |        |
| 6.6.3                            | 8.3.6   | Removal and Reinstale of lanscaping. (Engineer to approve before hand) | square metre (m²) |     |      |        |
| 6.6.4                            | 8.3.7   | Troxder Test                                                           | number (No.)      |     |      |        |
| Total Carried Forward To Summary |         |                                                                        |                   |     |      |        |



CITY OF CAPE TOWN  
TRANSPORT INFRASTRUCTURE IMPLEMENTATION  
URBAN MOBILITY DIRECTORATE  
CONTRACT NO. 72Q/2025/26  
SCHEDULE 5: ELECTRICAL STREET LIGHTING

| SECTION                                                       | SUMMARY OF SECTIONS<br>DESCRIPTION | AMOUNT                                                                              |
|---------------------------------------------------------------|------------------------------------|-------------------------------------------------------------------------------------|
| 1                                                             | ITEM 1: PRELIMINARY AND GENERAL    |  |
| 2                                                             | ITEM 2: UNDERGROUND NETWORKS       |                                                                                     |
| 3                                                             | ITEM 3: EXCAVATIONS                |                                                                                     |
| 4                                                             | ITEM 4: STREET AND AREA LIGHTNING  |                                                                                     |
| 5                                                             | ITEM 5: EARTHING                   |                                                                                     |
| 6                                                             | ITEM 6: TRAFFIC LIGHT SUPPLY POINT |                                                                                     |
| Total Carried   Total Carried Forward To Summary Of Schedules |                                    |                                                                                     |



CITY OF CAPE TOWN  
 TRANSPORT INFRASTRUCTURE IMPLEMENTATION,  
 URBAN MOBILITY DIRECTORATE  
 CONTRACT NO. 72Q/2025/26  
 SCHEDULE 6: TRAFFIC SIGNALISATION

BILL 1: 5th AVENUE - VOORTREKKER ROAD

| Item                  |           |  | Description                                                                                                                                                                                                                                                                                                                                        | Unit         | Quantity | Rate | Amount |
|-----------------------|-----------|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|----------|------|--------|
|                       |           |  | <b>BILL 1: 5th AVENUE - VOORTREKKER ROAD</b>                                                                                                                                                                                                                                                                                                       |              |          |      |        |
| 1                     | 9.3.2     |  | <b>CONTROLLER</b>                                                                                                                                                                                                                                                                                                                                  |              |          |      |        |
|                       | PS 3.3(a) |  | Remove existing controller and return to City of Cape Town – Traffic Signal depot for storage. Includes all miscellaneous and sundry items for complete removal.                                                                                                                                                                                   | number (No.) |          |      |        |
| 1.1                   | PS 3.3(e) |  | Supply and installation of 18 phase MX Plus, controller, equipped with a licenced Sensys controller, equipped with licensed Sensys CPU, 3G Router, GPS clock card/module, a dual wire antenna and provision, in the form of a glanded PVC pipe, must be made for a comms cable between UPS and controller, concrete plinth commission and testing. | number (No.) |          |      |        |
| 1.2                   | PS 1(a)   |  | Supply and install CoCT Traffic Signal Department approved UPS (3.0 KVA Inverter(220VAC) 48 VDC with 3800Wh 36V(Lithium Ion based Battery) complete with UPS cabinet (100% Vandal proof Galvanised Steel Cabinet and Base, Secure 3mm thickness Galvanised Steel) including concrete plinth and testing.                                           | number (No.) |          |      |        |
| 1.3                   | 9.3.3(b)  |  | Extra over item 1.2 for multi-channel detector units, total number of independent channels required is :4- channel units                                                                                                                                                                                                                           |              |          |      |        |
| 1.4                   |           |  | (i) Quad Detectors                                                                                                                                                                                                                                                                                                                                 | number (No.) |          |      |        |
| 1.5                   |           |  | (ii) Quad Pedestrian Detectors                                                                                                                                                                                                                                                                                                                     | number (No.) |          |      |        |
| 2                     | 9.3.5     |  | <b>VEHICLE DETECTORS</b>                                                                                                                                                                                                                                                                                                                           |              |          |      |        |
|                       | 9.3.5(b)  |  | Supply and installation of vehicle detector loops                                                                                                                                                                                                                                                                                                  |              |          |      |        |
|                       | PS4.2     |  | Wireless Vehicle Detection System                                                                                                                                                                                                                                                                                                                  |              |          |      |        |
| 2.1                   |           |  | Supply and install wireless magnetometer detector, including plastic shell and epoxy resin                                                                                                                                                                                                                                                         | number (No.) |          |      |        |
| 2.2                   |           |  | Supply and install Digital Radio Antenna                                                                                                                                                                                                                                                                                                           | number (No.) |          |      |        |
| 2.3                   |           |  | Supply and install flex solar repeater, including mounting kit                                                                                                                                                                                                                                                                                     | number (No.) |          |      |        |
| 2.4                   |           |  | Supply and install flex control unit                                                                                                                                                                                                                                                                                                               | number (No.) |          |      |        |
| 2.5                   |           |  | Supply and install outdoor rated UV shielded category 5 ethernet cable from access point to SPP0 and SPP1                                                                                                                                                                                                                                          | metre (m)    |          |      |        |
| Total Carried Forward |           |  |                                                                                                                                                                                                                                                                                                                                                    |              |          |      |        |

CITY OF CAPE TOWN  
TRANSPORT INFRASTRUCTURE IMPLEMENTATION,  
URBAN MOBILITY DIRECTORATE  
CONTRACT NO. 72Q/2025/26  
SCHEDULE 6: TRAFFIC SIGNALISATION

| Item                  | Description | Unit | Quantity | Rate | Amount |
|-----------------------|-------------|------|----------|------|--------|
| Brought Forward       |             |      |          |      |        |
| 3                     | PS 2        |      |          |      |        |
| 3.1                   | PS 2.1      |      |          |      |        |
|                       |             |      |          |      |        |
| 4                     | 9.3.8       |      |          |      |        |
| 4.1                   | 9.3.8(a)    |      |          |      |        |
| 4.2                   | 9.3.8(v)    |      |          |      |        |
| 5                     | 9.3.11      |      |          |      |        |
| 5.1                   | PS 5.1      |      |          |      |        |
| 5.2                   | PS4.2       |      |          |      |        |
| 5.3                   | PS5.7.1     |      |          |      |        |
| 5.4                   | PS5.7.2     |      |          |      |        |
| 6                     |             |      |          |      |        |
| 6.1                   | PS3.4(b)    |      |          |      |        |
| 6.2                   | 9.3.12      |      |          |      |        |
| 6.4                   | PS3.4(c)    |      |          |      |        |
| 7                     | 9.3.13      |      |          |      |        |
| 7.1                   | PS 6.4(c)   |      |          |      |        |
| 7.2                   | PS6.4(b)    |      |          |      |        |
| 7.3                   | 9.3.13(c)   |      |          |      |        |
| 7.4                   | 9.3.13(d)   |      |          |      |        |
| 8                     | 9.3.14      |      |          |      |        |
| Total Carried Forward |             |      |          |      |        |







CITY OF CAPE TOWN  
 TRANSPORT INFRASTRUCTURE IMPLEMENTATION,  
 URBAN MOBILITY DIRECTORATE  
 CONTRACT NO. 72Q/2025/26  
 SCHEDULE 6: TRAFFIC SIGNALISATION

BILL 2: 10th AVENUE - VOORTREKKER ROAD

| Item                  |           |  | Description                                                                                                                                                                                                                                                                                                                                       | Unit         | Quantity | Rate | Amount |
|-----------------------|-----------|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|----------|------|--------|
|                       |           |  | <b>BILL 2: 10th AVENUE - VOORTREKKER ROAD</b>                                                                                                                                                                                                                                                                                                     |              |          |      |        |
| 1                     | 9.3.2     |  | <b>CONTROLLER</b>                                                                                                                                                                                                                                                                                                                                 |              |          |      |        |
|                       | PS 3.3(a) |  | Remove existing controller and return to City of Cape Town – Traffic Signal depot for storage. Includes all miscellaneous and sundry items for complete removal.                                                                                                                                                                                  | number (No.) |          |      |        |
| 1.1                   | PS 3.3(e) |  | Supply and installation of 18 phase MX Plus, controller, equipped with a licenced Sensys controller, equiped with licensed Sensys CPU, 3G Router, GPS clock card/module, a dual wire antenna and provision, in the form of a glanded PVC pipe, must be made for a comms cable between UPS and controller, concrete plinth commission and testing. | number (No.) |          |      |        |
| 1.2                   | PS 1(a)   |  | Supply and install CoCT Traffic Signal Department approved UPS (3.0 KVA Inverter(220VAC) 48 VDC with 3800Wh 36V(Lithium Ion based Battery) complete with UPS cabinet (100% Vandal proof Galvanised Steel Cabinet and Base, Secure 3mm thickness Galvanised Steel) including concrete plinth and testing.                                          | number (No.) |          |      |        |
| 1.3                   | 9.3.3(b)  |  | Extra over item 1.2 for multi-channel detector units, total number of independent channels required is :4-channel units                                                                                                                                                                                                                           |              |          |      |        |
| 1.4                   |           |  | (i) Quad Detectors                                                                                                                                                                                                                                                                                                                                | number (No.) |          |      |        |
| 1.5                   |           |  | (ii) Quad Pedestrian Detectors                                                                                                                                                                                                                                                                                                                    | number (No.) |          |      |        |
| 2                     | 9.3.5     |  | <b>VEHICLE DETECTORS</b>                                                                                                                                                                                                                                                                                                                          |              |          |      |        |
|                       | 9.3.5(b)  |  | Supply and installation of vehicle detector loops                                                                                                                                                                                                                                                                                                 |              |          |      |        |
|                       | PS4.2     |  | Wireless Vehicle Detection System                                                                                                                                                                                                                                                                                                                 |              |          |      |        |
| 2.1                   |           |  | Supply and install wireless magnetometer detector, including plastic shell and epoxy resin                                                                                                                                                                                                                                                        | number (No.) |          |      |        |
| 2.2                   |           |  | Supply and install Digital Radio Antenna                                                                                                                                                                                                                                                                                                          | number (No.) |          |      |        |
| 2.3                   |           |  | Supply and install Install flex solar repeater, including mounting kit                                                                                                                                                                                                                                                                            | number (No.) |          |      |        |
| 2.4                   |           |  | Supply and install flex control unit                                                                                                                                                                                                                                                                                                              | number (No.) |          |      |        |
| 2.5                   |           |  | Supply and install outdoor rated UV shielded, category 5 ethernet cable from access point to SPP0 and SPP1                                                                                                                                                                                                                                        | metre (m)    |          |      |        |
| Total Carried Forward |           |  |                                                                                                                                                                                                                                                                                                                                                   |              |          |      |        |



BILL 2: 10th AVENUE - VOORTREKKER ROAD







| Item                  |           |  | Description                                                                                                                                                                                                                                                                                                                                        | Unit         | Quantity | Rate | Amount |
|-----------------------|-----------|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|----------|------|--------|
| 1                     | 9.3.2     |  | <b>BILL 3: 12th AVENUE &amp; CREMATORIUM ROAD - VOORTREKKER ROAD</b>                                                                                                                                                                                                                                                                               |              |          |      |        |
|                       |           |  | <b>CONTROLLER</b>                                                                                                                                                                                                                                                                                                                                  |              |          |      |        |
| 1.1                   | PS 3.3(e) |  | Supply and installation of 24 phase MX Plus, controller, equipped with a licensed Sensys controller, equipped with licensed Sensys CPU, 3G Router, GPS clock card/module, a dual wire antenna and provision, in the form of a glanded PVC pipe, must be made for a comms cable between UPS and controller, concrete plinth commission and testing. | number (No.) |          |      |        |
| 1.3                   | PS 1(a)   |  | Supply and install CoCT Traffic Signal Department approved UPS (3.0 KVA Inverter(220VAC) 48 VDC with 3800Wh 36V(Lithium Ion based Battery) complete with UPS cabinet (100% Vandal proof Galvanised Steel Cabinet and Base, Secure 3mm thickness Galvanised Steel) including concrete plinth and testing.                                           | number (No.) |          |      |        |
| 2                     | 9.3.5     |  | <b>VEHICLE DETECTORS</b>                                                                                                                                                                                                                                                                                                                           |              |          |      |        |
|                       | 9.3.5(b)  |  | Supply and installation of vehicle detector loops                                                                                                                                                                                                                                                                                                  |              |          |      |        |
|                       | PS4.2     |  | Wireless Vehicle Detection System                                                                                                                                                                                                                                                                                                                  |              |          |      |        |
| 2.1                   |           |  | Supply and install wireless magnetometer detector, including plastic shell and epoxy resin                                                                                                                                                                                                                                                         | number (No.) |          |      |        |
| 2.2                   |           |  | Supply and install Digital Radio Antenna                                                                                                                                                                                                                                                                                                           | number (No.) |          |      |        |
| 2.3                   |           |  | Supply and install flex solar repeater, including mounting kit                                                                                                                                                                                                                                                                                     | number (No.) |          |      |        |
| 2.4                   |           |  | Supply and install flex control unit                                                                                                                                                                                                                                                                                                               | number (No.) |          |      |        |
| 2.5                   |           |  | Supply and install outdoor rated UV shielded category 5 ethernet cable from access point to SPP0 and SPP1                                                                                                                                                                                                                                          | metre (m)    |          |      |        |
| 3                     | PS 2      |  | <b>PEDESTRIAN PUSH BUTTONS</b>                                                                                                                                                                                                                                                                                                                     |              |          |      |        |
| 3.1                   | PS 2.1    |  | Supply and installation of Audio Tactile Pedestrian Push Button Assembly                                                                                                                                                                                                                                                                           | number (No.) |          |      |        |
| 4                     | 9.3.8     |  | <b>SIGNAL FACE MODULES</b>                                                                                                                                                                                                                                                                                                                         |              |          |      |        |
| 4.1                   | 9.3.8(a)  |  | S1 (LED optics), with background screen                                                                                                                                                                                                                                                                                                            | number (No.) |          |      |        |
| 4.2                   | 9.3.8(n)  |  | S8 (LED optics), with background screen                                                                                                                                                                                                                                                                                                            | number (No.) |          |      |        |
| Total Carried Forward |           |  |                                                                                                                                                                                                                                                                                                                                                    |              |          |      |        |



CITY OF CAPE TOWN  
TRANSPORT INFRASTRUCTURE IMPLEMENTATION,  
URBAN MOBILITY DIRECTORATE  
CONTRACT NO. 72Q/2025/26  
SCHEDULE 6: TRAFFIC SIGNALISATION

**BILL 3: 12th AVENUE & CREMATORIUM ROAD - VOORTREKKER ROAD**

| Item                  |           | Description                                                                                                                                                                                                                                                     | Unit         | Quantity | Rate | Amount |
|-----------------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|----------|------|--------|
| Brought Forward       |           |                                                                                                                                                                                                                                                                 |              |          |      |        |
| 4.3                   | 9.3.8(v)  | S11(P) (LED optics), with background screen                                                                                                                                                                                                                     | number (No.) |          |      |        |
| 5                     | 9.3.11    | <b>POLES</b>                                                                                                                                                                                                                                                    |              |          |      |        |
| 5.1                   | PS 5.1    | Remove existing poles, with aspects and pedestrian buttons and return to City of Cape Town - Traffic Signal Depot for safe keeping                                                                                                                              | number (No.) |          |      |        |
| 5.2                   | 9.3.11(a) | Supply and installation of poles, standard length not exceeding 4m                                                                                                                                                                                              | number (No.) |          |      |        |
| 5.3                   | PS5.8     | Supply and install 8m Galvanized mounting pole (for access points and repeaters)                                                                                                                                                                                | number (No.) |          |      |        |
| 6                     |           | <b>DISTRIBUTION PILLARS</b>                                                                                                                                                                                                                                     |              |          |      |        |
| 6.1                   | 9.3.12    | Supply and installation of distribution pillars complete with concrete plinth, commission and testing                                                                                                                                                           | number (No.) |          |      |        |
| 7                     | 9.3.14    | <b>37 - CORE CABLE</b>                                                                                                                                                                                                                                          |              |          |      |        |
| 7.1                   | 9.3.14(a) | Signal lamp supply ring-circuit from controller to distribution pillars : PVC insulated, galvanised steel wire armoured, 37-core cable minimum cross-sectional area 1,5mm² as specified in clause 7.2.3 and complete with cable marking tape                    | metre (m)    |          |      |        |
| 7.2                   | PS6.4(b)  | Extra over item 8.1 for laying cable in trench                                                                                                                                                                                                                  | metre (m)    |          |      |        |
| 7.3                   | 9.3.14(c) | Extra over item 8.1 for laying cable in duct (duct scheduled separately)                                                                                                                                                                                        | metre (m)    |          |      |        |
| 7.4                   | 9.3.14(d) | Extra over item 8.1 for connecting to controller                                                                                                                                                                                                                | number (No.) |          |      |        |
| 8                     | 9.3.15    | <b>19 - CORE CABLE</b>                                                                                                                                                                                                                                          |              |          |      |        |
| 8.1                   | PS 6.4(d) | Signal lamp supply cable from distribution pillars to signal lights and pedestrian push buttons: PVC insulated, galvanised steel wire armoured, 19-core cable minimum cross-sectional area 1,5mm² as specified in clause 7.2.3 and complete with cable markings | metre (m)    |          |      |        |
| 8.2                   | PS6.4(b)  | Extra over item 9.1 for laying cable in trench                                                                                                                                                                                                                  | metre (m)    |          |      |        |
| 8.3                   | 9.3.15(c) | Extra over item 9.1 for laying cable in duct (duct scheduled separately)                                                                                                                                                                                        | metre (m)    |          |      |        |
| 8.4                   | 9.3.15(d) | Extra over item 9.1 for connecting to distribution pillar                                                                                                                                                                                                       | number (No.) |          |      |        |
| 8.5                   | 9.3.15(e) | Extra over item 9.1 for connecting to signal head                                                                                                                                                                                                               | number (No.) |          |      |        |
| Total Carried Forward |           |                                                                                                                                                                                                                                                                 |              |          |      |        |



BILL 3: 12th AVENUE & CREMATORIUM ROAD - VOORTREKKER ROAD

CITY OF CAPE TOWN  
TRANSPORT INFRASTRUCTURE IMPLEMENTATION,  
URBAN MOBILITY DIRECTORATE  
CONTRACT NO. 72Q/2025/26  
SCHEDULE 6: TRAFFIC SIGNALISATION

| SUMMARY OF SECTIONS                           |                                          | Amount |
|-----------------------------------------------|------------------------------------------|--------|
| Sec#                                          | Description                              |        |
| 1                                             | BILL 1: 5th AVENUE - VOORTREKKER ROAD    |        |
| 2                                             | BILL 2: 10th AVENUE - VOORTREKKER ROAD   |        |
| 3                                             | BILL 3: 12th AVENUE & CREMATORIUM ROAD - |        |
| Total Carried Forward To Summary Of Schedules |                                          |        |





C2.1: GENERAL REQUIREMENTS AND TRENCHING FOR SERVICES

| Item                             |           |  |  | Description                                                              | Unit                    | Quantity | Rate | Amount |
|----------------------------------|-----------|--|--|--------------------------------------------------------------------------|-------------------------|----------|------|--------|
| C2.1                             |           |  |  | GENERAL REQUIREMENTS AND TRENCHING FOR SERVICES                          |                         |          |      |        |
| C2.1.2                           |           |  |  | Existing services location, detection, and verification                  |                         |          |      |        |
|                                  | PC2.1.2.6 |  |  | Extra over item C2.1.2.3 for Survey to verify existing service positions | prime cost sum (PC Sum) |          |      |        |
|                                  | PC2.1.2.7 |  |  | Handling costs and profit in respect of item C2.1.2.6 above              | %                       |          |      |        |
| Total Carried Forward To Summary |           |  |  |                                                                          |                         |          |      |        |





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SCHEDULE 7: CEMETERY WALL & FENCING

### C3.2: CULVERTS

| Item                             |            |     | Description                                                                                                                                                                                                                                | Unit                           | Quantity | Rate | Amount |
|----------------------------------|------------|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|----------|------|--------|
| C3.2                             |            |     | <b>CULVERTS</b>                                                                                                                                                                                                                            |                                |          |      |        |
| C.3.2.16                         | PC3.2.16.4 |     | <b>Brickwork (Engineering bricks):</b><br><br>460mm thick, 460x460mm (average) dimensioned brickwork to suit existing brickwork architecture including 32x800x1.2mm galvanized hoop iron straps at 500mm c/c, solid clay brick, 21MPa, at: |                                |          |      |        |
|                                  |            | (a) | Wall Type 3 with coping                                                                                                                                                                                                                    | square metre (m <sup>2</sup> ) |          |      |        |
|                                  |            | (b) | Wall Type 5 with coping                                                                                                                                                                                                                    | square metre (m <sup>2</sup> ) |          |      |        |
| PC3.2.17                         |            |     | <b>Plaster (provided plaster to suit existing plaster architecture)</b>                                                                                                                                                                    |                                |          |      |        |
|                                  | C3.2.17.1  |     | At Wall Type 3 with coping                                                                                                                                                                                                                 | square metre (m <sup>2</sup> ) |          |      |        |
|                                  | C3.2.17.1  |     | At Wall Type 4 coping                                                                                                                                                                                                                      | square metre (m <sup>2</sup> ) |          |      |        |
|                                  | C3.2.17.2  |     | At Wall Type 5 with coping                                                                                                                                                                                                                 | square metre (m <sup>2</sup> ) |          |      |        |
| Total Carried Forward To Summary |            |     |                                                                                                                                                                                                                                            |                                |          |      |        |

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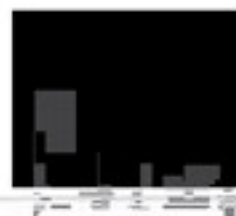
C11.1: PITCHING, STONEWORK, CAST IN SITU CONCRETE FOR PROTECTION AGAINST EROSION

| Item                             |            |  | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Unit             | Quantity | Rate | Amount |
|----------------------------------|------------|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|----------|------|--------|
| C11.1                            |            |  | PITCHING, STONEWORK, CAST IN SITU CONCRETE FOR PROTECTION AGAINST EROSION                                                                                                                                                                                                                                                                                                                                                                                             |                  |          |      |        |
| C11.1.4                          |            |  | Stone masonry walls:                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                  |          |      |        |
|                                  | PC11.1.4.2 |  | Cement-mortared stone walls, for Wall Type 3 and 4, including the use of 25x280x2.5mm thick galvanized heavy duty wall ties for joining new RC walls to stone walls where required (Rate to include the careful breakdown of the existing sandstone cemetery wall, stockpile and reuse/reconstruct into the works as specified on drawings, including all haulage, transport, security and other labour, plant, material and fuel costs, including restrictive works) | cubic metre (m³) |          |      |        |
|                                  | C11.1.4.3  |  | Extra over items C11.1.4.2 for procuring stone from commercial sources                                                                                                                                                                                                                                                                                                                                                                                                | cubic metre (m³) |          |      |        |
| Total Carried Forward To Summary |            |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                  |          |      |        |

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C11.5: FENCING

| Item                  |             |       | Description                                                                                                                                 | Unit           | Quantity | Rate | Amount |
|-----------------------|-------------|-------|---------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------|------|--------|
| C11.5                 |             |       | <b>FENCING</b>                                                                                                                              |                |          |      |        |
| C11.5.1               |             |       | Supply and erect new fencing material for new fences and for supplementing material in existing fences which are being repaired or removed: |                |          |      |        |
|                       | C11.5.1.1   |       | Zinc-coated barbed wire (3.15mm x 2.5mm x 35kg, mild steel)                                                                                 | kilometre (km) |          |      |        |
|                       | PC11.5.1.12 |       | <b>Cold Rolled Steel Palisades &amp; Posts</b>                                                                                              |                |          |      |        |
|                       |             | (a)   | Supplied fencing material to match existing Wall Type 1, 5, and 6 Steel palisades & posts                                                   | metre (m)      |          |      |        |
|                       | PC11.5.1.13 |       | <b>Steel Framing</b>                                                                                                                        |                |          |      |        |
|                       |             | (a)   | Supplied fencing material to match existing Wall Type 3 Steel Framing                                                                       | metre (m)      |          |      |        |
| C11.5.3               |             |       | <b>Moving existing fences and gates:</b>                                                                                                    |                |          |      |        |
|                       | C11.5.3.1   |       | <b>Fences:</b>                                                                                                                              |                |          |      |        |
|                       |             | (d)   | <b>Security fences</b>                                                                                                                      |                |          |      |        |
|                       |             | (i)   | Steel palisade & post (Wall Type 1 & 6)                                                                                                     | kilometre (km) |          |      |        |
|                       |             | (ii)  | Vibracrete (Wall Type 2)                                                                                                                    | kilometre (km) |          |      |        |
|                       |             | (iii) | Steel framing at old brick pier & coping (Wall Type 3)                                                                                      | kilometre (km) |          |      |        |
|                       |             | (iv)  | Steel palisade at brick pier (Wall Type 5)                                                                                                  | kilometre (km) |          |      |        |
|                       | C11.5.3.2   |       | <b>Gates</b>                                                                                                                                |                |          |      |        |
|                       |             | (a)   | At Wall Type 1 (pedestrian gate)                                                                                                            | number (No.)   |          |      |        |
|                       |             | (b)   | At Wall Type 2 (pedestrian gate)                                                                                                            | number (No.)   |          |      |        |
|                       |             | (c)   | At Wall Type 3 (vehicular gate)                                                                                                             | number (No.)   |          |      |        |
|                       |             | (d)   | At Wall Type 4 (pedestrian gate)                                                                                                            | number (No.)   |          |      |        |
|                       |             | (e)   | At Wall Type 4 (vehicular gate)                                                                                                             | number (No.)   |          |      |        |
| C11.5.5               |             |       | <b>Providing temporary fences and gates:</b>                                                                                                |                |          |      |        |
| Total Carried Forward |             |       |                                                                                                                                             |                |          |      |        |



C11.5: FENCING

| Item                             |           |     |  | Description      | Unit           | Quantity | Rate | Amount |
|----------------------------------|-----------|-----|--|------------------|----------------|----------|------|--------|
| Brought Forward                  |           |     |  |                  |                |          |      |        |
|                                  | C11.5.5.3 |     |  | Pedestrian fence | kilometre (km) |          |      |        |
|                                  | C11.5.5.5 |     |  | Temporary gates  |                |          |      |        |
|                                  |           | (a) |  | Pedestrian gate  | number (No.)   |          |      |        |
|                                  |           | (b) |  | Vehicular gate   | number (No.)   |          |      |        |
| Total Carried Forward To Summary |           |     |  |                  |                |          |      |        |

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SCHEDULE 7: CEMETERY WALL & FENCING

C13.1: FOUNDATIONS

| Item                  |            |     | Description                                                                                                                                                                                          | Unit                        | Quantity | Rate | Amount |
|-----------------------|------------|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|----------|------|--------|
| C13.1                 |            |     | <b>FOUNDATIONS</b>                                                                                                                                                                                   |                             |          |      |        |
| C13.1.1               |            |     | Provision of designs and drawings of temporary works by an ECSA-registered Professional Engineer or Technologist or Geotechnical Engineer for the lateral support required for excavation for Wall 1 | lump sum                    |          |      |        |
| C13.1.2               |            |     | <b>Additional foundation investigations:</b>                                                                                                                                                         |                             |          |      |        |
|                       | C13.1.2.1  |     | Provisional sum allowed for additional foundation investigations for Cemetery Walls                                                                                                                  | provisional sum (Prov. Sum) |          |      |        |
|                       | C13.1.2.2  |     | Handling costs and profit in respect of item C13.1.2.1                                                                                                                                               | %                           |          |      |        |
| C13.1.3               |            |     | <b>Excavation:</b>                                                                                                                                                                                   |                             |          |      |        |
|                       | C13.1.3.1  |     | Excavating soft material situated within the following successive depth ranges:                                                                                                                      |                             |          |      |        |
|                       |            | (a) | 0m up to 1,5m                                                                                                                                                                                        | cubic metre (m³)            |          |      |        |
|                       |            | (b) | >1.5m and <3.0m                                                                                                                                                                                      | cubic metre (m³)            |          |      |        |
|                       | C13.1.3.2  |     | Extra over subitem C13.1.3.1 for excavation in hard material irrespective of depth                                                                                                                   | cubic metre (m³)            |          |      |        |
|                       | C13.1.3.3  |     | Extra over subitem C13.1.3.1 for additional excavation required by the Engineer after excavation is complete                                                                                         | cubic metre (m³)            |          |      |        |
|                       | C13.1.3.4  |     | Extra over subitem C13.1.3.1 for excavation by hand                                                                                                                                                  | cubic metre (m³)            |          |      |        |
|                       | C13.1.3.5  |     | Extra over subitem C13.1.3.1 for excavation in restricted areas                                                                                                                                      | cubic metre (m³)            |          |      |        |
| C13.1.6               |            |     | <b>Access and drainage:</b>                                                                                                                                                                          |                             |          |      |        |
|                       | PC13.1.6.3 |     | Access (Excavations in vicinity of high groundwater table as per Geotechnical investigation - working below groundwater level expected)                                                              | lump sum                    |          |      |        |
|                       | PC13.1.6.4 |     | Drainage (Excavations in vicinity of high groundwater table as per Geotechnical investigation - working below groundwater level expected)                                                            | lump sum                    |          |      |        |
| C13.1.7               |            |     | <b>Backfill to excavations utilising:</b>                                                                                                                                                            |                             |          |      |        |
|                       | C13.1.7.1  |     | Material from excavation                                                                                                                                                                             | cubic metre (m³)            |          |      |        |
| Total Carried Forward |            |     |                                                                                                                                                                                                      |                             |          |      |        |

C13.1: FOUNDATIONS

| Item                             |            |     |  | Description                                                                                                                 | Unit             | Quantity | Rate | Amount |
|----------------------------------|------------|-----|--|-----------------------------------------------------------------------------------------------------------------------------|------------------|----------|------|--------|
| Brought Forward                  |            |     |  |                                                                                                                             |                  |          |      |        |
| C13.1.9                          |            |     |  | Fill within a restricted area (extra over item C5.2.2)                                                                      | cubic metre (m³) |          |      |        |
| C13.1.10                         |            |     |  | Haul in excess of 1,0 km on excavated material and on material imported for backfill, foundation fill and fill for caissons | cubic metre (m³) |          |      |        |
| C13.1.12                         |            |     |  | Overbreak in excavation in hard material                                                                                    | cubic metre (m³) |          |      |        |
| C13.1.14                         |            |     |  | Foundation fill consisting of:                                                                                              |                  |          |      |        |
|                                  | C13.1.14.4 |     |  | Mass concrete (C16/20-20) to:                                                                                               |                  |          |      |        |
|                                  |            | (a) |  | Wall Type 1 & 2 Mass Concrete Footings                                                                                      | cubic metre (m³) |          |      |        |
|                                  | C13.1.14.5 |     |  | Concrete blinding (C16/20-20) to:                                                                                           |                  |          |      |        |
|                                  |            | (a) |  | Footings (50mm thick) (Wall Type 3, 4, 5, and 6)                                                                            | cubic metre (m³) |          |      |        |
|                                  |            | (b) |  | Perforated drainage pipe footing (75mm thick) as per Wall Drainage Detail                                                   | cubic metre (m³) |          |      |        |
| Total Carried Forward To Summary |            |     |  |                                                                                                                             |                  |          |      |        |





### C13.3: STEEL REINFORCEMENT

10

| Item                  |            |     | Description                                                                                                       | Unit              | Quantity | Rate | Amount |
|-----------------------|------------|-----|-------------------------------------------------------------------------------------------------------------------|-------------------|----------|------|--------|
| C13.4                 |            |     | <b>CONCRETE</b>                                                                                                   |                   |          |      |        |
| C13.4.1               |            |     | <b>Cast in situ concrete:</b>                                                                                     |                   |          |      |        |
|                       | C13.4.1.1  |     | <b>Strength concrete (class C):</b>                                                                               |                   |          |      |        |
|                       |            | (a) | Wall Type 3, Strip footings & Wall C30/35-20                                                                      | cubic metre (m³)  |          |      |        |
|                       |            | (b) | Wall Type 4, Strip footings & Wall C30/35-20                                                                      | cubic metre (m³)  |          |      |        |
|                       |            | (c) | Wall Type 5, Pad footings C30/35-20                                                                               | cubic metre (m³)  |          |      |        |
|                       |            | (d) | Wall Type 6, Strip footings & Wall C30/35-20                                                                      | cubic metre (m³)  |          |      |        |
| 4.3                   |            |     | <b>Extra over item C13.4.1 for the protection of concrete from adverse environmental conditions, if required:</b> |                   |          |      |        |
|                       | C13.4.3.1  |     | <b>Strength concrete (class C):</b>                                                                               |                   |          |      |        |
|                       |            | (a) | Wall Type 3, Strip footings C30/35-20                                                                             | cubic metre (m³)  |          |      |        |
|                       |            | (b) | Wall Type 4, Strip footings C30/35-20                                                                             | cubic metre (m³)  |          |      |        |
|                       |            | (c) | Wall Type 5, Pad footings C30/35-20                                                                               | cubic metre (m³)  |          |      |        |
|                       |            | (d) | Wall Type 6, Strip footings & Wall C30/35-20                                                                      | cubic metre (m³)  |          |      |        |
| C13.4.5               |            |     | <b>Curing and surface protection of cast in situ concrete, as and where specifically required:</b>                |                   |          |      |        |
|                       | C13.4.5.1  |     | Wall Type 4 (wall only) (Tenderer to specify method of curing)                                                    | square metre (m²) |          |      |        |
| C13.4.14              |            |     | <b>Controlled demolition of concrete from structural elements:</b>                                                |                   |          |      |        |
|                       | C13.4.14.1 |     | Existing concrete base (footings) encasing existing fence/wall posts/piers (Wall Type 1 & 2 & 6)                  | cubic metre (m³)  |          |      |        |
|                       | C13.4.14.2 |     | Existing concrete strip footing (existing stone wall strip footing approx. 1.1m wide)                             | cubic metre (m³)  |          |      |        |
| PC13.4.15             |            |     | <b>Complete demolition and disposal of existing brickwork elements or parts existing structures:</b>              |                   |          |      |        |
| Total Carried Forward |            |     |                                                                                                                   |                   |          |      |        |

C13.4: CONCRETE

| Item                             |     | Description                                                                                                                                                               |  | Unit             | Quantity | Rate | Amount |
|----------------------------------|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|------------------|----------|------|--------|
| Brought Forward                  |     |                                                                                                                                                                           |  |                  |          |      |        |
|                                  | (a) | Existing brick piers and brickwork at Wall Type 3, retain existing coping elements (top of pier and continuous low wall coping) and reinstate/restore for new Wall Type 3 |  | cubic metre (m³) |          |      |        |
|                                  | (b) | Existing stone Wall Type 4, retain and refurbish/remove existing mortar for existing stone to rebuild Wall Type 4                                                         |  | cubic metre (m³) |          |      |        |
|                                  | (c) | Existing piers at Wall Type 5                                                                                                                                             |  | cubic metre (m³) |          |      |        |
| Total Carried Forward To Summary |     |                                                                                                                                                                           |  |                  |          |      |        |







### C13.10: PAINTING OF MINOR STRUCTURES



C14.3: DEMOLITION AND REMOVAL OF STRUCTURAL CONCRETE AND STEELWORK

| Item                             |     |  |  | Description                                                                        | Unit         | Quantity    | Rate | Amount      |
|----------------------------------|-----|--|--|------------------------------------------------------------------------------------|--------------|-------------|------|-------------|
| C14.3                            |     |  |  | DEMOLITION AND REMOVAL OF STRUCTURAL CONCRETE AND STEELWORK                        |              |             |      |             |
| C14.3.5                          |     |  |  | Removal of metal sections embedded in concrete                                     |              |             |      |             |
|                                  | (a) |  |  | Wall type 1: steel posts to existing fence to be removed from concrete foundation) | number (No.) | <div></div> |      |             |
|                                  | (b) |  |  | Wall type 6: steel posts to existing fence to be removed from concrete foundation) | number (No.) |             |      |             |
| Total Carried Forward To Summary |     |  |  |                                                                                    |              |             |      | <div></div> |



C14.7: DEMOLITION AND REMOVAL OF STRUCTURAL ONCRETE AND STEELWORK

| Item                             |  |  |  | Description                                                                                                                       | Unit              | Quantity | Rate | Amount |
|----------------------------------|--|--|--|-----------------------------------------------------------------------------------------------------------------------------------|-------------------|----------|------|--------|
| C14.7                            |  |  |  | PROTECTIVE COATINGS AND TREATMENTS FOR CONCRETE                                                                                   |                   |          |      |        |
| C14.7.2                          |  |  |  | Application of protective coatings and treatments for the exposed concrete faces of Wall Type 6 (Hydrophobic impregnants 250g/m²) | square metre (m²) |          |      |        |
| C14.7.3                          |  |  |  | On site monitoring and supply of written product performance guarantee                                                            | lump sum          |          |      |        |
| C14.7.4                          |  |  |  | Trial sample panels                                                                                                               | square metre (m²) |          |      |        |
| Total Carried Forward To Summary |  |  |  |                                                                                                                                   |                   |          |      |        |

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#### C14.11: REPAIR OF STEEL ELEMENTS

| Item                             |     |  | Description                                   | Unit            | Quantity | Rate | Amount |
|----------------------------------|-----|--|-----------------------------------------------|-----------------|----------|------|--------|
| C14.11                           |     |  | REPAIR OF STEEL ELEMENTS                      |                 |          |      |        |
| C14.11.1                         |     |  | Refurbishment of:                             |                 |          |      |        |
|                                  | (a) |  | Wall type 1 panel                             | number<br>(No.) |          |      |        |
|                                  | (b) |  | Wall type 3 (all existing steel frame panels) | number<br>(No.) |          |      |        |
|                                  | (c) |  | Wall type 5 panel                             | number<br>(No.) |          |      |        |
| Total Carried Forward To Summary |     |  |                                               |                 |          |      |        |

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SCHEDULE 7: CEMETERY WALL & FENCING

| SUMMARY OF SECTIONS                           |                                                                            | Amount |
|-----------------------------------------------|----------------------------------------------------------------------------|--------|
| Section                                       | Description                                                                |        |
| C1.6                                          | C1.6: CLEARING AND GRUBBING                                                |        |
| C2.1                                          | C2.1: GENERAL REQUIREMENTS AND                                             |        |
| C3.2                                          | C3.2: CULVERTS                                                             |        |
| C11.1                                         | C11.1: PITCHING, STONWORK, CAST IN SITU<br>CONCRETE FOR PROTECTION AGAINST |        |
| C11.5                                         | C11.5: FENCING                                                             |        |
| C13.1                                         | C13.1: FOUNDATIONS                                                         |        |
| C13.2                                         | C13.2: FALSEWORK, FORMWORK AND                                             |        |
| C13.3                                         | C13.3: STEEL REINFORCEMENT                                                 |        |
| C13.4                                         | C13.4: CONCRETE                                                            |        |
| C13.7                                         | C13.7: JOINTS                                                              |        |
| C13.8                                         | C13.8: ANCILLARY STRUCTURAL ELEMENTS                                       |        |
| C13.1                                         | C13.10: PAINTING OF MINOR STRUCTURES                                       |        |
| C14.3                                         | C14.3: DEMOLITION AND REMOVAL OF<br>STRUCTURAL CONCRETE AND STEELWORK      |        |
| C14.7                                         | C14.7: DEMOLITION AND REMOVAL OF<br>STRUCTURAL ONCRETE AND STEELWORK       |        |
| C14.1                                         | C14.11: REPAIR OF STEEL ELEMENTS                                           |        |
| Total Carried Forward To Summary Of Schedules |                                                                            |        |

CITY OF CAPE TOWN  
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SCHEDULE 8: WATER BOX CHAMBERS

C13.1: FOUNDATIONS

| Item                  |            |     | Description                                                                                                                                                    | Unit                        | Quantity | Rate | Amount |
|-----------------------|------------|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|----------|------|--------|
| C13.1                 |            |     | <b>FOUNDATIONS</b>                                                                                                                                             |                             |          |      |        |
| C13.1.1               |            |     | Provision of designs and drawings of temporary works by an ECSA-registered Professional Engineer or Technologist or Geotechnical Engineer for all box chambers | lump sum                    |          |      |        |
| C13.1.2               |            |     | <b>Additional foundation investigations:</b>                                                                                                                   |                             |          |      |        |
|                       | C13.1.2.1  |     | Provisional sum allowed for additional foundation investigations                                                                                               | provisional sum (Prov. Sum) |          |      |        |
|                       | C13.1.2.2  |     | Handling costs and profit in respect of item C13.1.2.1                                                                                                         | %                           | 5        |      |        |
| C13.1.3               |            |     | <b>Excavation:</b>                                                                                                                                             |                             |          |      |        |
|                       | C13.1.3.1  |     | Excavating soft material situated within the following successive depth ranges:                                                                                |                             |          |      |        |
|                       |            | (a) | 0m up to 1,5m                                                                                                                                                  | cubic metre (m³)            |          |      |        |
|                       |            | (b) | > 1,5m and < 3,0m                                                                                                                                              | cubic metre (m³)            |          |      |        |
|                       |            | (c) | > 3,0 and < 4,5m                                                                                                                                               | cubic metre (m³)            |          |      |        |
|                       | C13.1.3.2  |     | Extra over subitem C13.1.3.1 for excavation in hard material irrespective of depth                                                                             | cubic metre (m³)            |          |      |        |
|                       | C13.1.3.3  |     | Extra over subitem C13.1.3.1 for additional excavation required by the Engineer after excavation is complete                                                   | cubic metre (m³)            |          |      |        |
|                       | C13.1.3.4  |     | Extra over subitem C13.1.3.1 for excavation by hand                                                                                                            | cubic metre (m³)            |          |      |        |
|                       | C13.1.3.5  |     | Extra over subitem C13.1.3.1 for excavation in restricted areas                                                                                                | cubic metre (m³)            |          |      |        |
| C13.1.6               |            |     | <b>Access and drainage:</b>                                                                                                                                    |                             |          |      |        |
|                       | PC13.1.6.3 |     | Access (Excavations in vicinity of high groundwater table as per Geotechnical investigation - working below groundwater level expected)                        | lump sum                    |          |      |        |
|                       | PC13.1.6.4 |     | Drainage (Excavations in vicinity of high groundwater table as per Geotechnical investigation - working below groundwater level expected)                      | lump sum                    |          |      |        |
| C13.1.7               |            |     | <b>Backfill to excavations utilising:</b>                                                                                                                      |                             |          |      |        |
| Total Carried Forward |            |     |                                                                                                                                                                |                             |          |      |        |



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SCHEDULE 8: WATER BOX CHAMBERS

## C13.1: FOUNDATIONS

| Item                             |            | Description | Unit                                                                                                                        | Quantity          | Rate | Amount |
|----------------------------------|------------|-------------|-----------------------------------------------------------------------------------------------------------------------------|-------------------|------|--------|
| Brought Forward                  |            |             |                                                                                                                             |                   |      |        |
|                                  | C13.1.7.1  |             | Material from excavation                                                                                                    | cubic metre (m³)  |      |        |
| C13.1.9                          |            |             | Fill within a restricted area (extra over item C5.2.2)                                                                      | cubic metre (m³)  |      |        |
| C13.1.10                         |            |             | Haul in excess of 1,0 km on excavated material and on material imported for backfill, foundation fill and fill for caissons | cubic metre (m³)  |      |        |
| C13.1.12                         |            |             | Overbreak in excavation in hard material                                                                                    | square metre (m²) |      |        |
| C13.1.14                         |            |             | Foundation fill consisting of:                                                                                              |                   |      |        |
|                                  | C13.1.14.5 |             | Concrete blinding, 75mm thick, C15/12-20                                                                                    | cubic metre (m³)  |      |        |
| Total Carried Forward To Summary |            |             |                                                                                                                             |                   |      |        |

C13.2: FALSEWORK, FORMWORK AND CONCRETE FINISH

| Item                             |           |  | Description                                                                                                                                  | Unit              | Quantity | Rate | Amount |
|----------------------------------|-----------|--|----------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------|------|--------|
| C13.2                            |           |  | FALSEWORK, FORMWORK AND CONCRETE FINISH                                                                                                      |                   |          |      |        |
| C13.2.2                          |           |  | Vertical formwork to provide                                                                                                                 |                   |          |      |        |
|                                  | C13.2.2.1 |  | Class F1 surface finish to:                                                                                                                  |                   |          |      |        |
|                                  |           |  | (a) Box chamber walls and cover slab                                                                                                         | square metre (m²) |          |      |        |
|                                  |           |  | (b) Box chamber bases                                                                                                                        | square metre (m²) |          |      |        |
| C13.2.3                          |           |  | Horizontal formwork to provide                                                                                                               |                   |          |      |        |
|                                  | C13.2.3.1 |  | Class F1 surface finish to:                                                                                                                  |                   |          |      |        |
|                                  |           |  | (a) Box chamber cover slab soffit                                                                                                            | square metre (m²) |          |      |        |
| C13.2.4                          |           |  | Inclined formwork to provide                                                                                                                 |                   |          |      |        |
|                                  | C13.2.4.1 |  | Class F1 surface finish to:                                                                                                                  |                   |          |      |        |
|                                  |           |  | (a) Box chamber bases                                                                                                                        | square metre (m²) |          |      |        |
| C13.2.10                         |           |  | Provision of designs and drawings of falsework and formwork by an ECSA registered Professional Engineer or Technologist for all box chambers | lump sum          |          |      |        |
| Total Carried Forward To Summary |           |  |                                                                                                                                              |                   |          |      |        |

C13.3: STEEL REINFORCEMENT

| Item                             |           |     | Description                                                             | Unit    | Quantity | Rate | Amount |
|----------------------------------|-----------|-----|-------------------------------------------------------------------------|---------|----------|------|--------|
| C13.3                            |           |     | STEEL REINFORCEMENT                                                     |         |          |      |        |
| C13.3.1                          |           |     | Reinforcement for:                                                      |         |          |      |        |
|                                  | C13.3.1.1 |     | Box Chamber RC base                                                     |         |          |      |        |
|                                  |           | (a) | Mild-steel bars                                                         | ton (t) |          |      |        |
|                                  |           | (b) | High-yield-stress-steel bars (Hot rolled 450MPa)                        | ton (t) |          |      |        |
|                                  | C13.3.1.2 |     | Box Chamber RC walls                                                    |         |          |      |        |
|                                  |           | (a) | Mild-steel bars                                                         | ton (t) |          |      |        |
|                                  |           | (b) | High-yield-stress-steel bars (Hot rolled 450MPa)                        | ton (t) |          |      |        |
|                                  | C13.3.1.3 |     | Box Chamber RC cover slabs                                              |         |          |      |        |
|                                  |           | (a) | Mild-steel bars                                                         | ton (t) |          |      |        |
|                                  |           | (b) | High-yield-stress-steel bars (Hot rolled 450MPa)                        | ton (t) |          |      |        |
| C13.3.4                          |           |     | Extra-over item C13.3.1 (a), (b), etc. for galvanising of reinforcement | ton (t) |          |      |        |
| Total Carried Forward To Summary |           |     |                                                                         |         |          |      |        |

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C13.4: CONCRETE

| Item                             |           |     | Description                                                                                                       | Unit              | Quantity | Rate | Amount |
|----------------------------------|-----------|-----|-------------------------------------------------------------------------------------------------------------------|-------------------|----------|------|--------|
| C13.4                            |           |     | <b>CONCRETE</b>                                                                                                   |                   |          |      |        |
| C13.4.1                          |           |     | Cast in situ concrete:                                                                                            |                   |          |      |        |
|                                  | C13.4.1.2 |     | <b>Durable concrete (class D):</b>                                                                                |                   |          |      |        |
|                                  |           | (a) | Box Chamber RC base, D30/35-20-XC1b                                                                               | cubic metre (m³)  |          |      |        |
|                                  |           | (b) | Box Chamber RC walls, D30/35-20-XC1b                                                                              | cubic metre (m³)  |          |      |        |
|                                  |           | (c) | Box Chamber RC cover slabs, D30/35-20-XC1b                                                                        | cubic metre (m³)  |          |      |        |
| C13.4.3                          |           |     | <b>Extra over item C13.4.1 for the protection of concrete from adverse environmental conditions, if required:</b> |                   |          |      |        |
|                                  | C13.4.3.2 |     | <b>Durable concrete (class D):</b>                                                                                |                   |          |      |        |
|                                  |           | (a) | Box Chamber RC base, D30/35-20-XC1b                                                                               | cubic metre (m³)  |          |      |        |
|                                  |           | (b) | Box Chamber RC walls, D30/35-20-XC1b                                                                              | cubic metre (m³)  |          |      |        |
|                                  |           | (c) | Box Chamber RC cover slabs, D30/35-20-XC1b                                                                        | cubic metre (m³)  |          |      |        |
| C13.4.5                          |           |     | <b>Curing and surface protection of cast in situ concrete, as and where specifically required:</b>                |                   |          |      |        |
|                                  | C13.4.5.1 |     | Box Chamber RC base (Tenderer to specify method of curing)                                                        | square metre (m²) |          |      |        |
|                                  | C13.4.5.2 |     | Box Chamber RC walls (Tenderer to specify method of curing)                                                       | square metre (m²) |          |      |        |
|                                  | C13.4.5.3 |     | Box Chamber RC cover slabs (Tenderer to specify method of curing)                                                 | square metre (m²) |          |      |        |
| C13.4.9                          |           |     | <b>Manufacturing precast concrete members</b>                                                                     |                   |          |      |        |
|                                  |           | (a) | 2150x1113x300mm thick RC Top Cover Slab for applicable Box Chambers, HHO-7504-304-1101 & HHO-7504-304-1102        | number (No.)      |          |      |        |
| C13.4.11                         |           |     | <b>Transporting and erecting precast concrete members</b>                                                         |                   |          |      |        |
|                                  |           | (a) | 2150x1113x300mm thick RC Top Cover Slab, 12000kg, HHO-7504-304-1101 & HHO-7504-304-1102                           | number (No.)      |          |      |        |
| Total Carried Forward To Summary |           |     |                                                                                                                   |                   |          |      |        |

| Item                             |           |  |  | Description                                                                                                                                                                  | Unit              | Quantity | Rate | Amount |
|----------------------------------|-----------|--|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------|------|--------|
| C13.7                            |           |  |  | JOINTS                                                                                                                                                                       |                   |          |      |        |
| C13.7.2                          |           |  |  | Filled joints:                                                                                                                                                               |                   |          |      |        |
|                                  | C13.7.2.1 |  |  | Isolation joint between box chamber walls and removeable slabs. 3 layer thick Malthoid joint, bonded to box chamber walls, and debonded from the removable slab above joint. | square metre (m²) |          |      |        |
| C13.7.4                          |           |  |  | Sealing joints with:                                                                                                                                                         |                   |          |      |        |
|                                  | C13.7.4.1 |  |  | Sealant (silicone pavement sealant, or equivalent), 20mm joint                                                                                                               | metre (m)         |          |      |        |
| C13.7.8                          |           |  |  | Additional water tests for joints ordered by the Engineer                                                                                                                    | number (No.)      |          |      |        |
| Total Carried Forward To Summary |           |  |  |                                                                                                                                                                              |                   |          |      |        |

C14.7: PROTECTIVE COATINGS AND TREATMENTS FOR CONCRETE

| Item                             |  |  | Description                                                                                                                                    | Unit                           | Quantity | Rate | Amount |
|----------------------------------|--|--|------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|----------|------|--------|
| C14.7                            |  |  | PROTECTIVE COATINGS AND TREATMENTS FOR CONCRETE                                                                                                |                                |          |      |        |
| C14.7.2                          |  |  | Application of protective coatings and treatments for the exposed concrete faces of Wall Type 6 (Hydrophobic impregnants 250g/m <sup>2</sup> ) | square metre (m <sup>2</sup> ) |          |      |        |
| C14.7.3                          |  |  | On site monitoring and supply of written product performance guarantee                                                                         | lump sum                       |          |      |        |
| C14.7.4                          |  |  | Trial sample panels                                                                                                                            | square metre (m <sup>2</sup> ) |          |      |        |
|                                  |  |  |                                                                                                                                                |                                |          |      |        |
| Total Carried Forward To Summary |  |  |                                                                                                                                                |                                |          |      |        |



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| SUMMARY OF SECTIONS                           |                                | Amount      |
|-----------------------------------------------|--------------------------------|-------------|
| Sec#                                          | Description                    |             |
| 1                                             | C13.1: FOUNDATIONS             | <div></div> |
| 2                                             | C13.2: FALSEWORK, FORMWORK AND |             |
| 3                                             | C13.3: STEEL REINFORCEMENT     |             |
| 4                                             | C13.4: CONCRETE                |             |
| 5                                             | C13.7: JOINTS                  |             |
| 6                                             | C14.7: PROTECTIVE COATINGS AND |             |
| Total Carried Forward To Summary Of Schedules |                                |             |



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SCHEDULE 9: ELECTRICAL MV/LV INFRASTRUCTURE RELOCATIONS

|                                  |         |                                                                                                                                                                                                                                                                                       |      | ITEM 1: PRELIMINARY AND GENERAL |      |        |
|----------------------------------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|---------------------------------|------|--------|
| ITEM NO                          | PAYMENT | DESCRIPTION                                                                                                                                                                                                                                                                           | UNIT | QTY                             | RATE | AMOUNT |
|                                  | SSA     | ITEM 1 : PRELIMINARY AND GENERAL                                                                                                                                                                                                                                                      |      |                                 |      |        |
|                                  | 8.3     | FIXED CHARGE AND VALUE RELATED ITEMS                                                                                                                                                                                                                                                  |      |                                 |      |        |
| 1.01                             | 8.3.1   | Contractual requirements                                                                                                                                                                                                                                                              | Sum  |                                 |      |        |
| 1.02                             | 8.3.2   | Establishment of facilities on site                                                                                                                                                                                                                                                   | Sum  |                                 |      |        |
| 1.03                             | 8.3.3   | Removal of site establishment on completion                                                                                                                                                                                                                                           | Sum  |                                 |      |        |
| 1.04                             | 5.11    | Compliance with OHS Act Construction Regulations                                                                                                                                                                                                                                      |      |                                 |      |        |
| 1.04.1                           | 5.11.1  | Cost of Health and Safety Measures                                                                                                                                                                                                                                                    | Sum  |                                 |      |        |
| 1.04.2                           | 5.11.1  | Compiling and Maintenance of Health and Safety Plan                                                                                                                                                                                                                                   | Sum  |                                 |      |        |
| 1.04.3                           | 5.11.1  | Compiling and Maintenance of Safety File                                                                                                                                                                                                                                              | Sum  |                                 |      |        |
| 1.04.4                           |         | Planning of installation in sections to allow for outages, jointing of cables, moving of minisubs, kiosks and all other work in accordance with CoCT standards and the depot requirements, including any changes that are required to the planning to energise the relocated network. | Sum  |                                 |      |        |
|                                  | 8.4     | TIME-RELATED ITEMS                                                                                                                                                                                                                                                                    |      |                                 |      |        |
| 1.05                             | 8.4.1   | Contractual requirements                                                                                                                                                                                                                                                              | Sum  |                                 |      |        |
| 1.06                             | 8.4.2   | Operate and maintain facilities on site:                                                                                                                                                                                                                                              | Sum  |                                 |      |        |
| 1.07                             | 8.4.3   | Allow for site supervision. The cost shall include for the supervision of the installation and sign-off on the Certificates of Compliance by a competent person (Approved Inspection Authority, Competent Person as defined or Professionally Registered person).                     | Sum  |                                 |      |        |
|                                  | 5.3     | Apply for all relevant wayleaves, Collect wayleaves, pay permit fee and pay deposit (Refundable from Municipality) Contractor to ensure all wayleaves have been received and are up to date. (All costs included)                                                                     | Sum  |                                 |      |        |
| 1.09                             | 8.4.5   | Other obligations                                                                                                                                                                                                                                                                     | Sum  |                                 |      |        |
| 1.10                             | 5.11.2  | Guarding of the works throughout project                                                                                                                                                                                                                                              | Sum  |                                 |      |        |
| Total Carried Forward To Summary |         |                                                                                                                                                                                                                                                                                       |      |                                 |      |        |

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| ITEM 2: SUBSTATIONS              |         |                                                                                                                                             |      |     |      |        |
|----------------------------------|---------|---------------------------------------------------------------------------------------------------------------------------------------------|------|-----|------|--------|
| ITEM NO                          | PAYMENT | DESCRIPTION                                                                                                                                 | UNIT | QTY | RATE | AMOUNT |
|                                  | SSB     | ITEM 2 : SUBSTATIONS                                                                                                                        |      |     |      |        |
| 2.1                              | 8.3.1   | Concrete Plinths                                                                                                                            |      |     |      |        |
| 2.1.1                            | 8.3.1.1 | Concrete plinth for 500 kVA Type C CoCT (Western Cape)                                                                                      |      |     |      |        |
|                                  |         | mini-substation in compliance with CoCT spec                                                                                                | No   |     |      |        |
| 2.2                              |         | CoCT Minisub                                                                                                                                |      |     |      |        |
| 2.2.1                            | 8.3.4.3 | Installation 11 660V/420V                                                                                                                   |      |     |      |        |
|                                  |         | Type C CoCT Mini-Substation (DYN 7)                                                                                                         | No.  |     |      |        |
| 2.2.2                            |         | Relocation of existing minisub from existing position to new. Includes all costs involved with moving the minisub to the proposed position. | No.  |     |      |        |
| 2.2.3                            |         | Circuit breakers for minisubs (CoCT Approved)                                                                                               |      |     |      |        |
|                                  |         | Rate to include testing of breakers by CoCT                                                                                                 |      |     |      |        |
|                                  |         | 125A                                                                                                                                        | No.  |     |      |        |
|                                  |         | 200A                                                                                                                                        | No.  |     |      |        |
|                                  |         | 250A                                                                                                                                        | No.  |     |      |        |
| Total Carried Forward To Summary |         |                                                                                                                                             |      |     |      |        |

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ITEM 3: UNDERGROUND NETWORKS

| ITEM NO               | PAYMENT    | DESCRIPTION                                                                                                                                         | UNIT | QTY | RATE | AMOUNT |
|-----------------------|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|------|-----|------|--------|
| <b>3.1</b>            | <b>SSC</b> | <b>ITEM 3: UNDERGROUND NETWORKS</b>                                                                                                                 |      |     |      |        |
|                       |            | <b>MV CABLE INSTALLATION</b>                                                                                                                        |      |     |      |        |
| 3.1.1                 | 8.3.1.1    | Collect, lay and test 11kV cables                                                                                                                   |      |     |      |        |
|                       |            | GALVANISED DOUBLE LAYER STEEL TAPE ARMOUR (GDSTA),                                                                                                  |      |     |      |        |
|                       |            | PVC SERVING, TO COCT SPECIFICATION.                                                                                                                 |      |     |      |        |
| 3.1.1.1               |            | 300mm² (Al) x 3C 6,35/11kV PILC to CoCT specification                                                                                               | m    |     |      |        |
| 3.1.1.2               |            | 120mm² (Al) x 3C 6,35/11kV PILC to CoCT specification                                                                                               | m    |     |      |        |
| 3.1.1.3               |            | 50mm² (Al) x 3C 6,35/11kV PILC to CoCT specification                                                                                                | m    |     |      |        |
|                       |            | <b>Terminations and Joints and seals</b>                                                                                                            |      |     |      |        |
| 3.2.1                 | 8.3.4.1    | Jointing of 11kV cables tot CoCT Specifications                                                                                                     |      |     |      |        |
| 3.2.1.1               |            | 300mm² (Al) x 3C 6,35/11kV PILC                                                                                                                     | No.  |     |      |        |
| 3.2.1.2               |            | 120mm² (Al) x 3C 6,35/11kV PILC                                                                                                                     | No.  |     |      |        |
| 3.2.1.3               |            | 50mm² (Al) x 3C 6,35/11kV PILC                                                                                                                      | No.  |     |      |        |
|                       | 8.3.6.4    | Terminations of 6.35/11kV Cable to CoCT Specification                                                                                               |      |     |      |        |
| 3.2.2.1               |            | 300mm² (Al) x 3C 6,35/11kV PILC                                                                                                                     | No.  |     |      |        |
| 3.2.2.2               |            | 120mm² (Al) x 3C 6,35/11kV PILC                                                                                                                     | No.  |     |      |        |
| 3.2.2.3               |            | 50mm² (Al) x 3C 6,35/11kV PILC                                                                                                                      | No.  |     |      |        |
|                       |            | <b>Seal MV cable ends (Supply and Install)</b>                                                                                                      |      |     |      |        |
| 3.2.3.1               |            | 300mm² (Al) x 3C 6,35/11kV PILC                                                                                                                     | No.  |     |      |        |
| 3.2.3.2               |            | 120mm² (Al) x 3C 6,35/11kV PILC                                                                                                                     | No.  |     |      |        |
| 3.2.3.3               |            | 50mm² (Al) x 3C 6,35/11kV PILC                                                                                                                      | No.  |     |      |        |
|                       |            | <b>Additional pressure test before energising (Existing and new cable)</b>                                                                          | No   |     |      |        |
| <b>3.5</b>            |            | <b>Telecoms relocations with 300(Al)11kV Cables - Cables to be collected from CoCT stores (Free Issue)</b>                                          |      |     |      |        |
| 3.5.1                 |            | Collect and install of CoCT approved 1.5mm² 7-pair Cu pilot cores for relocation of primary MV cable telecoms cables. SWA and Polyethylene sheathed | m    |     |      |        |
| Total Carried Forward |            |                                                                                                                                                     |      |     |      |        |

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ITEM 3: UNDERGROUND NETWORKS

| ITEM NO                                                           | PAYMENT | DESCRIPTION                                                                                                                                           | UNIT | QTY | RATE | AMOUNT |
|-------------------------------------------------------------------|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----|------|--------|
| Brought Forward                                                   |         |                                                                                                                                                       |      |     |      |        |
| 3.5.2                                                             |         | Collect and install of CoCT approved 0.63mm² 10-pair Cu pilot cores for relocation of primary MV cable telecoms cables. SWA and Polyethylene sheathed | m    |     |      |        |
| 3.5.3                                                             |         | Supply and install CoCT approved Telecommunication cable joint box for primary MV cable pilot cables                                                  | No.  |     |      |        |
| LV INSTALLATION                                                   |         |                                                                                                                                                       |      |     |      |        |
| 3.6.1                                                             |         | Collect (free issue), Lay and test LV cables 600/1000V PVC PVC SWA PVC with SABS 1507 mark and to CoCT Specifications and standards                   |      |     |      |        |
| 3.6.1.1                                                           |         | 300mm² x 4C (Al)                                                                                                                                      | m    |     |      |        |
| 3.6.1.2                                                           |         | 185mm² x 4C (Al)                                                                                                                                      | m    |     |      |        |
| 3.6.1.3                                                           |         | 120mm² x 4C (Al)                                                                                                                                      | m    |     |      |        |
| 3.6.1.4                                                           |         | 70mm² x 4C (Al)                                                                                                                                       | m    |     |      |        |
| 3.6.1.5                                                           |         | 35mm² x 4C (Al)                                                                                                                                       | m    |     |      |        |
| 3.6.1.6                                                           |         | 16mm² x 4C (Cu)                                                                                                                                       | m    |     |      |        |
| 3.6.1.7                                                           |         | 16mm² x 2C (Cu)                                                                                                                                       | m    |     |      |        |
| Supply and install LV Joints to CoCT standards and specifications |         |                                                                                                                                                       |      |     |      |        |
| 3.6.2.1                                                           |         | 300mm² x 4C (Al)                                                                                                                                      | No.  |     |      |        |
| 3.6.2.2                                                           |         | 185mm² x 4C (Al)                                                                                                                                      | No.  |     |      |        |
| 3.6.2.3                                                           |         | 120mm² x 4C (Al)                                                                                                                                      | No.  |     |      |        |
| 3.6.2.4                                                           |         | 70mm² x 4C (Al)                                                                                                                                       | No.  |     |      |        |
| 3.6.2.5                                                           |         | 35mm² x 4C (Al)                                                                                                                                       | No.  |     |      |        |
| 3.6.2.6                                                           |         | 16mm² x 4C (Cu)                                                                                                                                       | No.  |     |      |        |
| 3.6.2.7                                                           |         | 16mm² x 2C (Cu)                                                                                                                                       | No.  |     |      |        |
| Kiosk Terminations to CoCT standards and specifications           |         |                                                                                                                                                       |      |     |      |        |
| 3.6.3.1                                                           |         | 300mm² x 4C (Al)                                                                                                                                      | No.  |     |      |        |
| 3.6.3.2                                                           |         | 185mm² x 4C (Al)                                                                                                                                      | No.  |     |      |        |
| 3.6.3.3                                                           |         | 120mm² x 4C (Al)                                                                                                                                      | No.  |     |      |        |
| 3.6.3.4                                                           |         | 70mm² x 4C (Al)                                                                                                                                       | No.  |     |      |        |
| Total Carried Forward                                             |         |                                                                                                                                                       |      |     |      |        |

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ITEM 3: UNDERGROUND NETWORKS

| ITEM NO               | PAYMENT | DESCRIPTION                                                                                                                                                                                        | UNIT | QTY | RATE | AMOUNT |
|-----------------------|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----|------|--------|
| Brought Forward       |         |                                                                                                                                                                                                    |      |     |      |        |
| 3.6.3.5               |         | 35mm <sup>2</sup> x 4C (Al)                                                                                                                                                                        | No.  |     |      |        |
| 3.6.3.6               |         | 16mm <sup>2</sup> x 4C (Cu)                                                                                                                                                                        | No.  |     |      |        |
| 3.6.3.7               |         | 16mm <sup>2</sup> x 2C (Cu)                                                                                                                                                                        | No.  |     |      |        |
|                       |         | <b>Over Head (O/H) Terminations to CoCT standards and specifications</b>                                                                                                                           |      |     |      |        |
| 3.6.4.1               |         | 300mm <sup>2</sup> x 4C (Al)                                                                                                                                                                       | No.  |     |      |        |
| 3.6.4.2               |         | 185mm <sup>2</sup> x 4C (Al)                                                                                                                                                                       | No.  |     |      |        |
| 3.6.4.3               |         | 120mm <sup>2</sup> x 4C (Al)                                                                                                                                                                       | No.  |     |      |        |
| 3.6.4.4               |         | 70mm <sup>2</sup> x 4C (Al)                                                                                                                                                                        | No.  |     |      |        |
|                       |         | <b>Sealing of LV cable ends</b>                                                                                                                                                                    |      |     |      |        |
| 3.6.5.1               |         | 300mm <sup>2</sup> x 4C (Al)                                                                                                                                                                       | No.  |     |      |        |
| 3.6.5.2               |         | 185mm <sup>2</sup> x 4C (Al)                                                                                                                                                                       | No.  |     |      |        |
| 3.6.5.3               |         | 120mm <sup>2</sup> x 4C (Al)                                                                                                                                                                       | No.  |     |      |        |
| 3.6.5.4               |         | 70mm <sup>2</sup> x 4C (Al)                                                                                                                                                                        | No.  |     |      |        |
| 3.6.5.5               |         | 35mm <sup>2</sup> x 4C (Al)                                                                                                                                                                        | No.  |     |      |        |
| 3.6.5.6               |         | 16mm <sup>2</sup> x 4C (Cu)                                                                                                                                                                        | No.  |     |      |        |
| 3.6.5.7               |         | 16mm <sup>2</sup> x 2C (Cu)                                                                                                                                                                        | No.  |     |      |        |
|                       |         | <b>Distribution kiosks</b>                                                                                                                                                                         |      |     |      |        |
| 3.6.6.1               |         | Supply and install CoCT approved fatboy kiosks populated with 12 circuit breakers and all wiring complete. A new C.O.C included in pricing for Each Kiosk                                          | No   |     |      |        |
| 3.6.6.2               |         | Moving of Distribution kiosks and Pillar boxes, Rates to include disconnection of existing LV cables. A new C.O.C included in pricing for Each Kiosk                                               | No   |     |      |        |
| 3.6.6.3               |         | Supply and install CoCT-approved Pillar Box kiosks, all wiring is complete with fuses. Fuses Size to be confirmed with Engineer before ordering A new C.O.C included in the pricing for Each Kiosk | No   |     |      |        |
| 3.6.7                 |         | <b>Install CoCT approved fuses</b>                                                                                                                                                                 |      |     |      |        |
| 3.6.7.1               |         | 1 set of 400A HRC Fuses                                                                                                                                                                            | No   |     |      |        |
| 3.6.7.2               |         | 1 set of 250A HRC Fuses                                                                                                                                                                            | No   |     |      |        |
| Total Carried Forward |         |                                                                                                                                                                                                    |      |     |      |        |



CITY OF CAPE TOWN  
 TRANSPORT INFRASTRUCTURE IMPLEMENTATION  
 URBAN MOBILITY DIRECTORATE  
 CONTRACT NO.72Q/2025/26  
 SCHEDULE 9: ELECTRICAL MV/LV INFRASTRUCTURE RELOCATIONS

ITEM 3: UNDERGROUND NETWORKS

| ITEM NO                          | PAYMENT | DESCRIPTION                                                                                                                                                                                                                                                                                               | UNIT | QTY | RATE | AMOUNT |
|----------------------------------|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----|------|--------|
| Brought Forward                  |         |                                                                                                                                                                                                                                                                                                           |      |     |      |        |
| 3.6.7.3                          |         | 1 set of 200A HRC Fuses                                                                                                                                                                                                                                                                                   | No   |     |      |        |
| 3.6.7.4                          |         | 1 set of 160A HRC Fuses                                                                                                                                                                                                                                                                                   | No   |     |      |        |
| 3.8                              |         | Communication (Telekoms/Fibre) installation                                                                                                                                                                                                                                                               |      |     |      |        |
| 3.8.1                            |         | Install fibre ducts wherever fibre cables are to be reroute. The fibre ducts are to be according to CoCT specification. These 32mm DIA ducts will be free issued and are to be collected from CoCT stores                                                                                                 | m    |     |      |        |
| 3.8.2                            |         | Install fibre cables in the abovementioned newly installed ducts. The fibre cables are to be according to CoCT specification. These fibre cables will be free issued and are to be collected from CoCT stores. The cables are to be installed by blowing. Arrange for the City to splice and test cables. | m    |     |      |        |
| 3.8.3                            |         | Arrange for City to do splicing and testing of fibre for each fibre cable rerouted, as it is rerouted                                                                                                                                                                                                     | No   |     |      |        |
| Total Carried Forward To Summary |         |                                                                                                                                                                                                                                                                                                           |      |     |      |        |

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CITY OF CAPE TOWN  
TRANSPORT INFRASTRUCTURE IMPLEMENTATION  
URBAN MOBILITY DIRECTORATE  
CONTRACT NO.72Q/2025/26  
SCHEDULE 9: ELECTRICAL MV/LV INFRASTRUCTURE RELOCATIONS

| ITEM 4: EXCAVATIONS   |         |                                                                                                                                                                                  |      |     |      |        |
|-----------------------|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----|------|--------|
| ITEM NO               | PAYMENT | DESCRIPTION                                                                                                                                                                      | UNIT | QTY | RATE | AMOUNT |
|                       | SSE     | ITEM 4: EXCAVATIONS                                                                                                                                                              |      |     |      |        |
| 4.1                   | 8.3.2.1 | Excavation by hand in all material for trenches, backfilling, compaction and removal of surplus material                                                                         |      |     |      |        |
| 4.1.1                 | 8.3.2.1 | 0,5 m x 1 m deep for MV cables                                                                                                                                                   | m    |     |      |        |
| 4.1.2                 | 8.3.2.1 | 0,5m x 1 m deep for MV, LV distribution and service cable                                                                                                                        | m    |     |      |        |
| 4.1.3                 | 8.3.2.1 | 1m x 1 m deep for MV, LV distribution and service                                                                                                                                | m    |     |      |        |
| 4.2                   | 8.3.2.1 | Extra-over for import of clean backfill sand, inclusive of removal of surplus insitu material (Engineer to approve before hand)                                                  | m³   |     |      |        |
| 4.3                   |         | Directional moling                                                                                                                                                               |      |     |      |        |
| 4.3.1                 |         | Setup costs per crossing                                                                                                                                                         | No   |     |      |        |
| 4.3.2                 |         | 110mm DIA ducts                                                                                                                                                                  | m    |     |      |        |
| 4.3.3                 |         | 160mm DIA ducts                                                                                                                                                                  | m    |     |      |        |
| 4.4                   | 8.3.4   | Tracing and protection of existing services crossing excavations                                                                                                                 | No   |     |      |        |
| 4.5                   | 8.3.5   | Tracing and protection of existing services parallel to excavations                                                                                                              | m    |     |      |        |
| 4.6                   | 8.3.7   | Troxler Test                                                                                                                                                                     | No   |     |      |        |
|                       |         | Reinstate made up surfaces                                                                                                                                                       |      |     |      |        |
| 4.7.1                 |         | Paving                                                                                                                                                                           | m²   |     |      |        |
| 4.7.2                 |         | Cutting and Reinstating of Tar                                                                                                                                                   | m²   |     |      |        |
| 4.7.3                 |         | Removal and Reinstate of landscaping.                                                                                                                                            | m²   |     |      |        |
| 4.8                   |         | Duct Installations to CoCT standard duct type installations. Rates to include concrete encasement and all other requirements, complete arrangement to be supplied and installed. |      |     |      |        |
| 4.8.1                 |         | A - 2xS                                                                                                                                                                          | m    |     |      |        |
| 4.8.2                 |         | B -2xS, 1xL                                                                                                                                                                      | m    |     |      |        |
| 4.8.3                 |         | C - 2xS, 2xL                                                                                                                                                                     | m    |     |      |        |
| 4.8.4                 |         | D -2xS, 3xL                                                                                                                                                                      | m    |     |      |        |
| 4.8.5                 |         | E - 3xS, 3xL                                                                                                                                                                     | m    |     |      |        |
| 4.8.6                 |         | F - 4xS, 4xL                                                                                                                                                                     | m    |     |      |        |
| Total Carried Forward |         |                                                                                                                                                                                  |      |     |      |        |

CITY OF CAPE TOWN  
TRANSPORT INFRASTRUCTURE IMPLEMENTATION  
URBAN MOBILITY DIRECTORATE  
CONTRACT NO.72Q/2025/26  
SCHEDULE 9: ELECTRICAL MV/LV INFRASTRUCTURE RELOCATIONS

ITEM 4: EXCAVATIONS

| ITEM NO                          | PAYMENT | DESCRIPTION   | UNIT | QTY | RATE | AMOUNT |
|----------------------------------|---------|---------------|------|-----|------|--------|
| Brought Forward                  |         |               |      |     |      |        |
| 4.8.7                            |         | G - 6xS, 4xL  | m    |     |      |        |
| 4.8.8                            |         | H - 4xS, 3xL  | m    |     |      |        |
| 4.8.9                            |         | J - 8xS, 6xL  | m    |     |      |        |
| 4.8.10                           |         | K - 12xS, 8xL | m    |     |      |        |
| 4.8.11                           |         | L - 3xS, 12xL | m    |     |      |        |
| Total Carried Forward To Summary |         |               |      |     |      |        |



CITY OF CAPE TOWN  
TRANSPORT INFRASTRUCTURE IMPLEMENTATION  
URBAN MOBILITY DIRECTORATE  
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SCHEDULE 9: ELECTRICAL MV/LV INFRASTRUCTURE RELOCATIONS

ITEM 6: OVERHEAD NETWORK

| ITEM NO                          | PAYMENT | DESCRIPTION                                                                                                                   | UNIT | QTY | RATE | AMOUNT |
|----------------------------------|---------|-------------------------------------------------------------------------------------------------------------------------------|------|-----|------|--------|
|                                  |         | ITEM 6: OVERHEAD NETWORK                                                                                                      |      |     |      |        |
| 6.1                              |         | Disconnect cables from feeder poles and make safe                                                                             | No   |     |      | 0      |
| 6.2                              |         | Install new feeder cable to feeder pole (Including kicker pipe (Cables measured seperately                                    |      |     |      |        |
| 6.2.1                            |         | 300mm² x 4C (Al)                                                                                                              | No.  |     |      | 0      |
| 6.2.2                            |         | 185mm² x 4C (Al)                                                                                                              | No.  |     |      | 0      |
| 6.2.3                            |         | 120mm² x 4C (Al)                                                                                                              | No.  |     |      | 0      |
| 6.2.4                            |         | 70mm² x 4C (Al)                                                                                                               | No.  |     |      | 0      |
| 6.2.5                            |         | 35mm² x 4C (Al)                                                                                                               | No.  |     |      | 0      |
| 6.2.6                            |         | 16mm² x 4C (Cu)                                                                                                               | No.  |     |      | 0      |
| 6.2.7                            |         | 16mm² x 2C (Cu)                                                                                                               | No.  |     |      | 0      |
| 6.3                              |         | Remove, store and deliver poles to CoCT stores (Engineer to approve poles to be removed)                                      | No.  |     |      | 0      |
| 6.4                              |         | Remove, store and deliver O/H lines to CoCT stores. Conductor measured per linear meter for all O/H conductors between poles. | m    |     |      | 0      |
|                                  |         | O/H POLES                                                                                                                     |      |     |      |        |
|                                  |         | Supply and installation of O/H lines to CoCT standard. Insulation, earthing ,etc to be included in pricing.                   |      |     |      |        |
| 6.5.1                            |         | Stay Wire to Support the Existing O/H line poles                                                                              | No   |     |      | 0      |
| 6.5.2                            |         | Strut Pole                                                                                                                    | No   |     |      | 0      |
| 6.5.3                            |         | Fledge Pole                                                                                                                   | No   |     |      | 0      |
| Total Carried Forward To Summary |         |                                                                                                                               |      |     |      | 0      |

CITY OF CAPE TOWN  
TRANSPORT INFRASTRUCTURE IMPLEMENTATION  
URBAN MOBILITY DIRECTORATE  
CONTRACT NO.72Q/2025/26  
SCHEDULE 9: ELECTRICAL MV/LV INFRASTRUCTURE RELOCATIONS

| SUMMARY OF SECTIONS                                           |                                 | AMOUNT      |
|---------------------------------------------------------------|---------------------------------|-------------|
| SECTION                                                       | DESCRIPTION                     |             |
| 1                                                             | ITEM 1: PRELIMINARY AND GENERAL | <div></div> |
| 2                                                             | ITEM 2: SUBSTATIONS             |             |
| 3                                                             | ITEM 3: UNDERGROUND NETWORKS    |             |
| 4                                                             | ITEM 4: EXCAVATIONS             |             |
| 5                                                             | ITEM 5: EARTHING                |             |
| 6                                                             | ITEM 6: OVERHEAD NETWORK        |             |
| Total Carried   Total Carried Forward To Summary Of Schedules |                                 | <div></div> |





| SUMMARY OF SCHEDULES                          |                                                         | Amount                                                                              |
|-----------------------------------------------|---------------------------------------------------------|-------------------------------------------------------------------------------------|
| Schedule                                      | Description                                             |                                                                                     |
| 1                                             | SCHEDULE 1 : GENERAL                                    |  |
| 2                                             | SCHEDULE 2: ROADWORKS                                   |                                                                                     |
| 3                                             | SCHEDULE 3: SERVICES                                    |                                                                                     |
| 4                                             | SCHEDULE 4: WATER MAINS                                 |                                                                                     |
| 5                                             | SCHEDULE 5: ELECTRICAL STREET LIGHTING/SUPPLY           |                                                                                     |
| 6                                             | SCHEDULE 6: TRAFFIC SIGNALISATION                       |                                                                                     |
| 7                                             | SCHEDULE 7: CEMETERY WALL & FENCING                     |                                                                                     |
| 8                                             | SCHEDULE 8: WATER BOX CHAMBERS                          |                                                                                     |
| 9                                             | SCHEDULE 9: ELECTRICAL MV/LV INFRASTRUCTURE RELOCATIONS |                                                                                     |
| Total Carried Forward To Summary Of Contracts |                                                         |  |



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## Part C2: Pricing Data

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|                                | Pages    |
|--------------------------------|----------|
| C2.1 Pricing Assumptions.....  | 76 – 77  |
| C2.2 Bills of Quantities ..... | 78 – 214 |



|   |                                                                                                                                                                                    | Page No.  | Amount |   |
|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|--------|---|
|   | <b><u>SUMMARY</u></b>                                                                                                                                                              |           | R      | c |
| 1 | General                                                                                                                                                                            | 79 - 87   |        |   |
| 2 | Roadworks                                                                                                                                                                          | 88 - 125  |        |   |
| 3 | Services                                                                                                                                                                           | 126 - 138 |        |   |
| 4 | Water Mains                                                                                                                                                                        | 139 - 151 |        |   |
| 5 | Electrical Street Lighting                                                                                                                                                         | 152 - 161 |        |   |
| 6 | Traffic Signalisation                                                                                                                                                              | 162 - 174 |        |   |
| 7 | Cemetery Wall & Fencing                                                                                                                                                            | 175 - 193 |        |   |
| 8 | Water Box Chambers                                                                                                                                                                 | 194 - 201 |        |   |
| 9 | Electrical MV/LV Infrastructure Relocations                                                                                                                                        | 202 - 212 |        |   |
|   | <b>SUB-TOTAL</b>                                                                                                                                                                   | R         |        |   |
|   | <b><u>CONTINGENCIES</u></b>                                                                                                                                                        |           |        |   |
|   | Allow the sum of 10% (ten percent) of the above Sub-total for Contingencies to be spent as the Employer's Agent may direct and to be deducted in whole or in part if not required. | R         |        |   |
|   | <b>TOTAL INCLUDING CONTINGENCIES</b>                                                                                                                                               | R         |        |   |
|   | <b><u>VALUE ADDED TAX</u></b>                                                                                                                                                      |           |        |   |
|   | ADD: VAT at the rate of 15%                                                                                                                                                        | R         |        |   |
|   | <b>Carried to part C1.1 Form of Offer and Acceptance</b>                                                                                                                           | R         |        |   |

**DECLARATION (In respect of completeness of Tender)**

City of Cape Town  
Tower Block, Civic Centre  
12 Hertzog Boulevard  
**CAPE TOWN**

I/we, the undersigned, do hereby declare that these are the properly priced Bills of Quantities forming Part C2.2 of this Contract Document containing 156 pages in consecutive order upon which my/our tender for **TENDER NO. 72Q/2025/26: UPGRADE OF VOORTREKKER ROAD, FROM 4TH AVENUE TO 12TH AVENUE, MAITLAND** has been based. If I/we have submitted a printed version of the Bills of Quantities, I/we warrant that no amendments have been made to it from the original, other than amendments issued in any Addenda in terms of Clause C.3.2 in Part T1.2 Tender Data.

\_\_\_\_\_  
SIGNATURE OF TENDERER/

\_\_\_\_\_  
DATE

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## Part C3: Scope of Work

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|                                            | Pages            |
|--------------------------------------------|------------------|
| <b>C3.1 Description of the Works .....</b> | <b>216 – 224</b> |
| <b>C3.2 Engineering / Design .....</b>     | <b>225 – 229</b> |
| <b>C3.3 Procurement .....</b>              | <b>230 – 231</b> |
| <b>C3.4 Construction .....</b>             | <b>232 – 483</b> |
| <b>C3.5 Management.....</b>                | <b>484 – 594</b> |
| <b>C3.6 Annexes.....</b>                   | <b>595 – 601</b> |

### Status

Should any requirement or provision in the parts of the Scope of Work conflict with any requirement of any Standardised Specification, particular specification or any drawings, the order of precedence, unless otherwise specified, is:

Drawings  
Scope of Work (Parts C3.1, C3.4, C3.5 and C3.6)  
Particular Specifications  
SANS Standardised Specifications  
COTO Specifications



## C3.1 Description of the Works

### CONTENTS

- 3.1.1 EMPLOYER'S OBJECTIVES
- 3.1.2 OVERVIEW OF THE WORKS
- 3.1.3 EXTENT OF THE WORKS
- 3.1.4 LOCATION OF THE WORKS
- 3.1.5 TEMPORARY WORKS
- 3.1.6 SAFETY OF PUBLIC
- 3.1.7 NATURE OF GROUND AND SUBSOIL CONDITIONS
- 3.1.8 CONSTRUCTION PROGRAMME
- 3.1.9 SITE FACILITIES AVAILABLE
- 3.1.10 SITE FACILITIES REQUIRED
- 3.1.11 FEATURES THAT REQUIRE SPECIAL ATTENTION
- 3.1.12 USE OF LOCAL LABOUR

#### 3.1.1 EMPLOYER'S OBJECTIVES

Commuters are often experiencing congestion along Voortrekker Road during peak hours. Voortrekker Road acts as a corridor linking Bellville, Parow, Goodwood and Maitland within the greater City of Cape Town area. The section of road in question, is between 4<sup>th</sup> Avenue to 12<sup>th</sup> Avenue.

The aim of the project is to upgrade the road section in question from a single carriageway to a dual carriageway to alleviate congestion along this route. Infrastructure services within the road reserve will be upgraded and relocated to comply with the City of Cape Town standards.

It is noted that the widening of Voortrekker Road will not totally alleviate the congestion problem along Voortrekker Road. However, converting the single carriageway to a dual carriageway will provide commuters with more road surface and additional options at intersections.

The description of the project contained in the Scope of Work is merely an outline of the Contract Works and shall not limit the work to be carried out by the Contractor under this Contract. Details of some of the major items are given in this section and approximate detailed quantities for each type of work to be carried out in accordance with the Contract Documents are included in the Bill of Quantities

#### 3.1.2 OVERVIEW OF THE WORKS

##### 3.1.2.1 General Description of the Project

The project will entail the upgrading of 1.35 km long single carriageway sections of Voortrekker Road to a dual carriageway.

The works will include:

- The widening of Voortrekker Road (R102) on the southern side of the carriageway from 4<sup>th</sup> Avenue to 12<sup>th</sup> Avenue, including upgrading of intersections;
- The widening of 4<sup>th</sup>, 5<sup>th</sup> and 10<sup>th</sup> Avenue
- Resurfacing of existing northern carriageway from 4<sup>th</sup> Ave to 9<sup>th</sup> Ave
- The protection, relocating and upgrading of existing services impacted by the widening.
- Upgrade and relocation of the existing DN750 cast iron CML water supply pipeline
- Installation/upgrade of 4 no. traffic signalized intersections



- Relocation of ±850m of existing cemetery sandstone wall and fencing to new location
- All ancillary services including all signage, streetlighting, electrical cable (MV/LV) works, landscaping, drainage, IS&T services, ducting and road markings;

Construction will take place in the vicinity of existing services and a cemetery area. Due care shall be exercised to protect these services and graves when excavating or working in close proximity to existing services and graves, in compliance with the wayleave restrictions, allowances for which shall be made in the rates and prices tendered. The Contractor will be required to liaise directly with all relevant service and cemetery authorities, who shall be in attendance wherever service relocations, working alongside graves or protection measures are required to be carried out by the Contractor.

#### 3.1.2.2 Boundaries of the site

The site of the works shall comprise only the area required by the Contractor for the construction of the works and erection of temporary road signs on the approaches to the works, plus any localised temporary storage space that he may require for materials to be used at the specific location as approved by the Employer's Agent.

#### 3.1.2.3 Occupation of the site

Access to the various site locations will be granted in accordance with the Contractor's approved program. The Contractor will be required to complete, to the Employer's Agent's satisfaction, the roadworks which he has started in an area, before access will be granted to undertake works in subsequent areas identified in his program.

### 3.1.3 EXTENT OF THE WORKS

The extent of the work that is to be carried out under the contract is shown on the drawings and is described in the specifications. If during construction, conditions are found to differ from those anticipated, the Employer's Agent reserves the right to modify the scope of the work to suit the prevailing conditions and circumstances. Variations introduced in this manner will be measured and paid for at the rates tendered for appropriate items listed in the schedule of quantities or in the absence of such rates, as extra work.

The extent of the works consist of the following, which is has been measured under the relevant items in the Bill of Quantities:

#### Roadworks Items

- Mill and resurface ±4 300 m<sup>2</sup>
- New road layerworks area of ±14 000 m<sup>2</sup>
- Reconstruct intersections of total area ±2350 m<sup>2</sup>
- New sidewalk areas of ±9 300 m<sup>2</sup>
- Miscellaneous works such as road markings and signs

#### Services Items

- ±1000 m of stormwater pipe reticulation of DN300 to DN450
- ±30 No. of stormwater manholes and ±20 no. catchpits
- ±100 m of foul sewer pipe reticulation of DN150 to DN375
- ±5 No. of foul sewer manholes
- ±1100 m of DN750 steel CML pipe with 3 main chambers and valves/specials
- ±1000m of <DN250 water reticulation pipes and valve/specials replacement
- Construct ±2250 m of new grouped (6 or 7No.) ducts of size DN110/DN160
- Construction of ±1.1km of new street lighting, mostly median mounted

#### Structural Items

- ±900m existing cemetery sandstone wall to be relocated using existing recycled sandstone blocks



- Miscellaneous retaining walls for boundary edges in various areas

### 3.1.4 LOCATION OF THE WORKS

The Site of Works is located in the north-eastern quarter of the Cape Town Metropolitan area and confined to the road reserves of Voortrekker Road (R102), from 4<sup>th</sup> Avenue to 12<sup>th</sup> Avenue.

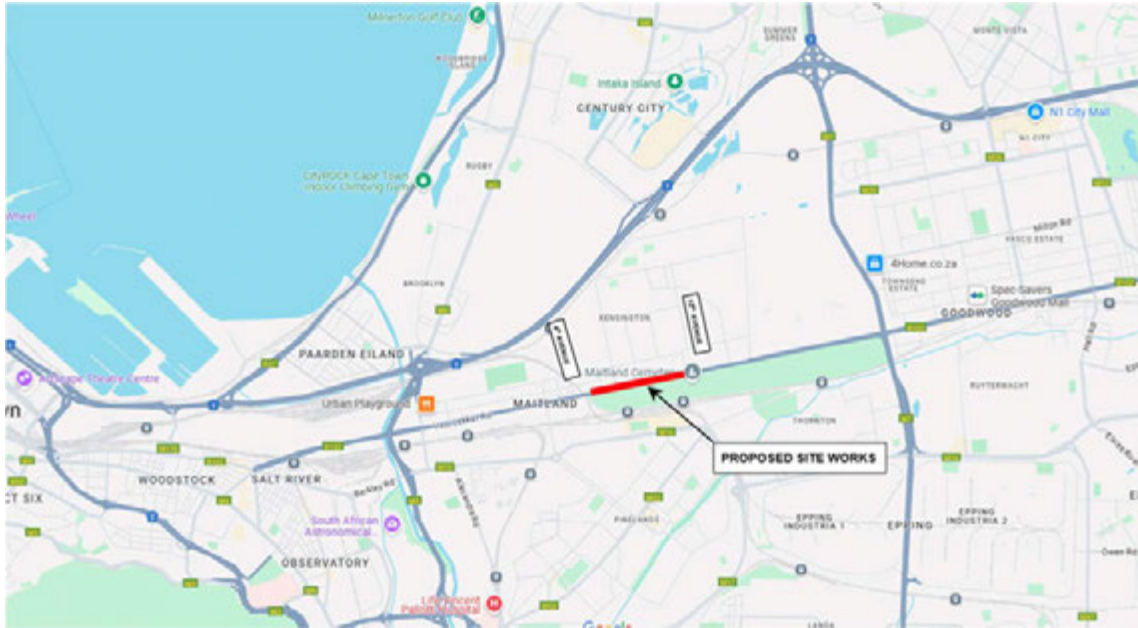


Figure 1: Locality Plan

### 3.1.5 TEMPORARY WORKS

The project entails the reconstruction/upgrading of existing major roads which carry significant volumes of traffic, both vehicular and pedestrian, during both peak and off-peak periods. Consequently, during construction, this vehicular and pedestrian traffic will have to be accommodated on the existing carriageways, temporary deviations and walkways.

The Contractor shall identify, design, install and allow in the rates for all necessary temporary works required to safeguard the Works and the Site and enable the permanent work to be constructed safely. No temporary works will be allowed to remain in position on completion of the Works.

The Contractor shall take all necessary precautions to protect the existing infrastructure and the Works from damage during the execution of the Works. If the Contractor causes any damage to existing infrastructure, the Contractor is required to make good all damage, at their own cost, to the satisfaction of the Employer's Agent.

The Contractor shall familiarise himself with the site and all local conditions/data and any environmental information/data (i.e. weather, water ground levels, boundary limitations, existing traffic volumes etc) and make provision for such conditions that could impact the Works and construction activities.

All temporary works are the responsibility of the Contractor and shall be designed by suitably competent and experienced professionals who are required to sign off on the temporary works design.

The Contractor shall indemnify the Employer's Agent and the Employer against any claims and actions that may arise out of the temporary works. The Contractor shall be responsible for full compliance with all the relevant codes of practice, legislation, safety, professional procedures, checking, site approval and requirements of the construction regulations with regards to temporary works. Temporary works are all works other than the permanent works as indicated on the drawings.

The Contractor shall submit all temporary works designs to the Employer's Agent, for acceptance, at least 14 days before commencing with the construction of the temporary works.

Dewatering:

It is expected that the Contractor will need to dewater sections of the Work throughout construction, primarily due to rain or flood actions.

Any dewatering must be designed to prevent the washing out of cement from the concrete mixture, minimise the segregation of materials and the formation of laitance, and prevent the flow of water through or over new concrete less than 24 hours old.

Existing Infrastructure:

The Contractor shall take all necessary precautions to protect the existing infrastructure, from damage during the execution of the Works. If the Contractor causes any damage to existing infrastructure, the Contractor will be required to make good all damage, at their own cost and to the satisfaction of the Employer's Agent.

### **3.1.6 SAFETY OF THE PUBLIC**

Access to all properties and businesses adjacent to the work area must be maintained at all times. The safe accommodation of vehicular and pedestrian traffic along the existing road network and sidewalks must be maintained. The Contractor shall provide and maintain hoarding/barricading, temporary traffic signs and warning lights to adequately provide safety to the general public in the vicinity of the work area; protect, secure and light the works and the site; and take any other precautions necessary to prevent injury to the public and damage to private property.

The Contractor will not be permitted to hinder pedestrians or block off entire sections of sidewalks to pedestrians. All work shall be programmed and sequenced in such a way so as to ensure minimum disruption to pedestrian flows. In addition, pedestrians shall be separated from work areas with the appropriate temporary fencing/barricades. The minimum sidewalk width to be maintained during construction shall not be less than 1.5 m unless otherwise agreed by the Employer's Agent.

Driveway accesses to private residences and businesses are to be constructed such that a minimum access width of 3 m is maintained at all times.

The travelling public shall have the right of way on public roads and the Contractor shall apply suitable approved methods for controlling the movement of his construction equipment and vehicles to ensure safety on site.

Failure to maintain road signs, warning signs or flicker lights, etc, in a satisfactory condition will result in the Employer's Agent stopping the Works until the traffic-control facilities have been replaced or repaired to the Employer's Agent's satisfaction.

The Contractor may not commence construction activities before adequate consultation with the traffic department personnel has taken place and the traffic plan has been approved by the Employer's Agent. The traffic plans and traffic-control measures shall be in accordance with the requirements of the South African Road Traffic Signs Manual.

### **3.1.7 NATURE OF THE GROUND AND SUBSOIL CONDITIONS**

A geotechnical investigation has been carried out and variable conditions can be expected throughout the site. The Materials Investigation Report is included in C3.4. Investigations do indicate that there is a high water table in the area of less than a 1m, especially within the cemetery area.

### **3.1.8 PROGRAMME, METHOD OF WORKS AND ACCOMMODATION OF TRAFFIC**

It is critical that the works shall be programmed and executed in such a way as to cause minimum disruption to the public including residents, businesses and other parties requiring access to the areas in which construction is taking place.

It is essential that the construction programme be determined in consultation with the Employer's Agent to ensure that these obligations can be met. In special circumstances, where the Contractor must co-ordinate with service providers for the relocation of services, which would hinder programmed key dates, then the Contractor shall, with approval of the Employer's Agent, postpone the completion of the affected works to the next phased completion date. In particular, the upgrading of the bulk watermain and foul sewer services will require the Contractor to install new bulk services, while keeping the existing bulk services functional and then quickly carry out the connections, so that the existing mains can be decommissioned, removed or abandoned. All of this must be carried out while two-way traffic on the roadways is maintained.

It is of paramount importance that during the AM peak, commuters have 2 lanes available towards the western direction (towards Cape Town City Bowl) and one lane in the opposite direction. During the afternoon, 2 lanes must be available in the eastern direction (towards Bellville) and one lane in the opposite direction.

The Contractor shall allow within the construction programme adequate time for application and renewal of wayleaves throughout the contract period. The Contractor shall allow in his programme for at least 6 (six) weeks for the initial application and receipt of wayleaves. In any area of the works where the Contractor has the necessary wayleaves, the construction may commence. It is not necessary to have every single wayleave in place in the entire contract before the start of the construction.

The Contractor shall allow adequate time for the verification of all services (position, type, diameter, depth and cover) and for liaising with service providers to determine relocation / mitigation measures for affected services in order to ensure that the timelines identified within the approved programme are met. Refer to 3.1.11.1, COTO Chapter 2 and all other relevant specifications.

The Contractor shall deliver notices to affected residents and businesses within at least 100m of the relevant works, a minimum of one week prior to conducting service verification activities.

The Tenderer's attention is drawn to the fact that a number of factors will affect the programming of and method of carrying out the works. The more important of these are:

- (1) Allow for the six week start-up period to obtain the Construction Permit not included as part of the Commencement of the Works.
- (2) Commencement of the Works (construction period) starts once all documentation has been received, inclusive of the 14 days to obtain further documentation.
- (3) Time allowances to be made for the ordering of special items such as the steel DN750 pipe and specials.
- (4) Notification required by service organisations/providers.
- (5) Any special sequence in which work must be carried out, including proving of services, relocation of services and constructing the works within the indicated phases 1-2, indicated on dwg 704-9001 to 9002.
- (6) If delays are anticipated with service relocations the contractor should make time allowance in his programme, based on the information at hand at the time.
- (7) Pedestrian and vehicle access to business/private property is to be maintained under the various phases (1-2, see dwg 704-9001).
- (8) Traffic restrictions - Number of minimum existing lanes maintained at all times or otherwise specified. Work outside peak hours (AM 05:30-09:00, PM15:00-18:00) where required.
- (9) Flood/rainfall conditions that will affect the work rate of the Contractor.

Those known, existing services in the area of the works have been depicted on the contract drawings. It is evident, however, that the status of existing service records as far as can be ascertained might not reflect the actual situation in the field. As such, due allowance has been made in the Bill of Quantities for the proving of services where directed by the Employer's Agent.

### **3.1.9 Requirements for Accommodation of Traffic**

#### **3.1.9.1 General**

Accommodation of traffic, where applicable, shall comply with SANS 1921-2: 2004: Construction and Management Requirements for Works Contracts, Part 2: Accommodation of Traffic on Public Roads occupied by the Contractor. The Contractor shall obtain this specification from Standards South Africa when accommodation of traffic will be involved on any part of the construction works.

Clause 4.10.4 of SANS 1921-2: 2004 shall be replaced with the following:

"Road signs and markings shall comply with the requirements of "The South African Road Traffic Signs Manual - Volume 2: Roadworks Signing".

#### **3.1.9.2 Basic Requirements**

The travelling public shall have the right of way on public roads, and the Contractor shall make use of approved methods to control the movement of his equipment and vehicles so as not to constitute a hazard on the road.

The Contractor shall ensure that all road signs, barricades, delineators, flagmen and speed controls are effective and that courtesy is extended to the public at all times.

Failure to maintain road signs, warning signs or flicker lights, etc, in a good condition shall constitute ample reason for the Employer's Agent to suspend the work until the road signs, etc, have been repaired to his satisfaction.

The Contractor may not commence constructional activities affecting existing roads before adequate provision has been made to accommodate traffic in accordance with the requirements of this document and the South African Road Traffic Signs Manual.

The Contractor shall construct and maintain all temporary drainage works necessary for temporary deviations. The Contractor shall ensure that the existing property accesses are maintained at all times. Where necessary the Contractor shall make allowance in the rates for completing the work required to the accesses out of normal hours.

### **3.1.9.3 Traffic Safety Officer**

The Contractor shall nominate a suitable member of his staff as traffic safety officer to be responsible for the arrangement and maintenance of all the measures for the accommodation of traffic for the duration of the project. Duties of the traffic safety officer shall be in compliance with the Occupational Health and Safety Act 1993 and the Construction Regulations 2014.

### **3.1.9.4 Payment**

The Contractor's tendered rates for the relevant items in the Bill of Quantities shall include full compensation for all possible additional costs which may arise from this, and no claims for extra payment due to inconvenience because of the modus operandi will be considered.

### **3.1.9.5 Pedestrian movement**

The Contractor shall make provision for accommodating all pedestrian movements in the area of the works and access to all business premises along Voortrekker Road and adjacent roads/streets during the construction period. No businesses or private access shall be closed off during construction or otherwise.

Allowance shall be made in the relevant rates for any barricades and signs required.

### **3.1.9.6 Temporary Reinstatement**

Provided always that if in the course or for the purpose of the execution of the works or any part thereof any road or way shall have been broken up, then notwithstanding anything herein contained:

- (a) if the permanent reinstatement of such road or way is to be carried out by the appropriate authority or by some person other than the contractor (or any subcontractor to him), the contractor shall at his own cost and independently of any requirement of or notice from the Employer's Agent be responsible for the making good of any subsidence or shrinkage or other defect, imperfection or fault in the temporary reinstatement of such road or way, and for the execution of any necessary repair or amendment thereof from whatever cause the necessity arises, until the end of the period of maintenance in respect of works beneath such road or way until the authority or other person as aforesaid shall have taken possession of the site for the purpose of carrying out permanent reinstatement (whichever is the earlier), and shall indemnify and save harmless that Council against and from any damage or injury to the Council or to third parties arising out of or in consequence of any neglect or failure of the Contractor to comply with the foregoing obligations or any of them and against and from all claims, demands, proceedings, damages, costs, charges and expenses whatsoever in respect thereof or in relation thereto.
- (b) where the authority or person as aforesaid shall take possession of the site as aforesaid in sections or lengths, the responsibility of the contractor under paragraph (a) of this sub-clause shall cease in regard to any such section or length at the time possession thereof is so taken, but shall during the continuance of the said period of maintenance continue in regard to any length of which possession has not been taken and the indemnity given by the contractor under the said paragraph shall be construed and have effect accordingly.



### 3.1.10 SITE FACILITIES AVAILABLE

#### 3.1.10.1 Location of Contractor's Camp Site

The Contractor will be required to make his own arrangements for suitable site camp(s) and provision of services, including obtaining all necessary statutory approvals for its intended use.

There are various publicly owned vacant properties that can be possibly used for site camps or hoarding areas. See below figure for locations. We have made allowance an under item PC 1.3.3 (f) for rental of private, if required.



Figure 2: Proposed Site Camp Locations

The Contractor shall make his own arrangements for water, electricity, foul sewer, refuse removal, or any other service that he may require. No unauthorised connections to existing services may be made. The cost of water, electricity and any other service shall be included in the rates for the relevant items.

#### 3.1.11 SITE FACILITIES REQUIRED

The Contractor shall provide, operate, maintain, service and upon completion, remove the site facilities required by themselves. Provision must also be made for suitable office facilities for temporary use by the Employer's Agent and for holding site meetings as measured in the Bill of Quantities. Facilities for the Employer's Agent shall be established and completed within two weeks of commencement of work.

#### 3.1.12 FEATURES REQUIRING SPECIAL ATTENTION

##### 3.1.12.1 Existing Services

Various types of services exist within the boundaries of the site. It will be necessary for the Contractor to arrange for the removal, relocation or protection of some existing services. Should any work become necessary, then all work shall be done strictly in accordance with the requirements of the relevant service owner and in accordance with the requirements of these Works Specifications.

Details of existing services are shown on the drawings and standard procedures for the protection and/or relocation of such services are outlined in COTO Chapter 2.

Proving of all services shall be completed at least one month in advance of the actual programmed date for commencing work in the area. Proving services process entails the following, but not limited to:

- Locate existing services / cables by hand excavation, being informed by the Drawings, Wayleaves and local area service provider



- Confirm type, size, class of service / cable with responsible local area service provider (municipal or private), having met on site with the responsible service provider persons
- Confirm route direction of services / cables or supply origin and destination point for each service / cable in excavation trench.
- Confirm availability of materials and lead time for the replacement, deviation of the affected services / cables
- Ordering new materials for services / cables relocation through commercial sources or municipal sources. The Contractor must be aware that any length of new electrical cable required for relocation (LV/MV) will have a lead time of at least 8 weeks before receiving the order on site.

The Contractor will make allowance in his tender programme for ordering of cables.

- Receipt of new materials for services / cables relocation through commercial sources or municipal sources

The position of these services located must be co-ordinated and levelled by the Contractor, and the information given in writing to the Employer's Agent's representative.

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

#### **3.1.12.2 Construction in confined areas**

It will be necessary for the Contractor to work within confined and restricted areas. No specific payment items have been provided where this is applicable, other than the provision of payment items to allow for special compaction requirements in close proximity to existing services. The tendered rates shall include for all additional costs incurred during the construction of earthworks, layerworks, asphalt surfacing, paving, building works, structural works and services in confined and restricted areas.

#### **3.1.12.3 Water for construction purposes**

The Contractor shall make adequate provision in his tender for all negotiations and procurement of water for construction activities and all related costs will be deemed to be included in his tendered rates.

#### **3.1.12.4 Weatherproof Protection for Workers**

All staff required to continue working during rain shall be provided with oilskins and rubber knee boots, or other approved protective clothing and footwear. All protective clothing and safety equipment shall comply with the requirements of the Health and Safety Specification.

#### **3.1.12.5 Night Work and Work on Public Holidays**

Work outside the normal working hours, or on public holidays, will not normally be permitted. Under exceptional circumstances, where the Contractor requires staff to work night shifts or on public holidays, he shall make the necessary arrangements with the Employer's Agent and obtain written approval from the Employer's Agent. Typical activities, which may require the Contractor to work at night, could include the installation/connection of bulk water and foul sewer services outside peak flow hours; the installation of bulk water and foul sewer services across roadways and in intersections; and half-width construction in intersections, where no alternative routes are available for motorists and the carrying out of night work will prevent excessive traffic disruption. The Contractor shall bear the additional costs of his overtime work, except where written approval has been obtained from the Employers Agent. Additional payment will be made only under items in Section C1.3.

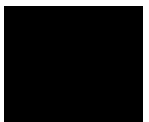
#### **3.1.12.6 Environmental Requirements**

The Contractor shall take every precaution to avoid damage to vegetation within that area of the road reserve which falls outside the designated work area, as indicated on the drawings. Any damage caused is to be repaired at the Contractor's expense. The Tenderer is referred to Specification E under C3.5 Management.

Storage and stockpiling of materials within the road reserve will not be permitted without the written consent of the Employer's Agent. Excess material from excavations as well as waste material shall be spoiled off site at suitable approved locations.

#### **3.1.12.7 Concrete**

All concrete used on this contract, including kerb bedding and backing, cast in-situ kerb transitions and other minor works, shall be properly batched and mixed using an approved mechanical concrete mixer, potable water and clean materials.

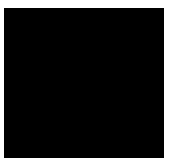


Concrete mixed by hand, concrete mixed using a backhoe-loader-tractor ("digger-loader"), or concrete mixed by any other non-approved methods, will not be permitted. All mixing of concrete and mortar shall be done in approved areas with adequate protection provided to prevent contamination of existing surfaces.

The Employer's Agent reserves the right to take test cubes of any concrete used on the contract. The Contractor shall remove any non-conforming concrete at his own cost and shall replace it with concrete conforming to the specifications.

#### **3.1.12.8 Overhaul**

Overhaul shall not apply to any excavated or imported material on this contract, unless otherwise specified. All material will be deemed to be within the free-haul distance and thus the provisions of any references to overhaul will not apply.



## C3.2 Engineering / Design

### CONTENTS

- 3.2.1 DESIGN SERVICES AND ACTIVITY MATRIX
- 3.2.2 EMPLOYER'S DESIGN
- 3.2.3 DESIGN BRIEF
- 3.2.4 DRAWINGS
- 3.2.5 DESIGN PROCEDURES

#### 3.2.1 DESIGN SERVICES AND ACTIVITY MATRIX

Not Applicable.

#### 3.2.2 EMPLOYER'S DESIGN

The design responsibility shall be as follows:

|                                   |                                                              |
|-----------------------------------|--------------------------------------------------------------|
| All permanent work:               | Employer/Employer's Agent                                    |
| Temporary work:                   | Contractor                                                   |
| Preparation of as-built drawings: | Employer's Agent with input as requested from the Contractor |

All temporary works shall be designed by a professional registered engineer, and remain the responsibility of, the Contractor. The Contractor shall appoint suitably qualified and experienced designers to carry out such work and shall indemnify and hold indemnified the Employer's Agent and the Employer against any claims and actions that may arise out of the temporary works. The Contractor shall be responsible for full compliance with all the relevant codes of practice, safety, professional procedures, checking, site approval and requirements of the construction regulations with regards to temporary works. Temporary works are all works other than the permanent works as indicated on the drawings.

Procedure for temporary works design:

- It will be the Contractor's responsibility to make provision for a Registered Professional Engineer to approve all temporary works design(s).
- The Contractor shall submit any temporary works design to the Employer's Agent within 14 days after the contract award as stated in the Works Project.

#### 3.2.3 DESIGN BRIEF

Not Applicable.

#### 3.2.4 DRAWINGS

The following drawings are applicable to the contract and are issued electronically on a memory flash disk with this tender document and forms part of the Contract Documents as **Volume 4**.

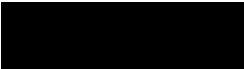
The Works shall be constructed in accordance with the issued design drawings.

The Contractor shall be responsible for the preparation of "as-built" drawings and shall ensure that accurate as-built records are kept during the contract.

The Contractor shall keep one complete set of drawings available on site for mark-up purposes. This set of drawings shall be regularly marked up in red ink by the Contractor to reflect the latest as-built status. Immediately after completion of each part of the Works, the completed marked-up drawing shall be handed over to the Employer's Agent, who will acknowledge receipt and arrange with the Designer for the completion of the as-built drawing.

| Document No. | Title                                                     |
|--------------|-----------------------------------------------------------|
|              | 5th Avenue / Voortrekker Road Traffic Signal Design       |
|              | 10th Avenue / Voortrekker Road Traffic Signal Design      |
|              | 12th Avenue / Voortrekker Road Traffic Signal Design      |
|              | Cemetery Wall Site Plan Sheet 1 of 2                      |
|              | Cemetery Wall Site Plan Sheet 2 of 2                      |
|              | Cemetery Wall Typical Elevations, Sections                |
|              | Cemetery Wall Cross Sections                              |
|              | Cemetery Wall Long section 1 of 8                         |
|              | Cemetery Wall Long section 2 of 8                         |
|              | Cemetery Wall Long section 3 of 8                         |
|              | Cemetery Wall Long section 4 of 8                         |
|              | Cemetery Wall Long section 5 of 8                         |
|              | Cemetery Wall Long section 6 of 8                         |
|              | Cemetery Wall Long section 7 of 8                         |
|              | Cemetery Wall Long section 8 of 8                         |
|              | Box Chambers Site Plan: Sheet 1 of 2                      |
|              | Box Chambers Site Plan: Sheet 2 of 2                      |
|              | Box Chambers Concrete Details: Sheet 1 of 2               |
|              | Box Chambers Concrete Details: Sheet 2 of 2               |
|              | Existing & Proposed Water Layout: Sheet 1 of 2            |
|              | Existing & Proposed Water Layout: Sheet 2 of 2            |
|              | Proposed Water Schematic Details                          |
|              | Proposed Water Details: Sheet 1 of 5                      |
|              | Proposed Water Details: Sheet 2 of 5                      |
|              | Proposed Water Details: Sheet 3 of 5                      |
|              | Proposed Water Details: Sheet 4 of 5                      |
|              | Proposed Water Details: Sheet 5 of 5                      |
|              | Long section 1 -Proposed DN750mm Water Main: Sheet 1 of 2 |
|              | Long section 1 -Proposed DN750mm Water Main: Sheet 2 of 2 |
|              | General Layout: Sheet 1 of 2                              |
|              | General Layout: Sheet 2 of 2                              |
|              | Typical Cross Sections: Sheet 1 of 11                     |
|              | Typical Cross Sections: Sheet 2 of 11                     |
|              | Typical Cross Sections: Sheet 3 of 11                     |
|              | Typical Cross Sections: Sheet 4 of 11                     |
|              | Typical Cross Sections: Sheet 5 of 11                     |
|              | Typical Cross Sections: Sheet 6 of 11                     |
|              | Typical Cross Sections: Sheet 7 of 11                     |
|              | Typical Cross Sections: Sheet 8 of 11                     |
|              | Typical Cross Sections: Sheet 9 of 11                     |
|              | Typical Cross Sections: Sheet 10 of 11                    |
|              | Typical Cross Sections: Sheet 11 of 11                    |
|              | Setting Out Layout: Sheet 1 of 2                          |
|              |                                                           |

| Document No. | Title                                                                 |
|--------------|-----------------------------------------------------------------------|
|              | Setting Out Layout: Sheet 2 of 2                                      |
|              | Existing & Proposed Sewer Layout: Sheet 1 of 2                        |
|              | Existing & Proposed Sewer Layout: Sheet 2 of 2                        |
|              | Existing & Proposed Stormwater Layout: Sheet 1 of 2                   |
|              | Existing & Proposed Stormwater Layout: Sheet 2 of 2                   |
|              | Existing & Proposed Telecommunications and Ducts Layout: Sheet 1 of 2 |
|              | Existing & Proposed Telecommunications and Ducts Layout: Sheet 2 of 2 |
|              | Street Lighting: Sheet 1 of 3                                         |
|              | Street Lighting: Sheet 2 of 3                                         |
|              | Street Lighting: Sheet 3 of 3                                         |
|              | Electrical Cable Relocation: Sheet 1 of 2                             |
|              | Electrical Cable Relocation: Sheet 2 of 2                             |
|              | Road Longitudinal Sections: Sheet 1 of 4                              |
|              | Road Longitudinal Sections: Sheet 2 of 4                              |
|              | Road Longitudinal Sections: Sheet 3 of 4                              |
|              | Road Longitudinal Sections: Sheet 4 of 4                              |
|              | Stormwater Long sections: Sheet 1 of 4                                |
|              | Stormwater Long sections: Sheet 2 of 4                                |
|              | Stormwater Long sections: Sheet 3 of 4                                |
|              | Stormwater Long sections: Sheet 4 of 4                                |
|              | 4th Avenue Intersection Grading: Sheet 1 of 1                         |
|              | 5th Avenue Intersection Grading: Sheet 1 of 1                         |
|              | 10th Avenue Intersection Grading: Sheet 1 of 1                        |
|              | Proposed Road Details: Sheet 1 of 5                                   |
|              | Proposed Road Details: Sheet 2 of 5                                   |
|              | Proposed Road Details: Sheet 3 of 5                                   |
|              | Proposed Road Details: Sheet 4 of 5                                   |
|              | Proposed Road Details: Sheet 5 of 5                                   |
|              | Proposed Sewer Details                                                |
|              | Proposed Stormwater Details: Sheet 1 of 3                             |
|              | Proposed Stormwater Details: Sheet 2 of 3                             |
|              | Proposed Stormwater Details: Sheet 3 of 3                             |
|              | Proposed Telecommunications and Duct Details                          |
|              | Generated Cross Sections: Sheet 1 of 6                                |
|              | Generated Cross Sections: Sheet 2 of 6                                |
|              | Generated Cross Sections: Sheet 3 of 6                                |
|              | Generated Cross Sections: Sheet 4 of 6                                |
|              | Generated Cross Sections: Sheet 5 of 6                                |
|              | Generated Cross Sections: Sheet 6 of 6                                |
|              | Construction Phasing Layout: Sheet 1 of 3                             |
|              | Construction Phasing Layout - Phase 1: Sheet 2 of 3                   |





### **3.2.5 DESIGN PROCEDURES**

Not Applicable.



## C3.3 Procurement

### CONTENTS

- 3.3.1 PREFERENTIAL PROCUREMENT
- 3.3.2 SUB-CONTRACTING PROCEDURES

#### 3.3.1. PREFERENTIAL PROCUREMENT

The Works shall be executed in accordance with the conditions associated with the granting of preferences detailed in the **Preference Schedule** where preferences are granted in respect of the specific goals

Financial penalties, as described in the **Preference Schedule**, shall be applied in the event that the Contractor is found to have breached and of the conditions contained in the **Preference Schedule** (unless proven to be beyond the control of the Contractor).

Notwithstanding the application of penalties, the Contractor's attention is drawn to other sanctions that may be applied by the Employer (listed in the **Preference Schedule**) with due consideration to the circumstances.

#### 3.3.2. SUB-CONTRACTING PROCEDURES

##### 3.3.2.1 Monitoring the use of sub-contractors

Notwithstanding the restriction on sub-contracting as described on the **Preference Schedule**, it is recognised that sub-contracting is an integral part of construction, which the conditions of contract make provision for.

In order, however, to comply with the requirements of the **Preference Schedule**, the Contractor shall submit to the Employer's Agent, on a monthly basis, a **B-BBEE Sub-contract Expenditure Report**. The format of this report is provided in Annex 2 attached.

The Contractor shall submit to the Employer's Agent documentary evidence in accordance with the applicable codes of good practise, , of the B-BBEE status level of every sub-contractor employed by the Contractor. Until such time as documentary evidence as described above has been submitted to the Employer's Agent, a sub-contractor shall be deemed to be a non-compliant contributor.

The Contractor shall furthermore, on the written request of the Employer's Agent, provide documentary evidence showing the value of work sub-contracted to any or all of the sub-contractors employed by the Contractor.



### 3.3.2.2 Procedure for the selection of sub-contractors/suppliers

Where monetary allowances for provisional sums or prime costs items have been provided in the Bills of Quantities, and where the work or items to which the allowances relate are to be executed/supplied by sub-contractors/suppliers, then the following selection process shall be followed in respect of the required sub-contractors/suppliers:

Where the monetary allowance is less than or equal to R300 000, the Contractor shall invite three quotations from suitably qualified sub-contractors/suppliers for the required work or items. The selection of the three sub-contractors/suppliers shall be in consultation with, and to the approval of the Employer's Agent. The evaluation of the quotations received must include a preference points system as described in C.3.11 of the Tender Data.

Where the monetary allowance is in excess of R300 000, an open competitive tender process shall be followed in respect of the selection of a sub-contractor/supplier for the required work or items. In such circumstances, tender documentation will be prepared by the Employer's Agent in consultation with and to the approval of the Contractor, invitations to tender will be advertised in the media by the Employer's Agent on behalf of the Contractor, and a sub-contractor/supplier will be selected from the responses received, by the Contractor and Employer's Agent in consultation. The evaluation of the offers received must include a preference points system as described in C.3.11 of the Tender Data. The Contractor must satisfy itself that the selected sub-contractor/supplier can meet the requirements of the sub-contract /supply agreement and may, on reasonable grounds, elect not to employ a particular sub-contractor/supplier.

In both instances above (less than or equal to R300 000 or in excess of R300 000), the contractual relationship between the Contractor and sub-contractor/supplier shall be as described in the conditions of contract.



## C3.4 Construction

### CONTENTS

- 3.4.1 TRADE NAMES OR PROPRIETARY PRODUCTS
- 3.4.2 APPLICABLE STANDARDISED SPECIFICATIONS
- 3.4.3 PARTICULAR / PROJECT SPECIFIC SPECIFICATIONS
- 3.4.4 WAYLEAVES, PERMISSIONS AND PERMITS
- 3.4.5 LOCAL PRODUCTION AND CONTENT
- 3.4.6 EMPLOYMENT OF SECURITY PERSONNEL
- 3.4.7 UNIVERSAL ACCESS

#### 3.4.1. TRADE NAMES OR PROPRIETARY PRODUCTS

Bid specifications may not make any reference to any particular trade mark, name, patent, design, type, specific origin or producer, unless there is no other sufficiently precise or intelligible way of describing the characteristics of the work, in which case such reference must be accompanied by the words "or equivalent".

**TENDERERS MUST NOTE THAT WHEREVER THIS DOCUMENT REFERS TO ANY PARTICULAR TRADE MARK, NAME, PATENT, DESIGN, TYPE, SPECIFIC ORIGIN OR PRODUCER, SUCH REFERENCE SHALL BE DEEMED TO BE ACCOMPANIED BY THE WORDS 'OR EQUIVALENT'**

#### 3.4.2 APPLICABLE STANDARDISED SPECIFICATIONS

The specification on which this contract is based are the Standard Specifications for Road and Bridge Works for South African Road Authorities prepared by the Committee of Transport Authorities (hereinafter referred to as the COTO spec) for the sections listed below. In addition the latest issues of the 'SANS 1200 specification for civil engineering construction' listed below shall apply:

|               |                                                   |
|---------------|---------------------------------------------------|
| COTO Ch.1:    | General                                           |
| COTO Ch.2:    | Services                                          |
| COTO Ch.3:    | Drainage                                          |
| COTO Ch.4:    | Earthworks Pavement Layers Materials              |
| COTO Ch.5:    | Earthworks & Pavement Layers Construction         |
| COTO Ch.9:    | Asphalt Layers                                    |
| COTO Ch.11:   | Ancillary Roadworks                               |
| COTO Ch.12:   | Geotechnical                                      |
| COTO Ch.13:   | Structures                                        |
| COTO Ch.14:   | Repairs of Structures                             |
| COTO Ch.20:   | Quality Assurance                                 |
| SANS 1200 C:  | Site Clearance                                    |
| SANS 1200 DB: | Earthworks (pipe trenches)                        |
| SANS 1200 G:  | Concrete (structural), Formwork and Reinforcement |
| SANS 1200 L:  | Medium Pressure Pipelines                         |
| SANS 1200 LB: | Bedding (Pipes)                                   |
| SANS 1200 LC: | Cable ducts                                       |
| SANS 1200 LE: | Stormwater drainage                               |
| SANS 1200 MM  | Ancillary Roadworks                               |

It should be noted that the Standard Methods of Testing Road Construction Materials: Technical Methods for Highways (TMH1), 1979 has been replaced by the South African National Standards (SANS) 3000 series.

### 3.4.3 PARTICULAR / PROJECT SPECIFIC SPECIFICATIONS

Amendments to the standard specifications are included in this Project Specifications

- (i) The project specifications form an integral part of the contract documents and supplement the standard specifications.
- (ii) In the event of any discrepancy between the project specifications and a part of the standard specifications, the schedule of quantities, or the drawings, the project specifications shall take precedence.
- (iii) The standard specifications, which form part of this contract, have been written to cover all phases of work normally required for road contracts, and they may therefore cover items not applicable to this particular contract.

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

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

The following sections of the standard specifications have been amended indicated below.

#### COTO ITEMS

|             |                                           |
|-------------|-------------------------------------------|
| COTO Ch.1:  | General                                   |
| COTO Ch.2:  | Services                                  |
| COTO Ch.3:  | Drainage                                  |
| COTO Ch.4:  | Earthworks Pavement Layers Materials      |
| COTO Ch.5:  | Earthworks & Pavement Layers Construction |
| COTO Ch.9:  | Asphalt Layers                            |
| COTO Ch.11: | Ancillary Roadworks                       |
| COTO Ch.12: | Geotechnical                              |
| COTO Ch.13: | Structures                                |
| COTO Ch.14: | Repairs of Structures                     |
| COTO Ch.20: | Quality Assurance                         |

#### SANS1200 ITEMS

|               |                            |
|---------------|----------------------------|
| SANS 1200 C:  | SITE CLEARANCE             |
| SANS 1200 DB: | EARTHWORKS (PIPE TRENCHES) |
| SANS 1200 L:  | MEDIUM PRESSURE PIPELINES  |
| SANS 1200 LB: | BEDDING (PIPES)            |
| SANS 1200 LC: | CABLE DUCTS                |
| SANS 1200 LE: | STORMWATER DRAINAGE        |

The project / particular specifications (PS) are located after section 3.4.7.

#### **3.4.4 WAYLEAVES, PERMISSIONS AND PERMITS**

The Contractor shall be responsible for obtaining all of the necessary wayleaves, permissions or permits applicable to working near any existing services or other infrastructure on Site, and shall ensure that any wayleaves, permissions or permits obtained by the Employer's Agent prior to the award of the contract are transferred into the Contractor's name.

The Contractor shall abide by any conditions imposed by such wayleaves, permissions or permits.

The Contractor shall ensure that all wayleaves, permissions and permits are kept on site and are available for inspection by the relevant service authorities on demand.

The Contractor shall also ensure that any wayleaves in respect of electricity services are renewed timeously every three months.

#### **3.4.6 EMPLOYMENT OF SECURITY PERSONNEL**

All security staff employed by the contractor on behalf of the CCT or at any CCT property must be registered with Private Security Industry Regulatory Authority (PSiRA). Proof of such registration must be made available to the employer's agent upon request.

#### **3.4.7 UNIVERSAL ACCESS**

In pursuit of becoming a fully accessible city, the City of Cape Town expects all Consultants and Service Providers to design and construct to SANS Standards for accessible Design, and any relevant City of Cape Town documents as may be relevant, and to exhibit a commitment to employing Universal Design Principles in their design, construction, service and product delivery of construction projects. This applies to all projects whether new, temporary, upgrades or rehabilitation works.

The contractor will engage with project representatives and the CCT's Universal Accessibility Department on how Universal Design Principles will enhance accessibility, within this project, that meets a variety of needs and creates a city that is accessible to everyone.



## **COTO CHAPTER 1: GENERAL**

### **SECTION 1.1: GENERAL PREAMBLE**

#### **PART A: SPECIFICATIONS**

##### **A1.1.2 DEFINITIONS**

*In subclause A1.1.2, "Conditions of Contract", replace the text after the first paragraph with the following:*

"The General Conditions of Contract for Construction Works (3rd Edition) 2015 (GCC 2015) published by the South African Institute of Civil Engineering, together with the special conditions of contract forming part of the contract."

*In subclause A1.1.2, "Employer", replace the wording with the following:*

"The Employer and employer is the same persona, and is defined in C1.1.1.15 of the Contract Data, and clause 1.1.1.15 of the general conditions of contract."

*In subclause A1.1.2, "Engineer", replace the wording with the following:*

The Employer's Agent, employer's agent and Engineer or engineer is the same persona, and is defined in C1.1.1.16 of the Contract Data, and clause 1.1.1.16 of the general conditions of contract.

*In subclause A1.1.2, "Pricing schedule", replace the wording with the following:*

The terms "Pricing schedule", "Schedule of Quantities", (used throughout the standard specifications) and "Bill of Quantities", (used in all other documents forming part of this contract), are synonymous

*In subclause A1.1.2, "Standard Specification", replace the wording with the following:*

The standard specifications for road and bridge works prescribed by the employer and forming part of the contract

*In subclause A1.1.2, "Project Specification", replace the wording with the following:*

Any specifications appearing under this heading and forming part of the contract, and containing any amendments to, omissions from or additions to the standard specifications that may be required in connection with a specific project.

*In subclause A1.1.2, "Project Specification", replace the wording with the following:*

Any specifications appearing under this heading and forming part of the contract, and containing any amendments to, omissions from or additions to the standard specifications that may be required in connection with a specific project.

*In subclause A1.1.2, add the following definition:*

Maximum Dry Density: In the specifications and schedule of quantities, the abbreviation MDD means Maximum Dry Density. Wherever Modified AASHTO density is specified it shall be taken to mean Maximum Dry Density.

##### **A1.3.3 GENERAL**

###### **A1.3.3.1 Construction camps**

*Add the following after the first paragraph of subclause A1.3.3.1:*

"No specific land or existing buildings have been made available on site by the Employer for the establishment of the Contractor's camp site.

The Contractor shall make his own arrangements concerning establishment of the camp site, supply of water, electrical power, and all other services. No direct payment will be made for the provision of water, electrical and other services and the cost thereof shall be deemed to be included in the rates and amounts tendered for the various items of work for which these services are required."

###### **A1.3.3.4 Contractor's own security arrangements**

*Add the following after the first paragraph of subclause A1.3.3.4*

The Contractor shall take every precaution to ensure safety and security at the location of the site offices and on the site of the works as described in 3.4.4 and 3.4.6.3. The Contractor shall be responsible for the safety and security of his personnel, materials on site and the works in general at all times, including existing traffic signals and street or pedestrian lighting. The Contractor shall, therefore, acquaint himself with the current situation in the area with regard to safety and security (liaising with the local police as necessary) and shall provide all security measures, including the employment of accredited security services, as deemed necessary to comply with the requirements under this clause of the Contract.

A pay Item is included in the Schedule of Quantities for the provision of security measures such as watching, guarding and any additional security services which the Contractor may require at his camp site and at all work sites or locations along the Site of the Works."

*Add the following new subclause:*

#### **A1.3.3.5 Legal and contractual requirements and responsibilities to the public**

"There has been recent legislation promulgated by Government that imposes mutual obligations on the Employer and Contractor in the performance of their duties to society and to the built and natural environment. To assist the Contractor in understanding and assessing his obligations, and thus to make allowances for the cost of compliance with this legislation, the following additional specifications are included in the project specifications:

- (i) Part E of C3.5 Management contains the Environmental Management Specification for this project. Its provisions regulate the Contractor's construction methods to ensure responsible conduct and treatment of the environment relevant to the project. A separate payment mechanism has been made available for the Contractor to allow for his compliance with relevant environmental legislation. Non-compliance with these provisions will lead to the imposition of penalties.
- (ii) C3.5 Management contains provisions that regulate the Contractor's construction methods for compliance with Government's initiatives towards the use of local labour in construction, black economic empowerment and the use of targeted enterprises and labour (local resources). Separate pay items for labour obligations and training are included in these provisions. Non-compliance with these provisions will lead to the imposition of penalties.
- (iii) Part H of C3.5 Management contains the specification that regulates the Contractor's construction methods so far as to ensure health and safety of his employees and of the public. A separate pay item is included in these provisions to allow the Contractor to make provision for the cost of health and safety measures during the construction process."

*Add the following new subclause:*

#### **A1.3.3.6 Services**

*The Contractor shall at his own expense, make the necessary connections to any utility services required by him for the execution of the works.*

*Add the following new subclause:*

#### **A1.3.3.7 Sanitation**

The Contractor shall provide at each work site at least one portable chemical latrine for use by personnel on site at a rate of 1 latrine per 15 personnel.

*Add the following new subclause:*

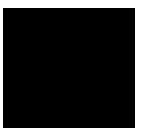
No separate payment will be made for any costs incurred in this regard and the Contractor shall allow for any costs in his tendered rates for establishment.

*Add the following new subclause:*

#### **A1.3.3.8 Environmental Protection**

Construction will take place within the existing road reserve and every precaution must be taken to protect the established vegetation and roadside facilities. It is therefore essential that the Employer's Agent be continually consulted throughout the contract period to ensure that environmental considerations are satisfied.

Failure to show adequate consideration for the environmental aspects of this contract will be sufficient reason for the Employer's Agent to have the Contractor's representative or any other Contractor's employee(s) removed from the site in terms of Clause 4.11.2 (GCC 2015) of the General Conditions of Contract.



The following conditions have been imposed and shall be strictly complied with:

- (i) Personnel and plant shall not enter property beyond the road reserve boundary irrespective of whether the boundaries are fenced off or not.

The Contractor shall, to the satisfaction of the Employer's Agent, take every necessary precaution to prevent the contamination of any watercourses.

The Contractor shall plan his activities so that materials, in so far as is possible, can be transported direct to and placed at the point where they are to be used. However, where utilising materials in this manner is impractical, it shall be temporarily stockpiled for later loading and transportation to where it will be used.

Stockpiling areas shall be indicated to and approved by the Employer's Agent. Before any stockpiling of material may be done, the site shall be cleaned, and all loose stones or any plant or other material which may cause pollution shall be removed. After the stockpiled material has been removed, the site shall be reinstated as closely as possible to its original condition.

The Contractor shall be responsible for the establishment of a refuse control system for the collection and removal of refuse from the camp site and working areas.

The Contractor shall ensure that waste and surplus food, food packaging plastic and organic waste are not deposited by his employees anywhere on the site except in refuse bins for removal. If his employees are to eat elsewhere on site than in the camp site, the Contractor shall designate restricted places for eating in his working areas, shall provide adequate refuse containers in all these places and shall remove the refuse and clean up any remaining food containers immediately after mealtimes.

The Contractor has no right to the trees and shrubs on the site.

No bituminous material or waste material shall be dumped within the road reserve, even if only as a temporary measure. Provision shall be made to remove such excess material directly off the site to spoil areas to be provided by the Contractor. Where bituminous material is milled for re- use in pavement layers and requires temporary stockpiling, approval for the location of the stockpile shall be obtained in advance from the Employer's Agent.

Before opening stages or sections of the works to traffic the Contractor shall remove all rubble and waste materials from the road verges to the satisfaction of the Employer's Agent and Environmental Agent.

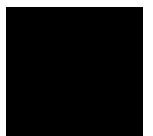
- (ii) The Contractor shall control dust and prevent pollution as set out in 3.4.6.4.2.

Failure or refusal on the part of the Contractor to take the necessary steps to comply with the environmental management specifications as stipulated in Part E, or as stipulated in 3.4.6.4.2 Pollution, or as required by statutory authorities, or ordered by the Employer's Agent or Environmental Agent, shall be sufficient cause for the Employer's Agent to deduct penalties as stipulated in Clause E6.1 of the environmental management specifications.

The management of existing sewage flows, during the installation and connection of new foul sewer mains and the removal or abandoning of existing foul sewer mains, will require pumping between manholes or into road tankers. No spillage shall be permitted into the road reserve or into the stormwater disposal systems.

The failure of or refusal by the Contractor to control dust, or to take the necessary precautions to prevent a dust nuisance to adjacent properties, businesses, residences, schools, pedestrians and public traffic, as specified or instructed by the Employer's Agent, shall be sufficient cause to suspend the Works until the required prevention measures have been completed to the satisfaction of the Employer's Agent. It shall be noted that, during non-working and special non- working days or periods, the required dust control measures shall also be put in place at the Contractor's cost.

The penalties shall be applied by making deductions from payments made under Payment Item E8.01.



**SECTION 1.2: GENERAL REQUIREMENTS AND PROVISIONS**

**PART C: MEASUREMENT AND PAYMENT**

*Add the following sub-items to payment item C1.2.8.1:*

| <b>Item</b>       | <b>Unit</b> |
|-------------------|-------------|
| (g) Flagman ..... | hour (h)"   |

*Replace C1.2.8.1 (f) in the first paragraph with C1.2.8.1 (g):*



SECTION 1.3: CONTRACTOR'S SITE ESTABLISHMENT AND GENERAL OBLIGATIONS

PART C: MEASUREMENT AND PAYMENT

| Item | Unit |
|------|------|
|------|------|

C1.3.1 The Contractor's general obligations

Replace the second paragraph of item C1.3.1.3 with the following:

The tendered rate per month for subitem C1.3.1.3 represents full compensation for that part of the Contractor's general obligation which are mainly a function of construction time. The tendered rate for Subitem C1.3.1.3 will be paid monthly, pro rata for parts of a month, from the date following the completion and receipt by the Employer of all requirements of Clause 5.3.1, until the end of the period for completion of the works, plus any extension thereof as provided for in clause 5.12 of the general conditions of contract, provided that:

Add the following after the last point of item C1.3.1.3:

- Should any extension of time claim be approved after the successful achievement of all the conditions of Clause 5.3.1 and the actual commencement of the construction works, then any time-related cost compensation made after the due completion date shall be based on the rate as tendered under payment Item C1.3.1.3.

The rate per calendar day to be paid for all extension of time claims shall be the rate per month tendered for item C1.3.1.3, plus all the other payment items which are compensated for on a monthly basis (i.e. PC1.3.1.4 Security, E8.01 Environmental Management, H10.01 Health and Safety, Services and Traffic Safety Officer), multiplied by 12 to arrive at a total annual cost and then divided by 365 to obtain the rate per calendar day.

It shall be noted that if the Contractor chooses to work a 5-day working week, then any claim for a delay shall be based on only 5 working days per week and not the 6 working days available per week. Any extension of time claim award after the due completion date shall be based on the 6 working days available for work from Monday to Saturday, plus any allowance after the due completion date for non-working days and special non-working days. The delay shall be calculated based on actual working days lost and then converted to calendar days after the due completion date.

It shall be noted that in terms of Clause 1.1.1.14 of the Contract Data in C1.2, the time for achieving Practical Completion is **42 (Forty Two) months**, inclusive of non- working days referred to in Clause 5.8.1, but **exclusive** of special non-working days (Clause 5.8.1). The due completion date shall therefore be determined based on Clause 1.1.1.14, but the total measurement made under payment item C1.3.1.3 at the time the contract completion reaches the due completion date shall be 42 months, plus the number of special non-working days which fall within the stipulated contract period, plus any calendar days awarded by the Employer's Agent for delay claims.

The tenderer shall be deemed to have allowed in C1.3.1 for his fixed obligation costs and any other additional costs incurred in the period between the Commencement Date and Commencement of the Works."

Add the following new subitems after Subitem C1.3.1.3:

- "(c) Extra over Subitem C1.3.1.3 for working on Sundays and other special non-working days on the written instruction of the Employer's Agent..... day
- (d) Extra over Subitem C1.3.1.3 for working at night (including provision of lighting) on the written instruction of the Employer's Agent..... day

The unit of measurement for Subitem (a) shall be the working day, which shall be considered to be 10 hours between sunrise and sunset and parts of a working day shall be calculated pro rata.

The tendered rate per working day for Subitem (c) shall be paid extra over the applicable time-related pay item(s) and shall include full compensation for additional costs associated with



working on Sundays, or other special non-working days on the written instruction of the Employer's Agent.

The unit of measurement for Subitem (d) shall be the working day, which is effectively during the night, and shall be considered to be 10 hours between sunset and sunrise. Parts of a working night shall be calculated pro rata. Measurement shall be determined in working hours expended on night work on the written instruction of the Employer's Agent measured to the nearest half-hour, over and above the amount of night work programmed by the Contractor. The quantity shall be calculated from the actual duration of the activity performed during the night and converted to parts of a working day as agreed with the Employer's Agent.

The tendered rates shall include full compensation for all additional costs and other incidental costs (including the provision of additional traffic accommodation and lighting of the work area if deemed necessary) incurred by the Contractor for having to perform work at night instead of normal working hours on the written instruction of the Employer's Agent.

The tendered rates shall apply to all items of work, irrespective of the nature thereof, and shall be paid over and above the normal rates applicable to the work being done.

No payment shall be made for any additional night work under C1.3.1.3 unless a written instruction to perform such night work was issued by the Employer's Agent. The quantity allowed in the Bill of Quantities under C1.3.1.3 shall be for specific operations which must be carried out at night. These may include specific asphalt operations on the carriageways and intersections. The Contractor's own night work operations for operations such as delivery and tipping of materials shall not be measured under this item."

*Add the following note after the last paragraph of the payment item description for C1.3.1:*

"The various Schedules in the Bill of Quantities for Electrical Works, Traffic Signals, Streetlighting and Landscaping/Irrigation Works contain payment items for Preliminary and General, Health and Safety, security and other general items for use by the respective Subcontractors to price for their general obligations and site establishment. The preliminary and general and establishment items tendered under Section C1.3 shall be deemed to allow for all additional establishment and preliminary and general costs incurred by the Main Contractor for the appointment, management and accommodation of all subcontractors, which are required to complete the contract in accordance with the specifications."

| Item | Unit |
|------|------|
|------|------|

|                                                    |  |
|----------------------------------------------------|--|
| <b>C1.3.1 The Contractor's general obligations</b> |  |
|----------------------------------------------------|--|

*Delete subitem C1.3.1.3 and replace with the following:*

C1.3.1.3 Time related obligations:

- |                                                                                                                                                  |     |
|--------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| c) Extra over Subitem C1.3.1.3 for working on Sundays and other special non-working days on the written instruction of the Employer's Agent..... | day |
| d) Extra over Subitem C1.3.1.3 for working at night (including provision of lighting) on the written instruction of the Employer's Agent.....    | day |

*Add the following pay subitems:*

C1.3.3 Provisional Sums:

(a) Protection, relocation or reinstatement of existing services

- |                                       |                             |
|---------------------------------------|-----------------------------|
| (i) Dark Fibre Africa.....            | provisional sum (Prov. Sum) |
| (ii) Liquid Telecom (Neotel) .....    | provisional sum (Prov. Sum) |
| (iii) Telkom (Open Serve) .....       | provisional sum (Prov. Sum) |
| (iv) City of Cape Town IS&T .....     | provisional sum (Prov. Sum) |
| (v) City of Cape Town Electrical..... | provisional sum (Prov. Sum) |



- (b) Handling costs and profit in respect of Subitems PC1.3.3 (a)(i) to (v) ..... percentage (%)
- (c) Advertising in the Press .....provisional sum (Prov. Sum)
- (d) Handling costs and profit in respect of Subitem PC1.3.3 (c)..... percentage (%)
- (e) Relocation, removal and installation of survey beacons..... provisional sum (Prov. Sum)

The provisional sums allowed shall be controlled and expended as stipulated in clause 6.6 of the general conditions of contract.

The provisional sums allowed under Subitem C1.3.3(a) shall be expended to cover the costs of the protection, relocation and/or reinstatement of existing services and the installation of new services in accordance with the conditions of contract. Only items of work ordered by the Employer's Agent, for which there are no applicable measurement and payment items in the schedule of quantities, will be measured and paid for under these items.

The provisional sum allowed under item Subitem (c) shall be expended to cover the actual costs of keeping the public informed with whatever means including the publication of notifications, press releases and advertisements in the local press, regarding traffic accommodation and other arrangements.

The tendered percentage for Subitems (b) and (d) is a percentage of the amount actually spent under the relevant subitems and shall include full compensation for all charges and incidental costs of the Contractor, profit and overheads in connection therewith.

The provisional sum allowed under item Subitem (e) shall be expended to cover the actual cost to remove or relocate town survey markers. The tendered rate shall include for full compensation for liaising with the City of Cape Town's Geomatics Section, removal and reinstatement of existing survey markers, and the installation of new survey markers.



**SECTION 1.4: FACILITIES FOR THE ENGINEER**

**PART A: SPECIFICATIONS**

**A1.4.7 EXECUTION OF THE WORKS**

**A1.4.7.1 Offices and laboratories**

**c) Laboratories**

Delete this subclause and replace with the following:

“A laboratory will not be required on site for the Employer’s Agent’s acceptance control testing. The Employer’s Agent will utilise a commercial laboratory to carry out his acceptance control testing. Refer also to Subclause 3.1.16 In C3.1 Description of the Works.”

*The following new subclause shall be added to clause A1.4.7.3 of the Specifications:*

**(c) First Aid**

“The Contractor shall provide a first aid kit at the site offices. No separate payment will be made and the Contractor shall allow for this in his tendered rates.”

**PART C: MEASUREMENT AND PAYMENT**

| Item | Unit |
|------|------|
|------|------|

**C1.4.3 Provision Items measured by number**

*Add the following sub-items under this payment item:*

|                                                                      |              |
|----------------------------------------------------------------------|--------------|
| “C1.4.3.39 Refrigerators (200 litre min. capacity) .                 | number (No.) |
| C1.4.3.40 Floodlights complete with poles and 500 watt (min.) globes | number (No.) |

Measurement and payment shall be as stipulated in the standard specifications.”

*Add the following sub-items under this payment item:*

| Item | Unit |
|------|------|
|------|------|

**C1.4.9 Provision for commercial laboratory testing**

*Add the following sub-items under this payment item:*

“(i) Provision for payment to Commercial Laboratory for acceptance testing by the Engineer..... prime cost sum (PC Sum)  
(ii) Contractor’s charge in respect of PC1.4.9 (i).....prime cost sum (PC Sum)

Measurement for PC1.4.9 (i) shall be a PC SUM to allow payment of a commercial laboratory to undertake acceptance control testing as instructed by the Employer’s Agent. Details of the testing required will be prepared by the Employer’s Agent and provided to the Contractor. The commercial laboratory will be chosen by open public tender. The tender process and the evaluation thereof will require the approval of the Employer before the appointment of a commercial laboratory can be made.

Measurement for PC1.4.9 (ii) shall be deemed to include full compensation for the contractors overhead and profit costs to administer the tender process and the management of the commercial laboratory.

**SECTION 1.5: ACCOMMODATION OF TRAFFIC**



**PART A: SPECIFICATIONS**

**A1.5.1 SCOPE**

*Add the following:*

"It is a condition of this contract that traffic is accommodated in accordance with the provisions of the latest edition of the South African Road Traffic Signs Manual (SARTSM). Copies of this publication are available from the South African National Roads Agency Limited, P.O. Box 415, Pretoria, 0001.

This section also covers the release of any notices to the media and the public.

The tenderer is also referred to Section C3.1 "Scope of Works", clause 14 "Construction Strategy" and Clause 15 "Construction Constraints".

**A1.5.3 GENERAL**

**A1.5.3.2 General requirements**

*Add the following points at the end:*

- **Safety**

"The whole of the site will be handed over to the Contractor at the start of the contract. The Contractor shall be responsible for maintaining the existing road surface both within the work area and the advance warning and termination areas in a safe and trafficable condition for the duration of the contract."

- **Approval of temporary deviations**

"If, after any temporary deviation has been constructed, any changes are considered necessary or desirable, the proposal shall be submitted to the Employer's Agent for his approval."

- **Staging of construction**

The work in this Contract will necessitate traffic having to be deviated onto a reduced-width carriageway and channelised into traffic lanes routed past / through the construction work areas.

Traffic shall be accommodated on the existing surfaced carriageway and shoulders. Temporary deviations may be required at certain road junctions / intersections under this contract.

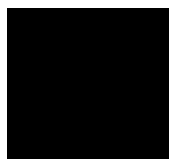
Accommodation of traffic for rehabilitation work on the carriageways shall generally be carried out by closing off one lane of traffic at a time and accommodating the traffic on the other lane(s).

Temporary closure or occupation of traffic lanes shall be permitted during agreed daylight or night-time working hours for as long as is required to complete the task undertaken. The section of work undertaken shall therefore be selected so that it can be easily accomplished within the specified period, allowing some float time

Amber flashing warning lights shall be placed on traffic lane deviations at night and during day time when and where instructed by the Employer's Agent to warn motorists of lane closures and occupation of lanes for work operation areas.

It is a condition of this contract that the Contractor shall programme and arrange for adequate accommodation of traffic within the following operational limitations:

- (i) Individual work areas shall be clearly demarcated with traffic signs and delineators / cones as specified. The lengths and widths of the individual working areas shall be agreed with the Employer's Agent in order to accommodate a working day's production in the case of operations within the roadway which are of short duration. Where longer working sections are practical, for example widening on the outer edges of carriageways, the lengths of the individual working areas and widths of encroachment onto existing shoulders shall be agreed with the Employer's Agent with a view to accommodate safe access and egress for plant, labour and materials; adequate weave distance between access/egress points and exits so that heavy vehicles do not weave across traffic lanes in an unsafe manner; adequate



clearance between barriers and the passing traffic; and adequate working space for the Contractor's operations.

- (ii) Closure of a traffic lane or partial lane shall be permitted only once the traffic-control facilities and temporary traffic diversions / deviations have been approved.
- (iii) No work shall be carried out simultaneously on both sides of a carriageway which is under traffic.
- (iv) A minimum single trafficable lane width of 3.0 m shall be maintained, where the available carriageway width permits. Where possible, two x 2-lane carriageways must be provided along Chichester Road, by making use of temporary surfacing, which will be constructed in the existing median islands, by using existing surfaced shoulders, or by removing short sections of existing sidewalks, which bulge out into the proposed carriageways at intersection bellmouths, or elsewhere.

The minimum preferred dual carriageway width with two-way traffic shall be  $3.4 + 3.4 + 0.3 + 3.4 + 3.4 = 13.9\text{m}$ . The 0.3m width allowed between opposing traffic flows will be for the placing of delineators.

At the existing signalised intersections, a 3.0m lane must be provided where possible, but reducing to 2.7m minimum where the available width does not allow for this.

Where the available surfaced width does not permit the provision of at least 4 lanes of 3.4m, the width may be reduced to 4 lanes of 3.0m, or combinations of lanes between 3.0m minimum and 3.4m preferred width. The minimum provision will therefore be  $3.0 + 3.0 + 0.3 + 3.0 + 3.0 = 12.3\text{m}$ , widening out at intersections to allow for a 2.7m or 3.0m wide turning slot.

Where unequal lane widths are provided, the wider lane shall be provided on the outer edge to allow for minibus taxis, buses and heavy vehicles. Where road width permits, provision must be made for an embayment for the stopping of buses and minibus taxis.

The width of the lane provided shall be measured to the kerb face. Where an existing concrete channel is provided in front of the kerb, the channel shall be measured as part of the available lane width.

Moveable concrete barriers will be required at the edges of all excavations for box cut and the construction of pavement layers. The moveable barriers shall be placed at least 0.3m from the edge of the excavation. The available road width shall therefore be measured to the bottom face of the concrete barrier.

In all of the above temporary layouts for the accommodation of traffic, the operating speed limit shall be reduced to 40 km/h using temporary signage in order to provide protection for the travelling public, cyclists, pedestrians and the workers.

All proposals shall be subject to the approval of the Employer's Agent.

- (v) Signage which does not apply during construction shall be removed or effectively covered.
- (vi) Signage erected for traffic accommodation which is not applicable (e.g. speed limits at weekends, temporary detours, etc.) shall be effectively covered.
- (vii) Signs and traffic accommodation devices for closures shall always be placed furthest away from the work area first and then placed by working inwards in the direction of traffic.
- (viii) On completion of the work, delineators/cones/signs shall be removed by starting at the work area and working outwards against the flow of traffic.
- (ix) Before re-opening a lane to traffic after surfacing operations, temporary road marking as specified shall be applied.



- (x) Where there are sharp drop-offs or excavations adjacent to the traffic lanes, or workers are in close proximity to moving traffic causing unsafe working conditions, moveable concrete barriers shall be placed adjacent to the trafficked lane for the full length of the work area.

Only concrete barriers shall be acceptable. The approach ends of all barriers shall be protected with sand bags or other measures to the approval of the Employer's Agent to lessen the severity of impacts.

A minimum clearance of 300mm shall be allowed between the edge of the excavation and the edge of the barrier. Remove first sentence Exits and entrances to the working area shall be controlled with appropriate traffic control measures and flagmen.

- (xi) There shall be restricted working hours for any construction activities on the temporary carriageways, or within the intersections, which negatively affect the traffic capacity during the peak periods. The restricted working hours for any operations which encroach onto the approved usable traffic lanes shall be as follows:

- 06:00 to 09:00; and
- 15:00 to 19:00.

The time periods given above are the times when no disruptive work shall be permitted within the usable lanes. There will be times when the work on existing or new underground services will require excavations in half widths across the two temporary lanes provided for each traffic flow direction. This work must be done in the daily unrestricted work period between 09:00 and 15:00 with permission from the Employer's Agent. Alternatively, the Contractor may submit proposals to the Employer's Agent for approval to do this work outside normal working hours, at night, or on weekends, provided that the requisite temporary traffic-control facilities are provided.

- (xii) The operations which involve high volumes of heavy vehicle traffic, plant and materials shall be programmed and managed so that disruption to through traffic is minimised. The access and egress shall therefore be restricted during the peak operating hours.

- (xiii) The operations which involve high volumes of heavy vehicle traffic, for example earthworks, asphaltting operations and delivery of pavement materials, may be programmed such that departures and deliveries are carried out at night between the hours of 19:00 and 06:00. The appropriate supervision, signing, lighting and traffic control measures, including permits for noise, shall be put in place and shall be submitted to the Employer's Agent and the traffic authorities for approval. No night work shall be permitted without such approval.

- (xiv) The safe passage of pedestrians shall be maintained at all times, in particular scholar access to adjacent or nearby schools. Appropriate signage shall be provided to guide pedestrians through the work areas. For pedestrian or traffic safety reasons, the Employer's Agent may order that open excavations next to the existing roadway or on pedestrian paths be temporarily backfilled, or that tipped material for the pavement layers be flattened, shaped and compacted. No payment for this activity shall be made but shall be deemed to the included under the tendered rates for traffic accommodation in the Bill of Quantities.

- (xv) The Contractor shall programme his work so that on all special non-working days or periods, all existing traffic lanes shall be open to traffic across the full width of the existing carriageways without a step in level in the roadway; and all deep or unsafe trenches are backfilled. Appropriate traffic-control measures and signage shall be in place to warn the road user and pedestrians/cyclists. During these non-working periods, the Contractor shall shut down normal construction activities and ensure that the maximum possible surfaced width is available to public traffic and all deep trenches closed, or made safe. Only emergency work shall be permitted and the Traffic Safety Officer shall patrol during these non-working periods and ensure that all temporary traffic-control facilities are in place and functional. The accommodation of traffic team shall be on standby.

- (xvi) All existing and proposed street lights, pedestrian lights and traffic signal facilities, which have been handed over into the care of the Contractor during the construction period, shall be maintained in working order and kept safe for the contract duration.

Any costs related to these construction limitations and restrictions shall be deemed to be



covered in the scheduled rates for traffic accommodation measures.

**(n) Failure to Comply with the Provisions**

Failure or refusal on the part of the Contractor to take the necessary steps to ensure the safety and convenience of the public traffic, accommodation of traffic, plant and personnel in accordance with these specifications, or as required by statutory authorities or ordered by the Employer's Agent, shall be sufficient cause for the Employer's Agent to deduct penalties as follows:

A fixed penalty of R5000,00 per occurrence.

In addition, a time-related penalty of R500,00 per hour or part thereof over and above the fixed penalty shall be deducted for non-compliance to rectify any defects in the accommodation of traffic within the allowable time after an instruction to this effect has been given by the Employer's Agent. The Employer's Agent's instruction shall state the allowable time, which shall be the time in hours for reinstatement of the defects. Should the Contractor fail to adhere to this instruction, the time-related penalty shall be applied from the time the instruction was given.

The failure of or refusal by the Contractor to construct and/or maintain diversions, barricades, traffic signs or road markings at the proper time, or to take the necessary precautions for the safety and convenience of public traffic as specified or instructed by the Employer's Agent, shall be sufficient cause to suspend the Works until the required construction or maintenance has been completed to the satisfaction of the Employer's Agent.

**(o) Media Releases and Public Relations**

Where ordered by the Employer's Agent, the Contractor shall inform the general public on matters relating to the intended road works, construction period and accommodation of traffic through media and press releases in local and regional newspapers, magazines, radio services and/or other forms of publicity. Costs incurred for such publicity releases by the Contractor will be reimbursed through Item P1.3.3 (c), where a Provisional Sum has been allowed for advertising in the press.

**A1.5.3.10 Safety of the travelling public and the Contractor's employees**

Add the following:

"The whole of the site will be handed over to the Contractor at the start of the contract. The Contractor shall be responsible for maintaining the existing road surface both within the work area and the advance warning and termination areas in a safe and trafficable condition for the duration of the contract.

If, after any temporary deviation has been constructed, any changes are considered necessary or desirable, the proposal shall be submitted to the Employer's Agent for his approval."

**A1.5.7 EXECUTION OF THE WORKS**

**A1.5.7.10 Construction of temporary deviations**

**a) General**

*Add the following to the end:*

The temporary deviations are indicated in broad detail and it will be the Contractor's responsibility to plan the finer details of the traffic accommodation measures required to:

- (i) Accommodate all public transport, general traffic and cyclists on the existing carriageways, or portions of the existing carriageways, which are to be widened using a temporary surfaced pavement.
- (ii) Accommodate existing pedestrian traffic on sidewalks and at pedestrian crossings.
- (iii) Accommodate traffic from the side streets at the existing intersections using partial width construction.



- (iv) Accommodate traffic from the adjacent residential areas, while constructing detours, deviating existing street alignments, or closing off access from side roads to Imam Haron/Chichester Roads, to suit the final road layout scheme.
- (v) Accommodate traffic on the existing or proposed road pavements and in intersections, while excavating, installing and backfilling new underground services and removing decommissioned services and manholes, which have to be abandoned, demolished or completely removed. New and existing bulk foul sewers, bulk watermains and water reticulation will require particular attention with sections of pipe line having to be constructed using partial width traffic accommodation measures.

The Contractor's attention is drawn to the volumes and speed of traffic carried on the affected roads and shall make due allowance therefor in his construction programme.

The method of accommodating traffic shall be in accordance with the typical layouts of the traffic-control facilities for the traffic diversions on the respective roads, as shown on the typical drawings and described below; and as directed and approved by the Employer's Agent.

The Contractor shall submit a drawing showing details concerning each traffic diversion to the Employer's Agent for approval at least 7 days prior to the scheduled commissioning of such diversion to allow him sufficient time to inform and obtain the approval of the traffic officials of the relevant authorities concerned for such diversion.

Diversions shall be advertised in the press when instructed by the Employer's Agent. Advance warning notice boards shall be placed on the affected routes at least 7 days prior to such diversion being implemented.

The diversions and temporary traffic-control facilities must be submitted for approval to the Employer's Agent and approved prior to each diversion being opened to traffic.

**e) Surfacing of temporary deviations**

*Replace the third sentence of the second paragraph with the following:*

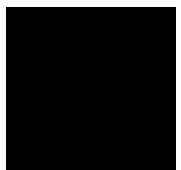
"The minimum lane width for temporary traffic deviations shall be 3,0m, unless amended in writing by the Employer's Agent."

**A1.5.7.11 Temporary traffic control facilities**

**i) Traffic control measures**

*Add the following to the end:*

The Employer's Agent may instruct the Contractor to provide any other road sign, reflective tape, etc not measured in standard pay items. Such road signs shall conform to the requirements of the SARTSM, or specification provided by the Employer's Agent. Similarly, in order to ensure that the travelling public is kept fully informed and warned on matters relating to the accommodation of traffic, construction sign posting and the effect of the construction on the free flow of traffic through the site, the Employer's Agent may arrange for advertising in the press and/or for other forms of publicity.





#### **A1.5.7.12 Traffic safety officer**

*Add the following to the end:*

In the event that the Contractor wishes to make use of a Subcontractor to provide all or some of the services required for the accommodation of traffic, such proposed Subcontractor's engagement will be subject to the Employer's Agent's approval and following receipt of all relevant documentation as requested by the Employer's Agent for the assessment of the Subcontractor's capability.

In case of the appointment of a Subcontractor, the Subcontractor will be directly responsible to the Traffic Safety Officer, who will be full-time employed by the Main Contractor."

"The Contractor shall ensure that statutory requirements of the Employment Act and Regulations, as amended, are adhered to and that sufficient resources are made available to provide all required traffic accommodation services 24 hours a day and 7 days a week. No separate additional payment will be made for this requirement and all costs need to be included in rates tendered under existing items."

### **PART C: MEASUREMENT AND PAYMENT**

#### **C1.5.1 Accommodation of pedestrian and non-motorised traffic:**

*Add the following to the payment item description:*

The contractor must make allowance for pedestrians to have direct access to businesses.

#### **C1.5.2 Accommodation of pedestrian and non-motorised traffic:**

*Add the following to the payment item description:*

The contractor must make allowance for delivery vehicles to have direct access to businesses during loading and off-loading assignments.

*Add the following new items:*

| Item                                                                                                                                  | Unit             |
|---------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>C1.5/PC11.4.3.2 Movable barriers, precast concrete NJ Type established on site, relocated as required and de-established .....</b> | <b>metre (m)</b> |

*Replace the second paragraph of the payment measurement item with the following:*

The unit of measurement shall be the metre of barrier established and ultimately de-established.

The tendered rate shall include full compensation for the establishment of the concrete NJ type barriers on site, the installation as required, the moving on site to suit the various construction stages and the de-establishment of the barriers once the project is complete.

The units are 3m long and the tendered rate shall include for the supply of the couplers required to couple the barriers together. Each coupling comprises two plates fabricated from 10mm x 100mm flat bar, 500mm long with two M22 bolts 200mm long.

90% of the tariff will be payable when the concrete barriers have been provided and erected in position for their first use on site and 10% when finally removed from the site.

**C1.5.13     Dismantle, store, refurbish and reinstall steel existing bus  
Shelters ..... Number (No.)**

The unit of measurement shall be the number of steel bus shelters dismantled, stored, refurbished and reinstalled.

The tendered rate shall include full compensation for the dismantling, loading and transportation of the bus shelter to store, where it shall be cleaned, painted and refurbished, prior to loading, transporting, off-loading and re-erecting on site in the new locations as required by the traffic accommodation phase/plans and the final location. If the work requires demolition and removal of a concrete foundation, or excavation/backfill, plus excavation and casting of new foundations with holding down bolts, then payment shall be made under the relevant existing payment items. Refer to C4 Site Information Clause 5.

The supports including baseplates shall be carefully removed from the existing concrete foundations.



## **SECTION 1.6: CLEARING AND GRUBBING**

### **PART A: SPECIFICATIONS**

#### **A1.6.1 SCOPE**

*Add the following:*

Also included in the clearing is the demolition and removal of all concrete, brick, stone or other structures, which are required to be removed in order to carry out the works. This includes the existing residences and buildings which have been identified for demolition. Refer to C4 Site Information, Clause 4. These structures will include concrete-lined or stonework drains, kerbing, channels, edgings, paving blocks, catchpits, headwalls, manholes, chutes and other ancillary structures, including the subsequent removal of all rubble and debris from the demolition to an approved spoil dump area selected by the Contractor off the site of the Works.”

#### **A1.6.7 EXECUTION OF THE WORKS**

##### **A1.6.7.3 Conservation of vegetation**

*Add to the end of the 1<sup>st</sup> paragraph:*

“The Contractor will not be required to remove topsoil to more than an average depth of 150mm, from any particular area. The depth of topsoil removed shall be reliant on the terrain, suitability of material and topsoil requirements of the work.

The Contractor shall constantly liaise and agree with the Employer’s Agent as to the depth of topsoil to be removed. Where, in the opinion of the Employer’s Agent, material that would not normally be classed as topsoil has been removed, the excavation shall be backfilled and compacted with selected material at the Contractor’s expense. Should material that is deemed by the Employer’s Agent not to be topsoil, be removed and stockpiled together with material classed as topsoil, the Contractor shall be responsible for the removal of this unsuitable soil from the stockpile and the replacement of the quantity of topsoil contaminated by the unsuitable material at his cost. The quantity of topsoil to be replaced shall be determined by the Employer’s Agent.”

“After clearing and grubbing, all topsoil shall be removed to either heaps alongside the construction area, or to a stockpile site. Where ordered by the Employer’s Agent, any topsoil that shall be required for the topsoiling of new banks and cuts, but which cannot be accommodated close to the construction area due to lack of working space, or presence of open drains or underground services, shall be loaded and hauled to the designated stockpile area, where it shall be placed in temporary stockpiles for later use in the rehabilitation of the site affected by construction. The moving of topsoil from heaps, or the loading of topsoil from temporary stockpiles and the placing and spreading thereof on cut slopes, fill slopes or median areas, is covered in Chapter 11.

Measurement for the stockpiling of topsoil shall be made under item C1.6, in the Schedule of Quantities.

**PART C: MEASUREMENT AND PAYMENT**

- (iii) **Items to be measured and paid for using items specified elsewhere in the specifications**

*In Table C1.6-1 for the Preparation of topsoil stockpile sites activity, delete reference to "Chapter 11" and replace with "Chapter 4".*

*Add the following:*

**PC 1.6.4 Removal of buildings and structures**

**C1.6.4.1 Erf 24541-RE, Maitland Cemetery existing building add-on structures, 5.5x3x3m shed and 7mx2.5x3m canopy ..... lump sum**  
(L Sum)

**C1.6.4.2 Erf 24544-RE, Maitland Cemetery Caretaker's Cottage Misc.buildings / ruins ..... lump sum**  
(L Sum)

The unit of measurement shall be the lump sum all inclusive cost to demolish, dismantle, load and spoil structural buildings and ruins.

The tendered rate shall include full compensation for the demolition, dismantling, loading and transportation/spoiling off site the existing structures and ruins indicated on site and on the plans. Demolition will include the removal of existing under ground structural foundations. Rate will include all excavations and backfill.

**SECTION 1.7: LOADING AND HAULING**

**PART A: SPECIFICATIONS**

**A1.7.3 GENERAL**

**A1.7.3.1 Measurement of haul distance**

*Delete the item description and replace with the following:*

"Payment for haulage of any material shall not apply in the case of:

- (i) Material to be obtained from commercial sources or sources provided by the Contractor.
- (ii) Material to be disposed of to commercial spoil dump sites or approved spoil dump sites provided by the Contractor off the site of the Works.
- (iii) Items salvaged on the site of the works such as existing pipes, culverts, manhole covers, grates, guardrails and signs.
- (iv) All other materials loaded and transported within the site of the Works.

The Contractor's tendered rates for all materials from commercial sources, sources on the site of the Works, or other Contractor sources of supply shall be deemed to include full compensation for hauling the materials to their point of use on the site of the Works. The Contractor shall make his own arrangements for the procurement of materials and shall pay all royalties and other costs in this connection.

Where material is required to be spoiled, the Contractor shall pay any dumping charges which may become payable."

## COTO CHAPTER 2: SERVICES

### PART A: SPECIFICATIONS

#### A2.1.3.1 Installation of new services

Add the following:

“Plans indicating all known services, form part of the documentation.

All known services are indicated on the drawings and listed in a table in Clause 10 of C4 Site Information.

The Contractor shall take due cognisance of the restrictions as well as requirements the service authorities have regarding any construction work to be carried out close to their services.

Wayleaves shall be applied for and obtained by the Contractor as specified in 3.4.2 and 3.4.10.1 prior to any excavations in close proximity to the affected service, as specified in the wayleave conditions.

The Contractor shall mark the position of all known services with suitable permanent markers to the satisfaction of the Employer's Agent. These markers shall remain visible and in place until the completion of the works in that area after which they must be removed by the Contractor. Refer also to 3.4.10.1 for the specific requirements for location of existing services affected by the Works and the submission of a report.”

#### A2.1.3.2 Location, identification, protection and relocation of existing services

##### b) Location of existing services

*Add the following after the last paragraph:*

Should the Contractor fail to adequately comply with the requirements of 3.4.10.1 to locate existing underground services and identify whether the existing services clash with the proposed new infrastructure and subsequently fail to liaise with the relevant service owners to obtain instructions sufficiently far in advance of construction to locate or protect existing underground or overhead services, all delays and additional costs thus incurred shall be for the Contractor's account.

If the Contractor considers that the progress of works on the critical path is being retarded by the failure of any Authority or Department to lay, remove or divert pipes, ducts, services, cables or poles within a reasonable time, he shall immediately notify the Employer's Agent in writing, stating clearly the number of days of delay claimed. The Employer's Agent will then decide whether such a claim is justifiable, and, in the event of the claim being accepted, he will hand to the Contractor a certificate stating clearly the number of days of delay sanctioned.

The cost of repairing any damage to services, due to miscalculations or negligence on the part of the Contractor, or his failure to carry out the duties set out in this Clause, shall be borne by the Contractor.

##### d) Protection of services

###### (ii) Protection

*Add the following after the last paragraph:*

Services and subsurface obstructions likely to be affected by the work, based on available records and surveys, have been shown on the Drawings. Although every care has been exercised in the presentation of the available data, the Employer cannot and does not vouch for the accuracy or completeness of the information shown. Whenever the Contractor deems it necessary to determine the exact location of an existing service or obstruction, he shall, in compliance with the procedures stipulated in 3.4.10.1, make any examination that he may consider desirable in advance of the work, and the Employer does not accept any liability for loss, damage or delay to the Contractor as a result of the non-location or inaccurate location of services or obstructions.

Where no underground services are shown on the Drawings or scheduled, but the possibility of their presence can be reasonably inferred, the Contractor shall in collaboration with the Employer's Agent, search for such services to establish their positions well in advance of the work. A full report shall then be submitted in good time to the Employer's Agent, to enable the necessary arrangements for the protection, removal or diversion of the services before work is commenced in their vicinity. Refer to 3.4.10.1.

In the event of damage to existing services, the Contractor shall take such immediate action as is necessary to prevent further damage or danger to life or property and shall immediately notify the Employer's Agent, who will issue instructions as to the necessary repairs or protective measures to be taken. The cost thereof shall be borne by the Contractor irrespective of whether the repairs or protective measures were carried out by him, or by or on behalf of the service authority or department concerned.

As soon as an underground service not shown on the Drawings is discovered, it shall be deemed to be a known service and the Contractor will be held responsible for any subsequent damage to it. If such service is damaged during the course of its discovery, the Contractor will be reimbursed for the cost of making good such damage, unless it is established by the Employer's Agent that the Contractor did not exercise reasonable diligence and care and that the damage was avoidable.

(iii) Damage

*Add the following after the second paragraph:*

"The Contractor's attention is drawn to the relevant clauses of the General and Special Conditions of Contract regarding liability for damage to the works, or property, or injury to persons arising from the construction of the works. His attention is also drawn to the relevant clauses regarding insurance to be acquired/implemented by the Contractor. Special attention is drawn to the exclusions in this insurance policy and particularly to the exclusions regarding consequential damage."

**A2.1.3.6 Provision of record drawings and details**

*Add the following:*

"When Drawings, method statements, test results or any other information is required to be submitted by the Contractor to the Employer's Agent for approval, he shall comply with the lead times specified in the Specifications and Project Specifications for the specific works. The lead time shall allow sufficient time for the Employer's Agent to carry out the review, sufficient time to provide a response to the Contractor and sufficient time for the Contractor to make any changes or amendments and then resubmit once more for final approval. No construction work shall commence or proceed until the drawings/method statements/proposals/test results/etc., have been approved in writing by the Employer's Agent. No claims for delay will be entertained if the Contractor does not allow a sufficient lead time."

**A2.1.3.9 Limitations and restrictions**

**a) Work near other existing services**

*Add the following after the last paragraph:*

The following standard wayleave requirements shall apply in addition to any specific wayleave requirements by the service provider.



## SUMMARY OF WAYLEAVE REQUIREMENTS

| Authority                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Standard restrictions to be applied for excavation and backfilling<br>(To be reviewed with latest wayleave conditions)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Electricity Generation & Distribution                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | The exact location of cables must be determined on site by careful hand excavation using only spades and no picks or crowbars.<br>No mechanical plant may be used for <u>excavation</u> for any underground service within 5m of 132kV cables, within 3m of 11kV cables, or within 3m of low voltage underground electricity services.                                                                                                                                                                                                                                                                                                                                                                                     |
| Dark Fibre Africa                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Any excavations by means of self-propelled mechanical machinery, including equipment used for drilling/boring, demolishing and or compaction of soil executed closer than 500mm from buried DFA optical cables, must be authorised by a DFA official during an on-site meeting before such excavation is to take place. Such excavations may not be executed directly above the DFA infrastructure at any time unless prior written approval is obtained. A minimum of 12 weeks should be allowed for relocation of cables.                                                                                                                                                                                                |
| Transport Traffic Signals                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | All work must be done under the supervision of the department.<br>Excavations to be carried out by hand for installation of new traffic signal cables and traffic signal equipment.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| All telecommunications cables including Liquid Telecom, Open Serve and CoCT Information Systems and Technology                                                                                                                                                                                                                                                                                                                                                                                                                                | No mechanical plant or vibrator type compactors may be used within three metres of any telecommunications equipment above or below ground level. A permit shall be obtained prior to excavation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Transport & Urban Development                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | No open trench excavations for road crossings will be allowed and all crossings must be done by means of directional drilling or pipe jacking. No excavation or any works within the road reserve will be allowed without a permit.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Water & Sanitation Reticulation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | No mechanical plant may be used within 3m of the underground infrastructure (if closer, the works must be conducted under strict supervision of an employee of the Water and Sanitation Department). Where at any stage during excavation or construction, cover over the water mains and services will be less than 600mm, excavation shall be carried out by hand over a width extending to 1.0m clear on each side of the service. Initially only light compactors are to be used for compacting layers over the water services until a minimum cover of 600mm is reached. Only when at least 600mm compacted cover is available above the top of the watermain may approved large mechanical compacting plant be used. |
| The Contractor will be deemed to have allowed in his rates and prices for excavation, filling, backfilling and compaction in the tender BOQ for the cost of working in close proximity to existing services, whether during earthworks operations, layerworks, or trenching for new or existing services. The only payment items available for pricing for his normal costs and all additional costs are those available in the tender BOQ. No other payment items are provided and no claims will be considered for perceived omitted items. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

The Contractor shall note that no pegs or stakes shall be driven into the ground in the vicinity of underground services unless their exact positions have been determined. The Contractor's attention is drawn to the following with regard to work done in the proximity of ESKOM and other electrical services:



MACHINERY AND OCCUPATIONAL SAFETY ACT (Act No 6 of 1983) WITH REGULATIONS

D16 (7) Excavations

"The builder or excavator shall ascertain as far as practicable the location and nature of underground services likely to be affected by the excavation and take such steps as may be necessary to prevent danger to persons."

THE ELECTRICITY ACT (Act No 40 of 1958)

Section 51(3) : Offences and Penalties

"Any person who without legal right (the proof of which shall be upon him) cuts or damages or interferes with any apparatus for generating, transmitting or distributing electricity, shall be guilty of an offence and liable on conviction to a fine not exceeding R1 000,00 or to imprisonment for a period not exceeding twelve months."

The Contractor shall take all of the above paragraphs and subclauses into account in the drawing up of his construction programme and in the calculation of his tendered rates, and shall note that no additional payment or compensation will be allowed for any additional costs or delays incurred as a result of compliance with these regulations, except as measured and paid under the Items listed in the Schedule of Quantities. It shall be noted that the Contractor must allow for all additional costs incurred. It shall further be noted that the specifications do not prescribe what method the Contractor shall use to excavate in close proximity to existing services and the onus remains on the Contractor to use the appropriate excavation plant and hand implements in compliance with the imposed wayleave restrictions.

The Contractor shall allow all reasonable access to the representatives of any Authority or Department for the purpose of maintaining, laying and/or relaying any services, cables or mains during the period of the Contract.

Permanent alterations to existing services ordered in writing by the Employer's Agent, and for which no separate provision has been made in the Bill of Quantities, will be paid for as Variation Orders or under Dayworks if required.

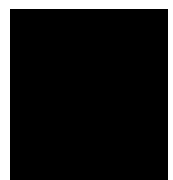
**A2.1.5.3 Water**

*Add the following:*

"As the Western Cape has a shortage of water for drinking purposes, the Contractor shall where possible procure treated effluent water for use in his construction activities and allow for the associated costs in his tendered rates."

**PART C: MEASUREMENT AND PAYMENT**

| Item                                                                                                         | Unit |
|--------------------------------------------------------------------------------------------------------------|------|
| <b>C3.2 /C2.1.2 Location, identification, protection and relocation of existing services</b>                 |      |
| C3.2/ C2.1.2.5 Using hand excavation to locate, expose and verify services.....cubic metre (m <sup>3</sup> ) |      |



COTO CHAPTER 3: DRAINAGE

SECTION 3.1: DRAINS

PART A: SPECIFICATIONS

A3.1.5 MATERIALS

A3.1.5.2 Subsoil Drainage Materials

c) Geotextiles

Add the following subclause:

“(ii) Synthetic-fibre filter fabric

The filter fabric used for subsoil drains shall be Bidim Grade A2, non-woven and needle-punched, or equivalent.

PART C: MEASUREMENT AND PAYMENT

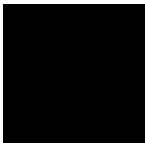
| Item                                                                                              | Unit |
|---------------------------------------------------------------------------------------------------|------|
| C3.1.4.1 Excavating in all material situated within the following depth ranges below the surface: |      |

Add the following new payment item and amend the payment:

|                                                                                                                                                                              |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| C3.1.4.1.1 Extra-over item C3.1.4.1 (a) and (b) for hand excavation in close proximity to existing services in order to comply with wayleave conditions.....cubic metre (m³) |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|

The unit of measurement shall be the cubic metre actually carried out by hand in the restricted area. Approval shall be obtained from the Employer’s Agent prior to carrying out any hand excavation work to be measured under this item, so that the extent of the work can be agreed, inspected and measured.

The tendered rate shall be paid as an extra-over to PC3.1.4.1 (a) and shall include for the use of hand tools excluding picks, as well as all other additional costs. In addition to this payment, an extra-over payment may be made, where relevant, under SANS 1200 DB 8.3.5(a) and (b). Note that measurement under SANS 1200 DB 8.3.5(a) and (b) must be proven by submitting cross-sections showing the dimensional relationship between the new service and existing service including the alignment, relative levels and spacings. The need for hand excavation as stipulated by wayleaves does not automatically prove compliance with the payment requirements of SANS 1200 DB 8.3.5(a) or (b).“



| Item                                             | Unit |
|--------------------------------------------------|------|
| <b>C3.1.9 Pipes in subsoil drainage systems:</b> |      |

*Add the following new subitem:*

| Item                                                                          | Unit      |
|-------------------------------------------------------------------------------|-----------|
| <b>C3.1.9.2 HDPE flexible pipes with smooth bore complete with couplings:</b> |           |
| (i) 110mm internal dia. perforated or slotted.....                            | metre (m) |
| (ii) 160mm internal dia. perforated or slotted .....                          | metre (m) |
| (iii) 110mm internal diameter, normal .....                                   | metre (m) |
| (iv) 160mm internal diameter, normal .....                                    | metre (m) |

The unit of measurement for pipes shall be the metre of pipe, measured in place along its centreline, including the length of fittings.

The tendered rate shall include full compensation for procuring, furnishing, laying and jointing the pipes and fittings as specified.



## **SECTION 3.2: CULVERTS**

### **PART A: SPECIFICATIONS**

#### **A3.2.1 SCOPE**

*Add the following:*

"This section also covers the use of culverts as service access ducts. Precast units shall be ordered by the Contractor from actual measurements of length determined on site. It shall be noted that bedding requirements for pipe culverts shall comply with SANS 1200 LB."

#### **A3.2.5 MATERIALS**

##### **A3.2.5.2 Culvert materials**

###### **c) Prefabricated concrete pipe culvert units**

*Add the following:*

"Types and classes shall be as specified on the Drawings and in the Bill of Quantities. Stormwater pipes shall be of the spigot-and-socket type.

Rubber joint rings shall conform fully with the requirements of SANS 974 Part 1 (Rubber Joint Ring: non-cellular)."

#### **A3.2.7 EXECUTION OF WORKS**

##### **A3.2.7.2 Excavation for construction by trench method**

###### **b) Excavation**

*Replace the third sentence of the second paragraph with the following:*

"When using the trench method, the cover shall be at least 300 mm to the underside of the subbase layer. This means that for shallow pipes, the Contractor shall allow in his tendered rates for excavation through the selected layers of the subgrade. For deeper pipes, the trench shall be excavated when the minimum cover is 300mm. In extreme cases, when the crown of the pipe culvert protrudes into the selected layers or subbase layer, the pipe culvert may be concrete or soilcrete encased, the bedding classification may be upgraded, or a protective raft slab will be instructed by the Employer's Agent. In all cases, where the cover to finished road level is less than 600mm, or where there is any doubt about the class of the bedding and backfill, the Contractor shall request an instruction from the Employer's Agent at least 5 days prior to the pipe culvert installation."

###### **c) Width of excavation**

*Add the following Subclause:*

"The minimum base width for trenches shall be as specified in SANS 1200 DB Subclause 5.2".

###### **d) Excavation by hand**

*Replace with the following:*

In the immediate vicinity of existing underground services, that portion of the pipe culvert trench which falls within the restricted zone imposed by the wayleave conditions, shall be excavated using hand tools. The remainder of the trench may be excavated using mechanical excavators. That portion of the trench excavation carried out using hand tools shall be compensated for under payment item C3.2.1.2 and C3.2.1.3.

The method to be used is to first locate the existing underground services using hand excavation, with payment made under item C3.2/C2.1.2.5. The Contractor shall obtain written authorisation from the Employer's Agent prior to carrying out any hand excavation, which qualifies for payment under item C3.2/C2.1.2.5 for locating an existing underground service.

If there is no level clash and there is sufficient vertical clearance between the new pipe culvert and existing service, then a mechanical excavator may be used for the entire trench, subject to the wayleave restrictions. If there is a level clash, then the existing underground service shall be relocated, or the pipe culvert levels shall be adjusted, where this is practical. The Contractor shall bring any level clashes to the attention of the Employer's Agent before commencing the first section of the pipe culvert installation.

Where pipe culverts are installed parallel to existing underground services, the requirements of SANS 1200 PSDB 8.3.5(b) shall apply for an extra-over payment for new pipe culvert trenches adjoining an existing underground service. Where hand excavation is stipulated by wayleave conditions, only that section of the trench affected by horizontal and vertical clearance requirements may be carried out by hand excavation with payment made under C3.2.1.2 and C3.2.1.3.

For new pipe culverts crossing an existing underground service, extra-over payment shall be made under SANS 1200 PSDB 8.3.5 (a), only if the trench excavation poses a risk of damage to the existing service i.e. closer than the vertical clearances stipulated in SANS 1200 PSDB 8.3.5 between the bottom of the culvert bedding cradle and the top of the underground service.

In proximity to existing services, total payment for trench excavation shall therefore be made under C3.2.1 for normal excavation, and hand excavation under C3.2.1.2 and C3.2.1.3, or under SANS 1200DB 8.3.5 (a) or (b), where applicable, plus C3.2/C2.1.2.5 to locate the positions of the existing services. The Contractor shall submit with his calculation sheets, dimensioned cross sections with levels to prove that the new services qualify for payment under SANS 1200PSDB 8.3.5 (a) or (b)."

#### **A3.2.7.7 Laying and bedding of prefabricated culverts**

*Add the following after the last paragraph:*

"On this contract, all beddings for pipe culverts shall be Class B under trafficked roadways and Class C in areas not subject to traffic loading, unless the cover to finished road level is less than 600mm, in which case the shallow cover depth shall be brought to the attention of the Employer's Agent, so that the applicable bedding class can be confirmed or instructed. The Notes on the Drainage Plans contain general guidelines as to how to deal with shallow pipe culvert crossings, but in all cases the correct bedding class and pipe class shall be checked once the trench floor is exposed and the in situ soil conditions inspected to identify substandard or saturated bedding conditions.

For cover depths greater than 600mm, the Class B bedding cradle shall comply with SANS Drawing LB-1 (b) and the Class C bedding cradle shall comply with SANS Drawing LB-1(c). In both these bedding classes, the bedding cradle shall be constructed with G5 subbase quality material, either recovered from excavations on site or imported from commercial sources and compacted to 97% of MDD. The selected fill blanket shall be constructed using G7 quality selected gravel material, either recovered from excavations on site or imported from commercial sources and compacted to 95% of MDD.

Where the trench floor is inspected and found to be saturated or subject to seepage, the lower 150mm of the bedding cradle shall be replaced with 20mm filter stone and the balance of the bedding cradle shall be G5 subbase quality material.

Where the cover to finished road level is 200mm or less, the first option is to relocate the crossing or regrade the pipe culvert section, but where this is not possible, the bedding cradle shall be in accordance with Drawing LB-1(a) for a Class A bedding of Class 20/20 concrete and the selected fill blanket shall be replaced with Class 20/20 concrete. The asphalt surfacing shall be laid directly on the concrete backfill with reinforcement to be added as instructed by the Employer's Agent in the top 150mm depth in the case of large diameter pipes greater than 600mm.



Where the cover to finished road level is 450mm or less, the first option is to relocate the crossing or regrade the pipe culvert section, but where this is not possible, the bedding cradle shall be in accordance with Drawing LB-1(a) for a Class A bedding of Class 20/20 concrete and the selected fill blanket shall be replaced with Class 20/20 concrete.

Where the cover to finished road level is 600mm or less, the bedding cradle shall be in accordance with Drawing LB-1 (b) for a Class B bedding of G5 subbase quality material and the selected fill blanket shall be replaced with G5 subbase quality material."

#### **A3.2.7.11 Laying and bedding of prefabricated culverts**

- e) Manhole covers, grid inlets, etc

*Add the following:*

"Manhole covers, inlet grids and frames shall be of the types indicated on the drawings, or in the Schedule of Quantities.

The hinged types of covers and inlet grids shall include pins or locking devices which prevent the cover from being removed from the frame."

#### **A3.2.7.12 Removal of existing work**

*Add the following:*

"The stormwater design drawings give an indication as to how existing drainage structures shall be treated, based on the principle that:

- (a) Manholes within the trafficked lanes or shoulders should be avoided.
- (b) Abandoned stormwater pipe culverts should be removed if they lie within the pavement structure i.e. they should have a cover of at least 700mm.

In order to avoid drainage structures under trafficked lanes or shoulders, the existing drainage structure shall be demolished and a pipe of the appropriate diameter and class installed in the gap, with Class 15/20 concrete used to fully encase the pipe joints.

In other cases, such as on lane widenings, the existing pipe culvert shall be extended to a point outside the shoulder, or behind the kerb line, where a new manhole, catchpit or headwall shall be constructed.

If there is a horizontal or vertical change in direction of the pipe culvert, then the treatment shall be as ordered by the Employer's Agent. One solution is to retain a manhole with the cover at least outside the trafficked lanes.

The products of the demolition shall be removed from site. The grid inlets and covers remain the property of the Employer and are to be carefully removed to store, or transported to the nearest Depot of the Employer as directed by the Employer's Agent.

The measurement and payment for the removal of existing stormwater infrastructure shall be under items C3.2.13.1, C3.2.13.2 and C3.2.13.3 (where applicable)."

**A3.2.7.13      Joining new and old**

*Add the following after the last paragraph:*

“(a)    Stormwater Connection to Existing Stormwater Structure

The Contractor shall ensure that the stability of the existing structure is not disturbed during excavating and breaking into the existing structure. After the installation of the new pipe, the Contractor shall make good the brickwork and the benching inside the structure.

(b)    Abandoning of Existing Structures

Where existing catchpits and manholes are to be abandoned, the ends of all pipes leading into or out of the catchpit or manhole shall be sealed off with plugs of Class 15/20 concrete to the satisfaction of the Employer’s Agent. The catchpit or manhole shall then be filled with selected subgrade quality material up to 150 mm from the top. The material shall be compacted to 90% of maximum dry density (100% for sand). The catchpit or manhole shall then be sealed with a layer of Class 15/20 concrete not less than one hundred and fifty millimeters (150 mm) in thickness.

**PART C:      MEASUREMENT AND PAYMENT**

|             |             |
|-------------|-------------|
| <b>Item</b> | <b>Unit</b> |
|-------------|-------------|

**C3.2.1.3      Excavating in all material situated within the following depth ranges below the surface level:**

*Add the following to the measurement and payment clauses:*

The unit of measurement shall be the cubic metre actually carried out by hand in the restricted areas, for existing services in order to comply with wayleave conditions. Approval shall be obtained from the Employer’s Agent prior to carrying out any hand excavation work to be measured under this item, so that the extent of the work can be agreed, inspected and measured.

Where excavations for drainage structures such as manholes and catchpits already include for the use of hand excavation, no additional measurement and payment shall be made under this item.

**C3.2.2      Backfilling:**

*Add the following to the measurement and payment clauses:*

The rate tendered for all Subitems requiring haulage shall include for unlimited free-haul. The rate tendered for Subitem C3.2.2.2 (a) shall include for all additional acquisition and transport costs.”

*Add the following new subitem:*

|             |             |
|-------------|-------------|
| <b>Item</b> | <b>Unit</b> |
|-------------|-------------|

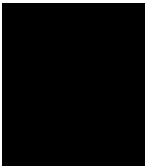
**C3.2.2.5      Extra over C3.2.2.1 and C3.2.2.2 for compaction in close proximity to Existing services.....cubic metre (m³)**

The unit of measurement shall be the cubic metre.

The tendered rate shall include full compensation for the additional cost of using small hand compaction tools and small compaction equipment of 1 ton or less in close proximity to existing services within the restricted area stipulated by wayleave conditions. Where the wayleave restrictions do not include any restrictions on compaction depth or compaction equipment, no measurement shall be made under this item.

|             |             |
|-------------|-------------|
| <b>Item</b> | <b>Unit</b> |
|-------------|-------------|

**C3.2.13      Removing and re-laying existing culverts:**





Amend the description to the following:

“Removing and spoiling existing prefabricated culverts”

**C3.2.13.1 Removing and stacking existing culverts for re-use (size and type indicated)**

Amend the description to the following:

“Removing and stacking existing culverts for spoiling”

**C3.2.13.2 Removing and re-laying existing culverts without stacking (size and type of bedding indicated)**

Amend the description to the following:

“Removing and spoiling existing culverts without stacking”

**C3.2.13.3 Re-laying existing culverts from stacking (size and type of bedding indicated)**

Amend the description to the following:

“Spoiling existing culverts from stacking”

Replace the first two lines of the measurement ad payment clauses with the following:

The unit of measurement shall be the metre of existing pipe or prefabricated portal culvert removed, stacked and/or spoiled, irrespective of pipe diameter, pipe type or type of bedding.

The tendered rate shall include full compensation for lifting, loading, transporting with unlimited freehaul without additional payment, off-loading, stacking (if required) and laying pipes according to the specifications.

Add the following new items:

| Item                                                               | Unit        |
|--------------------------------------------------------------------|-------------|
| <b>C3.2.28      Raising or lowering of existing manhole covers</b> |             |
| (a)      Raising covers by up to 250mm .....                       | Number (No) |
| (b)      Raising covers between 250mm and 500mm .....              | Number (No) |
| (c)      Lowering covers by up to 250mm .....                      | Number (No) |
| (d)      Lowering covers between 250mm and 500mm.....              | Number (No) |

The unit of measurement shall be the number and shall differentiate between height ranges and raising or lowering the manhole.

The tendered rate shall include full compensation for providing all materials, supervision, labour, plant and incidentals required to raise or lower the manhole cover, or cover and slab as necessary.

| Item                                                                                                                               | Unit        |
|------------------------------------------------------------------------------------------------------------------------------------|-------------|
| <b>C3.2.29      Removing and storing existing cast iron/steel manhole and kerb inlet covers and grids (Including frames) .....</b> | Number (No) |



The unit of measurement shall be the number of grids or covers, each complete with frame.

The tendered rate shall include full compensation for the supervision, labour, materials, plant and equipment required for the removal and storage in the site store of all salvaged manhole/kerb inlet covers, grids and frames, plus the removal and disposal of rubble and surplus materials to spoil. If the salvaged materials are not required on site they shall be transported to the Employer's store as instructed by the Employer's Agent with payment made under Dayworks."



**SECTION 3.3: CONCRETE KERBING AND CHANNELING, ASPHALT BERMS, CHUTES, DOWNPIPES, AS WELL AS CONCRETE, STONE PITCHED AND GABION LININGS FOR OPEN DRAINS**

**PART A: SPECIFICATIONS**

**A3.3.1 SCOPE**

*Replace the last sentence with the following:*

"This section also covers the replacement of damaged kerbing, channels, chutes, asphalt berms, linings of all types of construction and includes all work involved in the supply and installation of concrete edgings and bollards."

**A3.3.3 GENERAL**

**A3.3.3.1 Types of structures**

*Replace the first three paragraphs with the following:*

"The types of kerbs, channels, edgings and chutes used shall be as shown on the drawings and as listed in the Schedules of Quantities. All kerbs, channels, concrete edgings and chutes shall be precast, except when laid to a curve of less than one metre (1 m) radius, when they shall be cast in situ.

No units shall be cast in lengths in excess of one metre (1 m) and any lengths shorter than the nominal lengths, which are required as closures, shall be specially cast or saw-cut to the required length. No broken precast units may be used."

**A3.3.5 MATERIALS**

**A3.3.5.2 Drainage structure materials**

**c) Kerbing and channelling**

*Replace with the following:*

"Precast kerbs, channels and concrete edgings shall comply with the requirements of SANS 927 for quality, shape and strength and shall be at least 14 days old before delivery to site. All precast units shall be free of cracks, honeycombing, discolouration or imperfections of any kind. Care shall be taken to ensure that no cracking, chipping or other damage is caused to the units during removal of shuttering, loading, transporting, offloading or placing. The Employer's Agent will reject any kerbs, edgings or channels which do not comply with these requirements and when these units are manufactured on site, the Contractor shall provide the necessary equipment for the relevant tests. Any unit not complying with the foregoing which is rejected by the Employer's Agent, shall be promptly removed and replaced.

Precast and cast in situ kerbs, channels and edgings shall be constructed using at least a Class C25/30-20 concrete."

**e) Bedding material**

*Replace with the following:*

"Precast kerbs and channels shall be laid with a bedding layer and backing concrete of the class indicated on the cross-section drawings. For general traffic the bedding and backing shall be Class C16/20-20, but for bus lanes Class C25/30-20. The bedding shall be laid directly on top of the compacted subbase layer and the bedding thickness will therefore depend on the layer thickness of the asphalt surfacing and basecourse and the dimensions of the specified kerbs and channels. The bedding thickness shall nowhere be less than 50 mm and if necessary, the subbase shall be excavated to achieve this minimum depth.

The Contractor shall allow in his rates for the fact that bedding thickness can be greater than 50mm on this Contract, as indicated on the drawings.



In the case of all beddings and backings, the Tenderer shall base his rates on the dimensions and concrete class indicated on the tender cross-sections for each kerb, kerb and channel combination and edging. Distinction shall be made in the measurement for infall and outfall channels in order to allow for the different bedding / backing dimensions.

The concrete used as bedding shall comply with the requirements of Section C13.4 of these Specifications.”

*Add the following subclause:*

**“(o) Concrete bollards**

Concrete bollards for placing on sidewalks shall be concrete Class C25/30-20 minimum with an exposed aggregate finish to match the exposed aggregate paving. The dimensions shall be 230mm diameter at the top, tapering to 300mm diameter at the base and 1200mm long, as shown on the drawings. Alternatives may be submitted to the Employer’s Agent for approval. The height above pavement surfacing shall be 900mm minimum. The concrete backfill shall be Class C16/20-20 concrete.”

**A3.3.7 EXECUTION OF THE WORKS**

**A3.3.7.1 Drainage structures**

**(b) Prefabricated concrete kerbing and channeling**

*Add the following before the first paragraph:*

“Kerbs shall be propped with an in situ concrete backing as shown on the cross-section drawings. The concrete backing shall be placed and well-punned after the joints in the kerbs and channels have been grouted and allowed at least 24 hours to set. No grouting of joints shall commence until the lines and levels of the kerbs and channels have been approved by the Employer’s Agent.”

**(e) Cast in situ kerbs and channels**

*Add the following before the first paragraph:*

“Cast in situ kerbing and channelling shall be cast in alternate sections using Class 30/20 concrete. Except where shorter sections are necessary for closures, or where otherwise shown on the drawings or ordered by the Employer’s Agent, the lengths of sections shall be uniform throughout and equal to 2 m for every 100 mm average thickness or depth of concrete measured perpendicular to the bed. The joints in the channels shall be aligned with the joints in the kerbs.

After the concrete in the alternate sections has set, the exposed end surfaces shall be painted with a coat of an approved bituminous emulsion containing 60% of bitumen, and the emulsion shall be allowed to set and dry. The intermediate sections shall then be cast and the exposed surfaces finished off in accordance with the applicable requirements given above.”

**(k) Backfilling**

*Add the following before the first paragraph:*

“The above requirements for backfilling shall apply also to precast edgings. The material used for backfilling shall comply in all respects with the specified requirements for the materials in the adjacent layers and the backfill material shall be compacted to the density specified for the adjacent layers of construction. Surplus excavated material shall be spread or disposed of as directed by the Employer’s Agent. “

**(l) Construction sequence**



*Add the following before the first paragraph:*

*"Kerbs and channels shall be installed on top of the completed and approved subbase layer. Where necessary, the subbase shall be excavated in order to place a concrete bedding of 50 mm minimum depth. The kerbs and channels shall be completed and approved before the construction of the basecourse is commenced, unless otherwise authorised by the Employer's Agent."*

*Add the following after "Where kerbs and channelling are constructed after the asphalt base and/or asphalt surfacing":*

*"The procedures and requirements specified above shall also apply to the installation of kerbs and channels in existing roads."*

**(m) Protection**

*Add the following before the first paragraph:*

*"The covering of precast concrete units with sand, gravel, crusher dust or any material other than an approved sheeting as protection during bitumen spraying will not be acceptable."*

**(n) Cutting existing bituminous surfacing and pavement layers**

*Add the following:*

*"Only in the case of cast in situ kerbing, channelling or concrete-lining shall the concrete be placed directly against the cut edge."*

*Add the following new subclauses:*

**(p) Excavation and preparation of backing**

*"Where trenches for kerbs, channels, edgings and chutes are necessary, the trenches shall be excavated to the required width and depth. Before laying is commenced, the bottom of the trench shall be compacted to a density not less than the density required in the adjacent layers of construction. No bedding or backing material shall be placed on top of unsuitable, uncompacted or disturbed material. Unsuitable material beneath the bedding shall be removed and replaced with approved material. The concrete bedding material shall be placed, compacted and accurately shaped to the required dimensions and grades as shown on the drawings."*

**q) Painting of kerbs**

The top and face of all bellmouth kerbs, where instructed by the Employer's Agent, shall be painted using an approved road marking paint conforming to SANS 731. The kerb lengths shall be painted alternately black and white. An approved masonry undercoat shall be applied to the kerbing before the application of the road marking paint.

The kerb face at all traffic island noses where instructed by the Employer's Agent, shall be painted white over the entire semi-circle of the nose using an approved retro-reflective road marking paint conforming with SANS 731. An approved masonry undercoat shall be applied to the kerb face before the application of the retro-reflective road marking paint inclusive of beads.

**r) Depressed kerbs and channels at Pedestrian Crossings, Cycle Paths and Driveway Entrances**

At pedestrian crossings, cycle paths and driveway entrances, or where directed by the Employer's Agent, depressed kerbs or C2 and C1 channels shall be provided as detailed on the drawings. The installation of the road-edge channel is unchanged. At driveway entrances, the kerb shall be depressed so that the top of the depressed kerb is 40mm above the back of the road-edge channel. At pedestrian crossings and cycle paths, the top of the C2 channel shall be laid level with the back of the C1 road-edge channel.



The concrete bedding and backing dimensions for the kerb shall be the same as those specified for the normal kerb installation, except that the subbase under the kerb shall be excavated to a depth at which the minimum bedding thickness of 50 mm is attained. At driveway entrances, there shall be at least 150 mm of subbase below the bedding concrete. Where necessary, the material underneath the bedding and backing to the kerb and channel shall be excavated and backfilled with subbase so that the minimum compacted depth of 150 mm is achieved. The bedding concrete shall then be placed on top of the compacted subbase. The sidewalk or driveway entrance level shall be adjusted over the full length of the section of depressed kerbs, so that a straight grade is produced from the back of the kerb to the back of the sidewalk or driveway entrance as directed by the Employer's Agent. The adjustment to the kerb levels shall normally be made over the length of one inclined kerb.

**s) Approval of samples**

Before ordering or delivering any precast kerbs, channel, edgings or chutes, the Contractor shall furnish to the Employer's Agent for approval a sample consisting of at least two of each of the units he proposes to use. The approved samples will be used as the standard against which all units used in the works will be compared. Any kerb which is so twisted that there is a deviation of more than 3 mm on the front face and 10 mm on the back face between adjacent kerbs when laid shall be rejected. Any unit which is inferior to the approved sample and is rejected by the Employer's Agent shall be promptly removed from site at the Contractor's expense.

**t) Laying of precast concrete edging**

The edging at the back of sidewalks shall be laid after completion of the selected subgrade and before the sidewalk base is constructed. It will therefore be necessary to excavate a trench in the selected subgrade along the line of the edging. The edging shall then be laid true to line and level on a concrete bedding placed in this trench. The concrete mix used for the bedding and backing shall be in accordance with Subclause A3.3.5.2 (e) of the Project Specification. The dimensions of the bedding and backing shall be as shown on the cross-section drawings.

**u) Expansion joints in kerbs and channels**

Provision shall be made in kerbs and channels for expansion joints of width at least 12 mm at intervals not exceeding 20 m. The concrete surfaces shall be primed and the joints filled with an expanded foam spacer and approved sealant. Sealant for expansion joints in kerbing shall comply with the relevant requirements of SANS 110. Sealant for expansion joints in channels shall comply with the relevant requirements of BS 2499.

**v) Removal of kerbing, channelling and edging**

Where indicated by the Employer's Agent, the Contractor shall remove existing kerbing, channelling and edging and remove all demolished kerbing, channelling, edging and concrete bedding and backing from the site of the Works. The surrounding ground surface shall be reshaped in order to backfill the voids caused by the removal of kerbing, channelling and edging.

**w) Laying kerbs and channels in existing road**

Where kerbs and channels have to be laid in an existing road, a trench shall be neatly cut into the existing surfacing and pavement layers with an asphalt cutter to the required line and of sufficient depth and width to allow for the bedding and backing. The kerbs and channels shall then be laid to the requirements of Chapter 3.3 of the Specifications. The space between the existing surfacing and the edge of the channel shall be backfilled with concrete, Class 20/20, up to the level of the top of basecourse and the remaining space filled with the same asphalt surfacing as specified in this Contract. The requirements of Sub-subclause A3.3.7.1 (l) of the Specifications shall apply to this work.

**x) Dismantling, storing and re-installation of concrete street furniture**

Where ordered by the Employer's Agent, the Contractor shall dismantle and remove existing concrete street furniture such as concrete kilometre markers, concrete posts / bollards, concrete rubbish / garbage bins, concrete benches, concrete bubble blocks, etc., store them, and re-erect

/ re-install them at new positions indicated. The work shall be done with as little damage as possible to the street furniture.



Where required by the Employer's Agent, the street furniture shall be repaired and new materials shall be used for part or all of the supporting structure."

**y) Installation of Kassel Kerbs**

Kassel Kerbs shall be collected from the nearest City of Cape Town Depot which stocks the kerbs. The Contractor shall allow in his pricing to sort the kerbs at the depot, then load them on new pallets and load them onto the Contractor's truck. The Contractor shall inspect them and satisfy himself that they are all in good order before leaving the depot. Thereafter the Contractor shall be solely responsible for the condition of the Kassel Kerbs.

The Kassel Kerbs shall be transported to site, securely stockpiled, transported to the point of installation and installed in accordance with the drawings and Clause A3.3.8. All Kassel Kerbs issued to the Contractor but not built into the works or returned to the Depot shall be to the account of the Contractor. Kassel Kerbs shall be installed with a 5mm thick Sondor SPX45 expanded foam spacer, or equivalent approved spacer, at 1m intervals. This spacer shall be precut with a 10mm tear off strip on the exposed face to allow for sealing with a Dow Corning 888 silicone seal."

**A3.3.8**

**WORKMANSHIP**

*Add the following new subclause:*

**(a) Concrete Kerbing and Channelling**

**(ii) Vertical Alignment and Level**

*Replace the first sentence with the following:*

"The top edge of all channels which carry water shall always be between nought (0) and ten millimetres (10 mm) below the top of the adjacent bituminous surfacing. Where the fall on the channel is away from the kerb face, the bituminous surfacing shall be finished off flush with the channel edge."

*Add the following to Clause A3.3.8.1(a) Concrete Kerbing and Channelling*

**"(v) Kassel Kerbs**

The construction tolerances for Kassel Kerbs shall be as follows :

Horizontal Alignment : The maximum deviation of the leading edges of the Kassel Kerb from the specified position shall be 25mm.

Vertical Alignment : The leading edge of the Kassel Kerbs shall nowhere be above the finished road level nor more than 3mm below the finished road level.

Trueness of Exposed face : When tested with a 3mm straight-edge no surface irregularities shall exceed 3mm, nor should there be a displacement between adjacent kerbs which in the opinion of the Employer's Agent would cause damage to the tyres of the IRT buses.

Kassel Kerbs with chips or cracks on the exposed face shall be removed and replaced with undamaged Kassel Kerbs at the cost of the Contractor."





**PART C: MEASUREMENT AND PAYMENT**

| Item                                  | Unit      |
|---------------------------------------|-----------|
| <b>C3.3.1 Concrete kerbing:</b> ..... | metre (m) |

*Add the following to the end of payment clause of 3.3.1:*

The unit of measurement for shall be the linear metre.

| Item                                                                                                 | Unit      |
|------------------------------------------------------------------------------------------------------|-----------|
| <b>C3.3.19 Precast concrete bollard, 230mm diameter, 1200mm long, exposed aggregate finish</b> ..... | metre (m) |

The unit of measurement shall be the number of precast concrete bollards placed and approved.

The tendered rate shall include full compensation for all work necessary for the supply, installation and other incidentals necessary to install the bollards as shown on the drawings or instructed by the Employer's Agent. Refer to subclause A3.3.5.2 (o).

**C3.3.20 Inlet, outlet, transition and similar structures (measured by components)**

|                                                 |                  |
|-------------------------------------------------|------------------|
| <b>C3.3.20.1 Concrete class C25/30-20</b> ..... | cubic metre (m³) |
|-------------------------------------------------|------------------|

The unit of measurement shall be the cubic meter of concrete in place and approved.

The tendered rate shall include full compensation for procuring and furnishing all the materials, storing the materials, providing all plant, mixing, transporting, placing and compacting the concrete, forming the inserts, construction joints (except mandatory construction joints and contraction joints as measured), preparing the surfaces for structural bonding, repairing defective surfaces, and finishing the concrete surfaces as specified. Payment shall distinguish between the different classes and particular requirements of concrete.

**C3.3.20.2 Formwork**

|                                              |                   |
|----------------------------------------------|-------------------|
| <b>C3.3.20.2 (a) F1 surface finish</b> ..... | square metre (m²) |
|----------------------------------------------|-------------------|

|                                              |                   |
|----------------------------------------------|-------------------|
| <b>C3.3.20.2 (b) F2 surface finish</b> ..... | square metre (m²) |
|----------------------------------------------|-------------------|

The unit of measurement shall be the square metre, and only the actual area of formwork in contact with the finished face of the concrete shall be measured. Formwork for the different classes of finish shall be measured separately. Formwork for construction joints shall be measured for payment under class F1 surface finish, but only formwork for mandatory construction joints shall be measured for payment.

The tendered rates shall include full compensation for procuring and furnishing all materials required, erecting the falsework and formwork, constructing the forms, forming the grooves, fillets. chamfers up to 100 mm and stop-ends for construction joints, treating and preparing the forms, all bolts, nuts, ties, struts and stays, stripping and removing the formwork after completion of the work, all labour, equipment and incidentals, and rubbing and surface treatment. Payment of 80 % of the amount due for formwork will be made when the formwork has been removed, and payment of the remaining 20 % will be made on approval of the concrete surface finish.



**C3.3.20.2 (c) Class U2 surface finish .....square metre (m²)**

The unit of measurement shall be the square metre, and only the actual area of surface finish. This finish is required on sidewalks; the tops of wing walls and retaining walls; exposed concrete shoulders and unsurfaced areas on bridge decks; the inverts of box culverts; and decks which are to receive surfacings other than asphalt or concrete.

**Item** **Unit**

**C3.3.21 Remove and Reuse existing Granite/Sandstone kerbing–channelling consisting of:**

**C3.3.21.1 (a) Kerbing ..... metre (m)**

**C3.3.21.1 (b) Channelling ..... metre (m)**

This item will apply where existing granite/sandstone kerbs and channels are to be carefully removed, stockpiled, and reused later in the works.

The unit of measurement shall be the metre of kerbing or channelling complete, measured along the front face of the kerb. Kerbs and channels will be measured individually.

The tendered rate shall include full compensation for all supervision, labour, plant, equipment, materials, excavation, backfilling, careful removal, cleaning and preparing, haulage to a nearby stockpile site, stockpiling securely on site, haulage of material from stockpile to the point of installation, excavation and preparation of bedding, backfilling, furnishing, and installing all materials from stockpile, protecting work against staining, supporting the kerbs with in-situ cast concrete bedding and backing, and filling and pointing all construction or contraction joints, and producing and sealing all expansion joints, all complete as specified as well as any other incidentals necessary to carefully remove and reuse the existing kerbs and channels. The tendered rate shall also include the removal and haul of all surplus materials to spoil off-site, at approved dumps.

All concrete shall conform to the required specification.



COTO CHAPTER 4: EARTHWORKS AND PAVEMENT LAYERS: MATERIALS

SECTION 4.1: BORROW MATERIALS

PART A: SPECIFICATIONS

A4.1.7 EXECUTION OF THE WORKS

A4.1.7.2 Borrow pit and quarry operations

b) Classes of excavation

(iv) Hard excavation

In the 2<sup>nd</sup> bullet after: "Ripping with a bulldozer" add the following:

"Ripping shall be carried out on typically moderately weathered soft rock (soft rock as defined in Section 12.1 Table A12.1.7-1) that can be efficiently ripped by a bulldozer with a weight of at least 35 tons and minimum nett power of 220 kW."

PART C: MEASUREMENT AND PAYMENT

| Item | Unit |
|------|------|
|------|------|

C4.1.1 Provision Items measured by number

Add the following sub-items under this payment item and amend the payment:

"C4.1.1.3 For stockpile area .....number (No.)

The unit of measurement shall be the number of compiled M&U plans for borrow pits, quarries and stockpile areas.

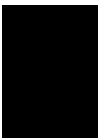
The tendered rates shall include full compensation for gathering all information and compiling the plans, for topographical surveys and for ensuring the implementation of the plans during the operation of the stockpile area.

| Item | Unit |
|------|------|
|------|------|

C4.1.12 Stockpiling the material

Add the following before the last paragraph:

No measurement under C4.1.12.1 or C4.1.12.2 is applicable where stockpiles are placed on the layers of the existing road pavement and the new road pavement."



**SECTION 4.2: CUT MATERIALS**

**PART A: SPECIFICATIONS**

**A4.2.7 EXECUTION OF THE WORKS**

**A4.2.7.1 Excavation operations**

**i) Excavation of material in box cuts**

*Add the following after the last paragraph:*

“No additional payment will be made for cutting of benches and shall be included in the rates provided.”

**A4.3.3 GENERAL**

**A4.3.3.1 Employer identified existing road materials**

*Replace the first sentence in the 2<sup>nd</sup> paragraph with the following:*

“All the suitable material from the existing pavement shall be re-used optimally. Excavated material from the road prism shall be taken to stockpile, subjected to the required laboratory tests and re-used appropriately in its final application.”

**PART C: MEASUREMENT AND PAYMENT**

*Amend pay item C4.2.4 to the following:*

| Item                                                                                        | Unit |
|---------------------------------------------------------------------------------------------|------|
| <b>C4.2.4 Excavating of materials in box cuts to stockpile site, material obtained from</b> |      |

*Add the following after the 4<sup>th</sup> fourth paragraph:*

The tendered rate shall include transport to an approved stockpile, inclusive of all haulage and additional traffic accommodation measures, off-load the material and finally load the material for re-use. Stockpiling of material shall be paid under C4.1.12.

*Add the following payitem:*

| Item                                                                                                                                       | Unit |
|--------------------------------------------------------------------------------------------------------------------------------------------|------|
| <b>“C4.2.13 Extra-over C4.2.4 for hand excavation in box cuts in close proximity to existing services..... cubic metre (m<sup>3</sup>)</b> |      |

The unit of measurement shall be the cubic metre of hand excavation measured within the box cut area up to roadbed level, or in the outer extremities of the box cut, which must be carried out using hand tools in order to comply with wayleave conditions. The measurement under this payment item shall be agreed with the Employer’s Agent beforehand and written permission obtained including prior agreement as to the length, width and depth to be carried out by hand. No measurement under this item shall be made for box cut to road level using any mechanical plant.

The tendered rate shall include full compensation for the use of hand tools to carefully excavate within close proximity of an existing service and only within the restricted width and depth dictated by the relevant wayleave condition. The tendered rate shall allow for the excavated material to be placed by hand in a windrow or heap to the side where it can be loaded using conventional mechanical plant.”



**SECTION 4.3:        EXISTING ROAD MATERIALS**

**PART A:        SPECIFICATIONS**

**A4.3.7        EXECUTION OF THE WORKS**

**A4.3.7.4        Milling**

*Replace the last sentence in the 4<sup>th</sup> paragraph with the following:*

“Loose asphalt shall be removed by brooming.”

**PART C:        MEASUREMENT AND PAYMENT**

| Item | Unit |
|------|------|
|------|------|

|                                                           |  |
|-----------------------------------------------------------|--|
| <b>C4.3.15        Stockpiling of road layer materials</b> |  |
|-----------------------------------------------------------|--|

*Delete the 3<sup>rd</sup> and 4<sup>th</sup> paragraph and replace with the following:*

“All haul costs shall be included in the tendered rates of item C4.3.15.”

*Add the following new item:*

| Item | Unit |
|------|------|
|------|------|

|                                                                                    |  |
|------------------------------------------------------------------------------------|--|
| <b>PC4.3.21        Mixing of reclaimed asphalt millings with granular material</b> |  |
|------------------------------------------------------------------------------------|--|

The unit of measurement shall be the cubic metre of the combined material mixed.

The tendered rate shall include full compensation for mixing the different materials together to form a uniformly mixed material as per Clause A5.4.7.2 and that is compliant with the properties required for the pavement layer for which the modified material is being used.

Payment for the construction operations required to process and compact the modified material shall not be included under this item.



## **SECTION 4.4: COMMERCIAL MATERIALS**

### **PART A: SPECIFICATIONS**

#### **A4.4.5 MATERIALS**

##### **A4.4.5.1 Earthworks and pavement layer materials**

*Add the following after the last paragraph:*

Material from the road prism sourced for re-use in the permanent works shall be stockpiled separately at the source. In such an instance it is not a requirement that the sourced material be fenced off.

Excess materials or materials to be processed shall be taken to stockpile. The location of stockpile areas and plant for processing of material from the pavement layers shall be as close to the works as possible and agreed with the Engineer. No land has been made available for the execution of this operation. The Contractor will secure land to stockpile material. No separate payment will be made for securing land.

##### **A4.4.5.4 Non-traditional stabilising or soil treatment agents**

*Replace the description with the following:*

"Non-traditional stabilising or soil treatment agents shall not be allowed."

#### **A4.4.7 EXECUTION OF THE WORKS**

##### **A4.4.7.1 Selection (design) of the stabilising agent content**

**(c)Cementitious stabilising agent for chemical stabilisation**

**Step 2: Determine the Initial Consumption of Stabiliser (ICS) of the material.**

*Add the following after the 1<sup>st</sup> paragraph:*

"The ICS shall be determined for more than one stabilizer agent and the stabilizer agent to be utilised in Step 3 shall be selected by the Engineer based on the ICS results."



**COTO CHAPTER 5: EARTHWORKS AND PAVEMENT LAYERS: CONSTRUCTION**

**SECTION 5.1: ROADBED**

**PART C: MEASUREMENT AND PAYMENT**

**(i) Preamble**

*Add the following to the 3<sup>rd</sup> paragraph:*

"No additional payment shall be made, nor shall any claim for additional payment be considered for construction of benches as per payment item C5.1.12 and shall be included in the rates provided in this section."

**SECTION 5.2: FILL**

**PART A: SPECIFICATIONS**

**A5.2 FILL**

**A5.2.3.3 Fill layer thickness**

*Add the following to the 2<sup>nd</sup> paragraph:*

"The fill layer thicknesses shall not exceed 200mm."





**SECTION 5.3: ROAD PAVEMENT LAYERS**

**PART A: SPECIFICATION**

**A5.3.3 GENERAL**

**A5.3.3.4 Compaction of pavement layer material**

*Add the following to the last paragraph:*

“The compaction of crushed (G5B) or a mixture of material, stabilized with chemical agents and placed as subbase pavement layers in one operation of 250mm thick, shall be 96% of MDD on average measured for the full depth of the layer with a minimum of 97% of MDD for the upper 150mm. Densities measured in the same test in the upper 150mm and in the lower 100mm of the layer shall not vary by more than 2%.”

The percentage content of the chemical stabilizing agent in the material shall be uniform throughout the layer thickness.

**A5.3.7 EXECUTION OF THE WORKS**

**A5.3.7.2 Combining materials**

*Add the following:*

“It is a requirement that reclaimed materials obtained from the road prism be re-used. If required, material from commercial sources and from the road prism may be mixed uniformly either at the point of use or at the stockpile site(s).”

**A5.3.8 WORKMANSHIP**

**A5.3.8.5 Surface regularity**

*Add the following to the 1<sup>st</sup> paragraph:*

“The surface regularity shall be assessed on the final prepared layer after all excess fines have been swept off the surface.”

**c) By using a profiler**

In the paragraph following Table A3.5.8--6, delete the following: " for payment items \*\*\* \_\_\_\_\_ ", and replace with the following: "for payment items as specified in the Contract Documentation".

**PART C: MEASUREMENT AND PAYMENT**

| Item                                          | Unit |
|-----------------------------------------------|------|
| <b>C5.3.2 Construction of pavement layers</b> |      |

*Delete the 3<sup>rd</sup> and 4<sup>th</sup> paragraph and replace with the following:*

Measurement and payment for loading the layer work material stockpiled from material from existing roads, transporting and then off-loading the material at the point of use shall be included in the tendered rates.



## **SECTION 5.4: STABILISATION**

### **PART A: SPECIFICATION**

#### **A5.4.6 CONSTRUCTION EQUIPMENT**

*Delete the last paragraph and replace with the following:*

“Side-spraying tankers travelling off the layer is not required.”



**COTO CHAPTER 9: ASPHALT LAYERS**

**SECTION 9.1: ASPHALT LAYERS**

**PART A: SPECIFICATIONS**

**A9.1.5 MATERIALS**

**A9.1.5.4 Aggregates**

**a) Aggregate properties**

*In the 1<sup>st</sup> paragraph, delete the 2<sup>nd</sup> sentence: "Coarse and fine aggregate shall be clean and free from decomposed materials, vegetable matter or any other deleterious substances, and shall meet the requirements listed in Table A9.1.5-1 below unless otherwise specifically stated in the Contract Documentation.", and replace with the following:*

"Coarse and fine aggregate shall be clean from excess dust and free from decomposed materials, vegetable matter and any other deleterious substances such as clay lumps and organic matter and shall meet the requirements listed in Table A9.1.5-1 below unless otherwise specifically stated in the Contract Documentation."

**A9.1.8 WORKMANSHIP**

*Add the following new section:*

**A9.1.8.4 Surface regularity**

**a) Measured using inertial laser profilometers**

*In the 6<sup>th</sup> paragraph add the following prior to "The applicable Full Payment Bracket ...":*

"For the Asphalt Base the values in Payment Bracket 6 in Table A9.1.8-3 shall be applied as the payment adjustment factors for the Asphalt Base on the contract or section, and for the Asphalt Surfacing".

*In the 6<sup>th</sup> paragraph add the following after "...assessment of the base as per Clause A5.3.8.5c) of Chapter 5 for granular bases":*

" , and this clause A9.1.8.4a) for Asphalt bases."

*In the 7<sup>th</sup> paragraph, delete: "under 1".*

*Add the following after the 8<sup>th</sup> paragraph:*

"Where the asphalt surfacing is placed on a surface, other than a granular or asphalt base, constructed by the Contractor through mill and replace or patching, the surface regularity of the replaced or patched surface shall be measured before the surfacing is placed. Should the IRI values per 100m section so determined be better than the IRI values of the original surfacing for the particular 100m section, the measured values shall be used for the  $IRI_{b Ave}$  in the above calculation. Should the IRI values per 100m section so determined be worse than the IRI values of the original surfacing for the particular 100m section, the IRI values of the original surfacing shall be used for the  $IRI_{b Ave}$  in the above calculation."

*In the 9<sup>th</sup> paragraph, delete : "surfacing".*



For Table A9.1.8-3, delete "surfacing" in the heading and add the following additional Payment Bracket to Table A9.1.8-3

| "Target IRI <sub>100m Ave</sub> (m/km) | Payment Bracket 9 |
|----------------------------------------|-------------------|
| < 0.80                                 | 1.050             |
| 0.81 to 0.90                           | 1.050             |
| 0.91 to 1.00                           | 1.050             |
| 1.01 to 1.10                           | 1.050             |
| 1.11 to 1.20                           | 1.050             |
| 1.21 to 1.30                           | 1.050             |
| 1.31 to 1.40                           | 1.050             |
| 1.41 to 1.50                           | 1.050             |
| 1.51 to 1.60                           | 1.050             |
| 1.61 to 1.70                           | 1.025             |
| 1.71 to 1.80                           | 1.010             |
| 1.81 to 1.90                           | 1.000             |
| 1.91 to 2.00                           | 0.990             |
| 2.01 to 2.10                           | 0.975             |
| 2.11 to 2.20                           | 0.955             |
| 2.21 to 2.30                           | 0.930             |
| 2.31 to 2.40                           | 0.900             |
| 2.41 to 2.50                           | 0.865             |
| >2.51                                  | Reject"           |

#### PART C: MEASUREMENT AND PAYMENT

| Item                                                                                                                                                                                                                                        | Unit |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| PC9.1.17 Asphalt reinforcement interlayers, supply and install                                                                                                                                                                              |      |
| PC9.1.17.1 High strength, open fibreglass grid, custom knitted in a stable construction and coated with an elastomeric polymer and a pressure sensitive adhesive backing - Glasgrid 8511 or equivalent ..... square metre (m <sup>2</sup> ) |      |

The unit of measurement shall be a square metre of asphalt covered with reinforcing placed, complete as specified and accepted by the Engineer.

The tendered rate shall include full compensation for procuring, providing, placing and fixing all materials (irrespective of the quantity of reinforcing required), overlapping and cut-offs included, and for all transport equipment, tools, labour, supervision and all other costs necessary for installing and protecting the reinforcing until the asphalt bond coat has been placed. The tendered rate shall also include full compensation for all special preparatory work required. If it is necessary to repair cracks in the underlying seal or asphalt layer, separate payment shall be made therefore under the appropriate payment items.

## COTO CHAPTER 11: ANCILLIARY ROADWORKS

### SECTION 11.4: ROAD RESTRAINT SYSTEMS

#### PART A: SPECIFICATIONS

##### A11.4.1 SCOPE

*Add the following sentence at the end of the paragraph:*

"This section also includes the removal of identified handrails, guardrails and posts, the selection and renovating of the identified handrails and guardrails and re-erection where instructed by the Employer's Agent."

##### A11.4.7 EXECUTION OF WORKS

##### A11.4.7.3 Removing, renovating and re-erecting existing guardrails on timber posts

*Add the following before the first paragraph:*

"Where construction or widening is to be carried out adjacent to existing guardrails or handrails, the Contractor shall carefully remove all elements of the guardrails or handrails, temporarily store the elements and re-erect them on completion of the layerworks, kerbing and surfacing. The timing of the guardrail and handrail installation in relation to the completion of the surfacing/widening shall be approved by the Employer's Agent. The Employer's Agent will indicate which guardrail or handrail materials are suitable for re-use. Any elements damaged as a result of negligent workmanship shall be replaced by the Contractor at his own cost. Materials that are suitable for re-use shall be cleaned and painted as instructed."

#### PART C: MEASUREMENT AND PAYMENT

*Add the following new items:*

| Item                                                                                                 | Unit      |
|------------------------------------------------------------------------------------------------------|-----------|
| <b>C11.4.16</b> <b>Dismantling, rehabilitation, painting, and re-use of existing handrails</b> ..... | metre (m) |

The unit of measurement shall be the metre of existing handrail dismantled, refurbished and re-used in accordance with the detail on the drawings. Refer to Drawing HHO-220017-101-3202 for the handrail detail.

The tendered rate shall include full compensation for all materials, tools and equipment required for dismantling and reinstalling of the handrail as required as well as storage and handling costs. Any damage incurred on the specified items during these activities shall be repaired or replaced at the Contractor's cost unless otherwise agreed with the Employer's Agent.

The tendered rate shall also include a condition survey of the handrails on site and the submission of a work method statement to the Employer's Agent outlining how the handrails will be removed, repaired and reinstalled.

Should new materials be required, because the existing post, handrail or sections thereof are damaged and unfit for re-use, the new materials shall be measured under C11.4.17 below.

##### **C11.4.17**      **New material required for the re-erection of existing handrails**

C11.4.17.1      New rail .....metre (m)

C11.4.17.2      New post..... number (No.)

The unit of measurement for subitem C11.4.17.1 shall be the metre of new handrail procured and installed.

The unit of measurement for subitem C11.4.17.2 shall be the number of new posts procured and installed.

Refer to Drawing HHO-220017-101-3202 for handrail details.

The tendered rates shall include full compensation for all supervision, labour, equipment's, materials, transport, tools and equipment required for procuring and installing the new materials as required in the re-installed handrail, as an extra over to item B54.14."

**C11.4.18 Supply and install protection bars at staggered pedestrian crossings  
as indicated on the drawing HHO-220017-101-2404. .... metre (m)**

The unit of measurement for subitem C11.4.18 shall be the metre of new protection bar procured and installed.

Refer to Drawing HHO-220017-101-2405 for the protection bar details.

The tendered rates shall include full compensation for all supervision, labour, equipment's, materials, transport, tools and equipment required for procuring and installing the new materials as required to installed the protection bars at staggered pedestrian crossings"

**C11.4.19 Supply and install handrails according to standard  
drawing CoCT-GE2. .... metre (m)**

The unit of measurement for subitem C11.4.19 shall be the metre of new handrail procured and installed.

Refer to Drawing HHO-220017-101-3202 for the protection bar detail.

The tendered rates shall include full compensation for all supervision, labour, equipment's, materials, transport, tools and equipment required for procuring and installing the new materials as required in the new handrails.



## **SECTION 11.5: FENCING**

### **PART A: SPECIFICATIONS**

#### **A11.4.1 SCOPE**

Add the following:

“This section covers all work related to the removal of all existing fences, walls and gates on the existing property/road reserve boundaries and their re-erection/reconstruction on the revised boundaries as shown on the drawings. Existing wire fences, precast concrete walls and palisade fences shall be dismantled and re-erected in new positions. All brick walls with brick columns shall be demolished and reconstructed in new positions. All combination brick walls with brick columns with fencing or palisade components shall be demolished/dismantled and reconstructed in new positions. The Contractor will be required to survey and set out the revised boundaries.

All such new fencing and fencing removal shall be carried out to the satisfaction of the Employer's Agent and each property owner. In this regard the fencing subcontractor shall allow for prior notice to the property owner, before entering onto his property; and daily consultation to keep him informed about progress and about any matters which affect the property owner's access and safety.

The fencing strategy shall be to erect temporary fencing on one erf or property at a time, so that residents and property owners are fully protected from unlawful entry or trespassing onto their properties. This will include temporary gates and pedestrian gates. Temporary fencing and gates shall be to at least the same height as the existing fence and gate. The temporary fence shall be fully erected prior to demolishing/dismantling the existing fence. The new fence shall then be reconstructed/re-erected in its new location as quickly as possible, using the recovered components of the existing fence; or building new brick walls, brick columns, brick buttresses, etc., together with all existing additional fencing components and accessories; including electrical connections, electrical security fencing, gate motors, telecoms systems, remote gate openers, communications systems, property numbers on walls, razor wire, etc.

This scope also covers the repairing of existing fences where it is necessary. In this regard the Tenderer shall allow in his prices for the replacement of at least an amount of 10% of all fencing components, which could already be damaged, or could be unavoidably damaged in the dismantling operations. This includes all posts, standards, straining posts, concrete panels, steel panels, mesh panels and all required accessories and fittings such as nuts, bolts, washers, screws, fasteners, gate hinges, etc. In this regard, where existing fences have to be demolished and removed from site, the Contractor shall stockpile all re-usable fencing components so that he has enough materials to replace those already damaged, or unavoidably damaged during the dismantling and re-erection process.

All brick walls and buttresses shall be constructed to the same height, width, spacing and standard of the existing fence. Bricks shall be face brick of the same or similar colour and standard of the existing fence.

All wire fencing, palisade fencing, wire netting, security fencing, etc., shall be at least to the standard of the existing fence or better. All fencing materials shall conform to the minimum specifications as stipulated in A11.5.5.12 (e) of the standard specifications, particularly in terms of Class A galvanizing to suit coastal conditions. Spacings of standards, posts, straining posts, etc., shall match that of the existing fence. The fencing subcontractor shall therefore measure up the existing fences and walls prior to demolition or dismantling, including the taking of photographs, so that there can be no arguments with property owners after the fact.

In order to assist the Tenderer, the details of the existing fences and walls on property boundaries are provided in C4 site information Section 4, together with photographs, per property. These fence and wall details shall be used by the Tenderer to obtain prices from fencing or building subcontractors for the dismantling of existing fences and gates, demolition of walls where required and the re-installation/construction of the walls, fences, gates, electric fencing, etc., in their new locations.

The Tenderer shall be deemed to have visited the site of the works, inspected each property and property boundary and taken his own measurements in order to confirm the accuracy of the details





provided in C4 site information, so that he can price for the full scope of work required to demolish/dismantle/re-install each fence or wall inclusive of all gates and accessories.

Should it be necessary to install new sections of high security fence (Clear View) anywhere, such new fences shall comply with Subclause A11.5.5.12 (e) and A11.5.7.2 (e) below. A nominal amount of new high security fence has been allowed for in the schedule of quantities in new payment items C11.5.1.12.

#### **A11.5.5 MATERIALS**

##### **A11.5.5.12 Alternative materials**

Replace the sentence with the following:

Alternate materials required for the construction of the various types of fencing are as stipulated below:

- (a) Vibracrete walls
  - Precast plain concrete slabs at 58 kg per member.
  - Precast concrete pillars at 76 kg per member
  - Concrete as per section A13.4 of chapter 13
- (b) Steel Palisade Fences
  - Low carbon steel, stainless steel.
  - Concrete as per section A13.4 of chapter 13
- (c) Palisade Fences and Brick Pillars
  - Low carbon steel, stainless steel
  - Clay bricks for pillars shall comply with SANS 227.
  - Cement used in brick pillars shall comply with the requirements of SANS 471, SANS 626 and SANS 831.
  - Fine Aggregate (sand) used in mortar shall comply with the requirements of SANS 1090.
  - Concrete as per section A13.4 of chapter 13.
- (d) Brickwall
  - Clay bricks for pillars shall comply with SANS 227.
  - Cement used in brick pillars shall comply with the requirements of SANS 471, SANS 626 and SANS 831.
  - Fine Aggregate (sand) used in mortar shall comply with the requirements of SANS 1090.
  - Concrete as per section A13.4 of chapter 13.
- (e) Security Fences
  - Corrosion protection: mesh panels - zincalco posts / structure / rails / spikes: hot galvanised
  - Galvanised Cochrane Taper Locking Post



- Concrete as per section A13.4 of chapter 13.
- Tamper Proof fixing: To post - clamp fixed with 70 x 6 cover strips, using m8 allan socket mushroom head bolts, rivnuts & flat washers
- To rails - bolted using m8 anti-vandal cup square bolts, shear off nuts and fender washers
- All fasteners and fixing screws shall be to grade 304 stainless steel.
- Additional coating: Fence mesh panels, posts, structure & spike rails shall be uniformly pvc coated, which is free of lead, cadmium and D OP, to a minimum thickness of 200microns in accordance to EN 10245-2 steel wire and wire products - organic coatings on steel wire - part 2: PVC finished wire. Finish colours shall either be RAL 7021 anthracite or RAL 6005 green.

#### A11.5.7 EXECUTION OF THE WORKS

##### A11.5.7.2 Types of fencing

Add the following points:

###### (a) Vibracrete walls

- 2000mm x 300mm 40mm slab.
- 2300mm total height of Pillar to stack 6 slabs to a wall height of 1800mm.
- 500mm x 500mm x 500mm deep concrete footing for Pillars.

###### (b) Steel Palisade Fences

| Dimension of General Palisade Fence |                   |              |                 |                                          |             |            |
|-------------------------------------|-------------------|--------------|-----------------|------------------------------------------|-------------|------------|
| Item                                | Fence Height (mm) | Posts (mm)   |                 | Horizontal rails (rolled steel angle mm) | Pales (mm)  | Angle Type |
|                                     |                   | Rolled Steel | Embedded Length |                                          |             |            |
| GPF-02                              | 1800              | 102 x 44     | 525             | 40 x 40 x 4                              | 40 x 40 x 5 | General    |

- 500mm x 500mm x 525mm deep concrete footing for Post.

###### (c) Palisade Fences and Brick Pillars

| Free standing wall Pier/ Pillar spacing |                                           |                                  |                                     |
|-----------------------------------------|-------------------------------------------|----------------------------------|-------------------------------------|
| Nominal wall Thickness (mm)             | Maximum Height of fence above ground (mm) | Nominal Dimensions of piers (mm) | Maximum centre to pier spacing (mm) |
| 190                                     | 1800                                      | 590 x 390                        | 2800                                |

- Use dimensions of Palisade Fences between piers.
- The foundation for the brick wall shall be constructed in accordance with SANS 10400-H.

(d) Brick wall

| Free standing wall Pier/ Pillar spacing |                                           |                                  |                                     |
|-----------------------------------------|-------------------------------------------|----------------------------------|-------------------------------------|
| Nominal wall Thickness (mm)             | Maximum Height of fence above ground (mm) | Nominal Dimensions of piers (mm) | Maximum centre to pier spacing (mm) |
| 190                                     | 1800                                      | 590 x 390                        | 2800                                |

- The foundation for the brick wall shall be constructed in accordance with SANS 10400-H.

(e) Security fences

| Security Fence dimensions |                         |                                 |                       |                                                      |
|---------------------------|-------------------------|---------------------------------|-----------------------|------------------------------------------------------|
| Fence Height (mm)         | Mesh Wire Diameter (mm) | Post Foundation Dimensions (mm) | Post (mm)             | Lateral support (mm)                                 |
| 2400                      | 3.96                    | 400 x 400 x 800 deep            | 76 x 76 x 2 3200 long | Top spike: 40 x 40 x 40 x 2.5<br>Bottom: 40 x 40 x 3 |

Cast 400 x 400 x 800mm deep 15MPa/19mm concrete at each post.

#### A11.5.7.10 Erecting gates

Add the following:

"The relocation of existing gates is described in A11.5.1 Scope above. The Tenderer is referred to C4 Site information Section 4 for a description of the existing fences and walls. The Contractor will be required to carefully remove existing gates complete with all gate posts and accessories and re-erect them in their new positions as shown on the drawings, or indicated on site. All concrete attached to gate posts shall be carefully removed in order for the posts to be re-erected in their new positions. The tenderer shall allow for new bolts and nuts where they are rusted/corroded.

In the case of sliding gates, gate rails and gate motors, the tenderer shall allow for the removal and disposal of the existing rails and the provision, excavation and casting in Class 20/20 concrete of new galvanized rails to suit the dimensions of the gate in its new position. The Tenderer shall allow for the careful removal and re-installation of the gate motor together with all electrical cabling, electrical connections, conduits, excavation and backfilling in order to install the gate motor and gate in its new location.

In the case of pedestrian gates with remote locking or communications systems, the existing systems shall be carefully dismantled, removed and re-installed in the new location, together with all electrical cabling, electrical connections, conduits, excavation and backfilling."

#### A11.5.7.11 Temporary fencing and gates

Add the following:

"The relocation of existing fences and provision of temporary fencing is described in A11.5.1 Scope above. The temporary fence shall be a pedestrian fence of 1.8m minimum height with timber posts as shown on the typical drawings. The posts and standards need not be backfilled with concrete due to the temporary nature of the fence. Temporary single-leaf gates shall be provided where necessary for vehicles and pedestrians. Vehicle gates shall be 1.8m high and have a minimum width of 3m and pedestrian gates 900mm. All gates shall be provided with locks, chains and locking mechanisms for use by the property owner. All temporary gates shall be of galvanized tubular steel construction with plastic coated diamond mesh attached to the frame."

**PART C: MEASUREMENT AND PAYMENT**

| Item | Unit |
|------|------|
|------|------|

|                |                                                                                                                                                    |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>C11.5.1</b> | <b>Supply and erect new fencing material for new fences and for supplementing material in existing fences which are being repaired or removed:</b> |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------|

*Add the following sub-items under this payment item and amend the payment:*

**C11.5.1.12 New Fences and Boundary walls:**

- |                                                                       |           |
|-----------------------------------------------------------------------|-----------|
| (a) Plain Vibracrete wall (1.8m high) .....                           | metre (m) |
| (b) Steel Palisade Fences (1.8m high) .....                           | metre (m) |
| (c) Steel palisade Fences with Brick Pillars/ Piers (1.8m high) ..... | metre (m) |
| (d) Free standing Brick wall (1.8m high) .....                        | metre (m) |
| (e) Security Fences (1.8m high) .....                                 | metre (m) |

The unit of measurement for items PC11.5.1.12 (a); PC11.5.1.12 (b); PC11.5.1.12 (c); PC11.5.1.12 (d) and PC11.5.1.12 (e) shall be the linear metre (m) erected, of new fences and boundary walls. The tendered rates shall include full compensation for procuring and furnishing all materials, providing all labour, corrosion treatment, excavation, insitu-casting of concrete footings/ foundations, erecting the fences/ walls and all associated handling cost.

*Add the following new payment item:*

| Item | Unit |
|------|------|
|------|------|

|                 |                                                    |           |
|-----------------|----------------------------------------------------|-----------|
| <b>C11.5.11</b> | <b>Demolish and dispose of existing walls.....</b> | metre (m) |
|-----------------|----------------------------------------------------|-----------|

The unit of measurement shall be the linear metre (m) of existing walls to be demolished.

The tendered rates shall in addition include full compensation for the demolition of the brick walls, brick columns, brick buttresses and concrete foundations and the removal of the debris to an approved off site dump including all haul. The tendered rate shall also include all excavations and the backfilling of all excavations.

|                 |                                                                           |           |
|-----------------|---------------------------------------------------------------------------|-----------|
| <b>C11.5.12</b> | <b>Dismantle and dispose of existing walls with precast elements.....</b> | metre (m) |
|-----------------|---------------------------------------------------------------------------|-----------|

The unit of measurement shall be the metre of existing walls to be demolished.

The tendered rates shall include full compensation for the dismantling and removal to stockpile of all fencing/precast concrete components together with all fittings and accessories, gates, etc; all excavation to remove fencing posts and components; the removal and disposal off site to approved dumping sites including all haul of all demolished concrete foundations and concrete backfilling; excavations and the backfilling of all excavations

|                 |                                                                                      |                            |
|-----------------|--------------------------------------------------------------------------------------|----------------------------|
| <b>C11.5.16</b> | <b>Additional work required for the relocation of existing walls and fences.....</b> | Provisional Sum (Prov Sum) |
|-----------------|--------------------------------------------------------------------------------------|----------------------------|

A provisional sum has been allowed for any additional work instructed by the Employer's Agent, which is not included in the scope of work stipulated above.

The provisional sum allowed shall be controlled and expended as stipulated in clause 6.6 of the general conditions of contract.



## **SECTION 11.6: ROAD SIGNS**

### **PART A: SPECIFICATION**

#### **A11.6.1 SCOPE**

*Add the following after the first paragraph:*

"This section also covers the modifications and alterations necessary to the existing road signs and panels on the site of Works, as shown on the drawings or instructed by the Employer's Agent. Where indicated, the existing road signs shall be:

- Relocated to new positions to suit the widening of the carriageway, crossing road or intersection;
- Replaced with new signs to suit the changed geometric circumstances or the new lane configurations;
- Replaced with larger sign panels to suit wider lettering, or additional legends or symbols; and
- Removed to store should they no longer be applicable.

This specification shall also cover the dismantling, refurbishing and reinstatement of steel bus shelters and the installation of flexible "Safe Hit Bollards" in positions instructed by the Employer's Agent.

This work shall include the dismantling of existing road signs; installing new legends and borders on sign faces; installing new structural members or gantry supports; taking down and removing existing gantry supports; increasing the sign face area with additional legends and symbols; and galvanising and painting of structural members all in accordance with the Specifications."

*Add the following after the second paragraph:*

"Sign panels and retro-reflective material shall comply with SANS 1519-1990. Parts 1 and 2: 2006, Road Signs. Where relevant requirements are given in SANS 1519, they shall over-rule any other requirements given in the Standard Specifications or in CKS 191.

SANS and CKS Specifications as well as information concerning the latest issues of the specifications can be obtained directly from the SA Bureau of Standards, Private Bag X191, Pretoria, or from the regional offices of the Bureau in Cape Town, Durban and Port Elizabeth.

The construction and/or rehabilitation of overhead gantry sign supports shall not be carried out under the provision of this section, but shall be carried out under the provisions of Series 6000 and 8000 of the Standard Specifications and all relevant Project Specifications, and under the specifications for Special Works in Part E of these Project Specifications, if applicable."

#### **A11.6.5 MATERIALS**

##### **A11.6.5.1 General material specifications**

*Add the following after the last paragraph:*

"All modifications or additions to existing signs shall be constructed in materials that as far as possible match the existing sign materials. The Employer reserves the right to decide on the sign material and the Employer's Agent will instruct the Contractor accordingly."

##### **A11.6.5.2 Materials**

###### **b) Bolts, nuts and rivets**



Add the following to Subclause A11.6.5.2b:

“Galvanized “Sankeystrut” Universal Clamps (including Nylock nuts, matching bolts and washers) shall be according to Codes 1114 to 1126 depending on the diameter of the pole. The applicable pole diameters are indicated below:

| Clamp Code | Pole Diameter |
|------------|---------------|
| 1114       | 43mm – 47mm   |
| 1115       | 47mm – 51mm   |
| 1117       | 58mm – 63mm   |
| 1118       | 73mm – 80mm   |
| 1119       | 88mm – 95mm   |
| 1120       | 100mm – 107mm |
| 1121       | 111mm – 121mm |
| 1122       | 124mm – 130mm |
| 1123       | 138mm – 150mm |
| 1124       | 160mm – 175mm |
| 1125       | 190mm – 205mm |
| 1126       | 210mm – 225mm |

Cadmium plated mild steel blind rivets / Aluminium rivets of 4.8mm minimum diameter shall be used on all signs.”

**g) Retro-reflective material**

Add the following after the last paragraph:

“Whole sheets shall be used on a single sign face (faces in steel plate) – splicing or overlapping of sheets shall not be permitted.

The following shall be in the possession of the signs manufacturer and made available on request to the Employer’s Agent:

(i) Retro-reflective Manufacturer Certification

Certification from the manufacturer of the retro-reflective sheeting, indicating conformance with the recommended storage, handling and application procedures as laid down by the sheeting manufacturer.

(ii) Certification of Compatibility

Where a manufacturer of retro-reflective signs chooses to overlay products from various sheeting manufacturers, certification of compatibility of the complete system must be supplied by the signs manufacturer from the sheeting manufacturers.

Every batch of material used on the Contract shall be identified by a batch number and the Employer’s Agent shall be provided with a schedule indicating the batch numbers of the material used for each sign.”

Add the following new Subclauses after A11.6.5.2 (m):

**“(o) Fastening details**

All fastening details to edge the assembled sign panel and to fasten the completed panel on to the timber or steel tube sign supports or overhead gantry sign structures shall be constructed in accordance with the details shown on the drawings.

No additional payment will be made for fastening details required to complete and erect the sign according to specification. Fastening details are deemed to be included in the tendered rates for the scheduled pay items.

**(p) Flexible bollards**

Flexible bollards shall be durable and flexible such that they can rebound from multiple impacts.

They shall be manufactured from extruded polyethylene with ultraviolet light inhibitors. The posts shall be surface-mounted and have a 2-piece self-locking system that reduces installation and mounting costs. The flexible bollards, which the Contractor proposes to install for lane separation, shall be submitted to the Employer's Agent for approval and shall be approved prior to placing an order. The minimum requirements are as follows:

- 800mm height above ground
- Mass 4kg
- Diameter 68mm
- Colour yellow with diamond grade retro-reflective band
- 250mm base."

**A11.6.7 EXECUTION OF WORKS**

**A11.6.7.2 Manufacturing of road signboards and supports**

**a) Road sign boards**

*Add the following after the second paragraph:*

"The maximum deviation from flatness at any point further than 200 mm from the edge of the sign board shall not exceed 2 mm if a 1,0 m straight edge is used, or 4 mm if a 3,0m straight edge is used."

**c) Structural steel**

*Add the following after the first paragraph:*

"Details of support framework, stiffeners and other reinforcement specified for road sign boards are shown on the drawings. All framework and reinforcement sections shall be fastened to the rear of the road sign board by means of rivets, bolts, nuts, washers and/or locking setscrews as specified on the drawings as amended by the project specifications, or as directed by the Employer's Agent."

**f) Road sign supports**

*Add the following after the first paragraph:*

"If steel supports are to be used, the following paint specifications shall apply:

The surface of the steel tube received from ISCOR shall be cleaned with an epoxy thinner, after which it shall be scoured with a mechanical steel brush. The following coats shall then be applied:

- (i) Prime coat: Dulux Hichem II epoxy, 75 - 100 µm thick
- (ii) Part below ground: One coat Sigma TCN 300, 150 - 200 µm thick
- Part above ground: Two coats Dulux Kemrist Enamel, 35 - 40 µm thick per coat.

*Add the following new Subclauses after A11.6.7.2(m):*

**"(g) Road sign boards**

Anti-vandal measures as detailed in Figure 15.20 of SARTSM Volume 2 Chapter 15 are not required, unless specifically requested by the Employer's Agent.

Measures could include "Vandigard Nut" or "Tufnut" fasteners, where removal of the sign is a persistent problem.

For the purposes of this contract no special measures have been specified."





#### **A11.6.7.3 Road sign faces and painting**

*Add the following new subclauses:*

##### **“(f) Cleaning of road sign faces**

The Employer’s Agent shall indicate which signs are to be cleaned and when cleaning is to be carried out.

Sign faces shall be cleaned using a cleaning detergent in accordance with the manufacturer's instruction. The type of cleaning detergent shall be as specified in the schedule of quantities or ordered by the Employer’s Agent.

The sign face shall be dampened completely by means of a high-pressure water cleaner and then rubbed vigorously with a white specially manufactured cleaning pad, soaked with the detergent solution, to remove all dirt, grime and oxidised paint. All loose dirt and detergent shall be washed from the sign using the high-pressure water cleaner.

To avoid damaging the sign, the nozzle of the high-pressure water cleaner shall not be held closer than 1,0 metre from the sign face.

To reach the large overhead signs for cleaning, the Contractor shall use a truck with a hydraulic lift and shall take all necessary precautions not to damage the road surface when positioning the truck.

All sign faces shall be cleaned such that their reflectivity is restored.

##### **(g) Revision of information on existing signs**

Only the following methods shall be employed to revise information on existing signs, in order of preference:

- (i) Where possible, and subject to a successful trial, the retro-reflective material of the legend shall be heated and peeled off. The sign shall then be properly cleaned and the new legend applied.
- (ii) On steel signboards with a sign face of Class I or painted background the area to be changed may be blanked out with a patch of 1,4 mm Chromadek sheet covered with a matching retro-reflective material or paint. The patch shall be fastened with blind rivets of matching colour and the new legend shall be applied to the patch with a material matching the legend on the rest of the sign.

All workmanship shall conform to the requirements of the retro-reflective material manufacturer and shall be such that the warranties on the existing signs are not jeopardised.

Patches shall be laid over existing signs in such a way that they are neat and inconspicuous. The Contractor shall submit full details of patches to the Employer’s Agent for approval before their installation.

Patches shall have a minimum dimension of 180 mm and their corners shall be rounded to a minimum radius of 10 mm.”

#### **A11.6.7.5 Erecting road signs**

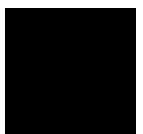
##### **(a) Position**

*Add the following after the first paragraph:*

The Employer’s Agent shall indicate which signs are to be cleaned and when cleaning is to be carried out.

Sign faces shall be cleaned using a cleaning detergent in accordance with the manufacturer's instruction. The type of cleaning detergent shall be as specified in the schedule of quantities or ordered by the Employer’s Agent.

“Vertical and lateral clearance requirements for the positioning of signs are summarised in Figure



In particular, the following Figures are applicable to the positioning of signs:

- Figure 15.9 Ground-mounted and overhead-mounted sign faces;
- Figure 15.11 Minimum clearances for different road and sign types;
- Figure 15.13 Positioning of hazard markers;
- Figure 15.14 Lateral and vertical clearances for larger multiple supports signs; and
- Figure 15.16 Positioning of route marker signs.

When “minimum”, “preferred” and “maximum” dimensions are given, “preferred” dimensions shall apply. If the location prevents the application of “preferred” dimensions, the Employer’s Agent’s approval shall be obtained for the use of alternative lateral or vertical clearances.

Should there be any conflict between the contract drawings and SARTSM figures, the drawings shall take precedence. The conflict shall be brought to the attention of the Employer’s Agent.”

*Add the following new subclauses:*

**“(h) Construction tolerances**

The Employer’s Agent shall indicate which signs are to be cleaned and when cleaning is to be carried out.

The tolerances given below shall be the maximum permissible deviations from the specified dimensions, alignment, positions, etc. shown on the drawings for road signs.

Horizontal alignment: 3°  
Verticality : 1,5°

Surface regularity:

- When tested with a 1,5m straight edge, the deviation shall not exceed 6mm.
- When tested with a 3,0m straight edge, the deviation shall not exceed 20mm.

Maximum deviation of level: ± 50mm

**A11.6.7.7 Dismantling, storing and re-erecting existing road signs**

*Add the following:*

“All existing road traffic sign boards, which are to be replaced by new sign boards, shall be dismantled and removed to store, or directly to the Employer’s Depot. The Contractor shall obtain written instructions from the Employer’s Agent prior to the commencement of this work. Sign supports and sign panels shall only be removed from site to the Employer’s Depot on written instruction. Receipts for the delivery of such material shall be obtained from the Depot Manager and provided to the Employer’s Agent as proof prior to measurement for payment.

Cognisance shall be taken of the precise position of the existing road sign in relation to the proposed location of the replacement or new road sign. Where existing sign supports are to be retained, the Contractor shall determine whether the existing sign structure can support the replacement or new road sign board. Any modifications to or strengthening of the existing sign structure required shall be submitted in design sketch/drawing detail to the Employer’s Agent in writing for approval.

The Contractor’s attention is drawn to the fact that under no circumstances may an existing road sign be dismantled without a replacement or new road sign being on site ready for erection. Where possible, the dismantling of the existing sign shall not be carried out before the replacement sign is erected and displayed. Where the dismantling of the existing sign is required before erection of the replacement sign, the dismantling shall not take place until immediately before work is to commence on the replacement, and the replacement shall be completed and the new sign displayed as soon as possible thereafter. At intersections the direction of replacement of road signs shall begin from the

point closest to the intersection and proceed in the direction of the oncoming traffic. Each intersection shall be completed in its entirety once replacement of signs has been commenced.

Existing road traffic sign boards and/or sign supports shall remain the property of the Employer. Such existing road traffic sign boards and/or sign supports shall be dismantled, loaded, transported to a storage area, off-loaded, carefully stacked and stored as required by the Employer's Agent. No existing support poles/supports shall be disposed of to spoil without the written instruction of the Employer's Agent.

Where existing sign panels are to be relocated, the Contractor shall measure up the dimensions, clearance heights, support spacings, etc., so that the signs can be constructed to exactly the same offsets and vertical clearances in their new locations. Support poles and sign panels shall be labelled so that the components can be stored together and returned together to site for re-erection.

After dismantling of existing road signs, the Contractor shall take full responsibility for the recovered materials and shall be held responsible for any losses of such recovered materials.

Where shown on the drawings or ordered by the Employer's Agent, the Contractor shall dismantle and remove existing road sign supports. Timber posts and supports shall be carefully excavated and removed without damage, where possible. Steel supports, which are mounted on concrete plinths using holding down bolts, shall be removed with their baseplates intact. No supports shall be cut without written instruction from the Employer's Agent. Posts, supports and frames of structural steel shall be dismantled, unbolted at the foundations and removed.

Where ordered by the Employer's Agent, existing concrete road sign foundations shall be demolished and removed from the site and the excavation backfilled with suitable approved material. Material excavated for removal of existing road sign supports and foundation shall be replaced and any depression made good using excess material from excavations for new signs."

#### **PART C: MEASUREMENT AND PAYMENT**

*Add the following subclauses:*

##### **“(vi) Lifting devices and cranes**

The Contractor shall include in his tendered rates for the use of lifting devices and/or cranes for dismantling and removal of road sign boards and road sign supports and for the erection of road sign boards and road sign supports, and for all associated supervision, transport, labour, plant and material costs and incidentals necessary to complete the removal / erection work as specified.

##### **(vii) Transport costs**

No specific payment items for transport costs have been included in the Schedule of Quantities. The Contractor shall allow in his tendered rates for all transport costs for supervisory staff, labour and the transport of signs, plant and materials.

In instances where the project involves supply and erection of signs, the tendered rates shall allow for the cost of transport from the Contractor's workshop to the centroid of the particular area for which the Contractor is submitting a tender.

In instances where the project involves removal of signs to a Municipal Depot and vice versa, the tendered rates shall allow for the cost of transport from the centroid of the particular area, for which the tenderer is submitting a tender, to the nearest Depot.

The haulage distance should be via the shortest most direct viable route. However, no claims will be entertained should an alternative longer route be utilised for whatever reason.

##### **(viii) Works items for which no tendered rate exists**

In circumstances where there is no existing rate, the work shall be measured using similar payment items (eg signs of the same shape or size), or a combination of items (eg two signs on the same pole). Alternatively, work can be measured using Daywork rates."



Amend the following payment item:

| Item                                                                        | Unit |
|-----------------------------------------------------------------------------|------|
| <b>C11.6.3 Road sign supports (overhead road sign structures excluded):</b> |      |

Amend Subitem C11.6.3.1 of Item C11.6.3 as follows:

C11.6.3.1 Steel tubing (diameter and wall thickness indicated) ..... metre (m)

Replace the first paragraph with the following:

"The unit of measurement for the supply and installation of supporting structures manufactured from steel tubing shall be the linear metre installed. Bolts, steel dowels or angle irons welded to the bases and other accessories shall not be measured. Distinction shall be made between different diameters and wall thicknesses. Cut-off sections shall not be measured."

Add the following new payment item:

| Item                                                     | Unit                           |
|----------------------------------------------------------|--------------------------------|
| <b>C11.6.12 Cleaning of road signs board faces</b> ..... | square metre (m <sup>2</sup> ) |

The unit of measurement shall be the square metre of road sign face cleaned as specified.

No measurement shall be made under this item for signs damaged by the Contractor during dismantling, transport, storage, handling and re-erection, where it can be proven that the cause of the damage was non-compliance with A11.6.7.4.

The tendered rate shall include full compensation for procuring, furnishing and transporting all the cleaning materials and liquids/chemicals (Graffiti Remover) and shall include for all supervision, labour, transport and equipment/ladders required in order to gain access to the sign face and clean / restore it to an acceptable condition.

**C11.6.13 Extra work for road signs:**

C11.6.13.1 Additional work instructed by the Employer's Agent ....Provisional Sum (Prov Sum)

C11.6.13.2 Handling costs and profit in respect of Subitem (a).....Percentage (%)

The provisional sum allowed shall be expended at the discretion of the Employer's Agent to cover the cost of work in addition to the scheduled items which may be required in respect of the replacement of road signs, repairs and maintenance, loading and transporting surplus material, or any other items of work required for which no pay items have been provided.

Payment shall be made as specified in Clause 6.6 (GCC 2015) of the General Conditions of Contract."



## **SECTION 11.7: ROAD MARKINGS AND ROAD STUDS**

### **PART A: SPECIFICATIONS**

#### **A11.7.1 SCOPE**

*Add the following:*

"It shall be noted that it will be a requirement of this contract to repaint all of the markings at the end of the Defects Liability period with thermo-plastic road-marking paint and the lettering, symbols, transverse lines and painted island markings with cold plastic road-marking material"

#### **A11.7.5 MATERIALS**

##### **A11.7.5.1 General Material Specifications**

*Add the following:*

Where plastic Road marking material (hot-melt plastic (also known as thermoplastic) and two-component (also known as cold plastic)) is used, the Contractor shall obtain an approved guarantee from the manufacturer that the paint complies with the specification. This shall be submitted to the Employer's Agent on request.

##### **A11.7.5.2 Materials**

###### **a) Marking materials**

###### **(ii) Thermoplastic road marking material**

*Add the following:*

"Plastic road marking material shall be of the hot-applied hydro-carbon resin type with a minimum application thickness of 1,2 mm. Tendered rates shall be based on an application thickness of 1,2mm.

#### **A11.7.7 EXECUTION OF WORKS**

##### **A11.7.7.8 General**

*Add the following:*

"In addition, sand blasting shall be carried out in accordance with the provisions of the Occupational Health and Safety Act, 1993, with suitable protection clothing and equipment to prevent inhalation of dust particles. Suitable signs shall be utilised to warn the public of sand blasting operation hazards."

Insert the following into the last sentence of the last paragraph between "black paint" and "or chemical paint remover":

“, bituminous emulsion, slurry,”

Add the following to the last paragraph:

"Where black paint is used, it shall be matt."

Add the following:

"The Contractor shall provide temporary traffic-control facilities in accordance with Chapter 1.5 of the COTO standard specifications for road and bridge works to ensure traffic safety where work is being executed.

Property and/or road signs damaged by the Contractor, his personnel, his agents or Subcontractors shall be repaired or restored to their condition prior to the damage at his own cost.

If ordered by the Employer’s Agent, the Contractor shall apply a further application of paint to all road markings on the site of works within the Defects Liability Period.”

**A11.7.7.9     Painting of kerbs**

The top and face of all bellmouth kerbs, where instructed by the Employer’s Agent, shall be painted using an approved road marking paint conforming to SANS 731. The kerb lengths shall be painted alternately black and white. A masonry undercoat (Polycell waterproofing damp seal or equal approved) shall be applied to the kerbing before the application of the road marking paint.

**PART C:     MEASUREMENT AND PAYMENT**

*Add the following new items:*

| Item                                                                     | Unit           |
|--------------------------------------------------------------------------|----------------|
| <b>C11.7.2.20   Retro-reflective road marking paint</b>                  |                |
| <i>Add the following new subitems as follows:</i>                        |                |
| (a) Temporary road markings                                              |                |
| (i)    Type A - White lines (broken or unbroken),<br>100 mm wide .....   | kilometre (km) |
| (ii)    Type A - Yellow lines (broken or unbroken),<br>100 mm wide ..... | kilometre (km) |
| (iii)   Type B – Pre-marking with 25 mm diameter spots .....             | kilometre (km) |

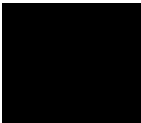
The unit of measurement for painting the lines shall be a kilometre of each specified colour and width of line and the quantity paid for shall be the actual length of line painted in accordance with the instructions of the Engineer, excluding the length of gaps in broken lines.

The tendered rate per kilometre shall include full compensation for establishing specialist teams and equipment, and for procuring and furnishing all labour and material, including the retro-reflective beads In the case of retro- reflective paint, and the necessary equipment, and for painting, protecting and maintenance as specified, but excluding setting out and pre-marking the lines. Separate rates for different types of application are applicable.

**C11.7.12            Painting of kerbs**

|            |                                                    |           |
|------------|----------------------------------------------------|-----------|
| C11.7.12.1 | Alternate black and white road marking paint. .... | metre (m) |
| C11.7.12.2 | Retro-reflective road marking paint.. ....         | metre (m) |

The rates tendered and paid shall include full compensation for the completion of the work as specified in A11.7.7.9. The rate tendered for the painting of the kerbs in C11.7.12.1 shall include for the application of the masonry undercoat and the application of the road marking paint topcoat The rate tendered for C11.7.12.2 shall include for the undercoat plus the retro-reflective road marking paint with beads.



COTO CHAPTER 12: GEOTECHNICAL APPLICATIONS

Add the following new section:

SECTION 12.13: PATENTED EARTH RETAINING SYSTEMS

A12.13.1 SCOPE

Add the following:

“Where instructed by the Employer’s Agent, or shown on the drawings, precast concrete block retaining structures shall be constructed at the back of sidewalk, or elsewhere, to a height not exceeding 2m. These will generally be used where fill embankments are constructed adjacent to private property boundaries. In the case of precast concrete walls, the proposed fill should not be allowed to add additional earth pressure to existing property boundary walls. Where the new sidewalk level is raised to a height which compromises the security of the property owner, because it reduces the effective height of the existing wall, then measures will be considered to raise the existing wall.”

A12.13.2 MATERIALS

(b) Concrete bases for earth retaining systems

“The concrete base shall be constructed with Class 20/19 concrete.”

(c) General

“Precast blocks shall be Terraforce units, Type L11 or similar, Class 30MPa. Alternatives may be submitted for approval, but shall be at least to the concrete class and typical dimensions of the standard Terraforce block Type L11.”

A12.13.3 CONSTRUCTION

(c) Installing the precast concrete blocks.

Add the following:

“Before constructing any retaining structures, alternative solutions should be considered first, including steepening the fill slope with additional slope protection. The preferred solution is to install the Terraforce units at the angles of inclination which comply with the patent holder’s specifications. Where this is not possible due to space restraints, vertical walls will be necessary as shown on the drawings.

Where vertical walls are required, the precast block shall be filled with Class 20/19 concrete, after the installation of high yield Y12 L-shaped steel bars at 200mm spacing, extending into the base. Typical details shall be as shown on the drawings.

Where a new block retaining wall is built immediately adjacent to an existing boundary wall, the distance between the two walls shall be 100mm. The 100mm space shall be filled with a coarse filter sand, compacted and the top finished off with in situ concrete, 75mm thick, Class 15/20, to the level of the back of sidewalk/concrete edging block. Where necessary, synthetic fibre filter fabric, Grade A2, shall be placed against the existing property boundary wall to prevent sand or fine materials from leaching through gaps in joints.

Where narrow gaps are created between the existing property boundary wall or fence and the new retaining structure, the slope of the existing ground should be checked to avoid trapped low points. The longitudinal slope should be graded so that rainfall can run off to a point where it can be collected in a drainage inlet.”

PART C: MEASUREMENT AND PAYMENT

| Item                                                                        | Unit              |
|-----------------------------------------------------------------------------|-------------------|
| <b>C12.13.01 Patented earth retaining systems and other types of blocks</b> |                   |
| (i) Segmental block retaining wall inclined .....                           | square metre (m²) |
| (ii) Segmental block retaining wall vertical.....                           | square metre (m²) |

The unit of measurement shall differentiate between inclined and vertical walls.



In the case of inclined walls, the tendered rate shall include for filling the precast block with topsoil, lightly compacting and finishing the topsoil off level with the top of each block.

In the case of vertical walls, the tendered rate shall include for filling the precast block with Class 20/19 concrete, compacting and finishing the concrete off level with the top of each block, as well as for all additional costs incurred during the placing of the blocks for installing Y12 L-shaped bars in the concrete base and the block cavities.

Separate payment will be made for the steel reinforcement in PC74.04, the filter fabric in PC74.05 and the sand infill in PC74.06."

|             |             |
|-------------|-------------|
| <b>Item</b> | <b>Unit</b> |
|-------------|-------------|

**C12.13.02 Excavation for concrete bases for earth retaining systems**

- |                                                                            |                               |
|----------------------------------------------------------------------------|-------------------------------|
| (a) In soft material.....                                                  | cubic metre (m <sup>3</sup> ) |
| (b) Extra-over subitem C12.13.02 (a) for excavation in hard material ..... | cubic metre (m <sup>3</sup> ) |

Measurement and payment for excavation shall be as specified for item C13.1.2 and C13.1.3 except that no additional excavation shall be measured were formwork is required.

|             |             |
|-------------|-------------|
| <b>Item</b> | <b>Unit</b> |
|-------------|-------------|

**C12.13.03 Concrete bases for earth retaining systems**

- |                               |                               |
|-------------------------------|-------------------------------|
| (a) Class 25/20 concrete..... | cubic metre (m <sup>3</sup> ) |
|-------------------------------|-------------------------------|

The unit of measurement shall be the cubic meter of concrete cast in concrete bases for earth retaining systems, calculated in accordance with the net approved dimensions of the concrete bases.

The tendered rate shall include full compensation for supplying and placing the concrete and constructing the concrete bases, including any formwork which may be necessary, and for all steel reinforcement, complete as specified.

|             |             |
|-------------|-------------|
| <b>Item</b> | <b>Unit</b> |
|-------------|-------------|

**C12.13.04 High tensile steel reinforcement..... ton (t)**

The unit of measurement shall be the ton.

The tendered rate shall include full compensation for the procuring and installation of the steel bars in accordance with the drawings.

|             |             |
|-------------|-------------|
| <b>Item</b> | <b>Unit</b> |
|-------------|-------------|

**C12.13.05 Filter fabric Grade A2..... square metre (m<sup>2</sup>)**

The unit of measurement shall be the square metre placed based on the area of the vertical wall.

The tendered rate shall include full compensation for the procuring and installation of the filter fabric in accordance with the details on the drawings. The tendered rate shall make allowance for any waste, if material is cut from standard widths.

|             |             |
|-------------|-------------|
| <b>Item</b> | <b>Unit</b> |
|-------------|-------------|

**C12.13.06 Sand infill..... cubic metre (m<sup>3</sup>)**

The unit of measurement shall be the cubic metre of sand infill placed, based on the area of the vertical wall and the actual width of the gap.

The tendered rate shall include full compensation for the procuring, placing and compaction of the sand infill, inclusive of a 75mm deep Class 15/20 concrete seal to close off the 100mm gap, level with the concrete edging.



## COTO CHAPTER 13: STRUCTURES

### SECTION 13.4: CONCRETE

#### PART A: SPECIFICATION

##### A13.4.2 DEFINITIONS

###### Fresh phase of concrete

*Add the following at the end of the definition of "Fresh phase of concrete":*

*"This is also known as the plastic phase."*

*Add the following definition between "Fresh phase of concrete" and "Hardened phase of concrete":*

**"Hydration or curing phase** – this is concrete that is no longer a semi-liquid but has not yet reached a solid state."

##### A13.4.7 EXECUTION OF THE WORKS

###### A13.4.7.12 Placing and Compaction

###### b) Placing

*Delete the 3<sup>rd</sup> sentence of the 1<sup>st</sup> paragraph and replace with the following:*

*"The Contractor shall not be permitted to pour unless the specific method statement for that pour has been accepted by the Engineer."*

#### PART C: MEASUREMENT AND PAYMENT

| Item | Unit |
|------|------|
|------|------|

|                                                                  |              |
|------------------------------------------------------------------|--------------|
| <b>C13.4.9.1 Manufacturing of Precast Concrete Members</b> ..... | number (No.) |
|------------------------------------------------------------------|--------------|

Add the following to payment item description:

Costs for galvanising reinforcement and debonding of tendons to be included within this rate.



SECTION 13.9: STRUCTURAL STEELWORK FOR MINOR STRUCTURES

PART C: MEASUREMENT AND PAYMENT

| Item                            | Unit         |
|---------------------------------|--------------|
| C13.9.1.1 Structural Steel..... | number (No.) |

Add the following to payment item description:

Costs for manufacturing and erection of light masts, not including Anchor Bolts and Corrosion protection to be included in this rate.

| Item                        | Unit         |
|-----------------------------|--------------|
| C13.9.2.2 Anchor Bolts..... | number (No.) |

Add the following to payment item description:

*Costs for anchor bolt assemblies as specified in the bill of quantities to be included within this rate.*

| Item                                | Unit         |
|-------------------------------------|--------------|
| C13.9.3.2 Corrosion Protection..... | number (No.) |

Add the following to payment item description:

*Costs for galvanising light masts as per drawing specifications to be included within this rate.*

SECTION 13.11: STRUCTURAL STEELWORK FOR MAJOR STRUCTURES

PART C: MEASUREMENT AND PAYMENT

C13.11.1 Structural Steelwork for Major Structures .....number (No.)

Add the following to payment item description:

*Costs for anchor bolt assemblies and plates as specified in the bill of quantities to be included within this rate.*

C13.11.2 Structural Steelwork for Major Structures .....number (No.)

Add the following to payment item description:

*Costs for anchor bolt assemblies and plates as specified in the bill of quantities to be included within this rate.*

COTO CHAPTER 14:REPAIR AND REHABILITATION OF STRUCTURES

SECTION 14.3:DEMOLITION AND REMOVAL OF STRUCTURAL CONCRETE AND STEELWORK

PART C:MEASUREMENT AND PAYMENT

| Item                                                                       | Unit     |
|----------------------------------------------------------------------------|----------|
| C14.3.3Demolition of structural steel structures, members or elements..... | metre(m) |

Replace the first line of the payment description as below:

*The unit of measurement shall be in metres for removal and scrapping of steel handrails as per drawing specifications to be included within this rate.*



COTO CHAPTER 20:       QUALITY ASSURANCE

SECTION 20.1:           TESTING MATERIALS AND JUDGEMENT OF WORKMANSHIP

PART A:       SPECIFICATION

A20.1.4       PUBLISHED TEST METHODS

A20.1.4.8     Testing of asphalt

*Add the following new paragraph:*

“Sabita Manual 39: Laboratory Testing Protocols for Binders and Asphalt, shall be implemented together with the asphalt tests listed.”

Delete reference to: “Sabita Manual 35 for Design and Use of Asphalt in Road Pavements: Determining the Richness Modulus of EME asphalt mixes.”

and replace with “Sabita Manual 33 for Design Procedure for High Modulus Asphalt (EME): Determining the Richness Modulus of EME asphalt mixes.”

A20.1.7       ACCEPTANCE CONTROL BY STATISTICAL JUDGEMENT PRINCIPLES

PART C:       MEASUREMENT AND PAYMENT

Add the following new pay item:

| “Item                                                                         | Unit |
|-------------------------------------------------------------------------------|------|
| <b>C20.1.6     Payment of independent site laboratory</b>                     |      |
| C20.1.6.1   Direct payment by contractor .....prime cost sum (PC Sum)         |      |
| a) Handling cost and profit in respect of item C20.1.6.1 ..... percentage (%) |      |

The contractor shall pay the appointed site laboratory monthly for the amount as certified by the Engineer.

The charge or mark-up tendered or allowed for is a percentage of the amount actually paid under the prime cost item. The percentage shall cover all the Contractors’ sourcing, handling, profit, and payment of the service provider in providing the services. The Contractor shall forfeit his mark-up when the service provider is not paid in time.”

## SECTION PS 1200C : SITE CLEARANCE

### PSC 8 MEASUREMENT AND PAYMENT

Amend the following item:

#### **PSC 8.2.7 Dismantle and remove pipelines (not encased in concrete), electricity transmission lines, cables, etc.**

Existing payment clause 8.2.7 to be amended to the following:

.....but to include the cost of excavation and backfill. Excavation and backfill will be measured under this item.

Add the following new items :

| <u>Item</u>                                                                                                                                              | <u>Unit</u> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| <b>PSC 8.2.12 a) Provision for removal of existing pipes containing asbestos by a registered asbestos contractor (RAC) to nearest approved dump site</b> | Prov Sum    |
| <b>b) Contractor's mark-up on (a)</b>                                                                                                                    | %           |

The provisional sum shall cover the full compensation for the removal and spoiling of existing pipes containing asbestos by a registered asbestos contractor with the Department of Labour in terms of the OHS Act. It will include all permit applications and using machinery, labour, transport, any required backfilling and haulage to spoil the material to the nearest approved asbestos dump site.

The percentage tendered shall include full compensation for direct and overhead costs and profit required by the contractor.

#### **PSC 8.2.13 Demolish and remove existing headwalls, manholes, chutes and catchpits and spoil material off-site**

(a) Manholes and chambers of all types and sizes, depths as follows:

- |                                    |    |
|------------------------------------|----|
| (i) Over 1,0m and up to 2,0m       | No |
| (ii) Over 2,0m and up to 3,0m etc> | No |

(b) Catchpits, depths as follows:

- |                              |    |
|------------------------------|----|
| (i) Over 1,0m and up to 2,0m | No |
|------------------------------|----|

(c) Headwalls and outlets of all types and sizes

- |                                |    |
|--------------------------------|----|
| (i) 100mm diam. to 300mm diam. | No |
|--------------------------------|----|

The unit of measurement shall be linear metres or number of, as applicable.

The tendered rate shall include full compensation for the demolition and removal of stormwater and sewer infrastructure using machinery and labour and any required backfilling. Backfilling of excavations will be done with excavated material and will include the borrowing of fill material within the freehaul distance and the spoiling of unusable material off site at a spoil site provided by the contractor.

#### **PSC 8.2.14 Remove and spoil existing kerb, edging, kerb and channel, etc.** **Metre (m)**

The unit of measurement shall be linear metres of precast element(s).

The tendered sum shall include full compensation for the removal of kerb/edging/kerb and channel etc. including the backing/bedding, using machinery and labour, for all radii and for disposal off-site at a spoil site provided by the contractor. All haulage shall be deemed to be included in the rates tendered.

#### **C 8.2.15 Expose existing services, ducts and cables by hand excavation, including restrictive work** **Cubic Metre (m³)**

The unit of measurement shall be cubic metres of excavation by all types of equipment including handheld. Excavation will include all types of road verge material, fill and in-situ material of intermediate excavation. Material to be stockpiled on site within the freehaul distance and surplus material disposed off site. The rate must include

backfill of excavations once relocations have been completed or where not required, and also where temporary backfilling is required for safety reasons. Contractor to take safety precautions to prevent damage to existing services and its workers, equipment and the public, including ensuring that safety netting is allowed within the rate as per OHS specifications to open trenches, excavations.

Contractor to apply reasonable rate of production to work in order to slowly expose the existing services without causing damage. Rate will include proving of services. Working in restricted areas will be inclusive of the rates.





## **PSDB EARTHWORKS (Pipe Trenches)**

### **PSDB-1 SCOPE**

*Add the following:*

"Excavation for manholes, headwalls and associated pipe works are also covered under this section."

### **PSDB-3 MATERIALS**

#### **PSDB-3.1 Classes of excavation**

All excavation will be classified as soft unless meeting the definition for hard material.

### **PSDB-4 PLANT**

#### **PSDB-4.2 Control of Water**

*Add the following:*

"The Contractor shall control all surface and sub-surface water during construction, and the costs of such shall be deemed to be included in the rates tendered under PSDB8.3.4"

### **PSDB-5 CONSTRUCTION**

#### **PSDB-5.1 Precautions**

##### **PSDB 5.1.2.2 Stormwater**

Whilst it is the Contractor's responsibility to control subsurface water during construction; in certain circumstances the Employers Agent may order that the Contractor place filter fabric plus a crushed stone bedding layout to the base of the trench where unstable bedding conditions prevail. The specified bedding material shall then be used to bed the pipe. The Contractor will only be compensated for this treatment where it was carried out on written instruction by the Employers Agent.

##### **PSDB-5.1.5 Trench Excavations (additional subclause)**

The precautions for excavations as specified in Clause 5.1.1 of Section 1200 D, 1200 DA, and the relevant clauses in PSD, shall also apply to all trench excavations.

The Contractor, his agent or his representative shall **not** allow any person to work in or under an excavation which is more than 1,2 m deep unless it has been supported or braced or the sides sloped to the natural angle of repose of the material. The support, shoring or bracing to be designed and constructed by the Contractor"

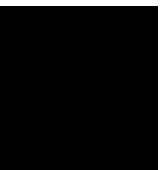
#### **PSDB-5.4 Excavations**

*Add the following:*

"Excavations for manholes and chambers shall be taken out simultaneously with the trench excavations to the net plan dimensions of the structure.

The Contractor shall excavate pipe trenches progressively and will not be permitted to pass over harder sections of the excavation to proceed with excavation at further points along the trench unless approved by the Employers Agent. It is recommended that Stormwater pipelines be constructed continuously from the lowest point upwards to provide for the drainage of groundwater.

In no case shall the Contractor excavate more than 75 m ahead of the pipe laying gang. The requirements of this clause may be relaxed as far as any road crossings are concerned, at the discretion of the Employers Agent.



The contractor will be held responsible for all costs arising from the need to place imported fill, stabilised fill or mass concrete in the bottom of the trench excavation as a result of over excavation of the pipe trench.

Where the trench excavation crosses surfaced roads (including concrete and premix surfaced roads), the Contractor shall be responsible for saw-cutting through the existing surfacing on both sides of the centreline of the pipeline, removing the cut surfacing to spoil, and neatly excavating the material between the two grooves. The cost of this work, where not scheduled separately, shall be deemed to be included in the rates for excavation."

#### **PSDB-5.7 Compaction**

Notwithstanding the compaction provisions of this clause, backfill for all trenches shall be compacted to not less than 95 percent Modified AASHTO for cohesive material. Non-plastic sand shall be compacted to 100% Mod AASHTO.

The trench bottom is to be compacted to a minimum 93% Mod AASHTO compaction before placement of bedding material.

The bottom of excavations for manholes and headwalls shall be thoroughly rammed and consolidated and compacted to 95% Mod AASHTO at the Contractor's expense before any concrete is placed.

The rates tendered for excavating and backfilling trenches are to include for the above minimum compaction criteria and there will be no additional payment made.

#### **PSDB-8 MEASUREMENT AND PAYMENT**

##### **PSDB-8.3 Scheduled items**

##### **PSDB-8.3.2 Excavation**

*Add the following:*

"Excavation shall be measured in cubic metres in the depth categories, 0 to 1.0metres, 0 to 2.0 metres, 0 to 3.0 metres, etc. with increments of 1.0 metre, and shall be measured from original ground level or bulk earthworks level as applicable, to the invert level of the pipe. Additional excavation for bedding, and over break for rock, spoiling of trench excavations, stockpiling of trench excavations shall be included in the rates tendered.

#### **PSDB 8.2 COMPUTATION OF QUANTITIES**

*Add the following new Clauses*

##### **PSDB 8.2.5: Filter fabric and stone layer in trenches**

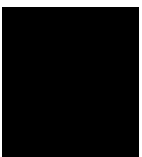
- Stone bedding in water-logged conditions.

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

- Geotextile filter fabric

Where the Employers Agent has authorised the use of the geotextile filter fabric, this shall be measured by area as:

Where the width shall be the full or half-width supplied by the manufacturer which conforms closest to the specified minimum base width +2 x height of bedding.



The tendered rate shall include the cost of supply, placing and losses as a result of overlaps and over excavated trench widths.

Add the following new items:

| Item | Unit |
|------|------|
|------|------|

**PSDB 8.3.4 Particular Items**

**c) Temporary works: Control / over pump sewerage water from existing manhole to another manhole as per dwg 701-1601 to 1603**

|     |                      |       |      |
|-----|----------------------|-------|------|
| (1) | Provide equipment    | ..... | No.  |
| (2) | Operate and Maintain | ..... | Days |
| (3) | Remove equipment     |       | Sum  |

In addition to standard Clause DB 8.3.4 b) 1), 2), 3), the following conditions will be added:

The unit shall be per number of submersible pump establishments, including all related incidentals, plant, equipment, labour and material to supply and position the pump assembly within the existing manhole to dewater and over pump sewerage water to another manhole as indicated on the drawings. The submersible pump for sewerage will have a minimum power rating of 1.1 kW and control box with automatic on/off floating switch with continuous power supply. The rate includes all restrictive work. All security measures to ensure that all equipment is safeguarded from vandalism or theft shall be included in the rates.

**d) Provision of stone bedding and filter fabric layer for unstable trench bottom**

|      |                                      |                |
|------|--------------------------------------|----------------|
| (i)  | 20mm stone bedding                   | m <sup>3</sup> |
| (ii) | A6 geotextile or equivalent approved | m <sup>2</sup> |

The unit shall be cubic metres for the 20mm stone bedding and square metres for filter fabric.

The rate tendered shall include fully cover the preparation of the trench bottom, the supply of the stone and placing the layer of the stone to correct dimensions and all other activities required for a stable platform, including restrictive work. The rate for geofabric shall cover the supply of grade A6 bidim or equivalent approved and installation including 300mm minimum overlap.

**e) Provision of liquid waste (sewer) transport and disposal by approved service provider**

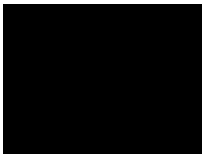
|     |                                          |     |
|-----|------------------------------------------|-----|
| (i) | Honey sucker vacuum truck, min size 10kl | hrs |
|-----|------------------------------------------|-----|

The unit of measurement shall be hours of service on site provided by the service provider to dispose and transport the removed sewerage, including all standing time, for all hours of the day and night. The rate shall cover all costs related to the removal, storage and transport of the sewerage anywhere on site to the nearest available waste water treatment plant. The service provider must have all relevant City of Cape Town permits in place to remove and transport sewerage.

**PSDB 8.3.5 Location of Existing Services**

**(i) The use of GPR equipment or equivalent to detect underground services h (hours)**

The hourly rate shall include all costs and overhead charges/profits of the contractor to appoint and manage a specialist service provider to detect/trace existing services with GPR (Ground Penetrating Radar) equipment or various other induction equipment which does a similar function in detecting or tracing services.



## **PSL MEDIUM PRESSURE PIPELINES**

### **PSL 3 MATERIALS**

Replace SANS 1200 Clause 3.1 with the following:

#### **PSL 3.1 GENERAL**

Pipes and fitting shall be of the types specified in the Bills of Quantities and these specifications and unless otherwise required in terms of these specifications, they shall be capable of withstanding the applicable test pressure as specified in PSL 7.3:

All pipes and fittings shall be supplied complete with couplings and jointing material.

#### **Ductile Iron Pipes**

Ductile Iron pipes, fittings and accessories where specified, shall be fitted with spigot and socket rubber ring joints and shall comply with the relevant requirements of BS, EN 545: 2010 and ISO 2531- 2009. Insert gaskets to be EPDM complying with the requirements of ISO 4633 including marking of gaskets.

All bends, T-pieces, couplings and other fittings for ductile iron (DI) pipe shall be fabricated from ductile iron (DI) and must comply with the test pressures as specified.

#### **PSL 3.1.1 Storage, handling and transport of pipes, specials and fittings**

##### **PSL 3.1.1.4 Storage**

- i. Pipes shall generally be distributed and stored as close as possible to the laying position in order to minimise double handling. Where pipes are strung alongside the trench, they should be placed on the side away from excavated material.
- ii. Where pipes, specials and fittings are to be stockpiled in bulk storage yards. The Contractor shall make his own arrangements for a suitable area which shall meet with the Engineer's approval. The stockpiling area shall be adequately fenced and protected by lockable gate and a watchman shall be maintained at all times.
- iii. Pipes and specials shall be strung or stockpiled on level, well drained ground in a manner such that they will not be in contact with the ground, tree stumps, or other sharp objects and all vegetation and other combustible material shall be completely removed to at least 5 metres from the nearest pipe or special.
- iv. Coated steel and ductile iron pipes shall always be supported on a sufficient number of approved soft bolsters to prevent damage or permanent deformation of coatings. Coated pipes shall not be stacked more than two pipes high, each layer separated by bolsters.
- v. Concrete pipes shall not be stockpiled more than 2 metres high with the bottom layer supported on timber runners such that no part of the pipe is in contact with the ground. Timber runners shall be spaced at pipe length. Pipes having elliptical reinforcement, shall be stockpiled or strung with the marks indicating the top and bottoms of pipes in the correct position. If concrete pipes are to be stockpiled for longer than four weeks, steps shall be taken to prevent the pipes from drying out by daily spraying of water or the application of an approved membrane type curing compound to the external and internal surfaces.
- vi. Each class and size of pipe shall be stored separately in its own stockpile.



- i. All rubber rings or other materials which will deteriorate under the action of sunlight, ozone or inclement weather, shall be stored in permanent shade in lockable weatherproof sheds. Welding and the running of welding machines and electric machinery shall not be permitted in or near places where rubber or plastic products are stored and care shall be taken at all times to prevent contamination of these products by oil or other petroleum derived solvents.
- ii. Valves shall be stored in orderly groups on prepared floors to prevent damage, distortion or corrosion of flanges or working parts. All metal valves may be stored in the open but full protection shall be afforded to valves with non-metallic seals or working parts. Under no circumstances shall valves be stored in direct contact with the ground.

#### PSL 3.1.1.4.1 Storage of Pipes

##### (i) General

Special care shall be taken when storing pipes for water supply use to ensure they are not contaminated by the ingress of soil, animals, fuel oils, chemicals, etc. End caps shall be used to minimise the risk.

They shall not be stored where there is a risk of serious contamination. Where pipes are stored long term, they shall be located where there is least risk of damage.

##### (ii) Stacking Bundled Pipes

The stacking area should provide a firm foundation with a suitable approach road for vehicles. Stacks shall be arranged to provide a safe vehicular and pedestrian access. Bundles are provided with base timbers and these can be laid directly onto a good, level, hard-standing surface. The bundles shall be stacked one on top of the other with the axes of pipe parallel.

**Table 4.1 – Maximum stack layers of bundled pipes**

| DN  | Maximum Stack Layers<br>(Number of pipes) |
|-----|-------------------------------------------|
| 80  | 18                                        |
| 100 | 18                                        |
| 150 | 18                                        |
| 200 | 12                                        |
| 250 | 8                                         |
| 300 | 9                                         |

The maximum recommended stacking height on a good, level, hard-standing surface is shown in Table 4.1. However, the maximum stacking height for any particular location shall be determined by a competent supervisor. Bundled pipes larger than DN300 shall not be stacked.

When breaking down pipe bundles, it is essential that bundles which have been stacked be lowered to ground level before the straps are cut. Special care shall be taken when cutting the straps of the bundles and when removing pipes from individual tiers to prevent pipes from falling.

##### (iii) Stacking Non-Bundled Pipes - General

Pipes being taken to a central stockyard for storage and held pending further distribution shall be arranged in stacks. The stacking area shall provide a firm foundation with a suitable approach road for vehicles. Stacks shall be arranged so as to provide safe vehicular and pedestrian access. During stacking and removal operations, safe access to the top of the stack is essential. In bad weather conditions, when pipe surfaces may become slippery, consideration shall be given to the use of lightweight stagings placed on top of the stacks. Pipes shall be stacked on a base of raised wooden battens at least 100mm thick x 225mm wide. The battens shall be positioned approximately 600mm from each end of the pipe. The bottom layer of pipes shall be securely anchored.

Three types of stacking are recommended:-

- square stacking : suitable for pipes of all sizes;
- parallel stacking using timber : suitable for pipes of all sizes;
- pyramid stacking: suitable for pipes of all sizes.

(iv) Square stacking (preferred)

Each tier of pipes shall be positioned with their axes at right angles to those of the preceding tier to form a stable and compact stack. The sockets of the pipes in each tier shall be at the same end, except for the two end pipes which shall be reversed to lock the tiers in position. Alternatively, the sockets of alternate pipes in each tier may be reversed.

The pipes rest upon those beneath and extra care should be exercised when lowering the pipes into position to prevent damage to the protective coating, sleeves and wrapping.

Stack shall not exceed 4 pipes in height.

(iv) Parallel stacking using timbers

For this method of stacking, two timber battens of sufficient strength shall be placed across the pipes between each tier, approximately 600mm from the pipe ends. The sockets of pipes in each successive tier shall be reversed and the battens shall be of sufficient thickness to avoid pipe contact.

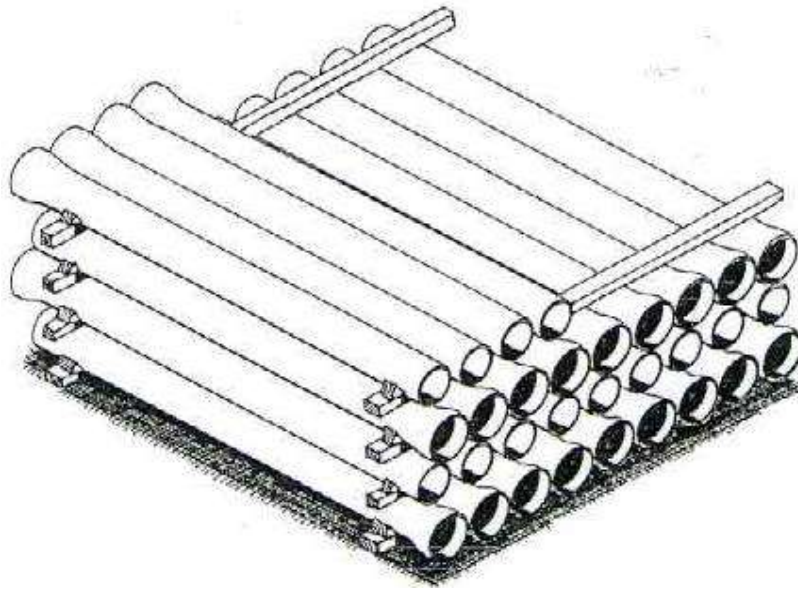


Fig. 3

An adequate number of chocks shall be wedged under the outer pipes of each tier and nailed to the timber bearers to ensure stability. Pipes may be rolled into position along the battens, thus facilitating stacking or removal from the end of the stack.

(vi) Pyramid stacking

In pyramid stacks, each pipe nestles between the two pipes immediately beneath it and care shall be exercised when lowering pipes into position especially to prevent damage to protective coatings and sleeves. It is essential that the end pipes of the bottom tier be securely anchored along their length with chocks preferably fixed to timbers

running the width of the stack. The axes of all pipes should be in the same direction and the sockets should be reversed in successive tiers. The stacking heights shall not exceed those in Table 4.2.



Fig. 4

Table 4.2 – Stacking heights

| Maximum number of tiers as a function of stack formation |                     |                     |      |                     |                     |
|----------------------------------------------------------|---------------------|---------------------|------|---------------------|---------------------|
| DN                                                       | Fig. 3<br>K9/C25-40 | Fig. 4<br>K9/C25-40 | DN   | Fig. 3<br>K9/C25-40 | Fig. 4<br>K9/C25-40 |
| 60                                                       | 33                  | 89                  | 600  | 7                   | 10                  |
| 80                                                       | 30                  | 70                  | 700  | 5                   | 7                   |
| 100                                                      | 27                  | 58                  | 800  | 4                   | 6                   |
| 125                                                      | 24                  | 47                  | 900  | 4                   | 5                   |
| 150                                                      | 22                  | 40                  | 1000 | 3                   | 3                   |
| 200                                                      | 18                  | 31                  | 1100 | 3                   | 3                   |
| 250                                                      | 16                  | 25                  | 1200 | 2                   | 2                   |
| 300                                                      | 14                  | 21                  | 1400 | 2                   | 2                   |
| 350                                                      | 12                  | 18                  | 1500 | 2                   | 2                   |
| 400                                                      | 11                  | 16                  | 1600 | 1                   | 2                   |
| 450                                                      | 10                  | 14                  | 1800 | 1                   | 2                   |
| 500                                                      | 8                   | 12                  | 2000 | 1                   | 2                   |

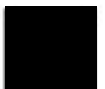
The maximum heights of stacks are governed by:-

- the requirement for firm and level ground;
- the total lift given by the available crane; and
- the facilities available to ensure stable stacking.

(vii) Storage of Fittings

Fittings may be supplied loose or shrink wrapped on wooden pallets. Loose fittings shall be stored by being carefully stacked, placed on pallets or held in suitable containers. They shall not be piled up randomly. Pallets shall be stored on firm ground and stacked as necessary.

(viii) Storage of Gaskets



Gaskets are prone to damage by sunlight, chlorine, ozone and heat. The performance of the gaskets mainly depends on the storage and handling of the gaskets. It is of utmost importance to store the gaskets away from heat, sunlight and hazardous substances. Gaskets should be stored flat on timber.

#### PSL 3.1.1.5 Records of materials on site

- i. The Contractor shall keep and maintain a complete and comprehensive record of each pipe, special and fitting delivered to Site. The record shall at least denote the reference number, size, pressure class, and location in the pipeline, date and condition of delivery and the location of delivery and the location of storage. Copies of the record shall be submitted to the Engineer at the end of each month or whenever requested by the Engineer.
- ii. Where pipes, specials and fittings are delivered without reference numbers, same shall be provided by stenciling, labelling or other methods approved by the Engineer.

#### PSL 3.1.1.7 Maintenance of cleanliness

- i. End covers to pipes and specials shall be kept firmly in position until installation of same in the trench.  
  
The interior surfaces of all pipes, specials, valves and fittings shall at all times be kept free from dust, silt, foreign matter and access for rodents, animals and birds shall be prevented. Pipes and specials shall not be used as shelters by staff or for the storage of garments, tools, materials, food containers or similar goods. Particular care shall be exercised at all times to prevent faecal contamination of pipe interiors by staff, casual visitors or passers-by.

### PSL 3 MATERIALS

Replace SANS 1200 **Clause 3.4** (Steel Pipes, Fittings and Specials) with the following PSL 3.4, City of Cape Town Standard Specifications for steel pipe, fittings, and specials:





## PSL 3.4 WS-BW-011 STANDARD SPECIFICATION FOR STEEL PIPE, FITTINGS AND SPECIALS

### 1 SCOPE

This specification covers the manufacture, supply, delivery and offloading of straight-butt seam or spiral butt seam electrically welded pipe, fittings and specials intended for the conveyance of water in accordance with SANS 719 and the following variations and additional requirements.

This specification must be read in conjunction with the Project Specification if applicable, which deals with specific requirements of the project for which the pipes, fittings and specials are intended.

### 2 NORMATIVE REFERENCES

These normative references are cited at the appropriate places in the text and the publications are listed below.

|                                             |   |                                                                                                     |
|---------------------------------------------|---|-----------------------------------------------------------------------------------------------------|
| SANS 564                                    | – | Rubber insertion sheeting                                                                           |
| SANS 719                                    | – | Electric welded low carbon steel pipes for aqueous fluids (large bore)                              |
| SANS 1090                                   | - | Aggregates from natural sources — Fine aggregates for plaster and mortar                            |
| SANS 14713                                  | - | Protection against Corrosion of iron and steel structures – Zinc and Aluminium Coatings - Guideline |
| SANS 50197-1                                | - | Composition, specifications and conformity criteria for common cements                              |
| BS EN 10224                                 | - | Steel pipes and specials for water and sewerage                                                     |
| American Water Works Association Manual M11 |   |                                                                                                     |
|                                             | - | Steel pipe, a guide for design and installation                                                     |
| API 5L                                      | - | American Petroleum Institute Specification for Line Pipe                                            |

### 3 DEFINITIONS

For the purpose of this standard, the following definitions shall apply:

**Engineer** shall mean the Executive Director: Water and Sanitation or his/her authorised representative.

**Approval** shall mean approval in writing by the Engineer

**Fittings** shall mean bends, tees and collars

**Specials** shall mean any manipulated or fabricated pipe not being a fitting

### 4 REQUIREMENTS

#### 4.1 PIPE

##### 4.1.1 MATERIAL

The steel grade shall be B, C or D in accordance with SANS 719 and as approved by the Engineer or stated in the tender specifications.

##### 4.1.2 DIMENSIONS

###### 4.1.2.1 Length

Each pipe shall have the length stated in the Schedule and shall not vary from the specified length by more than 10 mm.



#### 4.1.2.2 Diameter

The pipes shall be manufactured in the nominal sizes and with the outside diameters as shown in Table A.

Unless otherwise agreed, the tolerance on the outside diameter using a diameter tape shall be as follows:

- 230 mm diameter and smaller +1.6 mm – 0.4 mm
- greater than 230 mm nominal diameter +2.4 mm – 0.8 mm

#### 4.1.2.3 Out of roundness

Except where more restrictive tolerances apply, the difference between the maximum and minimum values of the outside diameter measured across the plane at right angles to the axis shall not exceed 0.5 % of the relevant outside diameter shown in Table A.

#### 4.1.2.4 Straightness

The pipe walls shall be parallel to the axis within 5 mm for each 3 m length.

#### 4.1.2.5 Pipe wall thickness

The pipe wall thickness shall not be less than the minimum shown in Table A unless approved or stated otherwise in the schedule.

#### 4.1.2.6 Pipe ends

Pipe ends shall be clean cut, free from burrs and acceptably square to the axis of the pipe. They shall be plain or prepared in accordance with SANS 719 for field welding as stated in the schedule or specification. The outside of the pipe shall be free of indentations, projections or roll marks for a distance of 250 mm from each end. Longitudinal or spiral welds on the outside of the plain end shall be ground to plate or steel surface.

### 4.1.3 FABRICATION

#### Forming

Pipes shall have been fabricated from plates or strip formed, rolled or pressed to a cylindrical form and joined by one or more longitudinal seams (with or without circumferential seams), or from strip formed or rolled to cylindrical form and joined by a helical seam. Circumferential joints shall be at least 1.5m apart and the longitudinal welds of mated sections shall be at least 300 apart.

#### 4.1.3.1 Welding

All welds shall comply with the requirements for Electric Fusion welding in SANS 719.

#### 4.1.4 Rectification of defects

Welded seams and surface defects that have been repaired by welding shall be permitted in the parent metal, provided the welds comply with the requirements of 4.1.3.2.

#### 4.1.5 Resistance to hydrostatic pressure

When tested in accordance to 5.1.1, pipes shall be capable of withstanding without leaking or bursting, the hydraulic test pressure calculated using the following formula, subject to a maximum of 7 MPa, unless otherwise agreed:

$$P = \frac{1.7 \times Y \times t}{D}$$

Where:

P is the hydraulic test pressure in MPa

Y is the minimum specified yield stress of the steel plate or strip in Mpa

t is the nominal wall thickness in mm

D is the nominal outside diameter of the pipe in mm



(Note: this formula is based on 85% of the nominal minimum yield stress of the steel whereas SANS719 is based on 75%)

## **4.2 FITTINGS AND SPECIALS**

### **4.2.1 General**

All fittings and specials shall have the dimensions in accordance with the requirements of BS EN 10224, except as hereinafter specified and shall have the same outside diameter as the corresponding pipes. All fittings and specials shall be manufactured from the same grade of steel as specified in the schedule or specification for the pipes.

### **4.2.2 Bends**

Bends shall be cut, bevelled and welded from straight lengths of pipe which have been hydraulically tested in accordance with 5.1.1.

### **4.2.3 Reducers**

Reducers shall have a diametrical reduction of 50 mm per 300 mm of length of the taper portion and shall have plain ends 300 mm long, unless otherwise specified in the schedule. Where specified in the Schedule, they shall have an anchor ring

### **4.2.4 Tees and crosses**

All branches shall be flanged unless otherwise specified in the Schedule. The distance from the centre line of the main barrel to the mating face of flange of the branch shall be:

Branch Diameter greater than 305 mm but less than 500mm -  $0.5 \times (\text{outside diameter of main barrel})$   
+ 500 mm

Branch Diameter Greater than or equal to 500mm –  $0.5 \times (\text{outside diameter of main barrel}) + 1\ 000$  All tees and crosses shall be reinforced in accordance with AWWA Manual M11

### **4.2.5 Scour Tees**

Scour tees shall comply with the requirements stated in Clause 4.2.4 except that the branches shall be tangential to the main barrel.

## **4.3 JOINTS**

### **4.3.1 Flanges**

Flanges shall be drilled for and have dimensions for either imperial use or metric use, as stated in the Schedule and/or Project Specification and in accordance with the following tables:

#### **Imperial:**

- Table B attached hereto for working pressures up to 1.2 MPa
- Table C attached hereto for working pressures greater than 1.2 MPa, up to 2.5 MPa

#### **Metric**

- SANS 1123 Table 1000/1B for working pressure up to 1.0 MPa
- SANS 1123 Table 1600/1B for working pressures greater than 1.0 MPa, up to 1.6 MPa
- SANS 1123 Table 2500/1B for working pressures greater than 1.6 MPa, up to 2.5 MPa Jointing material shall comply with SANS 564

### **4.3.2 Welding collars**



Where required in the Schedule, welding collars shall be supplied in accordance with Table D.

#### 4.3.3 Sleeve joints

Where required in the Schedule, sleeved joints for internal or external field welding shall permit an angular set of 0.50 between adjacent pipes without impairing the efficiency of the joint. The sleeve shall be accurately formed in accordance with Table C so as to obtain a sliding fit. The maximum clearance over the pipe shall be 4 mm and the minimum clearance 2 mm.

### 4.4 CEMENT MORTAR LINING AND SHEATHING

#### 4.4.1 General

All pipes fittings and specials shall be protected by means of a cement mortar lining and sheath. These shall extend over the full effective length of each pipe, fitting or special except for those with plain or spigot ends where the sheathing shall cease 300 mm from the plain or spigot end.

#### 4.4.2 Preparation

All pipes, fittings and specials shall be cleaned both inside and outside of all loose rust, loose mill scale, paint, grease, oil or other foreign matter, including solidified welding material outside of the weld proper.

Cleaning shall be carried out immediately prior to the coating being applied. No cleaned surface shall be left exposed for a period of more than two hours before coating is carried out. Every precaution shall be taken to prevent the cleaned surface from becoming moist or wet. Should this occur, such surfaces shall be thoroughly dried and re-cleaned.

#### 4.4.3 Cement mortar lining

The cement mortar shall be composed of Portland cement in accordance with SANS 50197-1 CEM 1, sand in accordance with SANS 1090 and water well mixed and of proper consistency to obtain a dense homogeneous lining that will adhere firmly to the pipe surface. The aggregate cement ratio shall not exceed 1.5:1 and the water content shall be the minimum consistent with workability and the process used.

##### 4.4.3.1 Thickness

All pipes, fittings and specials shall have a cement mortar lining which shall have a thickness in accordance with the following table:

| NOMINAL DIAMETER OF PIPE, FITTING OR SPECIAL | THICKNESS OF LINING mm | TOLERANCE mm | MINIMUM BORE mm |
|----------------------------------------------|------------------------|--------------|-----------------|
| 100                                          | 5                      | +3 -0        | 85              |
| 150                                          | 5                      | +3 -0        | 135             |
| 230                                          | 6                      | +3 -0        | 205             |
| 305                                          | 7                      | +3 -0        | 285             |
| 306 - 610                                    | 10                     | +4 -0        |                 |
| 611 - 1 220                                  | 15                     | +5 -0        |                 |
| Greater than 1220                            | 20                     | +6 -0        |                 |

Pipes up to 305 mm nominal diameter shall allow a sphere (with the minimum bore diameter) to roll through under gravity and without hindrance to ensure the minimum bore of the pipe.

#### Method of application

The lining shall be applied to the pipes, straight fittings and specials by spinning or other approved methods, and to fitting and specials whose shapes preclude this method by hand-plastering or other approved process. All water and

laitance expelled during the lining operation shall be removed in such a manner that the surface of the lining shall be smooth, straight and true.

At a suitable time after completing the lining operation, as determined by experience, the spun lining shall be given a trowelled or smoothing bar finish by skilled workers. A second trowelling may be necessary should the first fail to remove all laitance and produce a smooth hard surface.

The finished lining shall be dense, firm and adhere rigidly to the surface. The lining shall be tested by lightly tapping the surface with a light hammer. Any pipe, fitting or special where there is no bond between the lining and the steel shall be rejected. Defective lining shall be repaired to the satisfaction of the Engineer.

#### **4.4.3.2 Reinforcing**

The lining of all fittings, specials, make-up pieces (where their length is less than their diameter) and at welded joints of nominal diameter 610 mm and greater shall be reinforced by means of a 50 mm x 50 mm x 2,5 mm diameter wire fabric. All reinforcing shall be tack-welded to the fitting or special in such a manner as to lie within the middle third of the lining.

### **Curing**

#### **General**

After the initial set has taken place, the mortar lining shall be cured by water or steam as hereinafter specified.

##### **4.4.3.2.1 Water Curing**

Where water curing is to be used, it shall be commenced not longer than twelve hours after completion of the lining. The lining shall be continually sprayed with water by means of approved atomising sprinkler heads, placed inside the pipes, fittings and specials. They shall be so spaced and be of such capacity to keep the entire surface of the lining continually wet for a period of not less than 96 hours.

Where exterior sheathing is to be applied after lining, its applications shall be commenced not less than 72 hours after completion of the lining and in this case, water spraying may be interrupted for a maximum of 3 hours for any sheathing operation.

When water spraying is recommenced after sheathing, precautions shall be taken so as to ensure that the sheathing is not damaged by escaping water. Except for the sheathing operation, no pipe, fitting or special shall be disturbed or moved during the curing period.

##### **4.4.3.2.2 Steam Curing**

When steam curing is to be used, it shall be commenced not longer than 8 hours after completion of the lining. The steam shall be introduced slowly and the total surface of the lining kept in contact with moist steam at a temperature of not less than 500 C and not more than 630 C for a period of not less than 14 hours.

When exterior sheathing is to be applied after lining, its application shall not be commenced until after completion of the steam curing.

#### **4.4.3.3 Exterior Sheathing**

##### **Cement Mortar**

The cement mortar shall be as specified for lining. If the mix is different to that specified, then the proposed mix shall be submitted with the tender for approval by the Engineer. It shall not be subject to Alkali Aggregate Reaction where the aggregate expands deleteriously (>0,5%).

##### **4.4.3.3.1 Thickness**

All pipes, fittings and specials shall have an exterior sheath which shall have a thickness in accordance with the following table:



| NOMINAL DIAMETER OF PIPE, FITTING OR SPECIAL<br>mm | THICKNESS<br>mm |
|----------------------------------------------------|-----------------|
| Up to 610                                          | 20 + 3 -0       |
| Greater than 610                                   | 25 + 6 -0       |

#### Method of application

The mortar shall be applied by an approved method. Fittings and specials whose shape precludes the approved method shall have the sheathing applied by hand plastering or other approved process.

The finished sheathing shall be dense, firm and adhere rigidly to the surface. Sheathing shall be tested by lightly tapping the surface with a hammer. Any pipe, fitting or special where there is no bond between the sheathing and the steel shall be rejected. Defective sheathing shall be repaired to the satisfaction of the Engineer.

#### 4.4.3.3.2 Reinforcing

The exterior sheathing of all pipes, fitting and specials shall be reinforced by 5 mm diameter steel wire wrapped around the circumference. The wire shall extend over the full length of the sheathing with a maximum spacing of 40 mm. The wire shall be tack-welded to the surface at each end. All fittings and specials whose shape precludes this method of reinforcement shall have their sheathing reinforces in a similar manner to that specified in Clause 4.4.3.3.

#### 4.4.3.3.3 Curing

The Exterior sheathing shall be cured in a similar manner to the lining excepts that the minimum duration of the curing shall be 48 hours and 12 hours for water and steam respectively.

### 4.5 Protection against corrosion

Hot-metal spray coatings shall be in accordance with SANS 14713 and shall comply with the following:

- The minimum coating thickness for both aluminium and zinc shall be 160 µm. Greater thicknesses may be specified in the Detailed Specification.
- The thickness shall be checked on every surface plane at points not more than 300 mm apart for small articles and 500 mm for large articles. Angles shall be checked along all 4 surfaces, channels along all 6 surfaces, pipes in 4 planes. The minus tolerance on thickness in isolated areas shall not exceed 10% and such low areas shall not be larger than 50 mm in diameter.
- The time between surface preparation and coating shall be shortened from 4 hours to 2 hours at any application area closer than 10 km from the coast.
- Unless otherwise specified, all hot metal coatings shall be sealed and coated immediately after hot-metal spraying. The system shall consist of a low viscosity sealant, which is applied until absorption is complete, followed by a suitable coating system.

The sealant systems outlined below are acceptable (where appropriate for the particular application).

#### System 1

Application of an epoxy zinc sealer to a dft of 60 µm; (Sigmarite Sealer or equivalent). Application of two coats of epoxy pipe coating to a dft (per coat) of 125 µm; (Sigmaguard EHB, or equivalent)

#### System 2

Application of micaceous oxide pigmented polyamide cured epoxy to achieve a dft of 60-80 µm; (Sigmarite Sealer or equivalent)

One coat of solvent borne acrylic coating to achieve a dft of 70 µm; (Sigma Topacryl coating or equivalent)

One coat of solvent borne modified acrylic finish to a dft of 30-45 µm; (Sigma Topacryl finish or equivalent)

## **5 Inspection and method of testing**

### **Hydrostatic test**

Prior to coating and lining, all straight pipes, fittings and specials shall undergo a hydraulic test to the relevant test pressure specified in Clause 4.1.5 without bursting or leaking. Prior to the manufacture of bends and tees, the straight pipe to be used shall be tested as stated. Flanged Tees shall have their branches closed during the test by means of a bolted on blank plate of sufficient thickness to withstand the test pressure. Where the branches and specials are prepared for welding or their shape precludes being tested in accordance with this clause, the welds shall be subjected to dye penetration tests as per 5.1.2.

The testing machine shall be of a design which will allow a steady application of the test pressure and shall be equipped with an accurate pressure gauge. Provision shall be made for attaching the Engineer's pressure gauge. Provision shall also be made to expel all air from any pipe, fitting or special under test during filling and before application of the test pressure.

The pressure shall be steadily applied and be maintained sufficiently long for proof and inspection, but in no case for less than three (3) minutes. Each pipe, fitting and special shall withstand this test without showing any leakage, weep, sweat or other defect. Should leakage occur at any weld, such weld shall be repaired in accordance with Clause 4.1.4 and subjected to Dye penetrating or X-ray testing in accordance with Clauses 5.2 and 5.3.

The duration of the test pressure may be reduced if 100% of the length of the welds are x-rayed, but may not be less than one (1) minute.

Records of all hydrostatic tests shall be kept and submitted to the Engineer prior to delivery of the item.

If required, the hydrostatic shall be carried out in the presence of the Engineer. All pipes, fittings and specials which have passed the hydrostatic test shall be stamped with the Contractor's test stamp.

The Engineer may call for the re-testing of any pipe, fitting or special which was not tested in his presence. If such pipe, fitting or special passes the re-test, all costs incurred in carrying out the re- testing shall be for the clients account.

### **5.1 Dye Penetration testing**

An approved penetrant dye shall be applied to all welds. No trace of the dye shall appear on the other side of the weld. Defective welds shall be ground and re-welded in accordance with Clause 4.1.3.2. The test shall be repeated on the repair.

### **5.2 X-Ray testing of welds**

Unless 100% of all welds as per Clause 5.1 are x-rayed, ten percent (10%) of the length of all welds shall be x-rayed and checked for defects. Defects shall be removed by grinding or cutting as approved by the Engineer and re-welded and tested.

### **5.3 Visual inspection**

All pipes shall undergo a visual inspection and be free of injurious defects as defined in API 5L.

## **6 Marking and Delivery**

### **Marking**

All pipes, fittings and specials shall have the following information stenciled, in black painted characters not less than 40 mm in height, on the inside as close to both ends as is possible and so as to be clearly visible from outside. The paint used shall be non-toxic.

- the serial number in order of manufacture;
- the nominal diameter in millimetres;
- the effective length to the nearest 5 mm;
- the working pressure in metres head.
- The tender number



All fittings and specials shall be marked in the same manner with the following additional information

- tees: the nominal diameter of the branch in millimetres and its effective length to the nearest 5 mm;
- bends: the angle of deflection in degrees;
- reducers: the nominal diameter of each end in millimetres;
- the tender number

The Contractor may place his own name and/or mark or trade mark on all pipes, fittings and specials supplied by him.

## **6.1 Delivery**

Before delivery to the pipeyard, approved internal bracing shall be placed in all pipes, fittings and specials at points of suspension and support used during loading, transportation and unloading. The bracing shall be so designed as to prevent the pipes, fittings and specials from exceeding 0,5% "out- of-roundness" as measured on the diameter and shall have sufficient bearing surfaces to prevent damage to the lining or sheathing.

All pipes, fittings and specials shall be delivered and stacked by the Contractor at the pipeyard or other site specified in the Schedule of Quantities.

The Contractor shall provide all carnage, webbing slings etc to offload and stack the pipes as directed by the Engineer.

They shall be neatly and methodically arranged off the ground or as directed by the Engineer and they shall be deemed to have been delivered to the Council as soon as they have been stacked to the satisfaction of and inspected and accepted by the Engineer.

The minimum rate of and the order of delivery shall be as stated in the Schedule of Quantities.

Should any pipes, fittings or specials be damaged in any way and through any cause whatsoever during delivery and stacking, or should they suffer damage subsequently to the faulty stacking, such damage shall be made good forthwith by the Contractor at his own expense and to the satisfaction of the Engineer. Alternatively the Engineer shall have the right to reject such pipes, fittings and specials.

## **7.0 Spigot and Socket (Bell) Joint Cement Mortar Lining Reinstatement**

For the reinstatement of the Cement Mortar Lining on Bell and Spigot jointed pipes of 550NB (22") or less – typically pipes of a diameter too small to allow reasonable "man access" or as dictated by any prevalent Health and Safety statutes, herewith the method as described in the American Water Works Association specification AWWA C205 – 1995 Clause 4.6.2.2.2 :

"Prior to assembling the joint, the inside shoulder of the bell shall be "battered" with a stiff mortar consisting of one part Portland cement to two parts sand, by weight (mass).

An accessory such as a specially designed rubber ball ("pig") wrapped in burlap (hessian) shall be used to :

- a) Provide backup against which the cement mortar is squeezed while the centred spigot is pushed home, and
- b) Hold the cement mortar in place in the assembled joint while alignment and grade are adjusted, the next bell is "battered" and the next spigot is centred.

The accessory (pig) shall then be pulled through the joint to screed off excess mortar to leave a smooth and continuous surface between pipe sections as it is drawn through the pipe".





**TABLE A****PIPE DETAILS**

| 1            | 2                | 3                       |
|--------------|------------------|-------------------------|
| NOMINAL SIZE | OUTSIDE DIAMETER | MINIMUM STEEL THICKNESS |
| mm           | mm               | mm                      |
| 75           | 88,90            | 4,50                    |
| 100          | 114,30           | 4,50                    |
| 150          | 165,10           | 4,50                    |
| 230          | 241,30           | 4,50                    |
| 305          | 323,85           | 4,50                    |
| 380          | 393,70           | 4,50                    |
| 460          | 469,90           | 4,50                    |
| 535          | 546,10           | 6,00                    |
| 610          | 622,30           | 6,00                    |
| 685          | 704,85           | 6,00                    |
| 760          | 781,05           | 6,00                    |
| 840          | 863,60           | 8,00                    |
| 915          | 933,45           | 8,00                    |
| 1 065        | 1 092,20         | 10,00                   |
| 1 220        | 1 244,60         | 10,00                   |
| 1 370        | 1 397,00         | 12,00                   |
| 1 525        | 1 613,00         | 12,00                   |
| 1 675        | 1 708,15         | 16,00                   |
| 1 830        | 1 860,55         | 16,00                   |



**TABLE B**

**FLANGE DIMENSIONS FOR A WORKING PRESSURE OF 1,2 MPa (AMENDED AUGUST 1987)**

| 1                                        | 2                               | 3                                       | 4                  | 5                   | 6                                      | 7                      | 8                          | 9                                                |
|------------------------------------------|---------------------------------|-----------------------------------------|--------------------|---------------------|----------------------------------------|------------------------|----------------------------|--------------------------------------------------|
| NOMINAL<br>DIAMETER<br>OF PIPE<br><br>mm | DIAMETER OF<br>FLANGE<br><br>mm | DIAMETER<br>OF BOLT<br>CIRCLE<br><br>mm | NUMBER<br>OF BOLTS | BOLT<br>DESIGNATION | DIAMETER<br>OF BOLT<br>HOLES<br><br>mm | THICKNESS OF FLANGE    |                            |                                                  |
|                                          |                                 |                                         |                    |                     |                                        | CAST<br>IRON<br><br>mm | WROUGHT<br>STEEL<br><br>mm | FORGED<br>OR CAST<br>STEEL<br>(VALVES)<br><br>mm |
| 75                                       | 185                             | 146,05                                  | 4                  | M16                 | 18                                     | 19                     | 12                         | 14                                               |
| 100                                      | 215                             | 177,80                                  | 4                  | M16                 | 18                                     | 19                     | 12                         | 17                                               |
| 150                                      | 280                             | 234,95                                  | 8                  | M16                 | 18                                     | 21                     | 12                         | 17                                               |
| 200                                      | 337                             | 292,10                                  | 8                  | M16                 | 18                                     | 22                     | 15                         | 19                                               |
| 230                                      | 370                             | 323,85                                  | 8                  | M16                 | 18                                     | 22                     | 15                         | 19                                               |
| 305                                      | 455                             | 406,40                                  | 12                 | M20                 | 22                                     | 25                     | 20                         | 22                                               |
| 380                                      | 550                             | 495,30                                  | 12                 | M24                 | 26                                     | 25                     | 22                         | 25                                               |
| 460                                      | 640                             | 584,20                                  | 12                 | M24                 | 26                                     | 25                     | 25                         | 29                                               |
| 535                                      | 735                             | 673,10                                  | 16                 | M24                 | 26                                     | 35                     | 28                         | 32                                               |
| 610                                      | 825                             | 755,65                                  | 16                 | M24                 | 26                                     | 35                     | 32                         | 35                                               |
| 685                                      | 910                             | 844,55                                  | 20                 | M24                 | 26                                     | 35                     | 35                         | 38                                               |
| 760                                      | 995                             | 927,10                                  | 20                 | M30                 | 3                                      | 38                     | 40                         | 41                                               |
| 840                                      | 1090                            | 1 016,00                                | 20                 | M30                 | 33                                     | 41                     | 45                         | 41                                               |
| 915                                      | 1 175                           | 1 092,20                                | 24                 | M30                 | 33                                     | 41                     | 50                         | 44                                               |
| 1 065                                    | 1 335                           | 1 250,95                                | 28                 | M30                 | 33                                     | 44                     | 55                         | 48                                               |
| 1 220                                    | 1 490                           | 1 409,70                                | 32                 | M30                 | 33                                     | 48                     | 60                         | 51                                               |
| 1 370                                    | 1 680                           | 1 593,85                                | 44                 | M45                 | 48                                     | 51                     | 75                         |                                                  |
| 1 525                                    | 1 855                           | 1 758,95                                | 52                 | M45                 | 48                                     |                        | 80                         |                                                  |
| 1 675                                    | 2 030                           | 1 930,40                                | 52                 | M45                 | 48                                     |                        | 85                         |                                                  |
| 1 830                                    | 2 195                           | 2 095,50                                | 60                 | M45                 | 48                                     |                        | 90                         |                                                  |

NOTE: The above table is based upon BS10: 1962 Table D, for sizes up to and including 1 0675 mm nominal diameter, and AWWA Manual M11, for sizes greater than 1 065 mm nominal diameter.



**TABLE C**

**FLANGE DIMENSIONS FOR A WORKING PRESSURE OF 2,5 MPa (AMENDED MAY 1987)**

| 1                                        | 2                               | 3                                       | 4                  | 5                   | 6                                      | 7                      | 8                          | 9                                                |
|------------------------------------------|---------------------------------|-----------------------------------------|--------------------|---------------------|----------------------------------------|------------------------|----------------------------|--------------------------------------------------|
| NOMINAL<br>DIAMETER<br>OF PIPE<br><br>mm | DIAMETER OF<br>FLANGE<br><br>mm | DIAMETER<br>OF BOLT<br>CIRCLE<br><br>mm | NUMBER<br>OF BOLTS | BOLT<br>DESIGNATION | DIAMETER<br>OF BOLT<br>HOLES<br><br>mm | THICKNESS OF FLANGE    |                            |                                                  |
|                                          |                                 |                                         |                    |                     |                                        | CAST<br>IRON<br><br>mm | WROUGHT<br>STEEL<br><br>Mm | FORGED<br>OR CAST<br>STEEL<br>(VALVES)<br><br>mm |
| 75                                       | 205                             | 165,10                                  | 8                  | M16                 | 18                                     | 19                     | 16                         | 16                                               |
| 100                                      | 20                              | 190,50                                  | 8                  | M16                 | 18                                     | 22                     | 19                         | 19                                               |
| 150                                      | 305                             | 260,35                                  | 12                 | M20                 | 23                                     | 25                     | 22                         | 22                                               |
| 230                                      | 405                             | 355,60                                  | 12                 | M24                 | 27                                     | 29                     | 29                         | 25                                               |
| 305                                      | 490                             | 438,15                                  | 16                 | M24                 | 27                                     | 32                     | 32                         | 29                                               |
| 380                                      | 580                             | 520,70                                  | 16                 | M27                 | 30                                     | 35                     | 38                         | 32                                               |
| 460                                      | 675                             | 609,60                                  | 20                 | M30                 | 33                                     | 38                     | 44                         | 35                                               |
| 535                                      | 760                             | 698,50                                  | 24                 | M30                 | 33                                     | 41                     | 51                         | 38                                               |
| 610                                      | 850                             | 781,05                                  | 24                 | M33                 | 36                                     | 44                     | 57                         | 41                                               |
| 685                                      | 935                             | 857,25                                  | 24                 | M36                 | 39                                     | 48                     | 60                         | 48                                               |
| 760                                      | 1 015                           | 939,80                                  | 28                 | M36                 | 39                                     | 51                     | 70                         | 51                                               |
| 840                                      | 1 095                           | 1 016,00                                | 32                 | M36                 | 39                                     | 54                     | 70                         | 54                                               |
| 915                                      | 1 190                           | 1 104,90                                | 32                 | M36                 | 39                                     | 57                     | 80                         | 57                                               |
| 1 065                                    | 1 355                           | 1 270,00                                | 36                 | M36                 | 39                                     | 64                     | 90                         | 64                                               |
| 1 220                                    | 1 530                           | 1 441,45                                | 40                 | M42                 | 45                                     | 67                     | 100                        | 67                                               |
| 1 370                                    |                                 |                                         |                    |                     |                                        |                        |                            |                                                  |
| 1 525                                    |                                 |                                         |                    |                     |                                        |                        |                            |                                                  |
| 1 675                                    |                                 |                                         |                    |                     |                                        |                        |                            |                                                  |
| 1 830                                    |                                 |                                         |                    |                     |                                        |                        |                            |                                                  |

The above table is based upon BS10: 1972 Table F



**TABLE D**  
**WELDING COLLAR DETAILS**

| 1                  | 2                       | 3           | 4                     |
|--------------------|-------------------------|-------------|-----------------------|
| NOMINAL SIZE<br>mm | INTERNAL DIAMETER<br>mm | WIDTH<br>mm | STEEL THICKNESS<br>mm |
| 230                | 243,30                  | 100         | 4,50                  |
| 305                | 325,85                  | 100         | 4,50                  |
| 380                | 396,70                  | 100         | 4,50                  |
| 460                | 472,90                  | 100         | 4,50                  |
| 535                | 549,10                  | 100         | 6,00                  |
| 610                | 625,30                  | 100         | 6,00                  |
| 685                | 707,85                  | 150         | 6,00                  |
| 760                | 784,05                  | 150         | 6,00                  |
| 840                | 866,60                  | 150         | 8,00                  |
| 915                | 936,45                  | 150         | 8,00                  |
| 1 065              | 1 095,20                | 150         | 10,00                 |
| 1 220              | 1 247,60                | 150         | 10,00                 |
| 1 370              | 1 400,00                | 150         | 12,00                 |
| 1 525              | 1 616,00                | 150         | 12,00                 |
| 1 675              | 1 711,15                | 150         | 16,00                 |
| 1 830              | 1 863,55                | 150         | 16,00                 |

Note: Welded bead to be ground flush on inside of collar



### **PSL- 3.7 Other Types of Pipes**

**Add the following as clause 3.7.3 at the end:**

Water pipes shall be either of the following as specified:

- uPVC in compliance with the relevant requirements of SABS 966
- HPE PE 63, 80 or 100 in compliance with the relevant requirements of SABS 533
- Ductile iron pipe as specified above

#### **PSL 5.1.1.8 Flanged gaskets**

Klinger quantum or Tolsill 101 full face gaskets 3mm thick must be supplied for all flanged joints. No rubber gaskets will be permitted.

#### **PSL 5.1.1.9 Bolts**

Grade 316 stainless steel bolts, nuts and washers must be supplied for all bolted joints and fittings.

### **PSL 5.1.2 Specials**

#### **PSL 5.1.2.1 Fabrication**

- i. All specials shall be fabricated, lined and coated where applicable, in the pipe supplier's works with all flanges and openings protected as specified.

#### **PSL 5.1.2.2 Installation of Bends**

Bends shall be installed true to line, level and deflection and shall be anchored in concrete where required to counteract thrust. Bends shall normally be supplied with "centre planes" marked with two small punch marks close to both ends of the bends to facilitate correct positioning of the bends in laying.

##### **i. Tees**

Tees for air valves shall be installed with branch barrels vertical. Tees for scour valves shall be installed with branch barrels horizontal or at the gradients as indicated on the drawings. Tees for off-takes shall be installed as shown on the drawings.

##### **ii. Flanges**

All flanges shall be installed with bolt holes off-centre and symmetrically off-set from the vertical centre lines of the flange. Flanges shall be installed truly square to the axis of the pipe.

##### **iii. Insulated flanged joints.**

Insulated joints shall be provided and installed by the Contractor where specified or instructed by the Engineer. The Contractor shall supply all materials, labour and equipment and shall complete and prove that each insulated joint after installation in the pipeline has a resistance well in excess of the resistance to earth of the pipeline on both sides of the insulating joint.

##### **iv. Dismantling joints**

Dismantling joints shall be installed where indicated on the drawing or instructed by the Engineer. These will normally be provided to facilitate the removal of valves or similar fittings from the pipeline. The Contractor shall supply and install dismantling joints with due regard to their pressure rating and mating flanges. The hydraulic pressure restraining tie-bolts shall be carefully installed to tie the pipework across the dismantling joint. Dismantling joints shall be watertight.



v. Thrust flanges

Where thrust flanges are to be installed on site as for anchoring pipes on steep slopes etc. these flanges shall be supplied by the Contractor split in two equal segments, undrilled with outer perimeter unmachined.

At the point of installation of the thrust flange the pipe coating shall be stripped of the pipe for a distance of 300 mm. The flange segments shall be double fillet welded to the pipe barrel around the full circumference and also along both sides of the split which shall be chamfered for welding. After welding, the coating and lining of the pipe shall be made good.

vi. Temporary closure pipes

Temporary closure pieces of the same standard, diameter and wall thickness as the pipeline shall normally be jointed with flanges and/or flexible couplings, except where otherwise specified or instructed by the Engineer.

**PSL 5.1.3 Installation of valves and meters**

PSL 5.1.3.1 The mass of valves or meters shall at no time be carried by the pipe, the flange or the coupling. Valve stools and supports should be completed before or immediately after the installation of valves and meters. Stools shall not be permitted to carry the mass of a valve until at least 7 days after casting the concrete. Prefabrication and welding of pipe and valve supports shall comply with the requirements of SABS 044 Part III and shall be fabricated to the Engineer's approval.

PSL 5.1.3.2 Valves and meters requiring special adjustment after installation shall be adjusted and commissioned by the respective suppliers or agents after installation.

PSL 5.1.3.3 Butterfly valves shall be installed with the blade seal retaining ring facing upstream.

**PSL 5.1.4 Pipelines with flexible couplings**

PSL 5.1.4.1 Joints by flexible couplings shall be made only in their final laid position. Before assembling the joint, care shall be taken to ensure that pipe ends are clean and free from burrs and ridges. Such burrs and ridges shall be removed if present and linings and/or coatings made good where damaged. Pipe ends shall be mated carefully before joints are made. Pipe ends shall be concentric and perfectly lined up and the coupling shall not be relied upon to line up or to support the pipe.

PSL 5.1.4.2 Joints shall be made and couplings assembled to the manufacturer's instructions. Bolts shall be placed with bolt heads alternately pointing in opposite directions.

PSL 5.1.4.3 Where couplings without central registers are used, precautions shall be taken to ensure that the pipe ends are apart by the same distance as if a coupling with central register had been used and the couplings shall carefully be centred over the pipe ends.

**PSL 5.1.5 Flanged joints**

PSL 5.1.5.1 Flanges shall be truly parallel with all bolts evenly firm before being finally drawn up with torque wrenches to watertightness. Taper gauges shall be used to check that there is a uniform gap before and after final tightening up of bolts. Bolts shall be tightened in an approved sequence.

PSL 5.1.5.2 The Contractor shall ensure that the correct jointing materials, i.e. gaskets, bolts and nuts are available when required. Only correct diameter and lengths of bolts and studs shall be used. Flat washers shall be used under all nuts. The length of bolts and studs shall be such that at least two threads protrude from the nut when fully tightened. The threads of bolts, studs and nuts shall be thoroughly cleaned and then coated with a graphite/grease compound immediately prior to assembly.

PSL 5.1.5.3 Flange faces shall be given two coats of an approved bituminous primer before mating.



- PSL 5.1.5.4 Flanged fittings shall be so installed that there are no stresses induced into the pipework, specials or fittings by forcing ill-fitting units into position or by bolting up flanges with faces not uniformly in contact with their gaskets over their whole faces.
- PSL 5.1.5.5 All bolted connections to be packed with mastic and enclosed in an impregnated mastic tape to prevent corrosion. The cost of this corrosion protection to be included in the jointing cost.
- PSL 5.1.6 Maintenance of cleanliness during laying**
- PSL 5.1.6.1 The interior of pipes shall be perfectly clean before being laid and the Engineer may instruct pipe interiors to be cleaned or washed before the pipes are lowered into the trench. All brushes, trowels, welding rod stumps, pieces of mortar, dust and all foreign matter shall be removed from pipes immediately after laying. Once a section of pipeline has been cleaned, it shall be sealed off and shall not be entered again unless permitted by the Engineer in writing.
- PSL 5.1.6.2 The Contractor shall at his own expense make good any damage to valves and fitting or clogging of off-takes or mal-functioning of fittings which result from his failure to keep the pipeline in a thoroughly clean condition.
- PSL 5.1.7 Night-caps**
- PSL 5.1.7.1 Metal night-caps shall be used to close off all ends of each laid section of pipework when work is stopped at the end of the day or for longer periods and shall be left on the ends of sections of completed pipework until such sections are tied-in with the remainder of the completed pipeline. The night-caps shall consist of an end cap for the applicable pipe or a steel plate welded onto a half coupling which shall be watertight.
- PSL 5.1.7.2 The Contractor shall also, at his own expense blank-off all air valves, scour valves and off-takes with 6 mm thick blank flanges which shall be bolted with at least four bolts to tee flanges or shall be fixed to plain ended tee branches by half couplings welded to the blank flanges. These shall be watertight and shall not be removed until the valves or other fittings are about to be fitted.
- PSL 5.1.7.3 Notwithstanding the use of night-caps the Contractor shall at his own expense make good all damage to pipe linings and fittings caused by the ingress of dirty water, silt, sand, debris, vermin, insects and other foreign matter. The Contractor shall at his own expense and to the satisfaction of the Engineer clean the interior of the pipeline of such contaminants.

**PSL 5.10 Disinfecting of potable water pipelines**

Replace the entire contents of this clause with the following:

- PSL 5.10.1 All pipelines for the conveyance of potable water shall be disinfected/sterilised.
- PSL 5.10.2 As soon as the whole pipeline has passed a hydrostatic test, test water shall be scoured to ensure a flushing velocity of not less than 1 m/sec over the entire length of the pipeline.
- PSL 5.10.3 Potable water treated with sodium hypochloride or calcium hypochloride or chlorine gas to a chlorine concentration of not less than 5 mg. per litre free available chlorine, shall be introduced into the pipeline or section of pipeline to be sterilised. On completion of filling with chlorinated water the chlorine concentration in water sampled at any point along the section of pipeline filled, shall not be less than 3 mg per litre free available chlorine.
- PSL 5.10.4 In determining chlorine concentrations the Contractor shall satisfy the Engineer that the method adopted does measure free available chlorine concentration and not total chlorine residuals, the latter being the easier to determine by means of simple comparators.
- PSL 5.10.5 Chlorinated water shall be retained for at least 2 hours during which all air valves, in-line isolating valves, bypass valves, branch isolating valves and scours shall be operated in order to expose all interior surfaces of these fittings to the chlorinated water.



- PSL 5.10.6 After 2 hours retention of chlorinated water in the pipeline, samples drawn at any point along the pipeline shall contain not less than 0,5 mg per litre free residual chlorine. Where necessary, additional chlorine shall be injected to maintain chlorine residuals, provided always that the 2 hours minimum retention time with water containing an initial free chlorine residual of at least 3 mg per litre and a final free residual of not less than 0,5 mg per litre is maintained.
- PSL 5.10.7 On completion of sterilisation of any section of pipeline, the water in that section may be retained or may be passed along the pipeline to other sections to be sterilised.
- PSL 5.10.8 Provided cleanliness of pipelines has been maintained during transport, storage and laying and provided furthermore that testing water is of potable quality, the Engineer may allow the introduction of chlorine gas or compounds into water during hydrostatic testing of pipelines. Should in these instances entry into the pipeline be necessary at any stage to repair leaks or shall the interior surfaces of any pipe, fitting, valve or similar appurtenance be touched by humans, equipment etc., portions so affected shall be re-sterilised.

**Add the following new clause PSL 5.11**

**PSL 5.11 Drainage of Pipeline**

Standing water in a pipeline can lead to anaerobic conditions where sulphate reducing bacteria can cause corrosion. After a pipeline has been hydrostatically tested and sterilised, if required, it shall be completely drained of all water, including pumping out of all low laying areas such as at scours, etc. Sections that will not need refilling for testing or sterilisation should be drained sooner.

This will generally apply unless otherwise instructed by the Engineer.

*Add the following:*

**PSL- 5.12 “Connection to existing mains**

Connections or work on existing mains shall be made under the supervision of the relevant Local Authority. The Contractor shall supply all materials required for these connections and shall expose the existing mains well in advance and coordinate the connection with the Local Authority.”





### PSL 7.3 STANDARD HYDRAULIC PIPE TEST

Replace the entire contents of SANS 1200 7.3 and its sub-clauses with the following:

#### PSL 7.3.1 General

- PSL 7.3.1.1 Pipelines shall be hydrostatically tested as pipe laying proceeds and after installation of all valves, specials and fittings.
- PSL 7.3.1.2 The Contractor shall be responsible for providing all water required for testing, the source of which shall be subject to approval by the Engineer.
- PSL 7.3.1.3 The length of pipeline to be tested in one operation shall be as approved by the Engineer.
- PSL 7.3.1.4 Where the method of test is in any way in variance to this specification, the Contractor shall submit a detailed method statement to the Engineer and no test shall proceed before approval of such method statement by the Engineer.

#### PSL 7.3.2 Test pressures

- PSL 7.3.2.1 Test pressures shall be as indicated on the tender drawings. Test pressures shall generally be 1,25 times the pipeline design pressure for design pressures up to and including 3,2 MPa and 1,1 times the design pressure for higher pressures. Design pressure shall be taken as the maximum pressure to which pipelines might be subjected under all conditions and shall include allowance for transient pressures.
- PSL 7.3.2.2 Test pressures over any length or section of pipeline under test, taking possible differences in elevation along the pipeline into account, shall be such that the test pressure at any point along the section is not less than 1.1 times nor greater than 1,40 times the design pressure at these points.

#### PSL 7.3.3 Leakage rates

- PSL 7.3.3.1 Leakage of a pipeline under test, taken as the aggregate quantity of water added over a 24 hour period to reinstate required test pressure, shall not exceed quantities equivalent to the following:
- Prestressed concrete, reinforced concrete and uPVC pipelines -  $1/3\ 000$  of the volume of water in the section under test.
  - Ductile iron pipes -  $1/3\ 500$  of the volume of water in the section under test.
  - The leakage rate at any one joint in the section under test shall not exceed the following:  
 $Q = \text{Allowable leakage in 24 h of pipeline under test in litres/20N}$   
Where  $Q = \text{Leakage rate in litres/hour}$   
 $N = \text{Number of joints in section under test}$

#### PSL 7.3.3.2 State of valves during test

- The state of valves during the test shall be as follows:  
  
In-line isolating valves open, except where used to isolate a test length.  
Scour isolating valves closed.  
Off-take isolating valves closed.  
Scour sleeve valves open unless no scour isolating valve is provided.  
Air valve isolating valves open.  
Bypass isolating valves to in-line isolating valves and reflux-valves closed.



- ii. The Contractor shall be permitted to test against a closed in-line isolating valve. He should bear in mind however that valve gates and seals are not expected to close drop tight at differential pressures exceeding the design pressure of the valve. Design pressures of valves shall be equivalent to a pipelines field test pressure. No relaxation of specified leakage rates shall be permitted due to leaks past gates, blades or seals of isolating valves.

#### **PSL 7.3.3.3 Method of testing**

- i. The Contractor shall provide an approved test pump, an accurate water meter, sealed pressure gauge and automatic pressure recorder, tested and certified by an independent testing organisation, and all other equipment, materials and labour required for the test.
- ii. The section of pipeline to be tested shall be clean and closed off at the ends by isolating valves, end caps or approved end-closure pieces. Free ends shall be firmly strutted against solid supports or thrust blocks designed to withstand safely 2 times the calculated end thrust under maximum test pressure. It shall be incumbent on the Contractor to establish the need for blank flanges or isolating valve flanges in order to limit leakage rates past gates, blades and seals.
- iii. Testing water may be introduced at any air valve within the portion of the pipeline under test. A test manifold shall be placed between the selected air valve and its isolating valve. The manifold shall be provided with three branches, each fitted with drop-tight valves. The main branch shall be sized to suit the Contractor's test pump connection. The two smaller branches shall not be less than 12 mm nominal bore fitted with heavy duty needle valves and reducers to suit pressure gauge connections. A pressure gauge and an automatic pressure recording gauge respectively shall be connected to each of the smaller branches. A water meter carrying a valid calibration certificate shall be installed between the pump and test manifold. The Contractor shall accurately determine the reduced level at the automatic pressure gauges and enter this level on the recorder chart. The Contractor shall also enter the reduced level of the highest and lowest invert of the section under test on the recorder chart.
- iv. The section of pipeline to be tested shall be slowly filled with clean water of quality to the Engineer's approval, great care being exercised to remove all air from the pipeline. The section of pipeline under test shall be completely filled with water and kept full for not less than 7 days in the case of pre-stressed concrete pipelines, not less than 3 days in the case of fibre-cement pipelines or steel pipelines with concrete linings and not less than 1 hour in the case of uPVC, unlined steel pipelines or steel pipelines with linings other than concrete.
- v. During this initial filling stage, the pipeline joints and all specials, fittings and valves shall be visually inspected for visible leaks and same rectified before proceeding with the test.
- vi. After the specified absorption period and with the pipeline full of water, the automatic recorder shall be put into operation at least 15 minutes before pressurisation of the pipeline commences. Water shall be added until the required test pressure is reached whereupon the valve on the test manifold shall be closed and sealed. The reading on the water meter shall be recorded.
- vii. The pressure shall be maintained for one hour and if a pressure drop occurs, more water shall be added to reinstate the test pressure and the valve closed again. The quantity of water added shall be measured by recording the readings before and after pumping. This procedure shall be repeated for a period of 24 hours, with water added at hourly intervals where necessary to reinstate pressure and water meter readings recorded. At the end of the 24 hours period, the aggregate quantity of water required to reinstate pressure over 24 hours shall be determined.
- viii. The Contractor shall give the Engineer 48 hours written notice of his intention to commence pressure testing and the Engineer may attend and supervise all or any part of tests. All records, recording charts and the attached duly completed hydrostatic test certificate shall be handed to the Engineer as soon as tests over any section have been completed.
- ix. All valves, specials, fittings and exposed joints, shall be inspected visually during the 24 hours pipeline test and all visible signs of leaks, sweating and distress shall be reported and attended to without delay.



- x. Immediately after completion of the prescribed 24 hours hydrostatic test, all air valves shall be tested in turn before test pressure in the pipeline is released. Each air valve shall be isolated and the drain plug removed. The air floats shall work freely without restraint. The isolating valve shall be checked for leakage before replacing the plug. Finally, the automatic resealing of the air valves shall be checked by re-opening the isolating valve.

After completion of tests on air valves, the section of pipeline under test shall be completely refilled with water, if necessary, and pressurised to static head shown on the drawings. Each scour valve shall be checked by opening isolating valves and sleeve valves where applicable for a duration sufficient to check the complete opening and closing cycles. If necessary, the pipeline shall be refilled after each individual test and re-pressurised to static pipeline head in order to test all scours within the section under test.



**PSL-8 MEASUREMENT AND PAYMENT**

**PSL-8.2 Scheduled Items**

*Add the following item:*

| Item                                                                                                                       | Unit                |
|----------------------------------------------------------------------------------------------------------------------------|---------------------|
| <b>L- 8.2.16 Break into main and tie-in. Excavate, backfill and dispose of surplus material and specials (Water Mains)</b> | <b>Number (No.)</b> |

The unit of measurement shall be the number of connections to tie into existing pipe of all material type with a new pipe. It shall include all costs related to pipe material, labour, plant, excavations, backfill in order that the connections are fully operational and safe, complete for handover. All incidentals like pipe couplings (VJ couplings, KLAMFLEX or similar), specials and making good shall be included in the rate. Final special orders to the approval of the Project Manager.



## **PSLC CABLE DUCTS**

### **PSLC-2 INTERPRETATIONS**

#### **PSLC-2.1 Supporting Specifications Add the following:**

“f) The requirements of PSC, PSD, PDB shall also apply.”

### **PSLC-3 MATERIALS**

#### **PSLC-3.1 Ducts**

In the first sentence replace the first “GPO” with “Communication Service Providers” and the second “GPO” with “communication services”.

The unit of measurement is the lineal metre (m)

End Caps

End caps for the ducts shall comply with the requirements of the relevant service Authority. All empty ducts to be fitted with end caps after installation and occupied ducts are to be sealed with a suitable expanding foam.

### **PSLC-5 CONSTRUCTION**

#### **PSLC-5.1 Excavation of Trenches**

##### **PSLC-5.1.1.5 Trench Excavations** *(additional sub clause)*

“Trenches shall be in accordance with SABS 1200 drawing LC-1, except where indicated to the contrary.

Where this specified depth is such that the level of the duct conflicts with other service pipes, the Employer’s Agent will modify the duct depth so as to pass over or under the service pipe” .

#### **PSLC-5.8 Road Crossings**

*Add the following:*

“Ducts together with draw wires shall be laid at right angle across road carriageways unless otherwise indicated on the drawings and shall extend 1.0m beyond the edge of the back of sidewalk or as directed by the Employer’s Agent. All road crossing types to be concrete encased as per drawings.”

#### **PSLC-5.9 Duct Route Markers & Position to be Marked (Sub clause 5.9 & 5.10)**

“Notwithstanding the method of marking specified in Sub clause 5.9 and the positions of the marks specified in Sub clause 5.10, the Contractor shall mark the position and type all ducts on kerbs by cutting the following symbols 5mm deep into the concrete surface with an angle grinder.

E for Electricity ducts

T for Telecomm ducts

After the symbols have been cut a number of notches shall be cut next to the symbol indicating the number of ducts laid. The symbol and figure shall be appointed with an approved colour paint.

After the laying of road kerbs and channels the Contractor shall expose the ends of the ducts before marking the position of the duct crossing. The subsequent backfilling of the duct ends shall not be carried out until the Employer’s Agent has inspected and approved the position of the markings. The tolerance on marking shall be such that when a line is strung over the centre of the markings the centre of the ducts or duct group shall be within 150mm either side of the line.”

#### **PSLC- 5.12 Freehaul**



All haul of material within the site area shall be regarded as freehaul.

**PSLC-8 MEASUREMENT AND PAYMENT**

**PSLC-8.2 Scheduled Items**

*Amend the following item:*

| Item                                                    | Unit             |
|---------------------------------------------------------|------------------|
| <b>LC- 8.2.5 Supply, lay, joint, bed and prove duct</b> | <b>Metre (m)</b> |

Under item a) **replace** the “GPO” with “Communication Service”

The pipe line will be measured linearly in plan. The Contractor is to make allowance in his rates for additional quantities due to slope factors.

In addition to the requirements of this sub-clause, the rate tendered shall include for selecting the fill blanket and backfill material and for additional excavation to make provision for the placement of the bedding material below the invert level of the pipe.

*Add the following item at the end:*

“ c) - Should the Communication Service Providers not provide the ducts free of charge, the Contractor will be reimbursed the cost of the ducts as an extra over charge under the relevant item in the Schedule of Quantities.”

**LC- 8.2.7 DRAW PITS/MANHOLES COMPLETE ACCORDING TO THE STANDARD DETAILS**

In addition to the requirements of this sub-clause of LC 8.2.7, the rate tendered shall include for backfill of material (min G7) required around all the electrical duct chambers to the Engineer’s specifications.

**LC- 8.2.10 CABLE PROTECTION**

**Installation of concrete slabs for protection of existing and new services (Provisional)**

|                          |    |
|--------------------------|----|
| (i) 1.5m x 0.9m, Type A  | No |
| (ii) 1.0m x 0.9m, Type B | No |

The rate shall include the cost of manufacture, transport and installation of the protection slabs of various types as detailed on the engineering drawings for duct protection slab details. Steel reinforcement shall be measured separately. Rate inclusive of restrictive width.

**LC- 8.2.11 Concrete encasement of existing and proposed ducts, 15mPa/20mm, where instructed Cubic Metre (m³)**

The unit of measurement shall be the cubic metre (m3) based on specified trench width and thickness (excluding the volume of the ducts). The tendered rate shall include full compensation for the encasement in class 15/20 concrete of the duct or duct group including excavation, backfill, the supply of concrete, placing, compacting curing and disposal of surplus material off site.

|                                                                                    |                         |
|------------------------------------------------------------------------------------|-------------------------|
| <b>LC- 8.2.13 Steel reinforcement for electrical chambers and protection slabs</b> | <b>Cubic Metre (m³)</b> |
| (i) High tensile steel bars                                                        | kilogram (kg)           |
| (iii) Welded steel fabric / mesh                                                   | kilogram (kg)           |

These items will be covered by standard pay items under 1200 GA, CL 8.3.1 and 8.3.2 whichever is applicable. Measurement unit will be kilogram / tonnage only. Rate shall include reasonable allowance (10-20%) for wastage, cutting, binding wire and spacer blocks where required.

## **PSLE STORMWATER DRAINAGE**

### **PSLE 1 SCOPE**

PSLE 1.1 This specification also covers the construction of subsoil drains to road pavements

### **PSLE 3 MATERIALS**

#### **PSLE 3.1 Pipes for underground stormwater reticulation**

Pipes for underground stormwater reticulation shall be spigot and socket type concrete pipes in the sizes and classes indicated.

#### **PSLE3.4 Manholes, Catchpits and Accessories**

##### **PSLD- 3.4.1 Bricks**

"Special bricks shall mean NXFE Engineering units as per City of Cape Town standards."

##### **PSLD 3.4.2 Prefabricated Chambers and Shafts**

Brick manholes may be used for depths up to 2,0m as an alternative to precast concrete manholes.

##### **PSLE 3.4.3 Manhole Covers, Grid Inlets**

"Covers and frames to be to City of Cape Town Standard 2010 – cast iron or ductile iron. "

#### **PSLE 3.5 Filter Fabric**

##### **PSLE 3.5.1 Grade and Requirements**

Where the material is specified as light, medium and heavy, the grades must satisfy the following specifications :

- (a) Tensile Strength  
The following unidirectional tensile strengths according to SABS test method 93 are required :

|        |                   |
|--------|-------------------|
| Light  | 4800 N/m minimum  |
| Medium | 9000 N/m minimum  |
| Heavy  | 19999 N/m minimum |
- (b) Elongation a Breakpoint  
The elongation at breakpoint of all grades when tested according to SABS 93 test method shall be a minimum of 50%.
- (c) Permeability  
Not less than 1 x 10<sup>-3</sup> m/sec.
- (d) Resistance to Chemicals  
Up to 50°C alkaline solutions of not less than PH. 12 must have no effect on the fabric.  
All acids at 30% concentration and at a temperature of 50°C must have no effect on the fabric.  
No saline solution must have any perceptible effect on the fabric.
- (e) Effect on Temperatures  
The fabric must be stable at a temperature range of - 20o C to + 140oC.
- (f) Effect on Ultra Violet Light  
The fabric must maintain at least 80% of the original strength after direct exposure of 1000 hours to sunlight.
- (g) Rot  
The fabric must be totally rot-proof and must not support the growth of Algae.



**PSLE 3.6 Crushed Stone Drainage Media**

The crushed stone filter media shall consist of 20mm nominal size aggregate and shall comply with the requirements of column 5 of Table 7 of SABS 1083 - 1976 as amended. The material shall be obtained from commercial sources.

**PSLE 3.7 Pipes for subsurface drains**

Pipes for sub-surface drains shall have an internal diameter as specified and shall be Class 4 uPVC pipes complying with SABS 791.

Any perforated pipes shall have two rows of holes of 6 to 8 mm diameter at 22,5 degrees below the horizontal axis and with 50 perforations per metre.

Unperforated or non-porous pipes shall be used in maximum lengths of one metre.

**PSLE 8 MEASUREMENT AND PAYMENT**

*Amend the following items:*

| Item                                                                                | Unit               |
|-------------------------------------------------------------------------------------|--------------------|
| <b>LE 8.2.8 MANHOLES Construct complete with covers and frames, as per the dwgs</b> | <b>Number (No)</b> |
| <b>CATCHPITS Construct complete with grid inlets, as per dwgs</b>                   | <b>Number (No)</b> |

The rate for manholes and catchpits includes for excavation, shoring, backfill and control of water. All accessories as shown on the detail drawings to be included in the rate.





## ELECTRICAL PROJECT SPECIFICATIONS

### COCT - VOORTREKKER RD STREET LIGHTING AND ELECTRICAL: SCOPE OF WORK AND TECHNICAL SPECIFICATIONS

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**ANNEXURE 4**

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**ANNEXURE 5**

(CoCT Standard drawings)



## 1 PURPOSE

This Scope of Work in this document provides a summary of the scope of the work and is not a complete record. Quantities and volume of work shall be read or obtained from the pricing schedules, drawings and the rest of the specification. The Technical Specifications specify the standard of workmanship and quality of material for the installation, the scope of which is specified in the Scope of Works, on the Drawings and listed in the Pricing Schedules.

Upon receiving a set of documents, Tenderers shall make sure that all pages are included, in the correct numerical order as per the CONTENTS and that all the drawings are attached as per the SCHEDULE OF DRAWINGS. Should this not be the case it should immediately be brought to the attention of the Engineer for rectification.

This Contract covers the manufacture, testing, supply, delivery, off-loading, storage, installation, commissioning, aiming of luminaires, cables, kiosks and all other materials and handing over in proper working order of the complete services installation as specified in the Project Specification and in all the constituent parts of this set of documents.

All equipment shall be new. In addition, full maintenance of the installation shall be provided during the 12 month defects liability period.

## 2 SCOPE OF WORK

The areas where the new roads will be installed, or the existing roads upgraded, have been surveyed to identify the existing electrical and communication services. The contractor should proceed with caution when working near these services, it could also be requested by the local authorities that they have a representative present to supervise when working in these risk areas.

The electrical supply authority for area is CoCT and is maintained by the local municipality, the contractor would be responsible to liaise with the municipality for all installations and should apply for the necessary wayleave documents and permits timeously.

The lighting installation for the roads was discussed with the department for Public Lighting Development. It was agreed that the existing infrastructure is to be removed and replaced with new infrastructure.

Galvanized steel post will be installed with a 12m mounting height, the luminaire will be a side entry, with the wattage, rake angle and optic package, as indicated on the design drawings. Applications must be submitted for new supply points; these supply points must be coordinated with the municipality.

The following drawings detail the street lighting scope of works:

- Street lighting Sheet 1 of 3:



Where existing electrical infrastructure is to be rerouted or relocated, the contractor would be responsible to coordinate the de-energizing and energising of the old and modified network. This work is to be to the standards of the CoCT.

The following drawings detail the electrical relocation scope of works:

- Electrical Relocation Sheet 1 of 3:
- Electrical Relocation Sheet 2 of 3:
- Electrical Relocation Sheet 3 of 3:
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- Road cross-section drawings Sheet
- Road cross-section drawings Sheet
- Road cross-section drawings Sheet
- Road cross-section drawings Sheet

### 3 RELOCATION OF ELECTRICAL SERVICES

#### 3.1 Service Cables

The City's drawings might not include service cables or all service cables to even. All kiosks that are to be relocated, with service cables that are energised, are to have the existing services cables rerouted to the new kiosk positions. Confirmation of unenergized cables are to be requested from the depot, to confirm that they can be abandoned.

#### 3.2 Cable Installation

All MV and LV cables that are indicated to be relocated are to be spiked and jointed under outage conditions. Outages are to be planned and arranged by the contractor with the CoCT depot. MV cables that are rerouted that have fibre or telephone communication lines, are to have these lines also extended along the new cable routes.

All cables to be to the following CoCT specifications:

- CEE 70 - LOW VOLTAGE UNDERGROUND DISTRIBUTION CABLE, AERIAL BUNDLED CONDUCTOR AND SERVICE CABLE
- CEE 69 - MEDIUM VOLTAGE PAPER-INSULATED UNDERGROUND CABLE

##### 3.2.1 LV Cables

The below chart will be used to ensure that the correct CoCT approved cable sizes are used to extend the existing cables:

| Relocate Cable | Relocate with |
|----------------|---------------|
| 006(Cu)LV      | 35(AI)LV      |
| 010(Cu)LV      | 35(AI)LV      |
| 015(Cu)LV      | 35(AI)LV      |
| 016(Cu)LV      | 35(AI)LV      |
| 026(AI)LV      | 35(AI)LV      |
| 026(Cu)LV      | 35(AI)LV      |
| 032(Cu)LV      | 70(AI)LV      |
| 035(AI)LV      | 35(AI)LV      |
| 039(Cu)LV      | 70(AI)LV      |
| 048(Cu)LV      | 70(AI)LV      |
| 050(Cu)LV      | 70(AI)LV      |
| 065(AI)LV      | 70(AI)LV      |
| 065(Cu)LV      | 120(AI)LV     |
| 070(Cu)LV      | 120(AI)LV     |

|           |           |
|-----------|-----------|
| 070(AI)LV | 70(AI)LV  |
| 081(Cu)LV | 120(AI)LV |
| 097(AI)LV | 120(AI)LV |
| 097(Cu)LV | 185(AI)LV |
| 120(Cu)LV | 185(AI)LV |
| 120(AI)LV | 120(AI)LV |
| 129(Cu)LV | 300(AI)LV |
| 161(AI)LV | 185(AI)LV |
| 161(Cu)LV | 300(AI)LV |
| 185(AI)LV | 185(AI)LV |
| 194(Cu)LV | 300(AI)LV |
| 256(AI)LV | 300(AI)LV |
| 300(AI)LV | 300(AI)LV |
| 323(AI)LV | 300(AI)LV |

### 3.2.2 MV Cables

The below chart will be used to ensure that the correct CoCT approved cable sizes are used to extend the existing cables:

| Relocate Cable | Relocate with |
|----------------|---------------|
| 015(Cu)11kV    | 50(AI)11kV    |
| 016(Cu)11kV    | 50(AI)11kV    |
| 026(Cu)11kV    | 50(AI)11kV    |
| 032(Cu)11kV    | 50(AI)11kV    |
| 039(Cu)11kV    | 50(AI)11kV    |
| 050(AI)11kV    | 50(AI)11kV    |
| 050(Cu)11kV    | 120(AI)11kV   |
| 065(Cu)11kV    | 120(AI)11kV   |
| 097(Cu)11kV    | 120(AI)11kV   |
| 120(AI)11kV    | 120(AI)11kV   |
| 129(Cu)11kV    | 300(AI)11kV   |
| 161(Cu)11kV    | 300(AI)11kV   |
| 185(AI)11kV    | 300(AI)11kV   |
| 258(AI)11kV    | 300(AI)11kV   |
| 300(AI)11kV    | 300(AI)11kV   |

### 3.3 Communication Cables and fibre ducts

All existing cables that currently have fibre or telephone communication cables installed and are to be rerouted or relocated, are to have the existing communication cables also rerouted or relocated.

This includes the 32mm DIA ducts that are used for the installation of the cables and manholes for joints.

All fibre cables installed, are to be 24-core fibre cables, while all telephone cables installed, are to be 10-pair telephone cable.

All installed 300mm<sup>2</sup>(AI) cable that is longer than 75% of the total existing length cable or more than 500m long, are to have 2 x 32mm OD duct installed. If these ducts are not connected to another duct, it is to be sealed for future use. Manholes are only to be installed for fibre cable joints. The correct couplers for the ducts are to be used and to be according to the CoCT HDPE duct and coupler specification.

All installed 120mm<sup>2</sup>(AI) cable is to have a single 32mm<sup>2</sup> OD Fibre duct installed for future use. These ducts are



to be sealed for future use.

#### **3.4 Kiosks/Pillars**

All kiosks and pillars that are marked for relocation, are to first have the position for relocation confirmed before disconnecting the kiosk and relocating the kiosk to the new position, under LV outage conditions. The LV outage and kiosk position is to be arranged and approved by the contractor with the CoCT electrical depot.

#### **3.5 Minisubs**

All minisubs indicated for relocation, are to first have the position for relocation confirmed before disconnecting the cables to the minisub and relocating the minisub to the new position, under MV outage conditions. The MV outage and minisub position is to be arranged and approved by the contractor with the CoCT electrical depot.

### **4 GENERAL**

#### **4.1 Establishment on Site and General Obligations**

A pay item is included in the Bills of Quantities for the Electrical Subcontractor's General Obligations.

#### **4.2 Health and Safety Obligations in Terms of the Occupational Health and Safety Act and Regulations**

The works shall be carried out in accordance with the requirements of all the relevant Government Acts and Regulations.

Specific hazards that could be encountered on this project, in addition to the health and safety hazards normally associated with streetlighting work, include the following:

Working adjacent to an existing road with traffic, including heavy vehicles.

Construction vehicles operating on the existing road.

Public traffic crossing the work zone.

Working at height.

Erecting and dismantling scaffolding and shuttering.

Working in close proximity to overhead and underground services including low-voltage, medium voltage cables, and high-voltage

Working adjacent to populated areas and schools with the associated requirement to keep plant and equipment away from pedestrians and children and to safely and securely barricade the works.

Working in proximity to excavated areas.

#### **4.3 Safety Procedure During Execution**

The Contractor shall acquaint himself with the contents of Clause SSA 5.3. The Contractor will be required to work near or on electric power cables that are normally energised. The "permit to work" system and standard safety procedures shall be strictly complied with, in accordance with the requirements and rules of the Supply Authority.

All equipment and material supplied and all work carried out shall comply with the Occupational Health and Safety Act (Act no. 85 of 1993) and the relevant Regulations in terms thereof.

A "Responsible Person" shall be nominated by the Contractor for the work to be done on site and he shall sign a letter acknowledging his acceptance of the responsibilities.

The Contractor shall issue a Compliance Certificate in accordance with the SANS 10142-1 and SANS 10142-2 requirements for all work done by him. These COC's form part of the project and the Contractor shall price for all his requirements in this regard and the COC's themselves in the Schedule of Quantities..

The Contractor shall comply with the Occupational Health and Safety Specification and any requirements of the Employer's Safety Agent and the Contractor shall price for all his requirements in this regard in the Schedule of Quantities.

#### **4.4 Submission Of Tender**

As per the main contract tender requirements

#### **4.5 Forms to be Completed**



As per the main contract tender requirements

#### **4.6 Existing Services**

The contractor shall apply for wayleaves from the relevant authorities before any excavation work is carried out outside the site boundaries, especially for areas near existing MV-cable installation. The existing services indicated on the layouts and cross-sections are not to be taken as the as-built status, this is to be received from the relevant authorities.

The City might not be able to supply drawings indicating service cables. It is to be assumed that service cables could be anywhere within the road reserve. Where kiosks are to be moved to new locations, the existing service cables are to be extended to the new kiosk positions.

### **STREET LIGHTING POLES**

NOTE: All masts and / or poles shall be fitted with required electrical cabling, wiring, terminations, fuses and any other parts or components as part of the tendered rate.

#### **4.7 Lighting Poles, Cable Terminations and Labelling**

All masts and poles shall be fitted with the required electrical cabling, wiring and components prior to installation on site. Termination of electrical supply at poles shall be according to phase rotation Red, White, Blue and shall be done in accordance to the City of Cape Town Termination Standards. Termination of cables in all poles shall only be of the relevant phase and neutral.

A porcelain fuse or Miniature Circuit Breaker (MCB) (to be confirmed in writing with the CoCT Electrical Regional Depot prior to procurement) of rating 10A single phase shall be installed per mast or pole. Miniature circuit breakers in poles (if required) shall comply with SANS 60947-2 and shall have type B time delay characteristics with thermal magnetic operation.

All MCB's shall be of one make throughout the installation. The Engineer will not accept a mixture of circuit breakers from various manufacturers.

Termination in poles is to be 25mm<sup>2</sup>.

The Electrical Contractor shall invite the CoCT Electrical and Engineer to witness the first termination. On Instruction from the City or the Engineer the Electrical Contractor shall change his method of termination. Only after written approval from CoCT Electrical or the Engineer shall the Electrical Contractor proceed with further terminations.

#### **4.8 Street Lighting Pole Positions**

Provisional positions of all poles are indicated on the setting out drawings issued with this tender. Construction drawings with a schedule of poles and co-ordinates will be issued prior to construction.

The electrical contractor shall set out pole positions according to these co-ordinates but excavation shall not commence until the setting out has been inspected by the Engineer or his appointed agent.

#### **4.9 Galvanized Steel Poles and Outreaches**

7.2m, 11m and 13.5m galvanized steel poles and spigots shall be installed as indicated on the drawings.

The poles and spigots shall be designed and manufactured in accordance with the City of Cape Town Electricity Department drawings:

SL33: 13.5m pole

SL37: 7.2m pole

SL11: 11m pole

SL52: Short side entry luminaire adaptor 0 deg rake angle ("spigot")

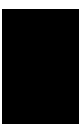
SL36: Short side entry luminaire adaptor 10 deg rake angle ("spigot")

SL27: Universal baseplate

SL51: Base/Flange Design

#### **4.10 Normative References**

The following documents contain provisions that, whether referenced in the text or not, constitute requirements of this specification. Information on currently valid national and international standards can be obtained from the South African Bureau of Standards.





|               |                                                                                                                                                                                |
|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SANS 62-1     | Steel pipes Part 1: Pipes suitable for threading and of nominal size not exceeding 150 mm                                                                                      |
| SANS 121      | Hot dip galvanized coatings on fabricated iron and steel articles – Specification and test methods                                                                             |
| SANS 657-1    | Steel tubes for non-pressure purposes Part 1 : Sections for scaffolding, general engineering and structural applications                                                       |
| SANS 1088     | Luminaire entries and spigots                                                                                                                                                  |
| SANS 9001     | Quality management systems - Requirements                                                                                                                                      |
| SANS 10064    | The preparation of steel surfaces for coating                                                                                                                                  |
| SANS 10160-1  | Basis of structural design and actions for buildings and industrial structures Part 1: Basis of structural design                                                              |
| SANS 10160-3  | Basis of structural design and actions for buildings and industrial structures Part 3: Wind actions                                                                            |
| SANS 10225    | The design and construction of lighting masts                                                                                                                                  |
| SANS 14713    | Protection against corrosion of iron and steel in structures – Zinc and aluminium coatings - Guidelines                                                                        |
| SANS 14713-1  | Zinc coatings – Guidelines and recommendations for the protection against corrosion of iron and steel structures Part 1: general principles of design and corrosion resistance |
| SANS 14713-2: | Zinc coatings – Guidelines and recommendations for the protection against corrosion of iron and steel structures Part 2: Hot dip galvanizing SANS 10044 Welding                |

Reference to a particular standard or recommendation in this specification does not relieve the manufacturer of the necessity of the work complying with other relevant standards or recommendations.

Tenderers offering equipment to standards other than those mentioned above may be considered provided it is clearly indicated in which respects the equipment offered does not comply and the likely consequences of such non-compliance.

#### **4.11 Design And Fabrication**

The design features of all equipment shall be based on the SI system of units. The poles shall be designed and manufactured in accordance with the recommendations of SANS 10225 and SANS 14713-1.

The design calculations shall be carried out by a registered professional Structural Engineer who shall certify the design complies with the requirements of this specification.

The terrain category shall be Category 2. (Altitude 0 to 300 m)

The regional basic design wind speed shall be taken to be 40 m/s.

The poles shall comply with the applicable drawings attached.

The poles shall be designed for the combination of pole and outreach arm in the highest stresses.

To allow interchangeability between pole stems and outreach arms, the outreach arms shall be manufactured exactly to the dimensions specified on the respective drawings. Any that do not comply will be returned at the Tenderer's expense.

The steel used in the manufacture of the poles shall be grade 355 to SANS 657-1.

Only steel bearing the SANS standardization mark signifying compliance with the appropriate SANS specification shall be used in the fabrication of the poles. The chemical composition of the steel shall be specified appropriately to ensure that a bright finish to the zinc coating is obtained.

The maximum horizontal and vertical deflections of the light duty poles at the spigot when subjected to the design loads due, respectively, to wind and to the self-weight of a double side entry adaptor and 2 luminaires shall not exceed the amounts specified in SANS 10225.

The maximum horizontal and vertical deflections of the heavy-duty poles at the spigot when subjected to the design loads due, respectively, to wind and to the self-weight of a double outreach arm and 2 luminaires shall not exceed the amounts specified in SANS 10225:



The minimum thickness of steel used shall be as stated in the design calculations sheet. Cross-section dimensions shall comply strictly with the drawings. Poles of reduced cross-section at the access opening will not be considered.

Manufacture shall not commence until the Contractor's design drawings have been approved by the Engineer. The Contractor shall not depart from the approved drawings except where a variation has been approved by the Engineer in writing.

The poles must be straight and true to within 10 mm in 6 m.

Whenever there is a need for reducing the diameter, it must be swaged down to the required diameter. Pipe reducers are not acceptable. The swaged joint between sections shall comply with drawing SL 37. No welding at the start of the reduction will be allowed, except the butt welding at the spigot where the smaller diameter fits into the larger diameter.

#### **4.12 Corrosion Protection**

Unless otherwise stated or implied the whole of the finished work shall be protected internally and externally by hot dip galvanizing in accordance with SANS 121.

The mass per unit area of the zinc coating over the whole of the galvanized surface shall not be less than that specified for general applications in Table 3 of SANS 121.

All material shall be substantially free from white rust when delivered. Close attention shall be paid to the way the material is stacked at the galvanizer's works and during subsequent handling prior to delivery.

Material that has been inspected at the galvanizer's or Manufacturer's works and passed by the Engineer shall still be liable to rejection if it has been found that white rust, or other defects, have developed between the date of inspection and the date of delivery to the City's stores.

#### **4.13 Access Openings, Covers, Etc**

Each pole shall have an access opening as detailed on the respective drawing.

A shaped hot dip galvanized steel cover with lettering as per drawing SK5244 shall be secured to the pole by means of two stainless steel 8 mm diameter Allen type countersunk screws. The screws shall be captive to the coverplate. A 3 mm thick synthetic rubber gasket shall be fixed to the cover. Details are shown on the drawings.

Alternatively, subject to approval, injection moulded materials or other non-metallic materials may be used for the cover instead of galvanized steel. Full details of any alternative material shall be submitted.

A treated hardwood backboard shall be fixed inside each pole opposite the opening. One of the bolts used to fix the backboard to the pole shall be extended to act as an earthing stud and be provided with a washer and two nuts as shown on the drawings.

The planting depth shown on the drawings shall be marked on the poles in a permanent manner. The method of marking shall be to approval.

All cover plates shall be provided with 8 mm x 15 mm long earth studs, welded to the inside of the cover plate.

Each pole shall have two cable entry holes one on each side of the pole. The minimum size of each entry hole and the position are specified on drawings.

##### **Baseplates**

Each pole shall be supplied with a hot dipped galvanized mild steel baseplate in accordance with the relevant drawing.

#### **4.14 Welding**

All welding shall comply with SANS 10044.

Butt welds shall have 100% penetration and seam welds shall have 60% penetration except for slip joint areas where the penetration shall be 100%.

Butt and seam welds shall be ground flush with the adjacent metal. Butt sections shall be neatly joined without noticeable discontinuity from one section to another.

Welding should only be conducted upon request by the City of Cape Town. If there is no such request, welding should not be performed.



#### **4.15 Particulars**

Tenderers shall submit with their tenders:

Full particulars and technical details of the poles offered, including details of the steel used.

A method statement describing the method of manufacture.

A copy of the manufacturer's Certificate of Listing in terms of SANS 9001. Where the tenderer or the tenderer's manufacturer's SANS 9001 certificate has expired in the past 12 months, the tenderer must submit proof of the expired certification including proof that the tenderer or the tenderer's manufacturer is in the process of renewing a Certificate of Listing in terms of SANS 9001. The City reserves the right to cancel the contract should the successful tenderer or the tenderer's manufacturer fail to attain the SANS 9001 certification.

A copy of the Structural Engineer's Professional Indemnity Insurance Certificate and professional registration number.

A copy of the permit authorizing the galvanizer to apply the SANS standardization mark.

The design of the poles offered shall be supported by full calculations which shall be submitted. The calculations shall detail the derivation of resultant nominal wind forces. Failure to submit the required information will result in the tender being ruled non-responsive.

Tenderers shall also complete and submit with their tenders:

The Schedule of Manufacturer's Technical Particulars and Equipment Guarantees (Returnable Schedule 24). Notwithstanding the submission of design calculations, complete details of the structural performance of the poles shall be entered into this schedule.

The Statement of Compliance or Qualifications by Tenderers (Returnable Schedule 17 & 20). Tenderers who are not the OEMs of the galvanized Steel Streetlight Poles and Brackets offered shall provide a letter from the OEM verifying that they are an authorized reseller or distributor of those galvanized Steel Streetlight Poles and Brackets and providing confirmation by the OEM of full compliance with the Specification, together with all detailed particulars and drawings listed above. The letter from the OEM shall state that the tenderer is an authorized reseller or distributor for the duration of the contract. Such Tenderers shall include details of their experience as authorized resellers or distributors of similar galvanized Steel Streetlight Poles and Brackets as an annexure to Schedule 16.

#### **4.16 Marking**

The year of manufacture as well as the pole length shall be marked visibly and indelibly inside each pole at access opening. The method of marking shall be to the engineer's approval. Heavy duty poles shall be marked "HD" and light duty poles shall be marked "LD" marking immediately below the access opening prior to galvanizing.

A 25mm line indicating the planting depth of the pole as indicated on the drawing shall be welded on the pole prior to galvanizing.

The poles shall bear the approved SABS standardization mark signifying compliance with SANS 121.

Pole covers to be bare marked with "Property of City of Cape Town" as per drawing SK5244 Sheet 1.

The pole is to be stamped prior to galvanizing with the Manufacturer's name and date of manufacture. The stamp shall be placed on the outside of the pole 100mm above the access opening centered on the access opening. The font type shall be Arial narrow, font size shall be minimum 10mm with a stamp depth of minimum 0.5mm. The name shall be visible after galvanising.

#### **4.17 Inspection And Tests**

During manufacture and prior to dispatch, all poles maybe be inspected at the Manufacturer's works by the Engineer both before and after galvanizing and, unless otherwise specified, not more than 5% of the poles (but at least one of each type) shall be subjected by the Contractor in the presence of the Engineer to such tests as may be deemed necessary by the Engineer to ensure good quality workmanship. The tests shall be for the contractors account and shall include the following, where applicable:

#### **4.18 Bending Test (Strength and Stiffness)**

Poles shall be subjected to a bending test to verify the deflections stated by the Tenderer in the Schedule of Manufacturer's Technical Particulars and Equipment Guarantees (Returnable Schedule 13). The poles shall be clamped vertically and rigidly for a length of 1,5 m from the base, and with specified test loads applied horizontally at a point 300 mm from the top of the pole the temporary deflection produced shall not exceed the values given in 3.12.



The details of the test shall be agreed upon between the Contractor and the Engineer. Where for convenience in testing the pole may be fixed horizontally and the test load applied vertically, the test loads shall be adjusted to compensate for the overhanging mass of the pole. On completion of the tests, the test reports and the type test certificates shall be submitted to the Engineer.

#### **4.19 Drop Test**

Poles of swaged construction shall be dropped vertically, butt downwards, three times in succession from a height of 2 m on to a hard wooden block 150 mm thick, laid on a concrete foundation. The pole shall withstand this test without showing any signs of telescoping or loosening of joints.

#### **4.20 Welding Test**

All welds shall be checked visually. If transverse butt welds are to be used, the poles shall be subjected, at each joint, to a bending load which causes the butt weld (half circumference) to be in tension. The load shall be varied according to the section and shall not cause permanent set. The load (or the amount of deflection produced) shall be to the satisfaction of the Engineer and sufficient to ensure that each butt weld is of adequate strength. Any joint in which cracking occurs shall be ground out to the full thickness of the material, rewelded and tested again.

#### **4.21 Galvanizing Test**

The quality of the galvanizing shall be tested in accordance with SANS 121. The surface of the zinc coating shall have a bright finish. Any poles with a dull finish will be rejected. Poles which exhibit discolouration after galvanizing will be rejected. Painting as a remedial measure is not acceptable.

In the event of any pole tested in accordance with this clause not fulfilling the test requirements, a further 5% of the poles shall be subjected to the tests enumerated. Should any further failure occur, the whole lot from which the poles have been selected shall be liable to rejection.

All poles shall be tested after galvanizing to ensure that there is no internal blockage.

Not less than seven days' notice in writing shall be given to the Engineer when the poles are ready for inspection and tests.

A copy of the Inspection Certificate certifying compliance with SANS 121 shall be submitted to the Engineer for each batch of poles. The items inspected shall be clearly identified on the certificate. The form of the certificate shall be approved by the Engineer.

Unless the Engineer shall otherwise direct, no poles shall be delivered to the City until the Engineer has issued to the Contractor, in respect of such poles, a certificate to the effect that the poles have passed the tests required.

### **5 EXCAVATIONS**

#### **5.1 Excavation Types**

The excavation of material will be classified as follows for measurement and payment purposes.

##### **5.1.1 Soft Excavations:**

Excavations in material that can be efficiently removed and loaded with a mechanical shovel with a flywheel output of approximately 0,10 kW per millimetre width of the shovel bucket, but without the use of pneumatic tools.

The loading of material, excluding prior stacking or breaking up, by means of a rubber wheeled front end loader of approximately 50 kW flywheel output, will also be classified as soft excavation but will not be measured for separate or additional payment.

Where excavation by hand has been specified, soft excavations shall be excavations in material that can be efficiently removed by hand using picks to break up any consolidated material.

##### **5.1.2 Intermediate Excavations**

Excavations (excluding soft excavations) that must be carried out with a mechanical shovel with a flywheel output in excess of 0,10 kW per millimetre width of the shovel bucket, and including the use of pneumatic tools, but before loading of material as described in Clause 3.1.2.1 above.

Where excavation by hand has been specified, intermediate excavations (excluding soft excavations) shall be excavations that cannot be efficiently carried out using picks and that must be carried out using pneumatic tools.

##### **5.1.3 Hard Rock Excavations**

Excavations (excluding intermediate and boulder excavations) in material that cannot be efficiently removed



without the use of explosives or rock splitting wedges.

#### 5.1.4 Boulder Excavations –

Class A: Excavations in material which consists of more than 40% by volume of rocks between 0,03 m<sup>3</sup> and 20 m<sup>3</sup> in size in a mixture of soft material and smaller rocks.

NOTE:

- Excavation of rocks larger than 20 m<sup>3</sup> will be classified as hard rock excavation.
- Excavations of fissured or fractured rock will not be classified as boulder excavation, but as hard rock or intermediate excavation depending on the type of material.

#### 5.1.5 Boulder Excavations - Class B:

Excavations in material which consists of less than 40% by volume of rocks between 0,03 m<sup>3</sup> and 20 m<sup>3</sup> in size in a mixture of soft material and smaller rocks and which require individual drilling and blasting in order to be loaded by a mechanical shovel. The excavation of the rest of the material shall be classified as soft or intermediate excavations, according to the nature of the material.

#### 5.1.6 Excavations crossing existing services

Number The rate shall cover the cost of the detection and protection of an existing service, or group of services, with horizontal dimensions smaller than 450 mm, where the excavations are to cross such existing services or a discovered service, at an angle of 45° or more between the centre lines, the costs of any risks inherent to the operation, including the repair of services damaged during the detection of the existing service or execution of the works, as well as any cost that results from the inconvenience of working in close proximity to the existing services. The unit refers to one service but services that are so grouped that they can be contained within a horizontal dimension of 200 mm measured at right angles to the axis of the services, will be measured as one unit.

#### 5.1.7 Excavations parallel to existing services:

The rate shall cover the detection and protection of existing services, where excavations are to cross such existing services or discovered services at an angle of 45° or less, measured between centre lines, from the position where the existing service enters a 500 mm zone, measured from the edge of the specified trench to the position where the service clears a similar 500 mm zone on the other side of the specified trench, the cost of any risks inherent to the operation, including the repair of services damaged during the detection of the existing service or the execution of the works, as well as any cost that results from the inconvenience of working in close proximity to the existing services.

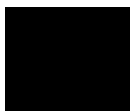
Trenching shall be professionally and neatly carried out as directed by the Engineer. The trench shall be positioned between the even boundaries and the kerb lines, and shall comply with all the requirements of the City of Cape Town, and shall be taken as 500mm in standard width for measuring purposes.

Where trenching in an asphalt covered area is necessary, the asphalt shall be saw cut before excavation so as to leave a neat edge. Roads/driveways are to be thrust-bored wherever possible which will be approved by the Engineer. All repairs and reinstatement of asphalt areas shall be done to be the same state that it was found. Where necessary, white or yellow lines (100/300mm) and/or characters and symbols shall be re-done using non-reflectorized paint to the approval of the Engineer.

Where new ducts are required and the road will not be resurfaced or extended, if thrust-boring is not possible, the surface cut of asphalt roads and footways shall be neatly made and shall be wide enough to allow trenching without undermining or subsiding of the asphalt edge to facilitate adequate joining of bitumen reinstated surfaces. Cutting of the asphalt surface shall be paid only once, and can be done either as part of the excavations or as part of the reinstatement. All reinstatements shall be done to be the same state as it was found. Reinstatements by the electrical contractor is to be approved by the engineer. The works are to be programmed to avoid the need to reinstate surfaces before surfaces are resurfaced or extended, where possible. Where it isn't possible, approval is required from the engineer for reinstatements.

Where grass sods or plants are removed, they shall be neatly packed adjacent to the trench. The Contractor shall keep the grass sods or plants damp after removal by watering or otherwise to ensure that they remain alive. The Contractor must ensure that all vegetation is replanted after the trench is properly backfilled and compacted. The Contractor will have to make good at his own cost, any vegetation damaged during the excavation and not restored to its original condition. The rate for re-instatement of grass and plants as to be provided in the Schedule of rates therefore must include all of these actions for restoring the areas. Special care must be taken when excavating in areas where irrigation systems have been installed. Where the Contractor accidentally damages pipes, sprinklers, valves or controls, the Contractor shall repair such equipment at his own cost.

Brick paving shall be neatly removed and stacked adjacent to the area excavated at a location that is acceptable to the user of such brick paved surface. Any breakage of bricks will be the responsibility of the Contractor. The Contractor will be responsible for reinstallation of the removed bricks to the satisfaction of the user. The Contractor



shall supply and deliver the bricks to site. The rates tendered shall be deemed to include all costs to be incurred including the supply and delivery to site of bricks to replace those broken during lifting, removal, packing etc. The same method of operation and bricks shall apply for paving slabs.

Where paving must be replaced for road surfaces it shall be minimum 80mm thick for clay bricks and of 35MPa strength for concrete bricks, laid on compacted 20mm thick bedding sand. Where paving must be replaced for pavement/sidewalk areas it shall be minimum 60mm thick for clay bricks and of 35MPa strength for concrete bricks, laid on compacted 20mm thick bedding sand.

Where a concrete surfaced road must be reinstated, all such reinstatements shall be done so that the surface is reinstated to the state that it was found. Reinstatement needs to be approved by the engineer, as the works are to be programmed to avoid reinstatement where resurfacing is planned.

When trenching through kerbs, channels, edgings or any other edge unit, these shall be carefully removed up to the nearest whole unit and replaced. If these units are damaged, they shall be replaced with similar approved new units. The rates provided in the Schedule of rates for kerbs shall include for the full installation.

All excavated trenches shall be in a straight line, where possible, and marked out by using a chalk line. Where cable trenches change direction, the excavated trench shall always result in the installed cable's bending radii within the required limit as directed by the Engineer. Under no circumstances shall this minimum bending radius be reduced.

While excavating, the Contractor shall remove asphalt pieces, stones and sharp objects from the unearthed soil and arrange for removal of such material from site on a daily basis. No stones, asphalt pieces or sharp objects may be put back in the trench. The bedding of the cables shall be according to City of Cape Town specifications.

The bottom of the cable trench shall be even and free of stones and sharp objects. A bedding layer of 100 mm of soft stone-free sand shall be installed prior to cable installation.

For purposes of this contract MV cables shall be installed at a depth of 1000mm and low voltage cables at a depth of 750mm.

Where possible no excavated trenches or holes shall be left open for longer than 3 days or over a weekend. Should this not be possible, the areas shall be properly barricaded and the Engineer notified thereof.

The Contractor may not dump or store excavated material against boundary walls or on landscaped gardens before consulting owners of properties. Restoration of defaced property will be the responsibility of the Contractor. Where excavated material is placed on road surfaces care should be taken not to block storm water drains or open channels.

No rubble or any other excavated material of any volume shall be left on site for more than 2 days. For purposes of measuring export of excess material, the maximum bulk factor tolerance that will be allowed for sand is 1.1, for clayish soil 1.2 and for all other rubble 1.4.

Any water accumulating in excavated trenches or holes, either as a result of rain or due to the level of the water table, shall be pumped out by the Contractor to make work inside the trench or hole possible.

Particular care must be taken to ensure that effective barriers are erected around all trenches and excavations to ensure the safety of the general public. In this regard the contractor is required to install an orange meshed barrier screen (or other type of barrier if deemed by the contractor to be more effective) up to at least a metre in height along the entire length of the trench or excavation. The barrier is to be secured in such a way that it will not be disturbed by adverse weather conditions. Where the general public requires access across the excavation, suitable, safe crossings must be provided. The contractor must detail the measures he will take to safeguard the public in his safety plan.

The strutting and shoring of excavated faces, if necessary, will be the responsibility of the Contractor and will not be measured and paid for separately. The Contractor, however, will be responsible to maintain and to keep all excavated faces in a safe condition to protect the Works and workers and to prevent delays caused by slope failures. The Contractor shall supply and deliver to site all timber and necessary material/tools/equipment. The rate tendered shall be all inclusive of costs to be incurred including the removal of all timber and tools/material/equipment from site.

Any liability arising out of the activities of the Contractor shall be the responsibility of the Contractor. This includes the Public Liability Claims as a result of open trenches.

All trench excavations within existing serviced areas shall be by hand. Extreme care shall be exercised by the contractor to prevent any damage to existing services installed in these areas, and any private or municipal property.



For any deviation from these depths, written permission shall be obtained from the Engineer before backfilling commences.

Should large rocky or difficult areas be encountered, jackhammers may be utilised, as approved by the Engineer. Due care and attention shall be given to the correct use of such methods to ensure the minimum danger to people and surrounding property.

Measurement of trenching executed shall be based on a linear meter measurement only. However, in the event of an exceptionally large excavation being necessary, the linear meter measurement will be replaced by a cubic meter measurement and is in the sole discretion of the Engineer where it is applicable.

Contractors are to take note of and comply with the provisions of the Occupational Health and Safety Act: 1993 regarding excavations. Special care shall be exercised and applied in the protection and fencing of open trenches, clearly demarcated.

Excavations, cable laying and back filling operations shall be programmed to minimize damage and inconvenience to people due to open trenches, holes, dumped soil and stones. All excavations in existing serviced areas shall be barricaded and protected to prevent any damage to property or injury to people. All barricading and excavations shall be in accordance with the latest OHS-Act.

All backfilling shall be done in layers of 250mm, each layer dampened and compacted mechanically to achieve a 93% MOD AASHO density.

The amount of trenching to be carried out, shall be carefully assessed taking the availability of cable and workforce into account. No cable trenches may be open for more than 3 consecutive days.

Furthermore, all vehicle access driveways shall be closed as soon as possible. Temporary bridges of braced steel plates shall be placed over open trenches, where vehicles have to cross whilst the trench is open.

## **5.2 Selected Granular Material**

Shall be material of a granular, non-cohesive nature that is singularly graded between 0.6 mm and 19mm, is free-draining and has a compactibility factor (as determined by the test given in Sections LD of Part 3 of SABS 0120) not exceeding 0.4 or such other value as is laid down in the Project Specification.

## **5.3 Selected Fill Material for Bedding**

### **Selection of Fill Material**

Selected fill shall be used to cover cables and ducts and to ensure good bedding. The material shall be soil of a low dry content, shall have a PI not exceeding 6, a thermal resistivity not exceeding 1,2 m K/W. It shall be free from vegetation, lumps and stones of diameter exceeding 15 mm except where other limits are specified in the Project Specification.

### **Supply of Selected Fill Material**

The Contractor is not required to but will be permitted to screen, work or otherwise treat the excavated material in order to produce material suitable for bedding of cables. The Contractor shall take positive steps to avoid bunting or contaminating material which otherwise would be suitable as bedding or main fill.

When suitable material is not readily available from trench excavations for use as bedding material, the Contractor shall obtain suitable material from other excavations on the site or by opening up borrow pits or importing material from commercial or other approved sources or by working the unsuitable material. The Contractor shall, however, not be paid extra for importing suitable material without prior notification and approval of the Engineer.

## **5.4 Backfill Material**

Material excavated from trenches may be used as backfill in all areas, provided only that it contains little or no organic material, that it excludes stone of average dimension exceeding 150 mm, and that it can be placed without significant voids and so compacted as to avoid significant settlement. Material containing more than 10% of rock or hard fragments that are retained on a sieve of nominal aperture size 50 mm, and material containing large clay lumps that do not break up under the action of the compaction equipment being used, will be regarded as unsuitable for use in backfilling.

In areas subject to loads from road traffic and in other areas specified in the Project Specification, backfill shall have a PI not exceeding 12 and a minimum CBR (California Bearing Ratio) of 15% at specified density if the backfill is to be placed in the upper 150 mm of the subgrade, and a minimum CBR of 7% if the backfill is to be placed lower in the subgrade.

## **5.5 Screening of Material**



The rate shall cover all costs associated with the working and screening of unsuitable material to produce acceptable bedding or backfill material. Covered shall be, inter alia, the loading up and transporting of the unsuitable material to a suitable location on the site, the working and screening of the material using sieves of suitable diameter to obtain bedding or backfill material, the loading, transport and placing of the worked material next to the excavation to suit the working method of the Contractor.

The volume will be computed based on the initial volume of the unsuitable material.

- a) Bedding Material (sieve to exclude stones of greater than 15 mm diameter)
- b) Backfill Material (sieve to exclude stones of greater than 150 mm diameter)

## 5.6 **Compaction Equipment**

The Contractor may use adequate hand tamping equipment or mechanical compaction equipment but he shall select such equipment and operate it in such a manner that the duct or cable is not stressed or damaged. Machine compaction shall not be used directly above the cable or duct until sufficient backfill has been placed to ensure that machine compaction loads transmitted to the top of the cable or duct are no greater than would be imposed by normal road traffic over a cable or duct with cover of depth 600 mm.

## 5.7 **Materials for Reinstatement of Roads and Paved Areas**

### 5.7.1 **Subbase and Base**

Where trenches cross or run along surfaced roads and paved areas of which the surfaces are scheduled to be reinstated, the Contractor shall obtain prior approval of subbase and base materials that may be required to supplement such materials lost during excavation.

### 5.7.2 **Gravel**

Where trenches cross or run along gravel roads of which the surfaces are scheduled to be reinstated, the Contractor shall, for the purpose of reinstatement, separately store the top 300 mm of material excavated.

### 5.7.3 **Bituminous Construction**

Materials for bituminous construction shall comply with the applicable requirements of the appropriate of the following Specifications:

|                                |                      |
|--------------------------------|----------------------|
| Primer                         | SABS 748 or SABS 749 |
| Cutback bitumens or emulsions  | SABS 308 or SABS 309 |
| Coarse aggregate (stone chips) | SABS 1083            |

### 5.7.4 **Asphalt Carpet**

An asphalt carpet shall consist of either of the following mixes:

|                                                                                |                                                   |
|--------------------------------------------------------------------------------|---------------------------------------------------|
| 6.7 mm coarse aggregate (stone chips)<br>plus RC 250 cutback bitumen           | 100 parts by mass,<br>7 parts by mass of emulsion |
| or                                                                             |                                                   |
| 6.7 mm coarse aggregate (stone chips)<br>plus premix Grade 60 bitumen emulsion | 100 parts by mass,<br>8 parts by mass of emulsion |

## 6 **MATERIAL AND EQUIPMENT**

All materials and equipment are to be supplied and installed as part of the contract.

The cost to collect any material, including loading, unrolling of cable as might be necessary etc., shall be deemed to be included in the rates tendered.

The Contractor shall be responsible for the security of all installed and uninstalled material. Once the network is handed over to the City, the responsibility of security will remain that of the contractor and includes any form of loss, damage or theft howsoever arising.

All material and equipment that requires scrapping e.g. recovered conductors, poles etc. shall be scrapped as per the applicable Material Scrapping Process and as advised by the Engineer.

All material and equipment shall comply with the City of Cape Town specifications. The City of Cape Town shall pay only for material installed, all unused material will not be paid for through the contract and will remain the possession of the contractor.

The Contractor shall ensure that all delivery drivers are informed of all procedures and restrictions to be complied





with on the various delivery sites. The Contractor shall ensure that these delivery drivers are supervised during offloading to ensure compliance.

Materials and equipment shall be appropriately stored, secured and covered to ensure that it is safe while being stored and/or transported. The Contractor shall be responsible for any clean up and rehabilitation of affected grounds after spillage from or of material resulting from the failure to secure transported materials properly.

All Medium Voltage material and equipment as supplied by the Employer shall be installed as per the correct design guidelines provided by the Engineer at the start of a specific project. The Miniature Substations shall be constructed as per City of Cape Town standards CTEF 104 (Miniature Substations) and shall comply with the Occupational Health and Safety Act.

All streetlight related material and equipment as supplied by the Employer shall be installed as per the correct design guidelines provided by the Engineer at the start of a specific project, and shall comply with the latest Public Lighting guidelines. All remedial work on streetlights shall be to the approval of the Engineer. The public lighting installations shall be constructed as per City of Cape Town standards CTEF 113 (Street lighting) and shall comply with the Occupational Health and Safety Act.

If material and equipment containing hazardous and/or flammable substances is to be stored on site and/or used during the construction works, these shall be stored in appropriate and properly marked containers at adequate room as well as atmospheric temperatures or as recommended by the manufacturers and shall be disposed of in compliance with applicable regulations. Minimal levels of fuel shall be stored on site. As much as it is practically possible, plant and vehicles shall be re-fuelled at the nearest petrol station. The Contractor shall have capacity and be responsible to rehabilitate contaminated grounds due to spillage of hazardous and flammable substances.

The Contractor shall have adequate material storage capacity and sufficient material to ensure that no interruption of the construction works can be attributed to material shortages.

All empty cable drums shall as a general rule be returned to the cable suppliers from whom the cable was originally collected or as directed by the Engineer. All documentation for the returned material shall form part of the Project Documentation and shall be submitted to the Engineer. Where the empty drums cannot be returned due to unknown manufacturers/suppliers, or where the manufacturers/suppliers are based outside the Cape Town area, the Contractor must remove it from site and dispose of it.



## **7 STREET LIGHTING BRACKETS / SPIGOTS**

Street Lighting Brackets used for the mounting of Luminaires shall be manufactured in accordance with the following specifications:

### **7.1 Applicable Standards**

The following standard specifications shall form part of this specification:

|                    |                                                                     |
|--------------------|---------------------------------------------------------------------|
| SANS 62            | - Steel pipes                                                       |
| SANS 1088          | - Luminaire entries and spigots                                     |
| SANS EN 10240:1997 | - Internal and/or external coatings for steel tubes                 |
| SANS ISO 1461:2000 | - Hot dip galvanized coatings on fabricated iron and steel articles |

### **7.2 Design And Working Conditions**

The medium duty brackets will be used for carrying street lighting luminaires each having mass of 10 kg.

The environment in which the brackets will be used is subject to heavily saturated saline atmospheric conditions and, at times, sand laden winds of up to hurricane force.

The steel tubing used for the manufacture of the brackets shall be heavy class steel pipe of nominal bore size 25 mm in accordance with SANS 62.

All welding must be continuous and must be of high-quality workmanship.

### **7.3 Corrosion Protection**

The whole of the finished brackets shall be protected internally and externally by hot-dip galvanizing in accordance with SANS EN 10240 and SANS ISO 1461.

The mass per unit area of the zinc coating over the whole of the galvanized surfaces shall not be less than that specified for general applications in Table 2 of SANS ISO 1461.

All brackets shall be substantially free from white rust when delivered. Close attention shall be paid to the manner in which the brackets are stacked at the galvanizer's works and during subsequent handling prior to delivery.

Brackets which have been inspected in the Galvanizer's or Manufacturer's works and passed by the Engineer shall still be liable to rejection if it has been found that white rust, or other defects, have developed between the date of inspection and the date of delivery to the Electricity Services Directorate's Stores.

All brackets shall be tested after galvanizing to ensure that there is no internal blockage.

During manufacture and prior to despatch, all brackets will be inspected at the Manufacturer's works by the Engineer both before and after galvanizing and not more than 5% of the brackets (but at least one) shall be subjected by the Contractor in the presence of the Engineer to such tests as may be deemed necessary by the Engineer to ensure good quality workmanship. The tests shall include the following, where applicable:

Galvanising Test: The quality of the galvanizing shall be tested in accordance with SANS EN 10240 and SANS ISO 1461.

In the event of any bracket tested in accordance with this clause not fulfilling the test requirements, a further 5% of the brackets shall be subjected to the tests enumerated. Should any further failure occur, the whole parcel from which the brackets have been selected shall be liable to rejection.

Not less than seven-day notice shall be given to the Engineer when the brackets are ready for inspection and tests.

Unless the Engineer shall otherwise direct, no brackets shall be delivered to the Council until the Engineer has issued to the Contractor, in respect of such brackets, a certificate to the effect that the brackets have passed the tests required.

## **8 LUMINAIRES**

### **8.1 Minimum requirements for all luminaires**

The luminaires shown on the drawings and listed in the Bill of Quantities shall be supplied, installed, aimed, levelled, connected, tested and switched on.



Street light luminaires carrying SABS 1277 mark

Unpainted and Bussmann Type FA sub protection fuse in marked fuse holder (10A) mounted on wooden backboard behind the access opening in pole. Sticker on luminaire to indicate wattage and road class type for easy identification.

Each luminaire must be fitted and wired with a seven pin NEMA base, surge protection device and shorting cap/ cover to ANSI C136.41, with an LED to indicate the status of the surge protection.

The top of the surge protector shall be capable of accepting a seven pin NEMA base dimming receptacle connection to ANSI C136.41 but on delivery shall be protected via purpose made UV protected shorting cap/ cover to enable the luminaire to be energized without a photocell

The luminaires Specified for this contract are:

Manufacturer : Beka Lighting  
Luminaire : 131W BEKA LEDLUME MIDI (Optic package 5399)

Manufacturer : Beka Lighting  
Luminaire : 45W BEKA LEDLUME MIDI (Optic package 5345)

Manufacturer : Beka Lighting  
Luminaire : 100W BEKA LEDLUME MIDI (Optic package 5307)

## 8.2 Construction and materials

All luminaries shall be delivered completely assembled.

The luminaries shall be weather-proof, hail-proof, insect-proof, corrosion-proof and resistant to both solar and ultra-violet radiation. In addition, they shall be robustly constructed and resistant to vandalism. All parts and components of the luminaire shall be designed to shed water, and no accumulation of condensation or precipitation shall occur.

To prevent risks associated with road safety, all luminaires shall be designed to avoid disintegration in the event of vehicular impact. The forces generated after a vehicle collides with a pole can be substantial, and to this end the luminaire housing shall be secured to the spigot and the design of the luminaire shall be such that the control gear remains attached to the spigot even after a severe impact. Preference will be given to luminaire designs where no part of the luminaire detaches itself from the pole i.e. no secondary missiles are deflected into, or onto, traffic or pedestrians. The luminaries shall be constructed from durable lightweight materials for which all parts are compatible and failure or deterioration shall not occur due to electrolytic action or by differential thermal expansion.

All spigot entries shall be designed to fit easily over the spigot and shall be truly parallel to the fitting axis. Spigot entries shall be constructed of corrosion-resistant materials and compatible with the galvanized mild steel spigot such that deterioration by electrolytic action shall not occur. The luminaries shall be secured to the spigot by means of at least two stainless steel (grade 304 or equivalent) screws conforming to ISO 4762.

All ferrous components shall be hot-dip galvanized in accordance with SABS ISO 1461 for heavy duty applications. Small components (clips, screws, bolts, nuts, washers, etc.) shall be manufactured from stainless steel (grade 304 or equivalent).

## 8.3 Electrical requirements

The internal wiring of the luminaires shall comply with clause 3.10 of SANS 60598-2-3 It shall be flexible and **suitably rated to withstand the voltages and temperatures** encountered in service. All wiring shall comply with the requirements of SANS 1507 and where applicable, SANS 529 or International equivalent. The wiring colours shall be as follows: live – red (or brown), neutral – black and earth – green/yellow.

Terminals and electric connections shall comply with clause 3.9 of SANS 60598-2-3. In addition, the luminaries shall incorporate a terminal block mounted in a reasonably accessible position as close to the point of entry as possible. The material of the terminal block shall be non-tracking and the terminals shall be made of non-corroding material such as brass. Terminals made of aluminium shall not be acceptable.

Any wiring passing through metal shall be suitably grommeted, sleeved or otherwise protected to avoid abrasion of the insulation.

The luminaries shall be earthed in accordance with clause 3.8 of SANS 60598-2-3.



Metal parts of luminaires which may become alive in the event of an insulation fault and which are not accessible when the luminaire is mounted but which are liable to come into contact with the supporting surface shall be permanently and reliably connected to an earth terminal and shall withstand the test specified in SANS 60598-2-3. An earth terminal shall be provided in all instances, even if the luminaire is fully insulated and even if all conductive parts which could become alive in the event of an insulation fault are not accessible. This is to facilitate future wiring should the luminaire be replaced by one which requires an earth connection.

Protection against electric shock (of at least IP 2X) shall be maintained for all methods and positions of installation in normal use. Protection shall also be maintained after removal of all parts which can be removed by hand.

All parts of an earth terminal shall be made of brass or similar corrosion-resistant material and the contact surfaces shall be bare metal and not painted or varnished surfaces.

All earth connections shall be effected by means of suitable lugs. All possibility of electrolytic corrosion shall be avoided.

#### **8.4 Guarantee**

Suppliers shall guarantee each street lighting luminaire for a minimum period of two years from the date of commissioning.

#### **8.5 Documentation**

Full technical information and descriptive literature relating to the items offered shall be submitted in order that the items can be fully evaluated. Test reports from a test authority with respect to the following tests shall be provided:

- a. Type tested in accordance with SANS 475 and SANS 60598-2-3 or International Equivalent;
- b. IP rating
- c. Full simulation report
- d. Lumen degradation

The following documentation shall also be provided:

- a. All other test reports
- b. Data sheets with respect to the grade of aluminium used;
- c. If painted luminaires are offered, details of the guarantee provided;
- d. Details of alternative fixing arrangements if applicable;

### **9 CABLES**

#### **9.1 General**

All work described herein shall be in compliance with the latest edition of SANS 10198 "The selection, handling and installation of electric power cables of rating not exceeding 33 kV", all relevant parts, 1 to 14 shall apply as the case may be.

#### **9.2 Cable Lengths**

All scheduled cable lengths are for tendering purposes only and the Contractor shall measure the actual lengths required before ordering.

The length of all cables will be re-measured after installation. The Contractor will be paid for the actual lengths measured on site. The contractor will supply measurement sheets for all cable and trench measurements, indicating measured lengths between street furniture.

All cables shall be installed in continuous lengths between termination points. Cable joints are not allowed under any circumstances, unless written approval is provided by the City or the Engineer.

Under no circumstances shall the minimum bending radius of the cables be exceeded while manoeuvring the cables during the installation process. Minimum bending radii are specified as 10 x outer diameter of LV cables, 12 x outer diameter of 11 kV PILCSTA cables and 17 x outer diameter of 11 kV XLPE insulated cables (i.e. the size of the belly of the cable drum from which the cable is removed).

Cables having conductors larger than 25 mm<sup>2</sup> shall be installed overlapping each other at straight jointing positions. Cables larger than 25 mm<sup>2</sup> may not be coiled, except by direct instruction from the Engineer.



Immediately after installation, the cables shall be cut, if required, and sealed in an approved manner. House connection and all other cables shall be properly sealed with heat shrink caps or sealing tape to the approval of the Engineer. All costs associated with this sealing of cable ends must be included in the rates tendered for the relevant cable installations.

Medium voltage cables which are to be cut and that cannot be terminated immediately shall be sealed by lead plumbing / wiping of the exposed end, in addition to fitting a heat shrink cap.

No cable shall be left exposed after installation. Backfilling up to orange danger tape level shall be completed before leaving the site.

The cost of labelling on all new cables shall be deemed to be included in the rates tendered and will not be compensated separately.

The insulation testing of LV cables after installation (meggering) shall be deemed to be included in the rates tendered for cable installation and will not be compensated separately. These test results shall be recorded on a template to be provided by the Engineer.

### **9.3 Trenching and Burial of Cables**

Note that trenching and backfilling shall be per COLTO specifications B22.01 and B22.02.

The Contractor shall peg out the cable routes after which the Engineer or his representative shall be called to approve the routing.

Electrical cables shall be direct buried on 150mm **imported sand** bedding in a 750mm deep trench.

**Sand** backfill of 150mm shall be installed on top of the electrical cable (sand blanket) and the remaining volume shall be backfilled with excavated material.

Before laying cables in trenches excavated in soft or hard rock or containing sharp stones, rocks or other items likely to injure cables, and before the layer of 100mm sand-bedding, all injurious items shall be removed from the bottom of the trench.

Cable installation shall be in accordance with SANS 10198 part 8. The thermal resistivity of the bedding soil shall be less than 1.2 Km / W.

The laying of cables shall not commence until the trenches have been inspected and approved. The cable shall be removed from the drum in such a way that no twisting, tension or mechanical damage is caused (i.e. rolled off the drum), and must be adequately supported at short intervals during the whole operation.

Backfilling shall then be continued with proper grading of material to ensure settling without voids, and the material is to be stamped down after the addition of every 150mm layer. Additional soilcrete (5%) or concrete shall be used for backfilling where specified by the Engineer. The surface is to be made good to approval.

Should the specified backfill not be available at any particular section of the trench, the Contractor shall transport from elsewhere.

The contractor shall, before commencing with any excavation work, satisfy himself as to the location of any buried cables, water pipes, buried earthing conductors, telecom services or other underground service which might be affected due to any activity, e.g. excavation or drilling. Any damage inflicted on other services by the Contractor shall be immediately reported to the Engineer and shall be made good by the Contractor or by others at the Contractor's expense.

The contractor shall take all the necessary precautions and provide the necessary barriers, warning signs and/or lights to ensure that the public and/or employees on site are not endangered.

The contractor shall ensure that the excavations will not endanger existing structures, roads, other site constructions or other property.

Trenches shall connect the points in a straight line. The Engineer beforehand shall approve any deviations due to obstructions or existing services.

The excavated material shall be placed adjacent to each trench in such a manner as to prevent nuisance, interference or damage to adjacent drains, gateways, trenches, water furrows, other works, properties or traffic. Where this is not possible the excavated materials shall be removed from site and returned for back filling on completion of cable laying.



All surplus ground, rocks and spoil generally shall either be removed to a selected area of the site or shall be spread evenly across the surface of the site, whichever is directed by the Engineer, and the cost of same shall be included in the prices for laying and installing the cables.

Trenches across roads, access ways or footpaths shall not be left open. If cables cannot be laid immediately the contractor shall install temporary "bridges" or cover plates of sufficient strength to accommodate the traffic concerned.

Where two or more cables are run in the same trench they shall be separated by at least 75mm side-to-side. Cable installation shall be planned so that as far as possible cables do not cross each other. Where crossing is unavoidable, a vertical separation of not less than 100mm shall be provided for cables of the same voltage and of 200mm for cables of differing voltage.

#### **9.4 Street Lighting Cables**

Cables shall be direct buried cables to supply the new lighting scheme.

This shall be low voltage lighting cables, 4-core (solid core) aluminium polyvinyl chloride (PVC) insulated PVC bedded galvanized steel wired armoured (SWA) PVC sheathed 600V/1000V cables manufactured to SANS 1507.

All cables shall be clearly marked with the applicable SANS standard number, cable rating and size as well as the manufacturer's name.

#### **9.5 MV Cables**

All MV cables that have been indicated to be rerouted, are to be replaced with CoCT approved cables according to CoCT specifications (CEE 69). All cables are to be Aluminium cables and are to be installed as per the CEE 69 standard.

#### **9.6 LV Cables**

All LV cables that have been indicated to be relocated are to be moved, if possible, with consultation with the depot. Cables that are to be rerouted with new cables are to be done so with CoCT approved cables according to CoCT specifications (CEE 70).

Existing LV cables are to be spiked before being jointed/Extended.

#### **9.7 Cable Joints**

All joints to be supplied and installed to CoCT standards.

Cable joints are not allowed under any circumstances for the street lighting network. For the MV and LV relocation work the below applies for all joints.

Cable jointing and termination shall be carried out by a qualified cable jointer using only approved standard methods for the particular type of cable. Proof of his training and experience may be required. Jointing and termination cables shall be in accordance with SANS 10198 Part 9.

Cable joints are to be kept to a minimum. Joints, other than the joints required at to joint to the existing cables, will only be allowed if the cable lengths exceed the cable drum lengths.

A suitable stripping tool shall be used to avoid damage to the conductor, removing only the required length of insulation. Conductors shall be properly cleaned by suitable methods. Where required, ends shall be coated with jointing / termination compound. Excess joint compound shall be wiped off.

All strands of steel wire armouring shall be through jointed.

Cables are not to be cut, except on approval from the Engineer and shall be jointed or terminated immediately. Where cables are cut and due to unforeseen circumstances cannot be jointed or terminated immediately, cable ends are to be sealed without delay by means of plumbed lead end caps.

The sealing of cable ends by means of rubber or bituminized tapes shall not be allowed. Heat shrink caps manufactured by Raychem or equivalent approved may be used provided the seal is correctly applied. Where cable ends were open for 24 hours or more or cable ends have been exposed to water, the cable ends shall be tested for moisture. Tests methods shall be approved by the Engineer and shall be for the contractor's cost.

Joints shall be subject to inspection. Any joint found to be inferior shall be remade, at the expense of the Contractor.



For MV joints, the CEE 26 standard is to be complied with regarding the supply and installation of MV joints. All MV cables are to be rerouted with new cables and can't be moved directly. All new cables are to be jointed under outage conditions after being spiked. These outages are to be arranged with the CoCT electrical depot by the contractor. Approved jointing kits are to be used for specific cable joints. For XLPE joint, heat shrink joints are to be used with torque shear ferrules.

#### **9.8 Cable connections and terminations**

Jointing and termination of LV cables shall be in accordance with SANS 10198 Part 9 and in full compliance with the recommendations of the Supplier of the termination system.

A suitable stripping tool shall be used to avoid damage to the conductor, removing only the required length of insulation. Conductors shall be properly cleaned by suitable methods (wire-brush or otherwise). Ends shall be coated with jointing / termination compound. Excess joint compound shall be wiped off.

Cable connections shall be made by means of mechanical screw type or compression type connectors. Connectors shall be installed (tightened or crimped) as per manufacturer's recommendation. Where lugs are used, these shall be marked with the wire size, die index number and location of crimps and suitably colour coded. For Al cables, the lug barrel must be factory prefilled with a suitable joint compound.

Connectors shall be firmly bolted, one plain and one lock washer being placed under the nut, so that the plain washer is against the lug and there shall be no washer between the lug and the terminal. A plain washer is also required under the bolt head.

Crimped lugs shall be fitted using manual tools below 70mm<sup>2</sup> and hydraulic tools from this size upwards. Where a single point hydraulic crimping tool is used, the lug shall be crimped in three places. Where a hexagonal die is used, this shall extend the full length of the lug.

Cable connections shall be made using brass bolts, nuts and washers, together with a star lock washer on all minisubs / sub-stations and lubricated and tightened as per the manufacturer's recommendation.

All connections are to be colour coded.

At all kiosk / minisub / sub-station terminations a minimum of 3m slack shall be provided adjacent to the termination point.

Where no intermediate connection is available, the cable tails shall be supported by means of pin insulators every 1.5m to avoid vibration in the crotch of the cable. Where a cold tail is joined to the cable tail, this shall be done by means of a barrier ferrule. The heat-shrink material shall cover the barrier ferrule.

Where the cable tail itself is connected to the lug or stud of an item of equipment, a sealed end lug shall be crimped onto the tail and the lug connected to the equipment. The heat-shrink material shall cover all but the spade of the lug to prevent the ingress of moisture.

Tenderers are to make due allowance for the length of tails in each particular case, since no claim for additional cost for extra-long tails will be considered.

#### **9.9 Labelling and Marking of Cables**

All LV cables shall be labelled with 3mm high letters punched onto aluminium tape attached to the cable with aluminium wire. The label shall state the cable size, number of cores, source and destination.

The labels shall be so installed that they are easily readable.

All MV cable labelling is to be according to CoCT standards.

#### **9.10 Overhead lines**

Overhead lines in Voortrekker Drive are to be removed after the overhead network is undergrounded and energised. The only overhead poles that are to remain are poles that are feeding overhead service connections to erven. These poles will remain and will have LV cables installed up the poles through kicker pipes that are mounted to the pole. The LV cables will then be connected to the overhead service cable. This connection is to be according to the City's standards.

All removed materials are to be stored and delivered to CoCT stores.



### **9.11 Handling of Cables**

The storage, transport, handling and laying of cables shall conform to approved and acceptable practice and shall meet the requirements of the latest version of SANS 10198 parts 6 and 8 as amended.

The contractor shall have adequate suitable equipment and labour available to ensure proper installation and prevent damage to cables.

Care shall be taken when handling drums of cable. Cable drums shall not be dropped or allowed to roll unchecked. The drums shall, under no circumstances, be rolled in any direction other than that indicated by arrows thereon.

When running cable off a drum, it shall be properly/securely mounted and rotate without difficulty. The spindle supporting it shall be straight and horizontal. The inner end of the cable shall be released before running any cable off the drum.

No cable shall be bent to a radius of less than that specified in the Wiring Code (SANS 10142) and in accordance with the manufacturer's recommendation.

Care shall be taken to ensure that each length of cable is run off the drum sequentially so that a crossed core situation does not arise at joints.

If a cable becomes damaged or the sheath or end cap punctured, this fact shall be brought to the attention of the Engineer immediately. He shall then decide on further action.

Before the cable is installed, the cable trenches must be carefully inspected and any objects, which may damage the cable during or after installation, must be removed.

### **9.12 Cable Testing**

Test equipment / instrumentation shall be calibrated by a SANAS approved test laboratory. The valid certificate of calibration shall be made available to the Municipality upon request.

Electrical LV cables shall be tested in accordance with SANS 10198 part 13.

All site tests results shall be recorded in a form approved by and acceptable to the Engineer and test results shall be submitted within 24 hours after testing to the Engineer who shall then call for tests to be repeated at random if he deems necessary.

MV cables are to be tested using high voltage withstand testing and partial discharge testing. Testing is to be done after installing the cable to ensure that the cable is functional and has no damage. The cables are then to be tested again within 24 hours of energising if the outage is not scheduled within 24 hours of testing.

### **9.13 Cable Routes and Measurements**

The contractor shall do all measuring on site himself in respect of lengths of cable and trenches required.

The lengths given in the schedules are only allowed for tender purposes. Payments will only be made for the lengths of cable actually installed and at the tendered tariffs. In their tenders, Tenderers shall allow for cut-off lengths of cables and bends in their rates.

### **9.14 Site security**

The Contractor shall be responsible for the security of all cables and street furniture, until the entire network is handed over to the City, ensuring protection against theft and/or vandalism and/or damage. The Contractor's program shall limit the exposure of cables to a minimum, especially during non-working hours.

The contractor remains responsible for the installation until the network is handed over to the City as complete. This is only possible when the roads are handed over to the City with construction completed. Streetlighting networks will not be handed over to the City, only once the roads are opened and handed back to the City is it possible to arrange the hand-over.

## **10 SUPPLY AUTHORITY APPLICATION FOR CONNECTION**

The electrical subcontractor shall be responsible for the submission and payment of all applications for new 3-phase 400V supplies from Cape Town Municipality or Eskom if applicable. The positions of the new connections shall be determined on site and in consultation with the City.





## 11 ELECTRICAL KIOSKS

### 11.1 Electrical Kiosks - Scope

The provisional number of kiosks to be supplied and installed is given in the Schedule of Quantities.

#### 11.1.1 Street Lighting Kiosks

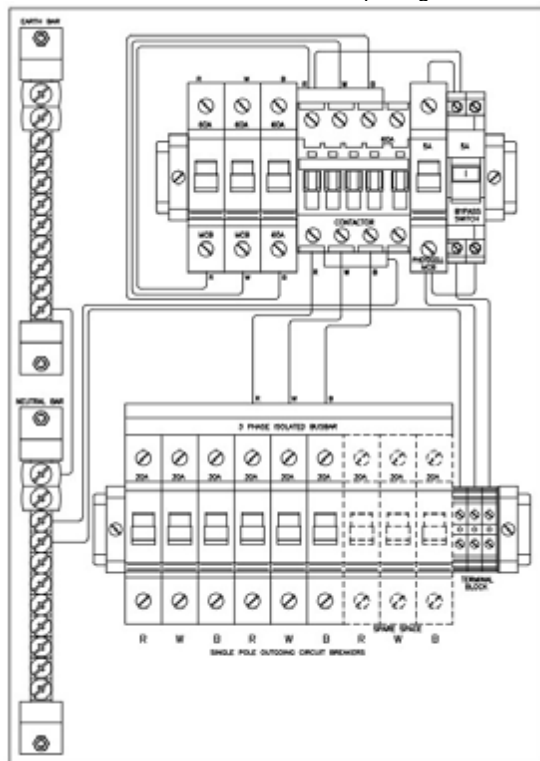
City of Cape Town standard streetlight pole mountable kiosk as per CoCT kiosk drawing DR3055. The colour of the electrical kiosks shall be as agreed with City of Cape Town. The contractor shall submit a sample for approval prior to manufacture. Please ensure that the City of Cape Town depot is consulted before placing an order for the street lighting kiosk.

The kiosks shall be tested to Ingress Protection rating IP66.

Kiosk components shall be finalised during the Contract. For tender purposes, the street light kiosk shall be fitted with the following components:

- 3 point padlockable locking mechanism,
- 3 x 60A 1P Curve 1 CB's,
- auto/manual bypass switch,
- 6 x 30A 1P, Curve 2 CB's,
- 1 x 5A 1P Curve 2 CB,
- 63A AC3 3P Contactor.
- Galvanised CCG glandplate,
- Photocell in window on side of kiosk,

All live parts shrouded. Contactor to be housed in a bulkhead. Kiosk to comply with SANS 10142-1 Code of Practice and CoCT 60A 3ph ground mount street light kiosk specifications. All as detailed on below diagram and CoCT drawing DR3055 sheet 3. C.O.C must be included in pricing.



The kiosk shall be wired with 16mm<sup>2</sup> colour coded stranded copper wiring.

The kiosk shall be assembled in accordance with CoCT Electricity standards.

A Royce Thompson photocell shall be fitted to the top of the nearest street light pole or a location to be agreed, to be in the shadow of street lights and vehicle head lights.

The terminals for the incoming main distribution cables shall be sized to accommodate cables up to 50mm<sup>2</sup>. The terminals for lighting circuit cables shall be sized to accommodate cables up to 25mm<sup>2</sup>.

All components and circuits shall be labelled.

The contractor shall supply workshop drawings for the electrical kiosks within 7 days of the award of the contract. Manufacturing of the electrical kiosks shall commence only on approval of the workshop drawings by the Engineer.

The plinths of the kiosks (if required) shall be placed and levelled prior to positioning of the kiosk and shall include at least two 110mm ducts with slow bends for access into the kiosk.

#### 11.1.2 Pillar boxes, meter kiosks, distribution kiosks and service pillars

All kiosks, boxes and pillars are to be supplied and installed according to CEE 30.

Existing kiosks, boxes and pillars that are to be moved, are to be moved after the cables have been rerouted to the new positions. The depot is to arrange an LV outage to allow for the disconnection of the existing cables and the moving of the kiosk.

### 11.2 Electrical Kiosks Specifications

The following specifications shall apply to all electrical kiosks supplied.

#### 11.2.1 Standards and Protection

Equipment shall be in accordance with the applicable SANS Specifications and Codes and with this Specification. The CoCT specifications of CEE 30 will take priority above the specification listed below.

Selection of materials, finishes, equipment, etc. shall also be based on the conditions and environment where the kiosks and equipment are to be installed, e.g. corrosive, hot, wet, damp, and dusty. The kiosk enclosure shall be Ultraviolet (UV) resistant.

#### 11.2.2 Access

Sufficient removable panels shall be provided to afford access to all equipment for maintenance, service and replacement purposes. The back panels shall be of similar construction to the front panels.

#### 11.2.3 Clearances

Sufficient space shall be left inside panels for incoming and outgoing cable connections and for interconnections and control wiring, taking into account the sizes and quantities of cables and wires involved.

Equipment on boards may be installed abutting. Undue cramping of equipment and wiring shall, however, not be permitted and the following minimum clearances must be maintained:

- Clearance of not less than 75mm between sides, top and bottom of architrave and any equipment mounted on the chassis.
- Clearance of not less than 75mm between rows of equipment (measured between terminals).

#### 11.2.4 Doors

Doors shall be provided as required and prescribed. Where doors of sheet steel finished in the colour specified are required they shall be manufactured of the same gauge material as the remainder of the panels.

Doors shall be suitably braced to ensure stiffness and shall have a smooth, flat finish. Door hinges (if installed) shall be heavy duty and shall be constructed to permit easy removal of doors.

Where hinges are used they shall preferably be concealed. If a surface mounted hinge is used it shall be chromium plated. Provision shall be made for adjustment of hinges to facilitate lining up of distorted doors.

All doors shall be fitted with locks unless otherwise specified. Locks shall be Union or Yale and shall have master key facilities for the entire installation and separate key facilities for each kiosk. Two individual keys shall be provided with each kiosk and four master keys shall be provided for the entire installation.

All kiosk doors shall be equipped with a covered, tamper free, lock system for padlock that cannot be cut by a bolt cutter.

Hinged doors shall be earthed to the kiosk by means of a flexible earth strap.



#### 11.2.5 Dust and vermin proofing

All kiosks shall be completely vermin proofed. No holes other than those required for cable or conduit entry shall be allowed. Should extra holes be required for temporary installations, these holes shall be suitably blocked off on the removal of these temporary installations.

Where doors or removable covers are situated and are required to be dust proofed, they shall be dust proofed by means of a minimum of 10mm thick non-perishable gasket, resistant to deterioration from heat, chemicals and moisture and capable of being compressed to half its original thickness.

Where doors are flush fitting, gaskets shall be glued to the fixed flange.

#### 11.2.6 Labelling

All safety warning notices shall be in English.

All kiosks shall be labelled in the sequence shown on the drawings and as specified or approved. The Contractor shall obtain final information and approval before labelling any kiosk.

Black letters on white background shall be used for all normal labels and red letters on white or yellow background for danger notices. All labels used shall be engraved Traffolite.

External number labels shall be black letters on yellow background and shall be installed facing the road in the direction of travel.

Size and origin of supply cables and bus bars shall be clearly labelled on all kiosks.

All equipment situated inside the kiosk, e.g. contactors, relays, circuit breakers, bypass switch, etc. shall be clearly marked, indicating function, circuit controlled and fuse rating, if applicable.

The main designation label shall be fitted at the top centre of the kiosk and shall be in English. Individual labels are to be fitted to each compartment door and corresponding fixed portion of rear panel (if accessible).

All circuit labels shall be the same size for kiosks or similar equipment supplied under this Contract.

These labels shall be white/black/white composition engraved Traffolite labels secured by self-tapping screws or channelling. Letter size: Main label – 20mm, other labels – 6mm.

The following labels shall be installed in English:

- NOTICES on doors together with warning sign prohibiting unauthorised entry.
- NOTICE/LABEL warning to switch off in case of accidental contact, etc.
- NOTICES in all places as required by the Occupational Health and Safety Act of procedures
- prescribed in case of fire and/or electric shock.

Labels on power cables shall be attached with approved type plastic adjustable grip clips.

The labels for power cables shall be provided with holes for the clips to pass through for fastening. Each power cable label shall be fastened with at least two clips. A legend card, covered by removable 2mm thick transparent acrylic plastic ('PERSPEX') or equivalent panel, shall be installed on the inside of the door of the kiosks and circuits shall be designated on this board.

#### 11.2.7 Equipment Mounting

Circuit breakers, contactors and any other components shall be positioned and installed as indicated on the relevant drawings or as approved in writing. The components shall be installed so that it is positioned squarely on its supporting steelwork, i.e. "lined up" in both the vertical and horizontal planes.

#### 11.2.8 Bus bars

Bus bars shall be installed in all kiosks and may be installed either horizontally or vertically and isolated from the rest of the kiosk. Bus bars and connections shall be in accordance with SANS 1195.

Bus bars shall be mounted on substantial porcelain or other approved insulators and spaced that they will prevent busbar distortion under maximum short circuit conditions.

Busbars shall be pre-drilled and plated for connection to the maximum number of circuit breakers.

The busbars shall be shrouded to protect them from inadvertent contact from above and in front. The shroud shall be removable and shall be labelled "Danger Live Busbars".



All terminations onto bus bars and interconnections shall be bolted with cadmium plated high tensile bolts, washers, spring washers and nuts.

All connections to and from busbars are to be made with colour coded PVC insulated copper conductors terminated with crimped lugs.

Bare conductors must be so spaced that with all clamps, lugs and lead-offs in position, the spacing between any conductor and earth shall not be less than 40mm.

Connections to the bus bars must be effected by means of the correct clamps or lugs with soldered connections or with connections crimped with the correct equipment.

Bus bars shall each be identified by means of 100mm long painted (or other approved) phase colouring bands spaced not more than 300mm apart.

The following colours shall be used:

| NUMBER OF PHASES | PHASE COLOUR    | NEUTRAL COLOUR | EARTH COLOUR | SPECIAL PURPOSE COLOUR |
|------------------|-----------------|----------------|--------------|------------------------|
| 1                | Red             | Black          | Green/Yellow | Orange                 |
| 2                | Red and White   | Black          | Green/Yellow | Orange                 |
| 3                | Red, White Blue | Black          | Green/Yellow | Orange                 |

Where bus bars are mounted horizontally the longer dimension shall be in the vertical plane. The bus bars shall be designed to withstand the mechanical and thermal stresses of any possible short circuit that could occur at that point in the system.

Rating of bus bars shall not exceed 1,55A/mm<sup>2</sup> for copper and 1,0A/mm<sup>2</sup> for aluminium.

Neutral bus bars shall have the same cross section as phase bars.

All bus bar contact surfaces shall be tinned.

All bracing and other insulating material shall be non-hygroscopic.

#### 11.2.9 Wiring

All internal wiring shall be PVC insulated 16mm<sup>2</sup> stranded copper wiring and colour coded in accordance with the table below:

| Colour of Wire        | Circuit Particulars                            |
|-----------------------|------------------------------------------------|
| Red, White and Blue   | Phase connections in all three phase circuits. |
| Green/Yellow b-colour | Insulated earth wires                          |
| Black                 | Neutral connections                            |

Wires shall not be joined between terminals points and no terminal shall have more than two wires connected to it unless they are lugged connections. Crimp lugs or ferrules shall be used on all conductors exceeding 10mm<sup>2</sup>.

All terminals shall be either bolted or screwed. All terminals for wires smaller than 16mm<sup>2</sup> shall have pressure plates.

Connections to bus bars or earth bars shall be made with tinned copper cable lugs soldered or crimped to the ends of the conductors and bolted to bus bars by means of cadmium plated high tensile steel bolts and nuts provided with spring washers.



Wiring shall be neatly installed, grouped and strapped together using plastic buckle clips or hard plastic "loom formers". Wiring shall not be run at random but shall follow board construction features as far as is possible.

Only wires of the same phase shall be grouped or bunched together.

No excessive bunching of wiring, which will impair the current carrying capacity, will be accepted. All wiring is to be kept free and away from any exposed terminals or other un-insulated current carrying parts.

Connections to terminals shall suit the connectors used, but in any case, terminal clamp screws shall not bear directly on the conductor.

Wires shall be clearly marked at all termination points in accordance with the numbering of the wiring diagram, by means of numbered ferrules, or other approved method.

#### 11.2.10 Terminals

Terminal assemblies (if required) shall consist of a metal mounting rail onto which terminal modules are fixed.

For cables up to and including 10mm<sup>2</sup>, clamp type terminals may be provided, but the type where the clamp screws bear directly on the conductor will not be accepted.

For exceeding 10mm<sup>2</sup>, terminal modules suitable for crimping lugs or ferrules shall be used.

Terminal modules shall have rigid insulating barriers between poles to provide an adequate creepage path for use at 440V between adjacent poles for 380V applications. The terminals of the modules shall be large enough to accommodate the cable sizes specified.

All terminals shall be clearly marked in accordance with the working drawings and wiring diagrams and as approved.

Additional spare terminals shall also be provided as specified or indicated on the drawings for the purpose of looping additional remote circuits, with a minimum of 20%.

#### 11.2.11 Miniature Circuit Breakers (MCB's)

All miniature circuit breakers shall comply with SANS 60947-2 and shall have type C or type B time delay characteristics with thermal magnetic operation. Final current ratings shall be determined during the Contract.

Voltage rating shall be 230 / 400V (± 10%, 50Hz). Breaking capacity of 6 or 10kA AC shall apply.

All MCB's shall be of one make throughout the installation. The Engineer will not accept a mixture of circuit breakers from various manufacturers.

Both single pole and three pole MCB's are required. Mechanically coupled single pole circuit breakers used as double or triple pole circuit breakers are **not** acceptable.

#### 11.2.12 Photo-Electric Controls and Contactors

Photo-electric switches shall be used to control contactors based on the natural light levels in order to switch lighting circuits "on" or "off".

Photo-electric switches shall be of the fully electronic type and shall bear the SANS mark. Suitable units are manufactured by Royce Thompson Limited.

The sensing unit shall be a solid-state silicon photo-diode or photo transistor capable of providing consistent switching levels over the life of the unit. Switching shall be fully electronic or by means of a sealed relay capable of switching the controlled circuits directly or via a suitable contactor with a 230V operating coil. The sensor and switching device shall be housed within a tough, translucent, weather and ultra-violet resistant cover.

The operating level shall be factory pre-set to switch on/off at approximately 60 lux. The unit shall provide an operating delay to make it insensitive to short duration changes in light levels. The response time after sudden changes in lights level shall not be less than 15 seconds.

Integral protection against voltage surges shall be provided.

The control unit shall be of the plug-in type with a NEMA base suitable for outdoor use fixed to a pole or another structure.

The photo-electric switch shall be positioned in such a way that it will not be affected by spill-light from the lighting installation or by vehicle headlamps.



Contactors shall comply with SANS IEC 947. They shall be suitably rated for the type of load controlled and shall be selected to provide a minimum of 5 years operation at normal switching frequency for the controlled load without contact replacement or repair.

## **12 EARTHING AND LIGHTNING PROTECTION**

The entire installation shall be properly and effectively earthed and bonded as prescribed in the Wiring Code and as specified below;

### **12.1 Earthing of kiosks**

A 2.4m x 16mm Cu earth spike shall be installed at each EK and connected to the EK earth bar by a 25mm<sup>2</sup> Cu earth conductor. The soil conditions at each site shall be tested and a Crow's foot earth shall be added to achieve an earth resistance reading not exceeding 10 ohms. Additives shall be added to the soil to achieve the required reading.

The kiosk Crows' foot earth shall consist of 3 lengths 70mm<sup>2</sup> stranded copper conductors of 7m each, installed in such a way to form 120° angles between the conductors (Crow's foot). At the center of the 120° angle all wires shall be Exo-welded (e.g. Cadweld) together with a 70mm<sup>2</sup> earth conductor to the main earth bar of the kiosk. All earth wires shall enter the kiosk via the normal cable opening of the kiosk. The Neutral shall be bonded to Earth at each electrical kiosk.

### **12.2 Earthing of Lighting Poles**

All lighting poles shall be bonded together by means of the armouring on the SWA cable as an earth potential equalisation conductor. The last pole of each line is to have the neutral and earth bonded.

### **12.3 Earthing Material and Installation methods**

#### **12.3.1 Earth Spikes**

Earth spikes shall comprise 16mm sectional steel cored rods with a minimum of 0.25mm pure copper coating molecularly bonded thereto. They shall comply with SANS 1063, and shall be of "Cadweld" or equivalent manufacture. The top of earth spikes and the interconnecting conductors shall be 1m below finished ground level.

The connections to earth spikes shall be by means of at least two phosphor bronze mechanical clamps of an approved type for this duty, or a "Cadweld" joint. The clamps shall not be attached to the rod but shall be installed so that the bolt face is in contact with the rod. Brazing will not be accepted. The connection shall be wrapped with two layers of "Denzo" tape.

#### **12.3.2 Earth Continuity Conductors**

Generally, the armouring of the SWA cables shall be bonded together between lighting poles to create earth continuity. Only in specific instances and on written Instruction from the Engineer shall separate earth continuity conductors be used in which case the following paragraphs shall apply.

Earth conductors shall be tin-plated copper wire interwoven with steel complying with SANS 1411, Part 1 -1966. **This product is generally known as anti-theft copper earthing conductor.**

The conductor sizes shall be such that they can carry the short circuit current likely to be imposed upon them but generally shall be half the area of the phase conductors with a maximum size of 80mm<sup>2</sup>.

Earth continuity conductors shall be connected to main earth bars. A terminal lug shall be crimped onto the end of the main earth conductor for bolting to the main earth bar. Earth connections shall be made so that in the event of any connections being removed the earth connection to the rest of the equipment will not be affected.

#### **12.3.3 Bonding**

All sections of kiosks to be bonded together

The steel structure of the kiosk shall be bonded to earth. The maximum resistance of any such point to the earthed end of the earthing lead shall not exceed 0.2 ohm.

Where equipment is bolted together, as in the case of a LV switchgear panel, there is to be a 32mm x 4mm copper earth strap extending the whole length of the equipment. All earth bars shall be run in one continuous length as far as possible, and shall not be bent or formed in any way that requires hammering or severe distortion. Any joints shall be lapped with at least two bolts with nuts and washers of suitable size. The lapped ends shall be pre-tinned. If multiple straps are used, they shall be bolted and fixed together at not more than 750mm intervals. All connections shall be made using brass or stainless steel bolts, nuts and washers, together with a star lock washer.



#### 12.3.4 Kiosk Earthing Installation

The Cadweld method of jointing shall be used for all earth conductor T-offs and joints.

All earthing conductors shall be terminated with crimped lugs and fixed with cadmium plated mild steel or brass bolts. Where lugs are used for terminating stranded earth conductors, the lugs shall be crimped with an approved type of crimping tool. The lug stud size shall correspond to the fixing bolt and the lug shall be positioned that the full contact area of the lug is utilised.

Self-tapping screws are not an acceptable means of securing earth conductors.

The armouring on all cables coming into kiosks shall be bonded together and bonded onto the earth bar. The armouring of cables alone shall not be considered as an effective earth conductor.

The continuity of the earth conductors shall be tested and recorded. In no case shall the resistance from any point of the kiosk installation to the main supply point exceed 0.1 ohms. In the event of this valued being exceeded this must be brought to the Engineer's attention.

#### 12.3.5 Minisub Earthing Installation

All minisubs that are moved or installed, are to have a new equipotential earth ring. The equipotential earth ring is to be installed according to CoCT standards. These minisubs are also to have new earth spikes installed as per CoCT standards.

### 13 QUALITY ASSURANCE, TESTING AND DOCUMENTATION

#### 13.1 General

This Quality Assurance specification defines the minimum requirements which must be met by the Contractor in respect of quality processes, procedures and records. This specification shall be read in conjunction with the Project Specification, which defines the extent of work required.

#### 13.2 Regulations, By-Laws and Standards

The installation shall be erected and tested in accordance with the following Acts and regulations:

- a. The Occupational Health and Safety Act, 1993 (Act 85 of 1993) as amended
- b. The Local Government Ordinance 1939 (Ordinance 17 of 1939) as amended and the municipal
- c. by-laws and any special requirements of the local supply authority.
- d. The Fire Brigade Services Act 1993, Act 99 of 1987 as amend, and the he local Fire Office
- e. Regulations
- f. The National Building Regulations and Building Standards Act 1977 (Act 103 of 1977) as
- g. emended.
- h. The Electricity Act 1984 (Act 41 of 1984) as amended.
- i. Telkom Regulations
- j. The Regulations of the local Gas Board where applicable.
- k. The material and installation work shall comply with the following standards:
- l. SANS 1507: Electrical cables and flexible cords with poly-vinyl chloride (PVC) insulation
- m. SANS 10198: The choice, handling and installation of electrical power cables with a rating not exceeding 33 k
- n. SANS 1339: Electrical cables with insulation of cross-linked polyethylene (XLPE)
- o. Insulated Electric Cables (where applicable)
- p. NRS 028: The latest issue of SANS 10142-1: "Code of Practice for the Wiring of
- q. Premises-Part 1: Low Voltage Installations"
- r. The latest issue of SANS 475: 2005: "Code of Practice for Streetlight Luminaires",
- s. The latest issue of SANS 10098-1: "Lighting of public thoroughfares",
- t. The latest issue of SANS 10098-2: "Lighting of certain specific areas of streets and highways"



- u. The following Specifications form part of the Contract and shall be read in conjunction with the Project Specification:

|     |   |                                                   |
|-----|---|---------------------------------------------------|
| SSA | : | Standard Specification - General                  |
| SSC | : | Standard Specification - Underground Reticulation |
| SSE | : | Standard Specification - Excavations              |
| SSG | : | Standard Specification – Earthing                 |

The standard specification from City of Cape Town Municipality regarding their low-voltage reticulation shall be applied in full.

Where any required by-law or regulation, which applies or becomes applicable during the execution of the electrical installation, conflicts with the stipulation of the document, the former must have preference in all cases. The contractor must immediately notify the Engineer of such discrepancies.

The contractor may not make any alterations to the installation before written sanction to do so is received from the Engineer or its representative.

### **13.3 Quality Of Materials**

Only new materials of highest quality shall be used and all materials shall be subject to the approval of the Employer. All products or components shall be used for its intended purpose and according to manufacturer's specifications. The Employer's specifications for various materials to be used on this Contract are attached to and form part of this specification.

Wherever applicable, the material shall comply with the relevant South African National Standards, specifications, or to British Standards Specifications, where no SANS Specifications exist.

Materials wherever possible, shall be of South African manufacture. Also note the Contractual requirements in terms of Local Content.

### **13.4 Workmanship and Staff**

The workmanship shall be of the highest grade and to the satisfaction of the Employer.

All inferior work shall, on instruction by the Employer's inspecting officers, be immediately removed and rectified by and at the expense of the contractor.

### **13.5 Quality Assurance System**

The contractor shall prepare and submit a quality assurance system to the Engineer for approval.

The quality assurance system including procedures for:

- a. installation
- b. commissioning
- c. acceptance testing
- d. lighting level testing
- e. documentation control

Checklists shall be used to confirm verification of quality requirements.

### **13.6 Inspections, Tests and Commissioning**

#### **13.6.1 General**

The Engineer may call for the inspection or testing of all or any goods forming the subject of the Contract. The Engineer may be present or represented at any of the tests carried out at any stage during the manufacture or installation.

The Contractor shall be responsible for arranging all the tests as specified, at the appropriate times and notify the Engineer.





The Contractor shall rectify any portion of the installation, which does not meet with the requirements of the Wiring Code, relevant SANS standards or this Specification, or the local by-laws as may be found by test or inspection. Such rectification shall be done at the Contractors cost.

#### **13.6.2 Tests and Inspections**

The entire installation shall be tested after completion in accordance with the Wiring Code and any applicable by-laws of local authorities.

Tests as stipulated in the "Occupational Health and Safety Act no. 85 of 1993, as amended, and in the "Code of Practice for the Wiring of Premises" SANS 10142 (as amended), shall be done. These test report forms must be filled in fully and correctly in ink, signed by the installation electrician and handed to the Engineer or his representative.

Tests must be conducted on site after the whole installation is complete, unless written the Engineer to the contrary grants permission. The tests must include a full-load test for an adequate period to ensure the satisfactory working of the installation. If negative test results are obtained, faults must be rectified and tests repeated.

All tests shall be carried out in conjunction with and to the satisfaction of the Supply Authority and in the presence of the Engineer or his representative. The contractor shall make all arrangements for testing and inspection, the costs thereof being included in the Tender Price.

The Contractor shall assist the Inspectors during any tests carried out by them and shall supply tools, instruments and consumables for testing purposes.

The Engineer reserves the right to be present at any tests and the Contractor shall inform the Engineer of all tests to enable them to be present if he so desires.

The Engineer may perform similar tests at any time and the Contractor shall render all assistance and shall provide all tools and instruments, which may be required for such tests.

The work specified in this document shall not be considered to have been completed until the installation inspectors of the responsible authorities have issued a clearance certificate for the electrical installation and the networks are taken over by the municipality.

#### **13.6.3 Acceptance Tests**

After completion, either in a part or as a whole the complete installations shall be subject to acceptance tests by the Engineer. The Contractor shall assist the Engineer during any test carried out and must supply tools and instruments for testing purposes.

#### **13.6.4 Test and Commissioning Instruments, Labour and Consumables**

All labour, power, fuel, dummy loads (where applicable) and all instruments and appliances that may be required for the tests and commissioning shall be provided by the Contractor.

Test instruments used to demonstrate capacities and characteristics specified or offered shall be tested for accuracy by an approved laboratory or by the manufacturer and certificates showing degree of accuracy shall be furnished to the Engineer.

If gauges, thermometers, etc. which are to be left permanently installed are used for tests, they shall not be installed until just prior to the tests to avoid possible changes in calibration.

#### **13.6.5 Test and Commissioning Certificates and Records**

The Engineer reserves the right to attend or not to attend any of the inspections, tests or commissioning. Written reports and test results shall be submitted to the Engineer, whether the Engineer attends these or not.

- All certificates shall be in English.
- All test and commissioning forms shall be completed in rough or final form during these operations.
- All test certificates are to be countersigned by the Engineer as "witnessed" or "accepted" or "seen".
- Four copies of test and commissioning certificates shall be handed over to the Engineer.
- Handover of the certificates and records is a prerequisite for handover of the installation.
- With Final Acceptance the Electrical Contractor shall accept in writing the responsibility for the total



installation as installed by him certifying the correctness of the installation in accordance with and on the Certificates of Compliance of Electrical Works. The contractor shall also be responsible to have the sections required to be completed by the Engineer and the Client completed by them as required.

#### **14 CERTIFICATE OF COMPLIANCE BY AN ACCREDITED PERSON**

On completion of the electrical installation the contractor shall complete the Certificate of Compliance for the electrical Installation in the form of Annexure 1 as described in the Occupational Health and Safety Act no. 85 of 1993, as amended, and obtainable from the Electrical Contracting Board of South Africa. This form must be handed to the Engineer or his representative.

#### **15 DRAWINGS**

As soon as is possible after the contract has been awarded to him, the contractor shall submit two (2) copies of the following drawings to the Engineer for approval:

Design and construction drawings of all street furniture (minisubs, kiosks, pillars, streetlighting poles, etc) as specified.

The following information must appear on the kiosk drawings:

- a. A full layout with the arrangement of the equipment in the kiosks, and on which all measurements of the equipment and the construction are indicated.
- b. The position, fastening method and current rating of the bus bars.
- c. The make, catalogue number and capacity of insulators, circuit breakers, fuses, contactors, etc.
- d. As part of the commissioning of the installation the Contractor shall submit as-built drawings and documentation to the Engineer.

#### **16 DEFECTS LIABILITY, EQUIPMENT GUARANTEES, MAINTENANCE AND REPAIR**

##### **16.1 Defects Liability**

The defects liability period is defined in the Conditions of Contract. The defects notification period for this contract is 12 months after the network is handed over to the municipality.

Tenderers should take careful note of the contractor's obligations during the defects notification and liability period.

##### **16.2 Equipment Guarantees**

All equipment (unless otherwise specified elsewhere in this specification) shall be guaranteed against defects and failure for a period of at least 2 years from date of acceptance of the system i.e., issuing of the taking over certificate.

The contractor shall guarantee that the proposed systems and components will be supported for at least 5 years after installation and that spare parts will be available for at least 10 years.

##### **16.3 Existing Services**

###### **16.3.1 Interference With Existing Services**

Prior to commencing work on site, and in good time, the Contractor shall discuss with and have the approval of all affected stakeholders regarding services, both overhead and underground affected by the Works. The Contractor shall convene such meetings and shall satisfy himself that he has obtained all the information regarding existing services that he needs to complete the Construction Works. The Contractor will also be informed which existing services, if any, will be affected.

Contractors shall note that the drawings given can have discrepancies and that the indicated services are neither in approximate positions as indicated nor the same nature and/or description as reflected on the drawings. The Contractor shall therefore note and inform the Engineer of any identified discrepancies for changes to be effected.

The Contractor shall carry out the trenching and related works with the minimum interference to existing services. He shall cooperate with all Service Providers and Departments concerned and he shall be solely responsible for informing all stakeholders and Departments in good time before the stage of the construction is reached for the laying and/or relaying of any particular service in accordance with the Scope of Work.



Any alteration to services outside this contract shall be carried out by the Service Provider concerned unless the Contractor is instructed otherwise.

The Contractor shall provide the necessary assistance during any operations necessary in connection with the removal, alteration or safe-guarding of any service.

If the progress of the Works is being retarded by the failure of any Service Provider or Department to lay, remove or divert services within a reasonable time, the Contractor shall inform the Engineer with immediate effect and if possible before the said delay comes into effect.

The cost of alterations to services necessitated by this contract will be borne by the Employer but the Contractor shall be responsible for any damage to such existing services and works in the execution of this Contract and shall reimburse the Employer, Service Provider or the owner concerned for any repairs required and for damages without the right of refund.

The Contractor shall assume full responsibility for any damages to existing services indicated to the Contractor through the Wayleaves, where such damage is caused by any person in the Contractor's service either directly or indirectly. The Contractor shall bear all associated costs of repair of any such damage.

The Contractor shall be responsible for immediately notifying the Engineer and the authorities concerned regarding any damage caused to existing services. If the Engineer discovers damage to existing services after the specific Construction Works have been completed and on investigation it is found to be directly related to the said Construction Works, the costs to repair the damages shall be for the Contractor's account.

The Contractor shall allow all reasonable access to any Service Provider or Department for the purpose of maintaining or installing any cables or other services during the period of the Contract.

#### **16.3.2 Water Resources**

Should the work necessitate the temporary impounding or diversion of flood or natural water or the discharge of water by other means, the work shall be executed only after Engineers instruction and in such manner as not to cause any damage to public or private property or other construction work in the vicinity.

All water to be used on the works shall be taken from the municipal water mains, own water trucks or other approved sources. The Contractor where necessary shall ascertain the source of supply and pay all the prescribed connection fees and charges for the supply of water, and provide and maintain all the necessary pumps, piping, storage tanks, etc., for conveyance of water to, and distribution in the works, and shall properly plug and take up such supply at the completion of the works to the satisfaction of the Engineer if so required.

Where trucks or trailers are required to be used, the volume of water to be transported must be agreed with the Engineer beforehand.

Under no circumstances shall the use of any resident's private water connections be allowed.

The Employer accepts no responsibility for shortage of water caused by restriction or from any cause whatsoever.

### **17 SCHEDULE OF QUANTITIES**

The Schedule comprises items covering the Contractor's profit and costs of general liabilities and of the construction of temporary and permanent works.

Although the Tenderer is at liberty to insert a rate of his own choosing for each item in the Schedule, his attention is drawn to the fact that the Contractor has the right, under various circumstances, to payment for additional works carried out and that the Engineer is obliged to base his assessment of the rates to be paid for such additional work on the rates inserted in the Schedules by the Contractor.

Descriptions in the Schedule of Quantities are abbreviated but, should any of the terms of the Schedule conflict with any requirement for measurement or payment given in a Specification, the requirement of the Specification shall prevail.

Unless otherwise stated, items are measured nett in accordance with the drawings, and no allowance has been made for waste.

The prices and rates to be inserted in the Schedule of Quantities are to be the full inclusive prices to the Employer for the work described under the separate items. Such prices shall cover all costs and expenses that may be required in and for the construction of the work described, and shall cover the cost of all general risks, liabilities, and obligations set forth or implied in the documents on which the Tender is based.



A price or rate is to be entered against each item in the Schedule of Quantities, whether the quantities are stated or not. An item against which no price is entered will be considered to be covered by the other prices or rates in the Schedule.

The Tenderer must price each item in the schedule of quantities in black INK.

The Tender Price must be based on the Schedule of Quantities. Tenderers are required to submit their priced Schedule of Quantities with their Tender.

The completed Schedule of Quantities shall detail the unit rate and total amount for material and labour respectively for each item. Tenderers are advised to check their item extensions and total additions since no claim for mathematical errors will be considered.

The Engineer will check the completed Schedule of Quantities and reserves the right to adjust any individual and/or total amount and rectify any discrepancy between the unit rate and total amount, deeming the unit rate to be correct.

"Material Rate" shall include the supply and delivery of all items of material to the site, including all incidentals necessary for the completion of each item, plus the profit but excluding VAT.

"Labour Rate" shall include the cost of all labour, both skilled and unskilled, including supervision and profit required to complete the installation of all material covered by each item but excluding VAT.

The attention of Tenderers is drawn to the fact that all prices and rates are to be submitted exclusive of Value Added Tax.

No alteration, erasure or addition is to be made in the text of the Schedule of Quantities. Should any erasure or addition be made, it will not be recognized but the original wording of the Schedule of Quantities will be adhered to.

Unless stated to the contrary in the Project Specification, the quantities set out in the Schedule of Quantities are estimated quantities of the work, and subject to re measurement.

Where alternative prices for equipment of different manufacture are offered, the lowest alternative price for equipment to specification must be included, against the relevant item in the Schedule of Quantities. The remaining alternative prices must be furnished separately.

Where such equipment is found not to comply with the Specification, the Contractor will be required to provide equipment which does comply, without adjustment to the price in the Schedule of Quantities.

In certain instances, prices are requested for items which may be required during the progress of the work, but which are not included in the known quantities of material required. These items are indicated as "Rate Only" in the "Quantity" column, and the price is to be noted in the "Rate" columns only and must not be carried forward.

The following abbreviations are used in the Schedule of Quantities:

|                 |   |                       |
|-----------------|---|-----------------------|
| m               | - | metre                 |
| km              | - | kilometre             |
| m <sup>2</sup>  | - | square metre          |
| m <sup>3</sup>  | - | cubic metre           |
| mm              | - | millimetre            |
| km <sup>3</sup> | - | kilometre cubic metre |
| (Al)            | - | Aluminium             |
| (Cu)            | - | Copper                |
| 1P              | - | Single pole           |
| 3P              | - | Three pole            |
| E/C             | - | Earth conductor       |
| R/O             | - | Rate Only             |
| H               | - | hour                  |



**18 TEST CERTIFICATE**

**18.1 Low Voltage Cables: Insulation Resistance**

Project or Development : .....

Location : .....

Date : .....

Test Equipment (Megger) ;

Make and Model : .....

Serial number : .....

Voltage : ..... kV

| CABLE DETAILS |       |       | CABLE ROUTE |    | INSULATION RESISTANCE (MEG OHMS) |     |     |     | COMMENTS |
|---------------|-------|-------|-------------|----|----------------------------------|-----|-----|-----|----------|
| Size          | Cu/Al | Cores | From        | To | RWB-E                            | R-W | W-B | B-R |          |
|               |       |       |             |    |                                  |     |     |     |          |
|               |       |       |             |    |                                  |     |     |     |          |
|               |       |       |             |    |                                  |     |     |     |          |
|               |       |       |             |    |                                  |     |     |     |          |
|               |       |       |             |    |                                  |     |     |     |          |
|               |       |       |             |    |                                  |     |     |     |          |
|               |       |       |             |    |                                  |     |     |     |          |
|               |       |       |             |    |                                  |     |     |     |          |
|               |       |       |             |    |                                  |     |     |     |          |

Test performed by : .....  
(Tester's Name) Signature Date

Test witnessed by : .....  
(Consultant's Name) Signature Date

.....  
(ECoCT Representative) Signature Date



## 19 EARTHING RESISTANCE

Project or Development : .....

Location : .....

Date : .....

Test Equipment (Megger) ;

Make and Model : .....

Serial number : .....

Voltage : ..... kV

| TEST POSITION | TARGET VALUE (OHMS) | MEASURED VALUE (OHMS) | COMMENTS |
|---------------|---------------------|-----------------------|----------|
|               |                     |                       |          |
|               |                     |                       |          |
|               |                     |                       |          |
|               |                     |                       |          |
|               |                     |                       |          |
|               |                     |                       |          |
|               |                     |                       |          |
|               |                     |                       |          |
|               |                     |                       |          |

Test performed by : .....  
(Tester's Name) Signature Date

Test witnessed by : .....  
(Consultant's Name) Signature Date.

.....  
(ECoCT Representative) Signature Date



# **ANNEXURE 1**

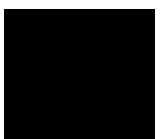
**(SSA: Standard Specification - General)**



**STANDARD SPECIFICATION**

**SSA - GENERAL**

***(GENERAL REVISION - JANUARY 1996)***





**STANDARD SPECIFICATION**

**SSA - GENERAL**

**(GENERAL REVISION - JANUARY 1996)**

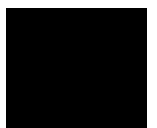
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## **STANDARD SPECIFICATION**

### **SSA - GENERAL**

***(GENERAL REVISION - JANUARY 1996)***

#### **1. SCOPE**

This Section covers only general requirements of electrical work, associated with the installation of electrical distribution systems and street lighting in townships.

The standards referred to in the Specification are listed in Appendix A.

Standards that are not referred to, but which are relevant, are listed in Appendix B.

#### **2. INTERPRETATION**

##### **2.1 APPLICATION**

This Specification contains clauses that are generally applicable to electrical engineering contracts.

Interpretations and variations of this Specification are set out in Part 2 of the Project Specification.

##### **2.2 DEFINITIONS**

For the purposes of this Specification the following definitions shall apply:

###### **2.2.1 General**

Authorised/Ordered/Rejected: Authorised/ordered/rejected in writing by the Engineer.

Approved/Approval: Approved/approval in writing by the Engineer.

Agreed: Agreed in writing.

In writing: Description of any communication in the form of a written, typed or printed document pertaining to the Contract, signed by the Engineer (Contractor) and addressed to the Contractor (Engineer).

###### **2.2.2 Tolerances**

Deviation: The difference between the actual (measured) size or position and the specified size or position.

Permissible Deviation: The specified limit(s) of deviation (see Clause 6) as set out in the contract documents.

Tolerance: The range between the limits within which a size or position may vary.

Note: A tolerance is an absolute value without sign but the dimension or axis to which it applies must be stated.



### 2.2.3 Measurement and Payment

Scheduled Rate: The unit rate or -price indicated in the Schedule of Quantities, at which the Contractor undertakes to do the specified task, or to provide the necessary material, article or service, as described under the particular item.

Method-related Charge: The sum inserted for an item in the Schedule by the Contractor when tendering to cover items of work relating to his intended method of executing the works.

Time-related Charge: A method-related charge for work, of which the cost to the Employer, varies in proportion to the length of time taken to execute the particular item.

Fixed Costs: Method-related charges for work carried out without consideration of time or quantities.

Value-related Charge: A charge that is directly proportional to the value of the Contract.

### 2.2.4 Other Terms

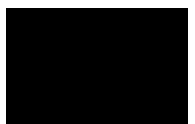
All other terms used in this Specification shall, unless different in context, have the same meaning as assigned to them in the Electricity Act (Act 41 of 1987) or in the Occupational Health and Safety Act and Regulations, or in the appropriate standard specification, or in SABS 0142.

## 2.3 ABBREVIATIONS

For the purposes of this Specification abbreviations shall have the following meanings:

(Note: Wherever any one of these abbreviations is used to identify a document, it shall be deemed to refer to the latest available edition of the document concerned including all amendments issued by the relevant body and published prior to the closing date for tenders.)

|         |   |                                                                   |
|---------|---|-------------------------------------------------------------------|
| BS      | : | British Standard Specification                                    |
| BSI     | : | British Standards Institution                                     |
| CP      | : | Code of Practice of the British Standards Institution             |
| IEC     | : | International Electrotechnical Commission                         |
| ILESA   | : | Institution of Lighting Engineers of SA                           |
| SABS    | : | South African Bureau of Standards                                 |
| SAIEE   | : | South African Institute of Electrical Engineers                   |
| SANCI   | : | South African National Committee on Illumination                  |
| AMEU    | : | Association of Municipal Electricity Undertakings of South Africa |
| CSIR    | : | Council for Scientific and Industrial Research                    |
| OHS Act | : | Occupational Health and Safety Act                                |



**2.4      CONDITIONS OF CONTRACT TAKE PRECEDENCE OVER SPECIFICATIONS**

Nothing that appears in the Specification or Schedule of Quantities, places any restriction on the obligations and responsibilities of the Contractor, the Engineer or the Employer in complying with any conditions of the contract.

**2.5      APPROVAL**

**2.5.1      Requirements to be Maintained**

Approval of any material or plant and its operation, or of any procedure to be used in the installation or construction, will not imply any relaxation of the requirements covering the quality of the materials of construction or of the operation of the completed installation, nor will it relieve the Contractor of his responsibilities under the contract in any way whatsoever.

**2.5.2      Engineer's Approval**

The Engineer's approval shall be obtained for each of the construction, erection and installation phases of the contract works. Reasonable notice shall be given by the Contractor to the Engineer as to when each phase of the works will be ready for inspection. The Contractor shall satisfy himself as to the correctness of all electrical connections between plant and apparatus supplied under any other contract before any of the said plant and apparatus are put into operation. Reasonable notice shall be given by the Contractor to the Engineer before any interconnection is energised.

**2.5.3      Supervision by Contractor**

The progress of the contract work shall be supervised throughout by a sufficient number of qualified representatives of the Contractor who have had thorough experience in the erection and operation of plant similar to that to be supplied. No deviation from the general arrangement and technical particulars of the plant and equipment, accepted under this Contract, shall be permitted without prior approval.

**2.6      SPECIFICATION DRAWINGS**

Where reference is made to a drawing number in a standard Specification in lieu of a written requirement, the drawing bearing that number shall be deemed to form part of the Specification.

**2.7      ITEMS IN THE SCHEDULE OF QUANTITIES**

**2.7.1      Scheduled Items**

The rate or price tendered by the Contractor for a particular item in the Schedule of Quantities shall be deemed to cover the Contractor's profit, plus the cost of carrying out the operation or activities stated in the relevant subclause of Clause 8 of the applicable standard specification. The cost to the Contractor of carrying out such ancillary and associated activities as the Contractor deems necessary for the completion of the works in accordance with the Specification and drawings shall also be included.



2.7.2 Scheduled Items in Preliminary and General Section

The Contractor's charges for an item scheduled in the Preliminary and General section of the Schedule of Quantities shall be interpreted to be his rate or price to cover his direct costs, plus overheads, plus profits on the specified item, together with all general risks, liabilities, and obligations set forth or implied in the contract documents on which the tender is based.

3. MATERIAL

3.1 QUALITY

If the Contractor is using materials that are required to comply with a Standard Specification he shall be required, if requested, to furnish the Engineer with certificates proving that the materials do so comply. In addition high voltage equipment shall comply in all respects with the applicable requirements of the local supply authority. Unless otherwise specified, all proprietary equipment and materials shall be operated and installed in strict accordance with the manufacturers' published instructions.

3.2 IDENTIFICATION AND DIAGRAM PLATES

Where practicable, each item of plant shall be provided with a rating plate of brass, stainless steel or other approval material on which the ratings are stamped or embossed. In addition to the markings required in terms of the applicable specification, the following information shall be given:

- The manufacturer's serial or reference number
- The year of manufacture
- Place and country of manufacture

3.3 MANUALS AND SPARE PARTS LISTS

If equipment or material that can be re-used is, in the opinion of the Engineer, unnecessarily damaged, the cost to replace such material or items will be recovered from the Contractor.

All recovered material and equipment will be neatly rolled up, stacked or otherwise packed away. The Contractor must obtain receipts for all material and equipment handed over to the Client and supply the Engineer with copies of such receipts.

3.4 STRUCTURES AND MATERIALS ON SITE

Soil, stone, gravel, sand and all other materials excavated or existing on site, shall not become the property of the Contractor, but will be at his disposal in so far as they are approved for use on the Contract. Existing structures on the site shall remain the property of the Employer and shall not be interfered with by the Contractor in any way, except to the extent as may be stated elsewhere in the contract.

3.5 DEMOLISHING OF EXISTING EQUIPMENT

Where existing installations and equipment need to be demolished, all components, conductors, insulators, poles, cables, switchgear, transformers, etc., shall be removed carefully. All recovered material shall be handed to the Client. Under no circumstances will the Contractor take possession of any material or equipment.



If equipment or material that can be re-used is, in the opinion of the Engineer, unnecessarily damaged, the cost to replace such material or items will be recovered from the Contractor.

All recovered material and equipment will be neatly rolled up, stacked or otherwise packed away. The Contractor must obtain receipts for all material and equipment handed over to the Client and supply the Engineer with copies of such receipts.

### **3.6 FINISHING OF MATERIAL AND EQUIPMENT**

#### **3.6.1 Galvanising of Metal Work**

3.6.1.1 Standard: Where galvanising is required, it will satisfy the requirements of the SABS 763 and be in accordance with this specification. All galvanising shall be by means of the hot dip process.

3.6.1.2 Design of Metal Work: Metal work shall be designed such that hot dip galvanising is possible. All drilling, punching, cutting and bending of metal work shall be performed prior to galvanising. The Galvaniser shall ensure that the above-mentioned requirements are met, with special attention to the suitability of welded seams for galvanising.

3.6.1.3 SABS Mark: Metal work will not be allowed on site without the SABS mark or written approval that the galvanising satisfies the requirements of the applicable SABS standard. The Contractor will be responsible to obtain and submit such approval.

The Engineer reserves the right to obtain the opinion of the SABS with regard to the compliance of any metal work with the relevant SABS standards. All expenses in this regard will be for the Contractor's account.

3.6.1.4 Damage: The Contractor will be fully responsible for any damage to the galvanising during transport, storage and construction. Before construction or painting of metal work any damage must be pointed out to the Engineer. The Engineer may inspect any metal work and, if defective, order the removal thereof, during construction but prior to painting. Galvanised steel work shall not be painted before the Engineer's inspection and approval.

3.6.1.5 Repair of Damage: The Engineer may, at his own discretion, allow minor damage to be repaired on site. These repairs shall be in the form of soldering or hot zinc spraying in accordance with SABS 763.

The Contractor shall furnish spare parts lists, instruction manuals, etc., in triplicate and shall submit for approval two copies of drawings of all switchboards, control panels, etc., before manufacture of these items is commenced.

#### **3.6.2 Hot Metal Anti-corrosive Spraying**

If the physical size of a component, or other factors, make the use of hot dip galvanising impossible an approved hot metal spray finish may be used. Detailed information regarding this process shall be submitted to the Engineer for his approval prior to the process being applied.

All drilling, punching, bending and welding shall be performed prior to coating. Before the coating is applied all metal work shall be thoroughly cleaned by means of sand blasting. Hot metal spray coatings shall be 25% thicker than the specified thickness of the zinc layer of the hot dipped galvanising process.



### 3.6.3 Painting of Galvanised Metal Work

The Contractor shall clearly point out to the Galvaniser which parts are to be painted after galvanising. Where galvanised steel is treated with a passivating coating, the galvanised sections shall be washed and dried before painting. After cleaning, the galvanised sections will be painted as follows:

- One coat calcium plumbate undercoating to SABS 912.
- One coat of undercoating which complies with SABS 681, Type 2.
- Two finishing coats with paint that complies with the requirements of SABS 630, Grade 1.

The final colour of painted metal work will be as approved or specified.

### 3.6.4 Painting of Ungalvanised Metal Work

3.6.4.1 Cleaning: After manufacture, all surfaces will be thoroughly degreased and all rust, dirt, etc., will be removed by sandblasting or pickling in accordance with SABS 064.

3.6.4.2 Undercoat: All metal work including welds, welded seams, etc., shall be painted with one layer of an approved undercoat immediately after cleaning.

The dry film thickness of the undercoat shall be at least 25 microns. A zinc-chromate undercoat that satisfies the requirements of SABS 679, Type 1, will be used.

3.6.4.3 Finishing Coat: Two finishing coats of gloss paint which satisfies the requirements of SABS 630, Grade 1, shall be applied.

The dry film thickness of each finishing coat shall be at least 25 microns. The total paint thickness, including undercoat shall be 75 microns.

In high corrosion areas, such as coastal areas within 50 km of the sea, the total dry film thickness shall be 125 microns.

The measurement of dry film thickness will be carried out according to the SABS method 140 or 141.

### 3.6.5 Painting of Aluminium Surfaces

Surfaces will be cleaned and then painted as follows:

- One coat self-etching undercoat to SABS 723 (Plascon Hi-Sheen or equivalent).
- Two final coats with paint in accordance with SABS 630 Grade 1.

## 4. CONSTRUCTION EQUIPMENT

### 4.1 TRANSPORT AND HANDLING EQUIPMENT

The Contractor shall provide all equipment necessary for offloading from railway trucks or other vehicles, transport to the required position, and for the erection or installation of all plant and equipment.





**4.2      SILENCING OF EQUIPMENT**

The Contractor's attention is drawn to Regulation 7 of the Environmental Regulations of the Occupational Health and Safety Act. When working in built-up areas, the Contractor shall provide and use suitable and effective silencing devices which will reduce noise levels of equipment to a value not exceeding 85 dBA during operation of such equipment. Alternatively, he shall provide barriers to effectively isolate the source of any such noise in order to comply with the said regulation.

**4.3      CONTRACTOR'S OFFICE, STORES AND SERVICES**

The Contractor shall, if required in terms of the relevant standard specification or of the Project Specification, or both, supply and maintain adequate and suitable sheds for the storage of materials. Sheds for the storage of materials that may deteriorate or corrode if exposed to the weather shall be weatherproof, adequately ventilated, and provided with raised floors. Latrine and ablution facilities and first aid services shall comply with the regulations of the local authority concerned and shall be maintained in a clean and sanitary condition to the satisfaction of the Engineer. On completion of the works or as soon as the said facilities are no longer required, the Contractor shall remove the facilities and clear away all indications of their presence.

**4.4      PACKING**

All plant, equipment and materials shall be carefully packed and protected to avoid damage during handling and transportation and to avoid damage or deterioration caused by climatic conditions. All polished and machined surfaces shall be protected from rusting in an approved manner.

When transported by sea, a dehydrating agent shall be provided in each individual package of plant and accessories that may be adversely affected during transportation, i.e. instruments, relays, etc.

The Contractor shall remove all such protective coverings when the plant is erected.

**5.        INSTALLATION**

**5.1        SURVEY**

**5.1.1      Setting out of the Works**

The Engineer will arrange for the placing of pegs (of adequate type and in sufficient quantity) as basic control points appropriate to the nature of the works. The Contractor shall use these points as references to set out positions for bases, plinths and equipment in accordance with the drawings or as specified in the Project Specifications. Co-ordinates of pegs that are positioned by the Engineer and that are likely to be disturbed during construction shall be noted by the Contractor. From the information given on the drawings, the Contractor shall calculate the position or level, or both, of all intermediate points required by him for the proper control of the works. Bench marks may be established on the site by the Engineer to a datum to be given in writing. Since these bench marks may be disturbed during the execution of the works, all levels and setting out pegs shall be referenced to at least two bench marks. Any discrepancy between bench marks shall be referred to the Engineer immediately.

The methods of setting out employed by the Contractor shall be such that they ensure positive control of the line and level of all construction and shall be subject to approval.



5.1.2 Preservation and Replacement of Beacons and Pegs subject to Land Survey Act

The Contractor's attention is drawn to the provisions of Sections 35 and 36 of the Land Survey Act, 1927 (Act 9 of 1927) in terms of which he will be deemed to be responsible for the integrity of all survey beacons, survey bench marks, and plot boundary pegs encountered on the site as well as for all costs incurred during the replacement by a registered Land Surveyor in terms of the said Act, of any such marks or pegs that are moved or damaged in any way.

Before the commencement of construction work in the vicinity of boundaries, the Contractor, under the direction of the Engineer, shall identify plot pegs where boundaries have not been established by the erection of walls or fences (e.g. between two adjacent undeveloped erven, or on an undeveloped corner erf) and the Contractor shall compile a list of such pegs that are apparently in their correct positions. At the completion of the contract, the Contractor shall expose the pegs that were listed at the commencement of the construction and the Engineer will arrange for any such pegs that are missing to be replaced at the Contractor's expense, bearing in mind that the Contractor will not be held responsible for:

- a) pegs that must be removed or buried in accordance with the finished dimensions of any part of the works or of any essential temporary work; and
- b) pegs moved by others who are not under the direct control of the Contractor.

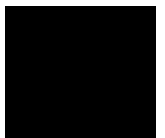
**5.2 EXISTING SERVICES AND STRUCTURES**

5.2.1 Location

The Contractor shall obtain, from all the relevant authorities, information regarding existing underground and overhead services regardless of whether such services have been shown on the construction drawings or not. It will also be the responsibility of the Contractor to obtain the approvals from the relevant authorities for construction work to be carried out at or near these existing services. All existing services not indicated on the construction drawings shall be marked up by the Contractor on the "as installed" drawings.

5.2.2 Positions of Services must be determined in good time

Where no underground services are shown on the drawings or scheduled but the possibility of their presence can reasonably be inferred, the Contractor shall, in collaboration with the Engineer, ascertain whether any such services exist within the relevant section of the site. The Contractor shall complete such an investigation well in advance of commencement of construction work in the relevant section and he shall submit a report in good time to enable the Engineer to make whatever arrangements are necessary for the protection, removal or deviation of the service before any construction work commences. (Attention is drawn to Regulation 13 of the General Safety Regulations of the Occupational Health and Safety Act.)



5.2.3 Protection of Existing Structures and Services

5.2.3.1 Structures: Where work is required to be carried out in the proximity of buildings, bridges, tanks, or other structures, the Contractor shall take all necessary precautions required in terms of the regulations under the Occupational Health and Safety Act (see Regulation 13 of the General Safety Regulations) and the Mines and Works Act, 1956 (Act 27 of 1956), including shoring, where necessary, to ensure the safety of structures that are at risk during installation.

5.2.3.2 Services: The Contractor shall take all necessary measures to protect all known services and will be held responsible for any damage to such services that is caused by his activities. All work and protective measures shall be subject to approval and the protective measures shall be carried out in conjunction with the owner(s) of the respective services.

5.2.4 Procedures when Services are Damaged

In the event of the services being damaged, the Contractor shall immediately notify both the authority concerned and the Engineer. The Contractor shall not repair any such services unless instructed to do so.

As soon as any underground service not shown on the drawings is discovered, it shall be deemed to be a known service and the Contractor will be held responsible for any subsequent damage to it. If such service is damaged during the course of its initial discovery, the cost of making good such damage will be met by the Employer unless it is established that the Contractor did not exercise reasonable care and that the damage was avoidable. Where the authority concerned elects to carry out any alterations or protective measures on its own account, the Contractor shall co-operate with and allow such authority reasonable access and sufficient space and time to carry out the required work. Authorised permanent alterations to or permanent diversion of services that are necessitated by the execution of the works, will be paid for in terms of 8.7(d). No such work which was not previously inspected by the Engineer and for which no proper written instructions were given will be paid for.

5.3 **SAFETY PROCEDURE DURING EXECUTION**

5.3.1 Arranging Power Outages

Any switching, whether energisation or de-energisation, of existing power supplies shall be arranged beforehand with the Electrical Engineer or the Local Supply Authority. All possible preparations shall be carried out timeously to ensure that the duration of power outages is kept to a minimum.

All such switching of equipment will be carried out by the "Competent Person" appointed by the Supply Authority in terms of Regulation 2.(1) of the General Machinery Regulations of the Occupational Health and Safety Act, unless written permission has been granted to the Contractor for such switching by the relevant Competent Person.

All power outages will be scheduled to allow the Local Supply Authority enough time to make alternative arrangements and/or to notify consumers.



5.3.2 Work Permits

5.3.2.1 Law: The Contractor's attention is drawn to Regulation 3 of the Electrical Machinery Regulations of the Occupational Health and Safety Act. The Contractor shall not perform work on any portion of a network until such portion has been isolated and earthed and all possible precautions have been taken to prevent accidental energisation while persons are working thereon.

5.3.2.2 Work Permit: The Contractor shall request a written "Work Permit" from the Competent Person appointed by the Supply Authority, which shall be completed in duplicate and shall contain the following information:

- Description of the point of isolation and the earthing point.
- The name and signature of the person to whom the Work Permit has been issued.
- The time and date of issue of the Permit.
- A statement whereby a portion/portions of the network is/are handed over, with an unambiguous definition of the portion/ portions of the network that will be safe to work on.
- The signature of the above Competent Person.
- The Contractor shall satisfy himself that the portion/portions of the network he intends working on has/have been effectively isolated, properly earthed, clearly defined and has made such portion/portions safe to work on, before he signs and accepts the "Work Permit".

5.3.2.3 Completion: The original "Work Permit" shall be retained by the Contractor until completion of his work on the portion/portions to which the Permit applies. Upon completion of the work on the relevant portion/portions, and after the Contractor has ensured that none of his staff (or Subcontractors) are still working on the relevant portion/portions, the Contractor shall sign a statement to this effect. He shall hand this statement, as well as the used "Work Permit" to the Competent Person, to enable the latter to re-energise the relevant portion/portions of the network.

5.3.2.4 First Energisation: When electrical equipment in any substation is energised for the first time or on any subsequent occasion, such substation shall be deemed to be an existing substation in terms of the above requirements.

5.3.3 Responsible Person

The Contractor shall, when applicable, submit to the Engineer in writing the name(s) of the person(s) who is/are designated in terms of Regulation 11 of the General Safety Regulations or Regulation 2.(1) of the General Machinery Regulations, or both, of the Occupational Health and Safety Act, to supervise the works.

**5.4 OTHER WORK OR REPARATIONS BY THE OWNER OR LOCAL AUTHORITY**

5.4.1 Contractor will give Precedence

The Contractor shall give precedence to repairs, other work or maintenance that are to be carried out by the Local Authority or the owners of other services on the site.



5.4.2 Time Lost due to Other Work

The Contractor shall not be held responsible for delays if other work should hinder him in the execution of his contract. Such time lost will be added to his contract period on condition that he submits a claim to this effect immediately and that the Engineer is satisfied that such other work has in fact delayed the Contract.

Except for the allowance of extra time, the Employer will not be held responsible for any other claim that may arise from the content of this clause.

5.4.3 Repairs effected in absence of the Contractor

In the event of any damage to property that needs immediate attention in the absence of the Contractor or his staff, or if the Contractor fails to effect the required remedial work immediately, such work will be performed by the Local Authority or the Engineer and the cost of such work will be deducted from any outstanding monies due to the Contractor.

**5.5 EQUIPMENT AND FACILITIES OF THE EMPLOYER**

The use or rental of equipment belonging to the Employer for purposes of transport, laying of cables, erection of street lights, etc., shall not be allowed.

The Contractor shall supply all ladders, scaffolding, cable rollers, cable cars, cranes, etc., as required for the execution of the Contract.

**5.6 SITE FACILITIES AND SERVICES**

5.6.1 Access Roads

The Contractor shall at all times ensure safe entry to the site and that traffic has unhindered use of public roads. The Contractor will therefore not dump any spoil or excess material on any public or temporary roads.

5.6.2 Fences

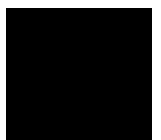
The Contractor will supply proper fences around any site facilities, stores or temporary storage areas. Erection of fences will not exempt the Contractor from his responsibility in the case of theft or damage.

5.6.3 Site Offices

The Contractor shall supply adequate site accommodation to promote the smooth and efficient execution of the Contract.

5.6.4 Toilets and Ablution Facilities

The Contractor shall supply and maintain suitable toilets and ablution facilities at his site. Toilet facilities shall comply with the Health Regulations of the relevant Local Authority.



5.6.5 Water, Electricity and Telephone Services

5.6.5.1 Water: The Contractor must make his own arrangements for drinking water on site. If available, a water supply point will be provided by the Local Authority. The cost of the water supply connection and consumption will be to the account of the Contractor.

5.6.5.2 Electricity: The Contractor shall also make arrangements with the Local Supply Authority if he requires an electricity supply. The cost of the electricity supply connection and consumption will be to the account of the Contractor.

5.6.5.3 Telephone: The Contractor must make his own arrangements should he require telephone facilities on site. If the provision of a telephone in the site office is a specific requirement of the Contract, it will be stated in the Project Specification.

**5.7 DISPOSAL OF REFUSE AND KEEPING SITE TIDY**

The Contractor shall at suitable intervals dispose of all refuse and excess material and keep the construction site in a neat and tidy condition at all times. Temporary dumping areas on site will be cleaned before termination of the Contract.

**5.8 TRANSPORT AND DELIVERY TO SITE OF MATERIAL AND EQUIPMENT**

5.8.1 Contractor's Responsibility

The transport and delivery of all material and equipment to the site will be to the account and at the risk of the Contractor.

5.8.2 Contractor to Ensure Correct Off-loading

The Contractor shall ensure that all material and equipment are off-loaded at the correct places, stores or places of safe keeping.

**5.9 DUST, NOISE AND POLLUTION**

The Contractor shall take all reasonable measures, to the satisfaction of the Engineer, to minimise any dust nuisance, pollution of streams, and inconvenience to or interference with the public (or others) as a result of the execution of the works. Driven machinery will be provided with adequate silencing.

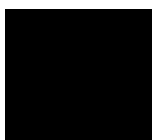
**5.10 WASTE AND EXCESS MATERIAL**

5.10.1 Excavated Material

Excavated material shall be heaped as close as possible to excavations to minimise obstruction to traffic.

5.10.2 Excess Material

The dumping of excess material or spoil must be executed carefully to prevent damage to fences and buildings. Storm water channels shall be kept clean at all times.



5.10.3 Claims due to Flooding

Should any claims arise due to flooding of private or public property and completed civil works as a result of the careless dumping of spoil or excess material, the Contractor shall handle such claims and repair all damage at his own cost.

**5.11 GUARDING, BARRICADING, LIGHTING AND TRAFFIC CROSSINGS**

5.11.1 Occupational Health and Safety Act

The Contractor shall comply with all relevant requirements of the Occupational Health and Safety Act and in particular Regulation 13 of the General Safety Regulations.

5.11.2 Watchman and Night-watchman

The Contractor shall employ sufficient watchmen to ensure that he complies with the Occupational Health and Safety Act.

5.11.3 Traffic

Arrangements for the control of traffic shall be made in conjunction with the local traffic authority. Their requirements as well as any additional requirements of the Road Traffic Ordinance and of the Project Specification, shall be complied with. Road markings, guide-posts, guard-rails and road signs shall be in accordance with the South African Road Traffic Signs Manual.

**5.12 DEALING WITH WATER ON WORKS**

5.12.1 Disposal of Water

The Contractor shall take all reasonable precautions to keep the works dry and in a workable condition. Excess water in excavations must be cleared immediately.

5.12.2 Contractor shall supply all Equipment and Temporary Works

The Contractor shall provide, operate and maintain, in sufficient quantity, such pumping equipment, well-points, pipes and other equipment, and he shall also provide any sumps, furrows, coffer dams, and other temporary works as may be necessary to minimise damage, inconvenience and interference to the works and adjoining property or services.

The cost of dealing with water is not separately measured and the Contractor shall make due allowance for the cost of dealing with water in his tendered rates.

**5.13 PROTECTION OF FAUNA AND FLORA**

5.13.1 Minimum Disturbance to Ecology

The Contractor shall take care to cause the minimum disturbance to the ecology.

5.13.2 Obtaining of Permits

The Contractor shall obtain the required permits if protected species of plants are to be trimmed, removed or relocated.



**5.14 PRIVATE PROPERTY**

**5.14.1 Permission to Enter**

Under no circumstances shall the Contractor enter private property unless he has obtained permission to do so from the legal owner. In all cases the Contractor shall clearly state the nature of the work to be carried out, and the time and duration thereof. If permission is refused and there is no alternative method of executing the work, he will notify the Engineer immediately.

**5.14.2 Gates and Fences**

The Contractor shall take care not to damage any fences enclosing private property. Fences damaged by the Contractor shall be repaired immediately or temporary repairs shall be effected to the extent as may be required to contain any livestock, etc., until permanent repairs can be effected. Gates shall be kept closed at all times.

**5.15 SITE MEETINGS**

The Contractor shall ensure that the works supervisor attends all site meetings. In the case of reticulation contracts in or near major centres, meetings may take place on a weekly basis. In remote areas and where contracts involve only electrical reticulation, meetings will be held monthly.

Any deviations from the above will be stated in the Project Specification. If the Engineer decides that the Contractor's progress warrants more frequent meetings, the works supervisor shall attend these meetings at the Contractor's own cost.

**5.16 CLERK OF WORKS**

In the event of a Clerk of Works being appointed, the Contractor shall ensure that all facilities are made available for the execution of his duties. To prevent interruption of his duties, the Contractor shall liaise with the Clerk of Works on a preprogrammed time basis.

The Clerk of Works shall act solely as an Inspector under guidance of the Engineer and has no authority to exempt the Contractor of any of his duties, or to authorise any work that will result in delays or additional costs to the Contract.

**5.17 DELIVERY TIMES OF MATERIAL**

The Tenderer shall state in his tender, the dispatch and delivery periods quoted by suppliers of equipment and materials that could result in an extension of the contract period.

On a monthly basis, for the duration of the Contract, the Contractor shall submit to the Engineer a report on the delivery status of all materials and equipment.

**5.18 INSPECTIONS, TESTS AND COMMISSIONING (also refer Clause 7)**

**5.18.1 Access**

The Engineer shall be granted access at all reasonable times to the works or the manufacturers' premises as required for inspection or testing of materials, workmanship or performance of equipment specified for the works.





5.18.2 Inspection of Equipment at Manufacturers' Premises

The Contractor shall ensure that all equipment such as switchboards, transformers, mini-substations, kiosks, etc., is inspected and tested at the Manufacturers' premises prior to delivery to site. The Engineer reserves the right to attend or perform such inspections. The Contractor remains responsible for the compliance to specification of all equipment and materials delivered to site and for the rectification of any defects noted during inspections.

5.18.3 Commissioning

On completion of the works or part thereof, as determined by the Engineer, the Contractor shall perform all the specified tests and commission the works.

All settings such as overload and tap switches shall be finally adjusted and locked where applicable, and all packing and temporary protective coverings etc. shall be removed to ensure the proper operation of equipment.

5.18.4 Notice to Engineer

The Contractor shall give the Engineer 14 days notice of any inspection or commissioning to enable himself or his representative to be present at such inspection or commissioning.

5.18.5 Test Equipment

The Contractor shall provide, operate and maintain all test equipment that may be required. Test equipment on site may among other items include the following:

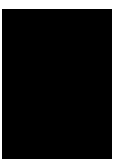
- Phase rotation meter
- Cable pressure tester
- 11 kV phasing probes
- 500 V Megger
- 5 000 V Megger
- Multimeter (Avometer)
- Earthing resistance bridge
- 500 A primary injection test set
- 25 A secondary injection test set

5.18.6 Test Certificates

Test certificates, signed by the Contractor and the concern who performed the tests, shall be submitted in duplicate to the Engineer as specified elsewhere.

5.18.7 Repetition of Tests

In cases where test results are suspect, the Employer may recover from the Contractor any reasonable cost incurred by himself or the Engineer in respect of retesting.



5.18.8 Other Approvals and Tests

The Contractor shall arrange for any statutory or Municipal inspections to be carried out before the final tests and commissioning of the works are approved by the Engineer. Copies of all test and inspection certificates in this regard shall be handed to the Engineer.

5.19 **RAIN DAYS**

The Contractor shall keep on site a record of all rain days. An approved rain gauge will be installed on site and the rainfall figures for the 24 hour period in question shall be recorded for each rain day. Unless otherwise specified or agreed only rainfall equal or greater than 10 mm per period shall be considered a rain day.

5.20 **RECORDS OF STAFF, CONSTRUCTION PLANT AND MATERIAL ON SITE**

The Contractor shall prepare a weekly report which indicates the following:

- Staff on site, numbers according to trades;
- Construction equipment on site, according to type;
- Materials on site, not installed, according to scheduled items;
- Materials installed, according to schedules items.

These records shall be handed to the Engineer on a monthly basis or on request.

5.21 **"AS INSTALLED" DRAWINGS**

5.21.1 General

During the course of the contract, the exact position, situation, depth, type, size, etc., of cables, cable sleeves, joints, poles, substations, kiosks and other equipment shall be carefully noted and marked up on a set of drawings specifically kept for this purpose in the site office.

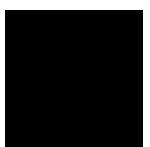
All positions noted shall be related to at least two boundary pegs. On completion of all installation and erection work, the information so recorded shall be transferred to a set of drawings provided by the Engineer. The drawings shall be marked up neatly, using the relevant drawing symbols and in a manner that will enable a tracer to transfer the information to the master drawings.

5.21.2 Cables

The distance from boundaries to each cable is to be indicated at 50 m intervals along the route and at change of direction of cables.

The cable size and type between each joint, substation, kiosk or pole is to be indicated. Where the depth of any cable does not comply with the specified depth, the actual depth must be stated at the specific point or section of the route.

The exact position of all cable joints and the depth below ground must be clearly indicated. The exact position and depth of all sleeves must be accurately indicated, together with the type, size and number at each position.



5.21.3 Overhead Lines

The exact positions of all poles and stays, as well as the number, type and size of conductors between strain points are to be clearly indicated.

5.21.4 Street Lighting and High Mast Lighting

The exact position of each pole or mast, and a legend detailing the type of poles or masts, luminaires, lamps, and lamp wattage together with the manufacturer of each item shall be indicated.

5.21.5 Substations

The exact position of each substation shall be indicated together with a separate legend detailing:

- The location, substation number, type of substation (brick-built or miniature);
- The make, type, model number and ratings of the HV and LV switchgear in the substation;
- The make, kVA rating and HV and LV voltages of transformers in each substation.

5.21.6 Kiosks

The exact position of each kiosk shall be indicated together with separate legend detailing:

- The location, kiosk number, manufacturer and type of material (e.g. 3CR12, steel, glass fibre, etc.);
- The make, type, model number and rating of the LV switchgear in each kiosk.

5.21.7 Retention Reduction

It should be noted that retention monies will not be reduced nor will a hand-over certificate be issued until all "as built" drawings and information have been submitted and accepted as complete.

**5.22 PROJECT BOARD**

5.22.1 Type

The Contractor shall supply and install a project board within two months of award of Tender. The board shall be 2,805 m x 1,87 m in size, and is to be in accordance with the drawings and detail as per the circular, reference 24/63, of the South African Association of Consulting Engineers (attached as Appendix C to SSA). The exact wording of the Project Board shall be given in the Project Specification or alternatively advised by the Engineer after the award of the Tender. If the Contractor fails to erect this project board within the prescribed period, the Engineer shall arrange for the board to be supplied and erected to the account of the Contractor.



5.22.2 Installation

The board shall be mounted on a frame of at least 38 mm diameter tubular steel, braced and stayed with similar tubular steel and firmly anchored into the ground. The bottom edge of the board shall be approximately 1,8 m above ground level. The position of the board will be indicated in the Project Specification or by the Engineer after the award of the Tender. The sum tendered shall include allowance for maintaining the board in good condition throughout the course of the contract and subsequent removal after expiry of the guarantee period.

6. **TOLERANCES**

6.1 **METHODS OF SPECIFYING**

Tolerances are specified by means of permissible deviations (PD) from the designated line or level or standards, as may be applicable.

6.2 **DEGREES OF ACCURACY**

The Contractor shall install each of the various parts of the works to the degree of accuracy given in the applicable Standard Specifications or where the degree of accuracy is not given in the said Standard Specifications, to the degree of accuracy specified in the Project Specification or shown on the drawings. The degree of accuracy may be one of the following:

6.2.1 Degree of Accuracy III

Degree of Accuracy III for use where a high degree of accuracy is unnecessary, e.g. siting of transmission lines (under or above ground).

6.2.2 Degree of Accuracy II

Degree of Accuracy II for what is commonly called "good work", e.g. structures such as substations.

6.2.3 Degree of Accuracy I

Degree of Accuracy I where the use of special (as opposed to normal) methods or materials (or both) is warranted despite the probability of higher costs than will be incurred by the application of Degree of Accuracy II.

6.2.4 General Use

Except where another degree of accuracy is specified, Degree of Accuracy II shall apply throughout.

7. **TESTING**

7.1 **APPROVED LABORATORIES**

Unless otherwise specified elsewhere in the Contract, only the testing laboratories of the SABS, the CSIR, and the relevant Government Departments and Local Authorities will be accepted as approved laboratories in which test or design work required in terms of a specification may be carried out.



**7.2      METHODS OF TESTING**

Unless otherwise specified in the Contract, all testing shall be carried out and the results interpreted in strict accordance with the methods given in the relevant SABS, IEC or BSI Specification(s).

**7.3      FACTORY TESTS**

The Contractor shall ensure that tests in accordance with the requirements of the applicable SABS, IEC or BSI standards have been carried out. The Contractor shall furnish the Engineer with a test certificate in respect of each item of plant or material, stating the standard(s) to which the plant or material was manufactured and setting out the results of the tests. If additional tests are necessary to determine whether the plant or material complies with the requirements of the specification, whether under test conditions or in normal service, such tests shall be carried out at the Contractor's expense if so required by the Engineer.

**7.4      TESTS ON SITE**

All site tests shall be carried out in the presence of and to the satisfaction of the Engineer and at such times as the Engineer may reasonably require. The Contractor shall provide all the relevant test equipment and bear the costs of all such tests.

**7.5      STATISTICAL ANALYSIS OF TEST RESULTS**

Unless otherwise specified elsewhere in the Contract, test results shall be analyzed by statistical methods wherever such methods are practicable and enough suitable test results are available.

**8.        MEASUREMENT AND PAYMENT**

**8.1        MEASUREMENT**

**8.1.1      Method of Measurement, All Sections**

Except where otherwise specified in the Project Specification, all items in the Schedule shall be measured and shall cover the relevant operations stated in Clause 8 of the applicable Standard Specification.

**8.1.2      Preliminary and General Section**

**8.1.2.1      Content:** A Preliminary and General item or section of the Schedule of Quantities is provided to cover the Contractor's charges for compliance with the requirements of the General and Special Conditions of Contract and of this Specification, as well as his charges for the provision, maintenance, and removal of his site establishment and for the provision of such Engineer's offices and facilities as are specified or required in terms of the Project Specification.

Provisions will be made in the Schedule for lump sums to cover the cost to the Contractor of supplying, commissioning, maintaining, and eventually dismantling and removing equipment, tools, and accessories and for complying with any other obligations of a Preliminary and General nature in terms of the Contract. The same section of the Schedule may include items to cover prime cost items, provisional sums, daywork, and temporary works.

Dayworks are defined as work which cannot be measured or valued in the normal way.



- 8.1.2.2 Tendered Sums: The sum tendered in the Schedule for any Preliminary and General item shall cover:
- a) The Contractor's direct and overhead costs, profit and all other costs for the provision of the item; or
  - b) The cost of complying with the obligations, liabilities, risks and requirements associated with such item; or
  - c) The costs referred to in both (a) and (b) above.
- 8.1.2.3 Contractor to Price all Items: The Contractor shall price all the items scheduled in the Preliminary and General and Site Establishment section of the Schedule of Quantities. These items and prices will form the sole basis for cost evaluation in the settlement of any claim for additional costs in respect of the Preliminary and General and Site Establishment section. In the absence of a price against any item, no claim in respect of additional costs or charges for provision of any of the duties, services, facilities, or obligations required in respect of that item will be considered.
- 8.1.2.4 Tendered Rates to Prevail: The prices of all items in the Schedule of Quantities shall be extended in accordance with the rates tendered. Where there is a difference between the amount tendered and the amount derived from the extended rates and quantities, the unit rate(s), except where otherwise specified in the Project Specification, shall prevail.

## **8.2 PAYMENT**

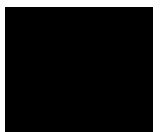
### **8.2.1 General**

The granting of any payment shall not absolve the Contractor from liability in respect of latent defects in workmanship and materials.

### **8.2.2 Time-Related Items**

Payment for time-related items will, subject to the provisions of 8.2.4, be effected as follows:

- 8.2.2.1 Contractual Requirements, Operation and Maintenance of Facilities: For contractual requirements (see 8.3.1), operation and maintenance of facilities on site and, after payment for the relevant fixed-charge item has been made in terms of 8.3.1 and 8.3.2, incremental amounts (calculated by the division of the sums remaining of the tendered sums by the number of months estimated by the Engineer to be required to complete the work then remaining) will be paid in terms of each of the subsequent progress certificates until the sums tendered have been paid.
- 8.2.2.2 Supervision, Company and Head-office Overhead Costs: For supervision, company and head-office overhead costs and other obligations and after all the obligations provided for in 8.3.1 and 8.3.2 have been discharged, incremental amounts (calculated by the division of the sum remaining of the tendered sums by the number of months required for completion, as estimated by the Engineer) will be paid in terms of each of the subsequent progress certificates until the sums tendered have been paid.



8.2.3 Fixed-Charge and Value-Related Items

The sum tendered for each fixed-charge and value-related item will be paid in one single payment, in terms of the first progress certificate issued after the Contractor's obligations have, in the opinion of the Engineer, been discharged as far as that item is concerned.

8.2.4 Contract Price Adjustment with respect to Preliminary and General Amounts

The payment of amounts tendered in respect of all Preliminary and General and Establishment items shall be subject to cost adjustment applied in accordance with the Conditions of Contract subject to the limitations implied in 8.2.5.2.

8.2.5 Withholding of Payment for Time-Related Items

8.2.5.1 Failure of Contractor: Should the Contractor fail to continue to provide all or part of the services, or to meet all or part of the obligations and liabilities required of him in a particular period in respect of any time-related item, payment of all or part of the relevant incremental amount for that item may be withheld until the required service has been discharged or the required obligation or liability has been met.

8.2.5.2 Cost Adjustment Factor: When a payment or portion of a payment, which has been withheld in consequence of the provisions of 8.2.5.1, is subsequently made, the cost adjustment factor to be applied to the delayed payment will be that factor which would have applied if the payment had not been withheld.

8.2.5.3 Omission of Payment: Should the Contractor fail entirely to provide all or part of the continuing services or to meet all or part of the obligations and liabilities required of him in respect of a time-related item, the amount or part of the amount for the item will be omitted and the total amount of the Contract reduced accordingly.

**8.3 SCHEDULED FIXED-CHARGE AND VALUE-RELATED ITEMS**

8.3.1 Contractual Requirements ..... Unit : Item

This sum shall cover the Contractor's initial costs of providing sureties, insurance of the works and plant, third-party or public liability insurance and unemployment insurance to cover his compliance with the requirements of the Workmen's Compensation Act, 1941 (Act 30 of 1941) and any other initial financing obligations of a Preliminary and General nature.

8.3.2 Establishment of Facilities on Site

- a) Offices and storage sheds ..... Unit : Item
- b) Workshops ..... Unit : Item
- c) Laboratories ..... Unit : Item
- d) Living accommodation ..... Unit : Item



- e) Ablution and latrine facilities ..... Unit : Item
- f) Tools and equipment ..... Unit : Item
- g) Water supply, electric power, communications and access ..... Unit : Item
- h) Project board ..... Unit : Item

The sum for each of items (a) to (h) above shall cover the cost of providing, establishing and commissioning on the site these facilities, adequately equipped in the opinion of the Engineer, to allow the work to commence and to proceed to completion as required in terms of the Contract.

#### 8.3.3 Removal of Site Establishment ..... Unit : Item

The sum shall cover the cost of demolishing and removing from the site all items established in terms of 8.3.2, and shall include for making good and restoring the site to the satisfaction of the Engineer.

### 8.4 **SCHEDULED TIME-RELATED ITEMS**

#### 8.4.1 Contractual Requirements ..... Unit : Item

This sum shall cover all the Contractor's time-related costs of providing surety, insurance of the works and plant, third-party or public liability insurance and unemployment insurance, continued compliance with the requirements of the Workmen's Compensation Act, 1941 (Act 30 of 1941), and such items as contributions to apprentice training boards, etc.

#### 8.4.2 Operation and Maintenance of Facilities on Site

- a) Offices and storage sheds ..... Unit : Item
- b) Workshops ..... Unit : Item
- c) Laboratories ..... Unit : Item
- d) Living accommodation ..... Unit : Item
- e) Ablution and latrine facilities ..... Unit : Item
- f) Tools and equipment ..... Unit : Item
- g) Water supply, electric power, communications and access ..... Unit : Item
- h) Project board ..... Unit : Item

The sums for items (a) to (h) above shall cover the Contractor's costs for site rentals, repairs to and depreciation of buildings, furniture, tools and equipment, the storage and distribution of fuels and lubricants, charges for water, electricity, communications, access and sanitation, and wages of staff operating and maintaining these facilities in accordance with the Contract.





8.4.3 Supervision ..... Unit : Item

This sum shall cover the costs of on-site supervision and such local administration as the Contractor considers necessary for the proper completion of the works, and shall include the salaries, wages, and allowances paid to any of the following:

Site Agent, General Foreman, Section Foreman (where applicable), Site Surveyors, Timekeepers, Assistants, and other site supervisory staff and, if on-site transport is required, the cost incurred in connection with such transport for the staff referred to above.

8.4.4 Company and Head Office Overhead Costs ..... Unit : Item

This sum shall cover the Contractor's company and head office overhead costs.

8.4.5 Other Obligations ..... Unit : Item

This sum shall cover the cost of all other obligations that are required for the proper execution of the works in accordance and compliance with the requirements of this Specification and the Conditions of Contract and that are not specifically covered in 8.4.1 to 8.4.4 (inclusive).

**8.5 PROVISIONAL SUMS AND PRIME COST ITEMS**

8.5.1 Provisional Sums (See 8.1.2.1)

- a) Provisional sums for work neither specified nor scheduled in detail ..... R.....
- b) Charges and profits on (a) .....% ..... R.....
- c) Specified activities (if any) associated with (a) above: Sum ..... R.....

The Engineer will state in the Schedule the amount he requires in order to complete the activity, operation, or service named in (a) above and specified more fully, if practicable, in the Project Specification. The rate for (b) above shall cover the Contractor's charges for profit and overheads on the amount stated for (a). The sum or rate for (c) above, if any, shall cover the cost of such operations associated with (a) above as are required of the Contractor and are specified fully in the Project Specification.

8.5.2 Prime Cost Items (see 8.1.2.1)

- a) Prime cost of goods or materials to be supplied ..... R.....
- b) Labour, transportation, profit, establishment, and other charges on (a) .....% ..... R.....



The Engineer will state in the Schedule the amount he requires for (a) above. The rate for (b) above shall cover the cost to the Contractor of taking delivery, handling, transporting, and everything else required in terms of the Project Specification for the relevant goods or materials, in addition to the Contractor's charges for profit and overheads.

**8.6 DAYWORK (see 8.1.2.1)**

The Engineer may schedule and request unit rates for estimated numbers of hours of daywork for various classes of labour and an amount to cover materials or equipment, or both, likely to be ordered under daywork during the course of the Contract. Alternatively he may schedule and require percentage allowances for labour, materials and equipment only. The unit rates of labour, equipment and materials or the percentage allowances for addition to the nett cost of labour and materials, shall cover all costs including overhead charges and profit, site supervision and site staff, insurances, paid holidays, and use and maintenance of tools and equipment. The rates for equipment shall cover all costs including the cost of operators, consumable stores, fuel and maintenance. The rates or allowances shall cover travelling allowances or travelling costs (transport of men by Contractor's transport or transport hired or paid for by the Contractor), lodging allowances, and any other emoluments and allowances payable to the workmen.

**8.7 TEMPORARY WORKS (see 8.1.2.1)**

Temporary works that may be scheduled include:

- a) Main access road to works (construct and maintain) ..... Unit : Item
- b) Deal with traffic (or accommodation of traffic) ..... Unit : Item
- c) Protection of structure until construction in vicinity is complete ..... Unit : Item
- d) Existing services (see 5.2) ..... Unit : Item

**8.8 RATES OF EXCHANGE, FREIGHT RATES, DUTY AND LANDING CHARGES**

**8.8.1 Documentary Proof Required**

The Contractor shall, when claiming an adjustment, submit documentary proof of rates of exchange, freight rates, duty and landing charges, as relevant, paid by him. In the absence of such proof, no claim by the Contractor for any increase will be considered.

**8.8.2 Differences in Rates, Duties and Charges**

Where there is a difference between any rate, duty or charge referred to in 8.8.1 and upon which the tender is based and the rate, duty or charge ruling on the date of payment, the said difference shall be for the Employer's account, provided that, if any difference is attributable to the Contractor's default or delay, the said difference shall be for the Contractor's account.



**8.9      VALUE ADDED TAX (VAT)**

**8.9.1      All Prices to be Exclusive**

All rates or prices entered in the Schedule of Quantities shall be exclusive of VAT. VAT at the ruling rate shall be added separately to the total in the Summary of the Schedule of Quantities (including the contingency allowance).

**8.9.2      Change of VAT Rate**

Any change to the applicable VAT rate shall be made on the date of the VAT rate change. The original VAT rate shall be applicable to all material or equipment supplied or work completed up to the date of the VAT rate change and the new VAT rate shall be applicable to all additional material or equipment supplied or work completed after the date of the VAT rate change.

**8.9.3      Documentary Proof**

If required by the Engineer the Contractor shall provide documentary proof of VAT paid on material or equipment purchased during the period of the VAT rate change.

**8.10      APPLICATION OF PRICE ADJUSTMENT FORMULA**

The contract price shall be fixed or subject to adjustment in accordance with the price adjustment formula as stated in the Special Conditions of Contract.

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**APPENDIX A**

**APPLICABLE STANDARDS**

Reference is made to the latest issues of the following standards and/or codes of practice:

SABS 0142 Code of Practice for the Wiring of Premises

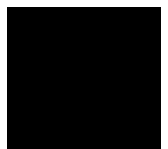
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**APPENDIX B**

**OTHER RELEVANT STANDARDS**

| Subject                                               | Standard/Publication Number |                     |         |
|-------------------------------------------------------|-----------------------------|---------------------|---------|
|                                                       | SABS                        | IEC                 | BS      |
| Transformers - Current                                | -                           | 185                 | 3938    |
| - Power Distribution                                  | 780                         | 76                  | 171     |
| - Voltage                                             | 743                         | 186                 | 3941    |
| Oil filled circuit breakers                           | -                           | 56                  | 5311    |
| Oil (insulating) and dielectrics                      | 555                         | 296                 | 148     |
| Busbars                                               | 1195                        | -                   | -       |
| Busbar trunking systems                               | 784                         | -                   | -       |
| Bushings (high voltage)                               | 1035                        | 137                 | 223     |
| Insulators (glass and ceramic)                        | 117, 1036                   | 233, 305<br>and 383 | 137     |
| Line fittings (OH transmission)                       | 178                         | -                   | -       |
| Isolators/circuit breakers rated above 1 kV           | -                           | 265                 | 5463    |
| Isolators/circuit breakers rated up to 1 kV           | -                           | -                   | 5419    |
| Switchgear and associated apparatus                   | -                           | 298/466             | 162     |
| HV metal clad switchgear                              | -                           | 517                 | -       |
| Lightning arresters                                   | 171                         | 99                  | -       |
| Cables - PVC                                          | 1507                        | 229                 | 6346    |
| Cables - PILC aluminium shielded                      | 97                          | 230                 | 6480    |
| Cables - XLPE                                         | 1339                        | -                   | -       |
| Watt-hour meters                                      | 1607                        | 521                 | 5685    |
| Indicating instruments                                | 1299                        | 51                  | 89      |
| Protective relays                                     | -                           | 255                 | 142     |
| Poles - stays (rods)                                  | -                           | -                   | 16      |
| - stays (wired)                                       | 182: Part V                 | 183                 | 183     |
| Creosoted wood transmission poles                     | 753/754                     | -                   | -       |
| Reinforced concrete transmission poles                | 470                         | -                   | -       |
| Galvanising (hot dip)                                 | 763                         | -                   | 729     |
| Conductors - overhead transmission                    | 182                         | 111                 | 125/215 |
| Cable glands and sealing boxes                        | -                           | -                   | 2562    |
| Colour standards for paint                            | 1091                        | -                   | -       |
| Colour for identification                             | 0140                        | -                   | 381C    |
| Contactors - LV up to 1 kV (AC)                       | 1092                        | -                   | -       |
| Standard voltages and currents for power distribution | -                           | -                   | -       |
| Symbolic safety signs                                 | 1019                        | 38                  | 77      |
|                                                       | 1186                        | -                   | -       |
| Cartridge fuses up to 1 kV                            | -                           | -                   | 88      |
| LV air-break switches and disconnecters               | 152/156                     | -                   | -       |
| Miniature substations                                 | 1029                        | -                   | -       |
| Longitudinal miniature substations (up to 315 kVA)    | 1030                        | -                   | -       |
| Bituminous filling compound                           | -                           | -                   | 1858    |
| Cable terminations                                    | -                           | -                   | 542     |
| Distribution boards                                   | 1180                        | -                   | -       |



# ANNEXURE 2

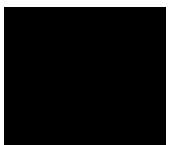
(SSC: Standard Specification - Underground  
Reticulation)



**STANDARD SPECIFICATION**

**SSC - UNDERGROUND NETWORKS**

***(GENERAL REVISION - JANUARY 1996)***

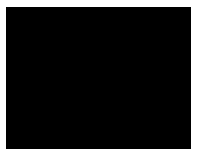


**STANDARD SPECIFICATION**  
**SSC - UNDERGROUND NETWORKS**  
**(GENERAL REVISION - JANUARY 1996)**

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**STANDARD SPECIFICATION**  
**SSC - UNDERGROUND NETWORKS**  
**(GENERAL REVISION - JANUARY 1996)**

1. **SCOPE**

This Specification covers the material and installation requirements for both underground high and low voltage reticulation networks in new or existing townships or industrial areas. This specification also covers the supply and installation of meter kiosks, switching boxes and distribution kiosks and underground service connections and street and area light cable.

2. **INTERPRETATION**

2.1 **SUPPORTING SPECIFICATIONS**

Where this specification is required for a contract document, the following specifications shall form part of the contract document:

2.1.1 Project Specification

2.1.2 SSA - General

In addition the following specifications may be required:

2.1.3 SSB - Substations

2.1.4 SSD - Overhead Networks

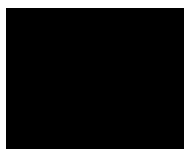
2.1.5 SSE - Excavations

2.1.6 SSG - Earthing

2.2 **APPLICABLE STANDARDS**

Reference is made to the latest issues of the following Standards:

|           |                                                                                                                     |
|-----------|---------------------------------------------------------------------------------------------------------------------|
| SABS 97   | Impregnated Paper-insulated Electric Cables                                                                         |
| SABS 141  | Glass-reinforced Polyester (GRP) Laminated Products                                                                 |
| SABS 1507 | Polyvinyl Chloride (PVC) Insulated Electric Cables and Flexible Cords                                               |
| SABS 152  | Low Voltage Air-break Switches, Air-break Disconnecters, Air-break Switch Disconnecters, and Fuse Combination Units |
| SABS 156  | Moulded Case Circuit Breakers                                                                                       |



|                 |                                                                                                              |
|-----------------|--------------------------------------------------------------------------------------------------------------|
| SABS 763        | Hot dip (galvanised) Zinc Coatings (other than on continuously zinc coated sheet and wire)                   |
| SABS 1091       | National Colour Standards for Paint                                                                          |
| SABS 1092       | Contactors                                                                                                   |
| SABS 1195       | Busbars                                                                                                      |
| SABS 1299       | Direct-Acting Indicating Electric Measuring Instruments and their Accessories                                |
| SABS 1339       | Cross-linked Polyethylene (XLPE) Insulated Electric Cables<br>(3,8/6,6 kV to 19/33 kV)                       |
| BS 88           | Cartridge Fuses up to 1 kV                                                                                   |
| BS 542          | Cable Terminations                                                                                           |
| BS 1858         | Bituminous Filling Compound                                                                                  |
| BS 2562         | Cable Glands and Sealing Boxes                                                                               |
| BS 3938         | Current Transformers                                                                                         |
| BS 5685         | Watt-hour Meters                                                                                             |
| SABS Method 540 | Voltage Test for Power Cables After Laying and Jointing or Installation                                      |
| TELKOM SA LTD   | Specification 325-0: Civil Engineering Works associated with the Installation of Underground Telephone Plant |
| VDE 0278        | Heat Shrink Material                                                                                         |

## 2.3 DEFINITIONS

The definition of certain words or terms used in this specification:

Ambient Temperature: The air temperature 400 mm above ground or above the bottom of a trench, as applicable.

Belted Cable: A multicore cable in which part of the insulation is applied to each conductor individually and the remainder over the assembled cores.

Cable: A length of core (or of two or more cores assembled together) that may or may not be provided with an overall mechanical cover.

Control Cable (Pilot Cable): A cable normally used for measuring or protection or communication circuits or for all of these.

Core: A single insulated conductor without protective covering.

High Voltage (HV): A voltage of rms value greater than 1 000 V.

Low Voltage (LV): A voltage of rms value 1 000 Volt or less.



Mass Impregnated Non-Draining Cable (MIND): A cable from which the surplus impregnate, because it is non-migratory at the maximum operating conductor temperature of the cable, has not been removed during processing.

Meter Kiosks (MK) or Distribution Kiosks (DK): A switch box for LV service connections between the reticulation system and domestic consumers supply points (meter kiosk) or bulk supply points (distribution kiosk).

Phase Sequence: The sequence in which the phase voltages of a polyphase system reach their maximum values.

Screened Cable: A cable in which each core is separately enclosed in a conducting layer in order to ensure that a radial electric field surrounds the conductor when the conductor is energised.

Thermal Resistivity: The resistance to the flow of heat across a dielectric  
(Unit : m.K/W).

## 2.4 **ABBREVIATIONS**

|      |   |                                     |
|------|---|-------------------------------------|
| Al   | : | Aluminium                           |
| csa  | : | Cross-sectional area                |
| DK   | : | Distribution Kiosk                  |
| HV   | : | High Voltage                        |
| LV   | : | Low Voltage                         |
| MIND | : | Mass impregnated non-draining Cable |
| MK   | : | Meter Kiosk                         |
| PI   | : | Plasticity Index                    |
| PME  | : | Protective Multiple Earthing        |
| PVC  | : | Polyvinyl Chloride                  |
| XLPE | : | Cross-linked polyethylene           |

## 3. **MATERIALS**

### 3.1 **CABLES**

#### 3.1.1 High Voltage Paper Insulated Cables

3.1.1.1 Specification: HV paper insulated cables shall comply with the requirements of SABS 97 and the Project Specification.



3.1.1.2 Identification: The following code letters shall be used to identify the type of cable.

Code Letters    Component

|   |                                      |
|---|--------------------------------------|
| P | Impregnated Paper Dielectric         |
| L | Lead Sheath                          |
| B | Lead-Alloy B Sheath                  |
| E | Lead-Alloy E Sheath                  |
| S | Fibrous Helical Bedding or Serving   |
| X | Fibrous Braided Serving              |
| T | Double Steel Tape Armour (DSTA)      |
| W | Single Wire Armour (SWA)             |
| D | Double Wire Armour (DWA)             |
| C | Anti-corrosion Bedding or Oversheath |

3.1.2 High Voltage Cross-Linked Polyethylene Cables

HV cross-linked polyethylene cables shall comply with the requirements of SABS 1339 and the Project Specification.

3.1.3 Low Voltage Cables

3.1.3.1 Specification: LV cables shall comply to the requirements of SABS 1507 and the Project Specification.

3.1.3.2 Identification: The following code letters shall be used to identify the type of cable:

Code Letters

Component

|              |                                              |
|--------------|----------------------------------------------|
| PVC          | PVC Dielectric                               |
| PVC          | PVC Sheath or Extruded Bedding               |
| PVCT         | PVC Tape Bedding                             |
| SWA          | Single Wire Armour                           |
| ECC/SWA      | Earth Continuity Conductor in Armour         |
| N, NE or ECC | Concentric Neutral or Earth Conductor        |
| PVC          | PVC Outer Sheath                             |
| G/Y          | Where a supplementary earth core is included |

3.2 **PLASTIC WARNING TAPE**

Plastic warning tape shall consist of a strip of polyethylene of thickness of 150 microns and 300 mm wide. The following shall be printed in black on an orange background at intervals not exceeding 1 m. Printing shall be of good durable quality.

"Danger"/"Gevaar"/"Ingozi"

Electrical Flash in accordance with the Occupational Health and Safety Act



### **3.3 CONCRETE PROTECTIVE SLABS**

Unless otherwise required in the Project Specification, concrete protective slabs shall comply to the following requirements:

Nominal dimensions:

Length : 600 mm

Width : 230 mm

Thickness : 50 mm

Slabs having different dimensions may also be used, subject to the written approval of the Engineer.

The slabs shall be constructed of 20 MPa concrete and each slab shall have one longitudinal and three transverse mild steel reinforcing rods of nominal diameter 8 mm.

The one end of the slab shall be rounded and the other concave, so that consecutive slabs can fit together around bends.

### **3.4 CABLE ROUTE MARKERS**

#### **3.4.1 Shape and Dimensions**

Cable route markers shall be pyramid shaped. The markers shall be approximately 450 mm high, with base 250 x 250 mm and top 150 x 150 mm.

#### **3.4.2 Marker Plate and Lettering**

An aluminium or lead plate shall be cast in at the top of the cable marker into which the appropriate lettering, approximately 10 mm high, shall be punched. In addition, arrows indicating the cable route direction or change in direction, shall also be punched onto the marking plate, where applicable.

### **3.5 CABLE JOINTS**

#### **3.5.1 HV Cable Joints**

- 3.5.1.1 Cast Iron through Joint: Paper insulated cables shall be jointed with a standard underground cast iron through joint similar to Abdare No's 1001, 1002 or 1003. The joint kit shall consist of a split cast iron casing, a seamless lead sleeve, spacers, cotton and paper tapes, filler plugs, clamps, etc. Special care shall be taken when tinning and sweating on ferrules on stranded conductors that the correct fluxides and solders for copper or aluminium conductors are used as recommended by the cable manufacturers. The filling compound shall be non-hygroscopic with high dielectric strength and isolation resistance qualities similar to AEI No 57016 and shall conform to the requirements of BS 1858.



3.5.1.2 Heat Shrink through Joint: XLPE cables shall be joined with heat shrink joints. The material shall conform to the requirements of VDE 0278. The electrical continuity of the conductors, shields and armouring shall in no way be affected by the joint. Bonding of the earth continuity conductor shall be internal to the joint. No external joining of the earth continuity conductor, which may be subject to corrosion, shall be permitted. The complete joint shall be covered with a waterproof jacket as protection against corrosion.

3.5.1.3 Insulation of HV Cable Joints

Where cast iron joint boxes are used with PVC served cables these joint boxes have to be insulated from earth by positioning the entire joint in a length of PVC pipe of suitable diameter and filling the whole assembly with compound after providing seals between the PVC pipe ends and the cable on either side of the joint. Other methods of insulating the joints may be employed by the Contractor, but he shall submit full details of his proposed method to the Engineer for approval before proceeding with same.

3.5.2 LV Cable Joints

LV Cable joints shall be of the epoxy resin type similar to "Scotch Cast".

**3.6 HV CABLE TERMINATIONS**

3.6.1 Outdoor HV Cable End Boxes

3.6.1.1 Type: HV cable end boxes for outdoor use shall be similar to the inverse cast iron type as supplied by GEC Henley. Cable end boxes shall be supplied complete with armour clamps, wiping glands, pole clamps, etc., and shall conform to the requirements of BS 542.

3.6.1.2 Installation within 50 km from the Coast: Outdoor 11 kV cable end boxes installed in areas 50 km or less from the coast shall be fitted with high pollution insulators with a minimum creepage distance of 600 mm.

3.6.1.3 Installation Further than 50 km from the Coast: 11 kV cable end boxes installed in areas more than 50 km from the coast shall be fitted with insulators with a minimum creepage distance of 450 mm.

3.6.2 Indoor HV Cable End Boxes

HV cable end boxes for indoor use shall comply with the general requirements stated for outdoor cable end boxes and shall be supplied complete with all material and brackets for vertical mounting.

3.6.3 Filling Compound

The mixture for the filling of cable end boxes shall be non-hygroscopic, with high dielectric strength and isolation resistance qualities. The mixture shall comply with the requirements of BS 1858.



3.6.4 HV Heat Shrink Terminations

Terminations shall be supplied in kit form and shall be clearly marked with the type of cable and voltage grade. The material shall be resistant to ultraviolet radiation and shall comply with the requirements of VDE 0278 Parts 1 - 5. Outdoor terminations shall be designed to resist flashover under wet and polluted conditions, and provided with the appropriate number of skirts.

The minimum lengths of stress control tubing and of non-tracking tubing shall comply with the manufacturer's specification and as specified in the Project Specification.

3.7 LV CABLE TERMINATIONS

3.7.1 Cable Glands

3.7.1.1 Type: Cable glands shall be supplied complete with neoprene rubber shrouds. Glands shall be similar to Pratley or Captive Cone Glands. The size and type required shall be in accordance with the type of cable, number of cores and the manufacturer's recommendations.

3.7.1.2 Material: The cable gland shall be manufactured completely of brass. Where glands are to be installed in areas 50 km or closer to the coast, the glands shall be supplied with a brass or stainless steel locknut.

3.7.2 Cable Lugs and Cable Lug Sleeves

3.7.2.1 Cable Lugs: Suitable cable lugs shall be supplied in accordance with the size of the conductor and connection bolt. Cable lugs may be soldered or crimped with a compression tool to stranded copper conductors. Cable lugs for aluminium conductor, solid or stranded, shall in all cases be crimped with a compression tool and hexagonal die.

3.7.2.2 Cable Lug Sleeves: Colour coded neoprene rubber cable lug sleeves shall be installed on all LV cable lugs. The sleeves shall be similar to those supplied by Bowthorpe Hellerman. Colours of sleeves shall correspond to the appropriate phase colour. Alternatively colour coded heat shrink tubing may be used, but PVC insulation tape shall not be accepted.

3.7.3 PVC Cable End Boxes for Termination of Cables at Overhead Lines

No 116 PVC cable end boxes shall be used for cables up to 16 mm<sup>2</sup> x 4 core and No 170 for cables from 25 mm<sup>2</sup> x 4 core up to and including 50 mm<sup>2</sup> x 4 core.

3.7.4 Heat Shrink LV Cable Terminations at Overhead Lines

Cables larger than 50 mm<sup>2</sup> x 4 core shall be terminated with heat shrink terminations at overhead lines. The material used for the termination shall be resistant to ultraviolet radiation. The termination shall be applied strictly in accordance with the manufacturer's instructions and shall seal effectively around the cable cores and cable to prevent water penetration. Heat shrink terminations shall be equivalent or equal to Raychem Thermofit.



3.7.5 Line Taps

Line taps shall be used for the connection of cable cores to the overhead conductors. Bi-metal parallel groove line tapes shall be used when connecting aluminium cables to copper conductor overhead lines or copper cables to aluminium overhead lines. Galvanised line taps shall not be used in areas 50 km or closer to the coast and never on copper conductors.

3.8 **METER KIOSKS (MK's) AND DISTRIBUTION KIOSKS (DK's)**

3.8.1 General

Kiosks shall be equipped in accordance with the Project Specification and the details given on the drawings.

Kiosks shall generally be of the double compartment type, with busbars and distribution equipment mounted in the one compartment and consumer equipment in the other.

The specified equipment shall be mounted on a 19 mm thick varnished blockboard or 10 mm thick "Weatherboard" panel and in the case of double compartment kiosks, this panel shall be supported by a sturdy hot dip galvanised frame. The enclosures of double compartment kiosks shall be removable without disturbing the equipment mounted therein. The bolts securing enclosures shall only be accessible from the inside of kiosks.

"Stubby" type kiosks as manufactured by Aluex, or equivalent shall have the equipment mounted on 2 mm thick, 3CR12 sheet secured at four positions to the shell. The shell need not be removable.

3.8.2 Steel Units

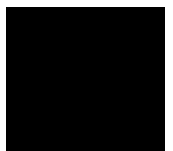
3.8.2.1 Material: The enclosure shall be manufactured of either mild steel plate with a minimum thickness of 3 mm or corrosion resistant steel, like 3CR12, with a minimum thickness of 2 mm. The type of material shall be specified in the Project Specification. 3CR12 units shall be manufactured in accordance with the Middelburg Steel and Alloys "3CR12 Fabrication Guide".

3.8.2.2 Doors and Access Panels: Each kiosk shall be equipped with two doors (back to back) unless otherwise specified. Doors shall be reinforced to ensure a rigid construction. Restraining straps shall be fitted to the doors to prevent them from opening through more than 135°.

"Stubby" kiosks shall be equipped with two sliding panels (back to back) unless otherwise specified. The panels shall be reinforced to ensure rigid construction and the minimum clearance between any live metal and the sliding panels shall be 10 mm. The sliding panels shall move in guide grooves to ensure that the minimum clearance of 10 mm is maintained while the panels are being removed or replaced.

An additional insulating protective panel made of glass-fibre or polycarbonate shall be mounted on the busbar side of stubby kiosks to insulate the busbars from the outer panel.

3.8.2.3 Locking Mechanisms: Doors shall be fitted with strong three point locking mechanisms. The complete assembly, including the handle, shall be manufactured of corrosion resistant material like brass or stainless steel. Handles shall be padlockable. Should patented locking mechanisms be supplied as a standard item, these mechanisms shall be approved by the Engineer and the Employer and shall be manufactured of corrosion resistant material.





- 3.8.2.4 Hinges: Each door shall be fitted with a minimum of two heavy duty hinges. Hinges shall be of the pedestal type and shall be manufactured of brass or stainless steel.
- 3.8.2.5 Ventilation Openings: Ventilation openings shall be provided and designed and placed in such a manner that the entry of insects and water into the kiosk is prevented. It shall also not be possible to push wires through the openings onto any live apparatus inside the kiosk. A good balance should be achieved between the prevention of the ingress of dust and the accumulation of moisture inside the enclosure.
- 3.8.2.6 Treatment and Finishing: All welds on the enclosure shall be grinded to ensure a smooth finish. Each manufactured metal part shall be sand blasted to remove all signs of rust, dirt, oil, grease, etc. and to ensure a clean and dry metal finish. Mild steel enclosures shall then immediately be hot dip galvanised in accordance with SABS 763. Kiosks manufactured of 3CR12 shall be treated and pickled and passivated in accordance with the "3CR12 Steel Fabrication Guide" as published by Middelburg Steel and Alloys.
- 3.8.2.7 Paint Finish: The complete kiosk shall be provided with an approved paint finish. The finish shall be guaranteed against peeling for a period of at least 12 months. The final finish shall be colour C12 (Avocado) in accordance with SABS 1091, unless otherwise specified in the Project Specification or on the drawings. Also refer Clause 3.6.3 of SSA.
- 3.8.3 Glass-Reinforced Polyester (GRP) Units
- 3.8.3.1 Material: Enclosures manufactured of glass-reinforced polyester shall comply with the requirements of SABS 141 and the enclosure manufacturer shall hold the SABS 141 mark.
- 3.8.3.2 Doors: Doors shall be reinforced and be firm and sturdy. Door restraining strap shall be provided to limit the opening angle of doors to 135°. Kiosks shall be provided with two doors each (back to back) unless otherwise specified in the Project Specification or indicated on the drawings.
- 3.8.3.3 Locking Mechanisms: Unless specified otherwise in the Project Specification, locking shall be effected by means of stainless steel or brass hasps and staples.
- 3.8.3.4 Hinges: Each door shall be fitted with a minimum of two heavy duty hinges. Hinges shall be of the pedestal type and shall be manufactured of brass or stainless steel.
- 3.8.3.5 Finish: The final finish of the enclosure shall be smooth and free from air bubbles or hair line cracks. The resin shall incorporate the colour pigment, which shall be colour F48 (light grey) in accordance with SABS 1091, unless indicated otherwise in the Project Specification. The finish shall be weather resistant and UV stabilized.
- 3.8.4 Equipment in Meter- and Distribution Kiosks
- 3.8.4.1 Busbars: The kiosk shall be fitted with 4 copper busbars, one for each phase and one for the neutral. Busbar ratings shall be in accordance with the Project Specification but with a minimum cross-sectional area of 100 mm<sup>2</sup> and suitable for a fault level of at least 5 kA unless otherwise specified. Busbars shall be mounted on approved insulators fitted with brass or stainless steel studs, bolts and/or nuts. Cable lugs may not be terminated onto the busbar holding-down bolts.



Busbars shall be pre-drilled to accept the number of consumer connections required on each phase at the particular kiosk. Note that the neutral busbar may have to be longer than the phase busbars in order to accept all the consumer neutral connections. Sufficient space should be allowed in the enclosure to allow the efficient termination and connection of the specified cables onto the busbars or distribution circuit breakers.

- 3.8.4.2 Isolators: Where local isolators are specified, these shall be of the moulded case type. Isolators shall be installed complete with connections to the busbars. The isolator shall be equivalent to Hy-mag type LJ603 or JSN.
- 3.8.4.3 Distribution Circuit Breakers: Circuit breakers shall be of the moulded case type. Circuit breakers shall be installed complete with connections between line terminals of the circuit breakers and the busbars or between the line terminals of the circuit breaker and the line terminals of the local isolator as applicable. Circuit breakers shall have a minimum fault level rating of 10 kA, unless otherwise specified. Circuit breakers shall be equivalent to Hy-mag type JSO or LY603. Where aluminium conductor distribution cables are specified, type T2 offset terminals shall be fitted. Flash barriers shall be fitted to the line side of circuit breakers.
- 3.8.4.4 Connections: Colour coded, single core, PVC insulated, stranded copper conductors shall be used for the connections between isolators, circuit breakers and busbars. The rating of the conductors shall be in accordance with the respective circuit breaker but never smaller than 150 A. The appropriate size cable lugs shall be soldered or crimped to the conductors and provided with colour coded cable lug sleeves (refer Clause 3.7.2.2). All connections shall be of the bolted type. Spring washers shall be used on all bolted connections. Bolts, nuts and washers shall be manufactured of brass, stainless steel or phosphor bronze. Connections to switchgear which comes equipped with steel bolts as a standard, shall be treated with a film of corrosion resistant silicon spray, after final tensioning of such connections. Connections shall not cross over one another and a minimum clearance of 10 mm shall be maintained between connections from different phases or the neutral. Connections taken through a 3CR12 backing plate shall be arranged in a trefoil formation and shall be securely held in position. The whole arrangement shall be such as to prevent the build up of heat due to eddy currents.
- 3.8.4.5 Screw Connections: If circuit breakers with screw type connections are specified instead of units with bolted connections, bimetallic pin lugs shall be used for the connection of aluminium conductor cables.
- 3.8.4.6 Spare Spaces: If spare spaces are required for circuit breakers in accordance with the Project Specification or the drawings, adequate space shall be provided on the equipment mounting board or panel for the subsequent installation of such equipment.
- 3.8.4.7 Consumer Circuit Breakers: Connections to domestic consumers shall be protected by means of 5 kA Curve 1 (slow curve) single pole circuit breakers. The circuit breakers shall be equivalent to Hy-mag SX1-G3 with brass terminals unless otherwise specified. The current rating of consumer circuit breakers shall be 80 A unless otherwise specified in the Project Specification or drawings. Small non-domestic consumers shall be supplied by similar 80 A, triple pole, 5 kA curve 1 circuit breakers unless otherwise specified in the Project Specification or drawings.



3.8.4.8 Energy Meters (kWh) for Small Users: Kiosks shall be equipped with kWh meters when called for in the Project Specification or drawings. kWh meters shall comply with the following requirements:

- Meters shall be suitable for either single or three phase operation in 4 wire 50 Hz 400/230 V systems.
- Meter elements shall be of the induction type, and shall be capable of continuously carrying the rated current.
- The registering mechanism shall be of the six digit cyclometer type with the sixth digit indicating tenths of a kilowatt-hour. Dial indicator type meters shall not be accepted.
- The meter shall comply with the requirements of SABS 1607 and be of Class 1 accuracy in accordance with IEC 51.
- The rotor shall be supported by means of magnetic bearings.
- Single phase meters shall be GEC C11B2 or equivalent.
- Three phase meters shall be GEC E43B2 or equivalent.

3.8.4.9 Energy and Maximum Demand Meters for Bulk Consumers: Where called for in the Project Specification or on the drawings, meter kiosks shall be equipped with combined energy/maximum demand meters, complete with a set of current transformers, in accordance with the following requirements:

- Meters shall be suitable for operation in a three phase four wire 50 Hz 400/230 V system.
- Energy metering shall be effected by means of an induction disc in accordance with the requirements as set out under 3.8.4.8 above.
- The maximum demand meters shall be of the thermal type, with analogue indication.
- The maximum demand meters shall have an integration period of 15 minutes unless otherwise specified in the Project Specification.
- Meters shall be connected to a current transformer circuit with a secondary current of 5 A.
- Current transformers shall be of the primary wound or ring type with current ratios as specified and shall comply with the requirements of BS 3988 and IEC 185.
- The complete metering installation including the current transformers shall be of accuracy Class 1 (up to 200 A primary) and 0,5 (200 A to 600 A primary).
- Meters shall be Sangamo CYLP or equivalent.

3.8.4.10 Gland Plates: Gland plates shall be manufactured of 4 mm mild steel. Holes for cable glands, to fit the cables to be connected as listed in the Project Specification or drawings, shall be provided. After cutting of the holes the complete gland plate shall be hot dip galvanised. Gland plates for single core cables shall be manufactured of non-ferrous material like aluminium or brass with a minimum thickness of 4 mm. If Tufnol is used for this purpose, it shall have a minimum thickness of 6 mm. Where a double compartment kiosk is specified, two gland plates shall be supplied, one for the termination of the cables in each of the two compartments. Gland plates made of 3CR12 steel shall be 2 mm thick and shall be manufactured as per the relevant requirements of Clause 3.8.2. The edges of the gland plates shall have a 90° return to provide rigidity and to prevent cables being cut by sharp edges. If specified in the Project Specification, gland plates must be insulated from the metal enclosure of the kiosk and must be provided with a removable link between the gland plate and the neutral bar.



3.8.5 Earthing

3.8.5.1 Earth Bolts: Brass or stainless steel earth bolts shall be provided on the gland plates in each compartment. The earth bolts in double compartment kiosks shall be bonded together, and in the case of steel kiosks, also to the enclosure with 70 mm<sup>2</sup> bare stranded copper, lugged at either end. Earth bolts shall be size M10 (minimum) and secured through gland plates with two brass or stainless steel nuts and washers, with at least 10 mm of thread exposed above the locknut.

3.8.5.2 Earth Connections: The neutral bar shall be bonded to the earth bolts with 70 mm<sup>2</sup> lugged stranded copper conductor. The connections between neutral bars and earth bolts shall be easily removable for purposes of testing.

3.8.6 Notices and Labels

3.8.6.1 Danger Notices: Danger notices of the "electrical flash" type in accordance with the Occupational Health and Safety Act shall be fixed to the doors of metal enclosure kiosks. Danger notices shall be manufactured of durable corrosion resistant material and shall be fixed to the doors with four corrosion resistant pop-rivets.

Danger notices for glass reinforced polyester enclosure kiosks shall be laminated into the doors of the kiosks.

3.8.6.2 Kiosk Identification Label: Each kiosk shall be labelled externally, in the centre, facing the street. Identification shall be in accordance with the Project Specification or the drawings. The label shall be manufactured of 3 mm thick aluminium plate with 40 mm high engraved lettering, filled with black or red paint. The label shall be fixed to the enclosure with corrosion resistant pop-rivets or brass bolts and nuts, peened on the inside to prevent removal.

3.8.6.3 Equipment: All equipment inside the kiosk shall be provided with identification labels. Wording of labels shall be in accordance with the Project Specification or as indicated on the drawings. Labels shall be in white (background) Celeron with 10 mm high black engraved lettering. Labels shall be fixed to equipment with epoxy glue. Double sided adhesive tape is not acceptable.

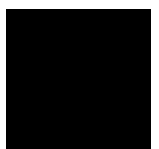
3.8.6.4 Erf Numbers: Engraved Celeron labels indicating erf numbers with 5 mm high black lettering on a white background shall be fitted above all consumer circuit breakers. The erf number labels shall be slightly offset towards the relevant meter side, to prevent them from being obscured by the wiring entering the top of the circuit breaker. The labels shall be fixed by means of two brass screws or epoxy glue. Double sided adhesive tape is not acceptable. In "Stubby" kiosks labels shall be fitted above the circuit breakers with epoxy glue or riveted with corrosion resistant rivets.

Should erf numbers not be available at the time that the kiosks are manufactured, the onus is on the Contractor to request the necessary information from the Engineer and to subsequently fix these labels on site during the contract period at no extra charge to the Employer.

3.8.7 Plinths

3.8.7.1 Concrete Plinths: Concrete plinths may be cast in situ. Plinths shall protrude approximately 150 mm above final ground level and 75 mm beyond the base of kiosks. Protruding edges shall be bevelled downward from the kiosk base so that water cannot accumulate around the base.

3.8.7.2 Fixing Bolts: A minimum of four M12 hot dip galvanised bolts shall be cast into the plinth for fixing of the kiosk.



- 3.8.7.3 Finish: The concrete mix shall have a strength of 20 MPa at 7 days and the plinth shall have a wood float finish.
- 3.8.7.4 Gasket: A strip of wax-impregnated polyurethane foam sealer ("Sondorband" or similar approved) shall be placed between the base of steel kiosks and the concrete plinth. The sealer shall be 20 mm thick and its width shall be the same as the base frame of the kiosk.
- 3.8.7.5 Glass Reinforced Polyester Kiosks: GRP kiosks with roots shall be installed with the root protruding approximately 150 mm above final finished ground level. A concrete layer of 100 x 100 x 100 mm shall be cast around the base of the root where sandy conditions are encountered.
- 3.8.7.6 Root Mounted Steel Kiosks: 3CR12 "Stubby" kiosks with roots shall be installed such that the centre line of the fixed plate shall be level with the final finished ground level unless otherwise specified in the Project Specification.
- 3.8.8 Drawings and Inspections
- 3.8.8.1 Drawings: Drawings indicating the following shall, prior to manufacture, be submitted to the Engineer for his approval.
- a) Dimensioned front and elevation view.
  - b) Dimensioned layout of the compartments showing arrangement of the specified equipment.
  - c) Schematic diagram complete with type and manufacture of equipment.
- Note: Approval of the drawings does not exempt the Contractor in any way of his responsibility to guarantee the soundness and proper functioning of his design.
- 3.8.8.2 Inspections: After approval of the shop drawings, a sample kiosk shall be manufactured. The sample shall be inspected by the Engineer, accompanied by a representative of the Contractor. The Contractor shall ensure that all further kiosks are manufactured in accordance with the approved sample or modified version. The Engineer shall be notified at least 14 days in advance of any inspections to be carried out.

#### **4. CONSTRUCTION EQUIPMENT**

##### **CABLE EQUIPMENT**

The Contractor shall ensure that cables are transported, loaded, off-loaded, installed in cable trenches and pulled through cable ducts in the specified manner. Cable cars, rollers and socks shall be supplied for the installation of cables.

#### **5. INSTALLATION**

##### **5.1 JOINT BAYS**

###### **5.1.1 Dimensions**

Joint bays shall be large enough to enable jointers to carry out their work efficiently and expeditiously. If required, sides of joint bays shall be shored with wood to prevent caving in.



5.1.2 Floor

The floor of the joint bay shall be kept hard and dust free. If concrete floors are not provided the ground directly underneath and next to the joint position shall be removed to approximately 200 mm below the joint. Ditches shall be provided at the edges of the joint bay to divert water away from the bay.

5.1.3 Protection Against Weather

The bay shall be adequately covered with a canvas, supported by a framework, to prevent rain, moisture and dust from entering the bay. The covering shall make provision for adequate ventilation of the bay.

**5.2 TRANSPORTATION AND HANDLING OF CABLES AND CABLE DRUMS**

5.2.1 Transportation of Cable Drums

Cable drums shall under no circumstances be dropped during transportation or unloading. Correctly designed spreaders shall be used when unloading drums with cranes. Cable trailers of adequate carrying capacity and of the appropriate size to handle the intended cable drum shall be used. Cable trailers shall not be overloaded.

5.2.2 Rolling Direction of Cable Drums

Cable drums shall be rolled only in the direction of the arrow displayed on the side of the drum, to prevent the development of loose convolutions of the cable which may cause subsequent damage.

5.2.3 Sealing of Cable Ends

Cable ends left on drums or in trenches shall be sealed against the ingress of moisture and the free end of cable left on a drum shall be secured to the drum.

5.2.4 Unrolling of Cables off Drums

Each cable drum shall be properly mounted on jacks or on a cable trailer having a horizontal support bar that is of adequate size and strength relative to the width and mass of the drum. The drum shall not be allowed to overrun during withdrawal of the cable as this may cause kinks and convolutions. The cable shall enter the trench from the top of the cable drum. The protection cover and the fixing of the inside cable end as well as any securing ties should be removed before unwinding the cable from the drum.

**5.3 INSTALLATION OF CABLES**

5.3.1 Equipment

The Contractor shall ensure that the correct equipment is used during the installation of cables. Cable pulling may be carried out by hand or with the aid of a winch. Cable rollers and skid plates shall be used and shall be securely fixed. A cable stocking shall be used for pulling the cable but an eye attached to the cable cores and sheath may also be used. The maximum tension on a cable during laying operations shall never exceed the value specified by the manufacturer.



### 5.3.2 Bending Radius of Cables

The following bending radii are minimum values and should be exceeded at all times:

|   |                                                                       | Up to and<br>including 11 kV | 22 kV to<br>33 kV |
|---|-----------------------------------------------------------------------|------------------------------|-------------------|
| - | Paper insulated:                                                      |                              |                   |
|   | Single core.....                                                      | 20 x d                       | 25 x d            |
|   | Multicore .....                                                       | 12 x d                       | 15 x d            |
| - | PVC insulated (600/1000 V):                                           |                              |                   |
|   | Up to 16 mm <sup>2</sup> single core .....                            | 4 x d                        |                   |
|   | Multi- and single core 16 to<br>50 mm <sup>2</sup> .....              | 8 x d                        |                   |
|   | Armoured multi- and single core<br>70 mm <sup>2</sup> and above ..... | 10 x d                       |                   |
|   |                                                                       | Up to and<br>including 11 kV | 22 kV to<br>33 kV |
| - | XLPE cables:.....                                                     |                              |                   |
|   | Single core .....                                                     | 25 x d                       |                   |
|   | Multicore .....                                                       | 15 x d                       |                   |

(d = total diameter over outer sheath)

### 5.3.3 Ambient Temperatures during Laying

Unless special arrangements are made to keep the cable temperatures above 10°C in the case of paper insulated, or 0° in the case of PVC insulated cables, for at least 24 hours prior to installation, no cables shall be installed. Cables can be warmed by the judicious use of heaters, fires, or torches around the cable drums underneath a tarpaulin shelter.

### 5.3.4 Spacing Between Cables

Cables shall be spaced in accordance with the typical cable trench cross-sections given in Appendix A of SSE, unless otherwise specified in the Project Specification or on the drawings.

5.3.4.1 HV Cables: Two or more high voltage cables on the same cable route shall be installed at least 300 mm apart measured between the outer sheaths.

5.3.4.2 LV Cables: LV distribution cables shall be spaced at least 100 mm apart in a cable trench, measured between the outer sheaths of the cables.

5.3.4.3 Service Connection and Street Light Cables: No specific spacing requirements shall apply to such cables provided they are not laid directly on top of one another or unduly bunched in the trench.

5.3.4.4 Vertical Spacing: A vertical spacing of 150 mm shall be maintained, measured between the centre lines of successive layers of cables.



#### 5.3.5 Crossing of Telecommunication Cables

Power cables shall be installed minimum 300 mm below telecommunication cables where such power cables are to cross telecommunication cables.

#### 5.3.6 Installation Depths of Cables

Unless otherwise specified in the Project Specification or indicated on the drawings, cables shall be installed in cable trenches at the following depths, measured between the centre of the cable and the final finished ground level, as per Appendix A of SSE (all dimensions in mm):

|                          | HV    | LV  | Service<br>Connections | Lighting | Street |
|--------------------------|-------|-----|------------------------|----------|--------|
| Public Open Spaces ----- | 1 050 | 900 | 750                    |          | 750    |
| Private Property -----   | 1 050 | 900 | 750                    |          | 750    |
| Road Reserves -----      | 900   | 750 | 600                    |          | 600    |

#### 5.3.7 Common Use of Cable Trenches

Unless otherwise specified in the Project Specification or drawings, HV, LV, service connection and street light cables shall be installed in the same cable trench, at the specified depths. The depth of the common cable trench shall be determined by the cable to be installed at the greatest depth (refer SSC 5.3.6) along any given section of the cable route. In cases where backfill material has to be treated or imported, it may be more economical to install service connection and/or street light cables at the same depth as LV distribution cables where the routes of such cables coincide. The onus is on the Contractor to refer such cases to the Engineer for approval and for a ruling on the spacings that shall apply.

### 5.4 PLASTIC WARNING TAPE

#### 5.4.1 Depth

Plastic warning tape shall be installed at 800 mm depth for HV cables and 650 mm depth for LV cables. In common trenches where HV and LV cables are installed in the same trench, but at different levels, plastic warning tape shall be installed at both depths. Plastic warning tape shall not be installed above service connection and/or street light cables unless otherwise specified in the Project Specification or on the drawings.

#### 5.4.2 Number of Tapes

Where the cable trench width exceeds 450 mm and plastic warning tape is required, two or more parallel lengths of tape shall be installed as per the typical trench cross-sections given in Appendix A of SSE.





## 5.5 **INSTALLATION OF CONCRETE PROTECTIVE SLABS**

Concrete protective slabs shall be installed 200 mm above the cables when called for in the Project Specification or drawings. Concrete protective slabs shall always be installed over power cables where power cables cross telecommunication cables for a distance of 1 m on both sides of the crossing.

## 5.6 **NUMBER OF CABLES IN CABLE DUCTS**

Cables shall be installed through ducts as follows:

- HV Cables .....: One per duct
- LV Distribution Cables .....: One per duct
- Service Connection or Street Light Cables .....: Four per duct (maximum)
- Combination of Service Connection.. and Street Light Cables.....: Four per duct (maximum)

## 5.7 **JOINTING OF HV CABLES**

### 5.7.1 **Overlap at Joints**

The ends of successive HV cable lengths shall overlap by approximately 1 m for jointing purposes. Ends of cables shall be protected and sealed against the ingress of dust and moisture prior to jointing.

### 5.7.2 **Cable Jointers**

Only experienced and competent cable jointers shall be employed by the Contractor. If requested by the Engineer, the Contractor shall provide documentary proof that the cable jointers have adequate experience and competence to joint the specific sizes and types of cable.

### 5.7.3 **Through Connection of Conductors**

HV cable cores shall always be joined to cores having corresponding numbers. Cables shall be installed carefully (new drum of cable shall be unrolled from position where previous drum length ended) to ensure that core numbers correspond. Cable end seals may be removed to determine rotation direction of cores but shall be properly resealed after completion of the inspection. Cable cores shall under no circumstances cross one another to achieve corresponding cable core numbers in a joint. The conductors shall be joined together by suitable sweated or compression ferrules.

### 5.7.4 **Joint Method**

The method shall be in accordance with the directions of the supplier of the through joint. Care shall be taken during the jointing of the cable to prevent any dust or moisture entering the joint. Floors and sides of joint bays shall be kept damp to restrict the formation of dust.



5.7.5 Marking of Joint Position

HV through joint positions shall be clearly marked by means of a cable marker installed directly above the joint. The marker plate shall be stamped, clearly indicating the cable size, type and date of jointing. If cables of different sizes are jointed, both cable sizes shall be stamped on the marker plate.

**5.8 JOINTING OF LV CABLES**

5.8.1 Allowance per Cable Length

Only one LV joint shall be permitted per drum length. The installation of a specific cable size shall be planned in advance to avoid unnecessary cable joints.

5.8.2 Overlap at Joints

LV cables shall be installed with at least 500 mm overlap at the point of jointing. Cable ends shall remain sealed until jointing is carried out.

5.8.3 Jointing Method

LV cables shall be joined strictly in accordance with the directions of the supplier of the joint. Cable cores shall be joined to the corresponding phase colours or numbers. Conductors shall be joined with suitable sweated or compression ferrules. The armouring at each end of the joint box shall be bonded with a 70 mm<sup>2</sup> stranded copper conductor.

5.8.4 Marking of Position of Joint

LV cable joint positions shall be marked with a cable marker installed directly above the cable joint. The size (or sizes where cables of different sizes are jointed), type and date of jointing shall be clearly stamped on the cable marker plate.

**5.9 METER KIOSKS (MK) AND DISTRIBUTION KIOSKS (DK)**

5.9.1 Transport, Unloading and Storage

The Contractor shall be responsible for the loading, transport from the place of manufacture, unloading on site, storage, transport and handling on site of meter kiosks and distribution kiosks unless otherwise specified in the Project Specification.

5.9.2 Installation

Kiosks not having roots shall be placed on plinths and bolted down carefully. A gasket in accordance with Subclause 3.8.7.4 shall be placed between the kiosk base frame and the concrete. The edge of the gasket shall be neatly trimmed level with the outside of the base frame of the kiosk. Also refer to Clauses SSC 3.8.7.5 and 3.8.7.6 above for the installation of kiosks with roots.



5.9.3 Sealing of Cable Opening

Once all cables have been installed and the cable opening has been filled with compacted clean dry sand to a level approximately 50 mm from the top edge, the remaining 50 mm shall be filled with a weak sand/ cement (10 : 1) mixture.

5.9.4 Compaction of Surrounding Ground

The bottom of the excavation for the concrete plinth shall be compacted to ensure a firm base. After installation of the plinth, the surrounding ground and backfilling shall be adequately compacted to prevent subsidence. Any such subsidence, whether during the contract or defects liability period, shall immediately be repaired by the Contractor.

5.9.5 Position and Orientation of Kiosks

Positions of kiosks shall be as specified in the Project Specification or on the drawings. Generally the kiosks shall be installed at predetermined distances from boundaries or kerbs. The meter side of kiosks shall always face the street. Single door kiosks shall be placed with the door facing the street.

**5.10 TERMINATION OF HV CABLES**

5.10.1 Cable Terminations at Switchgear, Substations and Transformers

The requirements of Subclause SSB - 5.5.4 shall apply.

5.10.2 Mounting of Pole Terminations

Pole mounted terminations shall be of the cast iron or heat shrink type as specified in the Project Specification. All brackets, bolts, nuts, etc., required for mounting of the cable end to the pole or cross-arm shall be manufactured of corrosion resistant material. The height of the terminations above final finished ground level shall be determined by the other equipment mounted on the pole or poles. These terminations shall, however, never be installed less than 6,5 m above final finish ground level, when measured between the underside of the insulators of cast iron boxes, or from the bottom of the heat shrink sheath, to ground level.

5.10.3 Phasing

Phasing tests shall be carried out before termination and final connection of HV cables. The Contractor shall supply the test equipment and phasing tests shall be done in the presence of the Engineer. Cable core numbers shall, wherever practical, correspond with the standard phase rotation, i.e. core No 1 on Red, 2 on White and 3 on Blue phase. Cable cores shall be so arranged to avoid crossing of the cores inside the cable end box.

5.10.4 Termination

Only qualified personnel shall be employed for the termination and connection of cables. Cables shall be terminated in accordance with the method applicable to the type of cable used and as specified in the Project Specification. All cable terminations shall be pressure tested after completion.



5.10.5 Connections to Other Equipment

The Contractor shall use XLPE insulated (yellow) conductors for connections between cable terminations and fuses, overhead lines, transformers, etc. The conductor type, size and voltage etc. shall comply with the requirements stated in the Project Specification or on the drawings.

5.10.6 Connectors and Protection Against Corrosion

All connections to equipment fitted with bolt type terminal shall be by means of cable lugs. Appropriate line taps shall be used for connections to overhead lines, with two line taps per connection point. Aluminium connections shall be treated with conductive paste similar or equal to Densal paste applied between the current carrying surfaces. A thin layer of paste shall be applied to the surfaces, the surfaces shall then be brushed vigorously with a clean metal brush and thereafter a new layer of paste should be applied. The surfaces may then be bolted together.

5.10.7 Fixing of Cables Against Poles

Cables running up poles shall be installed in 2,3 m long galvanised steel pipes or Class 12 HDPE pipes in accordance with SABS 533 of 1975, as specified in the Project Specification. The pipes shall be installed from 300 mm below ground level to 2 metres above ground level. The pipes and the cables above the pipes shall be strapped to the pole with 19 mm wide stainless steel straps at 600 mm intervals.

5.10.8 Marking of Cables after Termination

Cables shall be marked with approved aluminium, copper or lead labels. The cable size, type and designation shall be clearly and permanently punched on the labels in 5 mm high letters. A typical 95 mm<sup>2</sup> 11 kV copper conductor cable between substations 12 and 13 shall be labelled "95 (Cu) 11 kV - SS12" at substation 13 and "95 (Cu) 11 kV - SS13" at substation 12. Labels shall be installed as close as possible to the underside of glands or terminations in an easily visible position.

**5.11 TERMINATION OF LV CABLES**

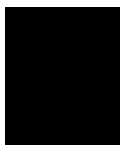
5.11.1 Terminations at Substations and Kiosks

General

LV cables shall be terminated with appropriately sized lugs and cable lug sleeves unless otherwise specified in the Project Specification. Only one cable core shall be allowed per cable lug and a maximum of two cable lugs shall be allowed per bolt or terminal connection. Busbars shall be provided for through connection of more than two cable cores. The correct size cable lugs shall be used and under no circumstances shall strands of stranded conductors be cut off, or solid conductors be filed down to fit lugs. Only cable cores with corresponding phase colours may be connected together, i.e. red on red, etc. Where appropriate current carrying surfaces shall be treated as specified in sub-clause SSC 5.10.6 above.

Glanded Terminations

Glands shall comply with Clause SSC 3.7 and shall be applied in accordance with the manufacturer's recommended methods.



#### "K"-Clamp Terminations

Where specified cadmium plated "K"-clamps of the appropriate size shall be used to terminate cables. If specified in the Project Specification clamps may be applied directly over the outer PVC sheath of the cable. If there is a danger of the clamp damaging the cable, an offcut piece of PVC cable sheath must be placed over the area to be clamped and under the "K"-clamp to protect the cable.

If specified in the Project Specification the outer PVC sheath of the cable may be removed in the area of the "K"-clamp and the clamp shall then be applied directly over the armour wires in order to earth the armour wires via the unistrut bracket.

#### Strapped Terminations

If specified in the Project Specification cables may be secured by using nylon straps ("Nylloc" or similar approved) to strap the cable against a support bar or strut. Two straps must be used for all cables except service connection or street light cables. The straps shall be applied in a crossed-over manner.

#### Earthing of Armour Wires

Except where glands are used earthing of the armour wires shall be done by taking two strands of armour wire and winding them tightly in opposite directions around the remaining armour wires and then binding the ends together. 10% of the remaining armour wires shall be terminated in an appropriately sized lug and shall be terminated onto the earth bar or stud.

Exposed armour wires shall be protected against corrosion by applying a silicon spray or corrosion inhibiting grease to the wires.

#### 5.11.2 Terminations at Overhead Lines

PVC cable end boxes shall be used for the termination of cables up to 50 mm<sup>2</sup> and heat shrink terminations for cables 70 mm<sup>2</sup> and larger. Connection of cable cores to overhead lines shall be done with the appropriate size and type of connector. At strain poles the cable cores shall be connected to the free ends of the overhead conductors or to the jumpers, as applicable. Direct connections to a section of overhead line under tension shall be avoided as far as possible. Cable armouring shall be brought out at cable end boxes or heat shrink terminations and connected to the overhead neutral conductor with the appropriate connector.

#### 5.11.3 Treatment of Connections and Protection Against Corrosion

All aluminium current carrying surfaces shall be treated as per sub-clause SSC.5.10.6 above.

All connections shall be treated with corrosion inhibiting paste similar or equal to Densal paste. Bolts, washers, connectors, etc. shall be manufactured of brass or stainless steel. Terminals of switchgear that cannot be fitted with brass or stainless steel bolts shall be covered with a layer of corrosion resistant silicon spray after final tensioning of the connection.

#### 5.11.4 Fixing of Cables Against Poles

The requirements of Subclause 5.10.7 of this Specification shall apply.

#### 5.11.5 Marking of Cables after Termination

The requirements of Subclause 5.10.8 of this Specification shall apply.



## 6. **TOLERANCES**

Degree of Accuracy II shall apply to all aspects of the works carried out in accordance with this specification, unless otherwise specified in the Project Specification or on the drawings.

## 7. **TESTS**

### 7.1 **PHASE IDENTIFICATION AND ROTATION**

A test shall be conducted on each cable run to determine whether the connections between terminals are correct. Phase rotation on existing systems shall be determined and additions to the existing system shall be of the same phase rotation.

### 7.2 **PHASING**

At HV cable terminations, and also at LV terminations where applicable, cable cores will be phased out prior to connection, not only to prove correct phase identification and rotation, but also that no vector hgroup shift exists between the two systems.

### 7.3 **INSULATION RESISTANCE TESTS ON LV CABLES**

The resistance of the insulation of each core to earth and to each other core shall be determined. This test shall be carried out with a 1 000 V megger.

### 7.4 **PRESSURE TESTS ON HV CABLES**

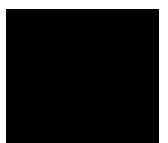
All HV cables (except XLPE insulated cables) of rated voltage up to 22 000 volt shall be tested in accordance with SABS Method 540 at the appropriate voltages given in Table D-1 of SABS 97.

The following table shall be used as reference for 11 kV unearthed and 22 kV earthed cables. Test voltages shall be maintained for 15 minutes. Note that lower test voltages shall be prescribed by the Engineer for cables that have already been in service.

| 7.4.1 <b><u>Paper Insulated Cables:</u></b> |                    | 11 kV           | 11 kV/11 kV   | 11 kV/6,35 kV | 22 kV           |
|---------------------------------------------|--------------------|-----------------|---------------|---------------|-----------------|
|                                             |                    | <u>Screened</u> | <u>Belted</u> | <u>Belted</u> | <u>Screened</u> |
| -                                           | Between Conductors | -               | 30 kV DC      | 30 kV DC      | -               |
|                                             |                    | -               | 20 kV AC      | 20 kV AC      | -               |
| -                                           | Conductor to Earth | 17,5 kV DC      | 30 kV DC      | 17,5 kV DC    | 35 kV DC        |
|                                             |                    | 11,5 kV AC      | 20 kV AC      | 11,5 kV AC    | -               |

### 7.4.2 **XLPE Cable (11 kV):**

Under no circumstances shall DC overvoltage test methods be used during commissioning or fault location. An expert in the field of commissioning and fault location on XLPE insulated cables shall be employed to carry out state of the art testing on XLPE insulated cables.



## 7.5 **TEST CERTIFICATES**

Test certificates shall be completed during and after the tests and handed to the Engineer. Data on test certificates shall include the description of the circuit or cable run together with the following:

- Insulation Resistance (LV Cables)
- Leakage Current (HV Cables)

## 8. **MEASUREMENT AND PAYMENT**

### 8.1 **PRINCIPLES**

#### 8.1.1 **Installation of Cables**

The rate of the installation (or laying) of cables along any route shall cover the cost of handling and placing of the cable in cable trenches, cable ducts or against poles as required, as well as any other cost associated with the laying of the cables.

#### 8.1.2 **Price Adjustment**

The price of material and labour shall be adjusted in accordance with the method(s) or formula(s) given in the Special Conditions of Contract.

### 8.2 **COMPUTATION OF QUANTITIES**

#### 8.2.1 **Cables and Plastic Warning Tape**

The length of cables and plastic warning tape actually used shall be measured along the centre line of the cable trench, cable duct, etc., for the total cable run from end to end.

For tender purposes allowances have been made in the tender quantities for snaking of cables in the trench as well as overlaps at cable joints and terminations:

- Terminations at Substations : HV = 3,0 m  
LV = 2,0 m
- Terminations at Poles .....: HV and LV = 12 m
- Snaking of cables : ..... 3% added
- Joints .....: HV = 2,0 m  
.....: LV = 1,0 m

#### 8.2.2 **Cable Route Markers**

Unless specified otherwise in the Project Specification, cable route markers shall be installed at the following standard positions:

- Above all cable joints
- Above ends of cable ducts
- Change in direction of cable routes
- Every 50 m along a straight section of the cable route



### 8.2.3 Remeasurement of Quantities

All quantities will be remeasured on site and the tender quantities adjusted accordingly. The Contractor shall establish cable lengths, number of kiosks, markers etc. on site before ordering. Deviations from the tendered quantities shall immediately be brought to the Engineer's attention. The Employer will only pay for the material actually installed.

Cables will be measured to the nearest metre. Any excess material will remain the Contractor's property.

## 8.3 SCHEDULED ITEMS

### 8.3.1 Cable Installation

#### 8.3.1.1 Supply, lay and test HV cables .....Unit : m

Cables will be measured linearly in accordance with 8.2.1 and 8.2.3. Separate items will be scheduled for each size and each type of cable laid. The rate shall cover the cost of supplying the cable and the cost of handling, transporting, inspection, laying, pulling through cable ducts, spacing and all other handling during installation, including the cutting and temporary seals on cable ends at joint and termination positions and on drums and testing of cables.

#### 8.3.1.2 Supply, lay and test LV cables .....Unit : m

Same as 8.3.1.1 for LV cables.

#### 8.3.1.3 Supply, lay and test control cables .....Unit : m

Same as 8.3.1.1 for control cables.

#### 8.3.2 Supply and Install Plastic Warning Tape .....Unit : m

Plastic warning tape will be measured linearly in accordance with 8.2.1 and 8.2.3. The rate shall cover the cost of supplying, handling, transportation and laying of plastic warning tape in cable trenches.

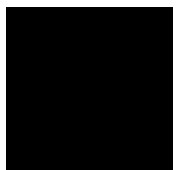
#### 8.3.3 Supply and Install Concrete Protective Slabs over Cables .....Unit : m

Concrete protective slabs will be measured linearly. The rate shall cover the cost of supplying, handling, transportation and installation of concrete protective slabs over cables.

### 8.3.4 Jointing of Cables

#### 8.3.4.1 Jointing of HV cables .....Unit : Number

Separate items will be scheduled for the different sizes and types of cables. The rate shall cover the supply of a complete joint kit, the cost of handling, fitting and cutting the cable, installation and completion of the cable joint as well as the testing of the joint.





8.3.4.2 Jointing of LV cables .....Unit : Number

Same as for 8.3.4.1 but for LV cables.

8.3.5 Meter and Distribution Kiosks

8.3.5.1 Supply and Installation of Meter and Distribution Kiosks .....Unit : Number

Separate items will be scheduled according to the size and type of kiosks. The rate shall cover the supply, transportation, handling and installation of the kiosks in their final positions. The rate shall also include the setting out and construction of concrete plinths or the supply and installation of GRP kiosk roots, as applicable, and additional compaction under and around the kiosks to avoid subsidence, as well as testing of the kiosks.

8.3.5.2 Supply only of additional or omission of existing LV circuit breakers for Meter or Distribution Kiosks .....Unit : Number

Separate items are listed for the various types and ratings of circuit breakers. Note that the rates quoted for kiosks already include for LV circuit breakers as applicable, and that this pay item shall only be applied where additional circuit breakers are to be supplied for kiosks, or where circuit breakers originally specified are to be omitted or replaced by others with different current ratings (Also refer pay items 8.3.5.3 and 8.3.5.4 below).

8.3.5.3 Installation only of LV circuit breakers in Meter or Distribution Kiosks .....Unit : Number

Separate items are listed for the various types and ratings of circuit breakers. The supply of the circuit breakers is covered by pay item 8.3.5.2 above, and this pay item shall cover material and labour for the mounting of the circuit breakers, the provision of front panel cut-outs where necessary, connection of the line side terminals to the busbars, labels and testing of the installation.

8.3.5.4 Removal only of LV circuit breakers from Meter or Distribution Kiosks .....Unit : Number

Separate items are listed for the various types and ratings of circuit breakers. Where a circuit breaker is to be omitted, the Employer will be credited for its value in accordance with pay item 8.3.5.2 above. This pay item shall cover the Contractor's costs for the removal of the circuit breaker and its connections, and the provision of a blanking plate where applicable.

8.3.5.5 Supply and Installation of kWh-meters in Meter Boxes or Kiosks .....Unit : Number

The rate covers the supply, installation and connection of kWh-meters in meter boxes or kiosks as well as the supply and mounting of engraved celeron labels as identification on the meters.

8.3.6 Termination of Cables

8.3.6.1 Termination of HV cables on cable end boxes forming part of equipment supplied and installed elsewhere ..... Unit : number

Separate items will be scheduled per cable size and type of terminations at transformers and switchgear. The rate shall cover the supply of all material for the termination, the cost of handling, fitting, cutting the cable, completion of the cable termination and testing and marking of the termination.



- 8.3.6.2 Termination of HV cables with outdoor pole mounted cable end boxes .....Unit : Number
- Separate items will be scheduled per cable size and type. The rate shall cover the supply of the outdoor end box, all material and clamps, the cost of handling, fitting and cutting cables, completion, testing and marking of the termination as well as the connections between the end box and other equipment by means of XLPE insulated conductor tails.
- 8.3.6.3 Termination of HV cables with indoor wall mounted cable end boxes .....Unit : Number
- Same as 8.3.6.2 for indoor wall mounted cable end boxes.
- 8.3.6.4 Termination of HV cables with heat shrink terminations .....Unit : Number
- Separate items will be scheduled per cable size and type. The rate shall cover the supply of the termination kit, all material, the cost of handling, fitting and cutting cables, completion, testing and marking of the termination as well as connections to other equipment.
- 8.3.6.5 Termination of pilot or control cables .....Unit : Number
- Separate items will be scheduled per cable size and type. The rate shall cover the cost of the supply of the cable glands with shrouds, cable lugs, cable lug sleeves or numbers, handling, fitting, cutting of cables and cable cores, completion of termination, spacing and binding in of cable cores, testing and marking cable.
- 8.3.6.6 Termination of LV cables at substations, boxes and kiosks .....Unit : Number
- Separate items will be listed per cable size and type and includes service connection and street light cables. The rate shall cover the cost of the supply of the cable gland with shroud, cable lugs, cable lug sleeves, handling, fitting, cutting of cable and cable cores, completion of termination, connection of cores, as well as the testing and marking of the cable.
- 8.3.6.7 Termination of LV cables at overhead lines .....Unit : Number
- Separate items will be scheduled per cable size and type (and includes service connection cables) for termination of LV cables at overhead lines with either PVC end caps or heat shrink termination kits in accordance with the requirements of 5.11. The rate shall cover the cost of the supply of the complete termination kit, handling, fitting, cutting of cable and cable cores, completion of termination, connection of cable cores and armouring to the line with the specified connectors, testing and marking of the cable.
- 8.3.6.8 Termination of Street Light Cables at Street Light Poles .....Unit : Number
- Separate items will be scheduled per cable size and type for termination of street light and control cables at street light poles. The rate shall include cable glands and sleeves, cable lugs, connectors, handling, fitting, cutting, making and connection of terminations, testing of the cable.



8.3.6.9 Strapping of cables against poles .....Unit : Number

Separate items will be scheduled per cable size and type and shall include service connection and street light cables. The rate shall be additional to the rates under items 8.3.6.2, 8.3.6.4, 8.3.6.7 and 8.3.6.8 and shall cover the cost of the supply of the protective pipe, its installation over the cable, handling of the cable, and strapping of the cable and protective pipe against the pole with stainless steel straps.

8.3.7 Supply and installation of cable markers .....Unit : Number

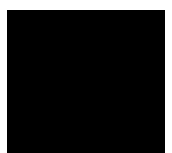
The rate shall cover the cost of the supply, handling and installation of cable markers along the cable routes, at joint position and road crossings, and punching the correct information on the cable marker plates. For service connection cable markers the rate shall include the provision of the specified marker as well as the fixing of the marker to the cable end.

8.3.8 Sealing of cable ends .....Unit : Number

The rate shall cover the cost of sealing the different sizes and types of cable as scheduled. A qualified cable jointer shall fit lead and heat shrink caps on lead covered cables. The cores of LV cables shall be separated and individually isolated before sealing the cable end with a heat shrink cap. This pay item shall only apply where cable ends must be left buried for future use. The temporary sealing of cable ends prior to jointing or termination or on cable drums shall be covered by the rates for the supply and installation of cables.

8.3.9 Supply and Fit Padlocks .....Unit : Number

Separate items are scheduled for each type of padlock. The rate shall cover the supply and fitting of each type of master keyed padlock and stamping of the specified code on locks and keys.



## **ANNEXURE 3**

**(SSE: Standard Specification - Excavations)**



**STANDARD SPECIFICATION**

**SSE - EXCAVATIONS**

***(GENERAL REVISION - JANUARY 1996)***



**STANDARD SPECIFICATION**

**SSE - EXCAVATIONS**

*(GENERAL REVISION - JANUARY 1996)*

**C O N T E N T S**

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## **STANDARD SPECIFICATION**

### **SSE - EXCAVATIONS**

**(GENERAL REVISION - JANUARY 1996)**

#### **1. SCOPE**

This Specification covers excavations for pole holes and for trenches for all types and sizes of cable and cable ducts. It covers the preparation of the trench bottom, backfilling and reinstatement of surfaces.

#### **2. INTERPRETATION**

##### **2.1 SUPPORTING SPECIFICATIONS**

Where this Specification is required for a project, the following Specifications shall, inter alia, form part of the contract document:

2.1.1 Project Specification

2.1.2 SSA - General

In addition the following Specifications may be required:

2.1.3 SSB - Substations

2.1.4 SSC - Underground Networks

2.1.5 SSD - Overhead Networks

2.1.6 SSG - Earthing

##### **2.2 APPLICABLE STANDARDS**

Reference is made to the latest issues of the following standards:

|               |                                                                                                                  |
|---------------|------------------------------------------------------------------------------------------------------------------|
| SABS 308      | Cut-back Bitumen                                                                                                 |
| SABS 309      | Anionic Bitumen Road Emulsions                                                                                   |
| SABS 748      | Road Tar Binders prepared from Coke Oven Crudes                                                                  |
| SABS 749      | Road Tar Binders prepared from Lurgi - Gasification Crudes                                                       |
| SABS 791      | Unplasticized Polyvinyl Chloride (UPVC) Sewer and Drain Pipes and Pipe Fittings                                  |
| SABS 921      | Pitch Impregnated Fibre Pipes, Couplings and Fittings                                                            |
| SABS 966      | Components of Unplasticized Polyvinyl Chloride (PVC) Pressure Pipe Systems                                       |
| SABS 1083     | Aggregates from Natural Sources                                                                                  |
| SABS 1200     | Standardized Specification for Civil Engineering Construction                                                    |
| Telkom SA Ltd | Specification 325 - 0 : Civil Engineering Works Associated with the Installation of Underground Telephone Plant. |





2.3

**DEFINITIONS**

The definitions of certain words or terms used in this Specification:

Thermal Resistivity: The resistance to the flow of heat across a dielectric (Unit: m. k/w).

Backfill (Main Fill): The approved filling material placed in a cable trench after the cable has been laid, bedded and surrounded by the blanket.

Bedding

- a) The material of the bedding cradle and blanket, up to the underside of the backfill.
- b) The operations of placing the bedding in the manner specified.

Blanket

The bedding zone in which material is placed on or from the top of the cradle up the sides and over the top of the cable or duct in such a manner that the cable or duct is protected on the sides and top by a cushion of material.

Cradle

The bedding zone in which material is placed firmly and without voids under and up the sides of the cable or duct in such a manner that the cable or duct is firmly held and protected.

Main Fill (See Backfill)

2.4

**ABBREVIATIONS**

|     |   |                          |
|-----|---|--------------------------|
| CBR | : | California Bearing Ratio |
| PI  | : | Plasticity Index         |

3.

**MATERIALS**

3.1

**CLASSES OF EXCAVATION**

3.1.1

Method of Classification

The Contractor may use the method of his choice to excavate or remove material. His chosen method of excavation will, however, not determine the classification of the excavation. The assessment and classification of excavations will be decided by the Engineer. The classification will be based on the material that has to be excavated and the criteria listed in 3.1.2.1 to 3.1.2.5 (inclusive), as applicable. All equipment specified in 3.1.2.1 to 3.1.2.3 shall be in a good mechanical condition. "Efficiently" as used in 3.1.2.1 to 3.1.2.3 shall mean "in a manner that can reasonably be expected of a Contractor, having regard to the production achieved". The decision of the Engineer, subject to the applicable conditions in the contract, will be final and binding.



3.1.2 Excavation Types

The excavation of material will be classified as follows for measurement and payment purposes:

3.1.2.1 Soft Excavations: Excavations in material that can be efficiently removed and loaded with a mechanical shovel with a flywheel output of approximately 0,10 kW per millimetre width of the shovel bucket, but without the use of pneumatic tools.

The loading of material, excluding prior stacking or breaking up, by means of a rubber wheeled front end loader of approximately 50 kW flywheel output, will also be classified as soft excavation but will not be measured for separate or additional payment.

Where excavation by hand has been specified, soft excavations shall be excavations in material that can be efficiently removed by hand using picks to break up any consolidated material.

3.1.2.2 Intermediate Excavations

Excavations (excluding soft excavations) that must be carried out with a mechanical shovel with a flywheel output in excess of 0,10 kW per millimetre width of the shovel bucket, and including the use of pneumatic tools, but before loading of material as described in Clause 3.1.2.1 above.

Where excavation by hand has been specified, intermediate excavations (excluding soft excavations) shall be excavations that cannot be efficiently carried out using picks and that must be carried out using pneumatic tools.

3.1.2.3 Hard Rock Excavations

Excavations (excluding intermediate and boulder excavations) in material that cannot be efficiently removed without the use of explosives or rock splitting wedges.

3.1.2.4 Boulder Excavations - Class A: Excavations in material which consists of more than 40% by volume of rocks between 0,03 m<sup>3</sup> and 20 m<sup>3</sup> in size in a mixture of soft material and smaller rocks.

**NOTE:**

- Excavation of rocks larger than 20 m<sup>3</sup> will be classified as hard rock excavation.
- Excavations of fissured or fractured rock will not be classified as boulder excavation, but as hard rock or intermediate excavation depending on the type of material.

3.1.2.5 Boulder Excavations - Class B: Excavations in material which consists of less than 40% by volume of rocks between 0,03 m<sup>3</sup> and 20 m<sup>3</sup> in size in a mixture of soft material and smaller rocks and which require individual drilling and blasting in order to be loaded by a mechanical shovel. The excavation of the rest of the material shall be classified as soft or intermediate excavations, according to the nature of the material.



**3.2** **SELECTED GRANULAR MATERIAL**

Shall be material of a granular, non-cohesive nature that is singularly graded between 0.6 mm and 19 mm, is free-draining and has a compactibility factor (as determined by the test given in Sections LD of Part 3 of SABS 0120) not exceeding 0.4 or such other value as is laid down in the Project Specification.

**3.3** **SELECTED FILL MATERIAL FOR BEDDING**

**3.3.1.** **Selection of Fill Material**

Selected fill shall be used to cover cables and ducts and to ensure good bedding. The material shall be soil of a low dry content, shall have a PI not exceeding 6, a thermal resistivity not exceeding 1,2 m K/W. It shall be free from vegetation, lumps and stones of diameter exceeding 15 mm except where other limits are specified in the Project Specification.

**3.3.2** **Supply of Selected Fill Material**

The Contractor is not required to but will be permitted to screen, work or otherwise treat the excavated material in order to produce material suitable for bedding of cables. The Contractor shall take positive steps to avoid bunting or contaminating material which otherwise would be suitable as bedding or main fill.

When suitable material is not readily available from trench excavations for use as bedding material, the Contractor shall obtain suitable material from other excavations on the site or by opening up borrow pits or importing material from commercial or other approved sources or by working the unsuitable material. The Contractor shall, however, not be paid extra for importing suitable material without prior notification and approval of the Engineer. (Refer to Clauses 8.1.2. and 8.3.3.1. of this Specification.)

**3.4** **BACKFILL MATERIAL**

**3.4.1** Except as specified in 3.4.2. below, material excavated from trenches may be used as backfill in all areas, provided only that it contains little or no organic material, that it excludes stone of average dimension exceeding 150 mm, and that it can be placed without significant voids and so compacted as to avoid significant settlement. Material containing more than 10% of rock or hard fragments that are retained on a sieve of nominal aperture size 50 mm, and material containing large clay lumps that do not break up under the action of the compaction equipment being used, will be regarded as unsuitable for use in backfilling.

In areas subject to loads from road traffic and in other areas specified in the Project Specification, backfill shall have a PI not exceeding 12 and a minimum CBR (California Bearing Ratio) of 15% at specified density if the backfill is to be placed in the upper 150 mm of the subgrade, and a minimum CBR of 7% if the backfill is to be placed lower in the subgrade.

Should backfill material not be available from the excavations the Contractor shall obtain backfill material as specified in Sub-Clause 3.3.2. above and 8.3.3.6.



### **3.5 MATERIALS FOR REINSTATEMENT OF ROADS AND PAVED AREAS**

#### **3.5.1. Subbase and Base**

Where trenches cross or run along surfaced roads and paved areas of which the surfaces are scheduled to be reinstated, the Contractor shall obtain prior approval of subbase and base materials that may be required to supplement such materials lost during excavation.

#### **3.5.2. Gravel**

Where trenches cross or run along gravel roads of which the surfaces are scheduled to be reinstated, the Contractor shall, for the purpose of reinstatement, separately store the top 300 mm of material excavated.

#### **3.5.3. Bituminous Construction**

Materials for bituminous construction shall comply with the applicable requirements of the appropriate of the following Specifications:

|                                      |                      |
|--------------------------------------|----------------------|
| Primer .....                         | SABS 748 or SABS 749 |
| Cutback bitumens or emulsions .....  | SABS 308 or SABS 309 |
| Coarse aggregate (stone chips) ..... | SABS 1083            |

#### **3.5.4. Asphalt Carpet**

An asphalt carpet shall consist of either of the following mixes:

- 3.5.4.1. 6.7 mm coarse aggregate (stone chips) ..... 100 parts by mass, plus  
RC 250 cutback bitumen ..... 7 parts by mass of emulsion

or

- 3.5.4.2. 6.7 mm coarse aggregate (stone chips) ..... 100 parts by mass, plus  
premix Grade 60 bitumen emulsion ..... 8 parts by mass of emulsion

### **3.6 CABLES DUCTS**

#### **3.6.1 General**

The type, size, quantity and length of cable ducts required for road-crossings shall be in accordance with the Project Specification or the drawings.

#### **3.6.2 Pitch Fibre Cable Ducts**

Pitch fibre ducts shall be of the thick wall type and shall conform to the requirements of SABS 921. Ducts of diameter 100 mm or 150 mm, as specified, shall be supplied complete with couplings.

#### **3.6.3 PVC Cable Ducts**

PVC cable ducts shall be 110 mm outside diameter as specified and shall be Class 34 (Heavy Ducts) in accordance with SABS 791. Ducts shall be supplied complete with couplings or shall be belled on the one side to facilitate coupling.



3.6.4 Asbestos Cement Ducts

Asbestos cement ducts shall be 100 mm diameter or as specified and shall comply with the requirements of Telkom SA Ltd Specification No. 325-0 (as amended). Ducts shall be supplied with the appropriate couplings.

4. CONSTRUCTION EQUIPMENT

4.1 EXCAVATION EQUIPMENT:

The Contractor may use trenching plant that will excavate to a width such that the side allowance does not exceed the appropriate value specified in 5.2 by more than 50%.

4.2 CONTROL OF WATER

The Contractor shall use appropriate techniques or provide plant such as pumps, well points and sheeting or close timbering for keeping the trenches sufficiently free from water to enable him to lay cables and ducts true to line and level and to bed them soundly, all as specified in this Specification (see Sub-Clause 5.12 of SSA).

4.3 COMPACTION EQUIPMENT

The Contractor may use adequate hand tamping equipment or mechanical compaction equipment but he shall select such equipment and operate it in such a manner that the duct or cable is not stressed or damaged. Machine compaction shall not be used directly above the cable or duct until sufficient backfill has been placed to ensure that machine compaction loads transmitted to the top of the cable or duct are no greater than would be imposed by normal road traffic over a cable or duct with cover of depth 600 mm.

5. EXCAVATIONS

5.1 ROUTE CLEARANCE

5.1.1 Clearing and Pegging of Route and Positions

The Contractor shall mark or peg the cable routes and positions of all kiosks and street furniture indicated on the drawings and shall clear sufficient space for excavations in the areas where kiosks and street furniture occur. All bushes and trees on the proposed route shall be cleared before cables are drawn into position. Unless differently specified in the Project Specification, the width cleared shall be the minimum required for the installation of the cables. Where the cable route follows a servitude or wayleave of specified width, the Contractor shall ensure that the clearing and damage to vegetation is restricted to the said servitude or wayleave.

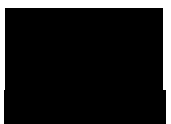
Deviations from the route or positions as indicated on the Engineer's drawings shall be approved by the Engineer before excavations are started.



- 5.1.2      Existing Services and Structures  
Refer Sub-Clause 5.2 of Specification SSA.
- 5.1.3      Safety Procedures during Excavations  
Refer Sub-Clause 5.11 of Specification SSA.
- 5.1.4      Guarding, Barricading, Lighting and Traffic Crossings  
Refer Sub-Clause 5.11 of Specification SSA.
- 5.1.5      Protection of Fauna and Flora  
Refer Sub-Clause 5.13 of Specification SSA.
- 5.1.6      Private Property  
Refer Sub-Clause 5.14 of Specification SSA.

**5.2            EXCAVATION OF CABLE TRENCHES**

- 5.2.1      General  
  
The Contractor shall not install any cables before proper clearance of the route or completion of mass earth works or excavations by others. Final finished ground levels, reference points or bench marks shall be used to determine the depth of excavations.
- 5.2.2      Finish  
  
Cable trenches shall be kept as straight as practical and shall be excavated to the approved and specified depths and dimensions. The bottom of trenches shall have an even contour.
- 5.2.3      Shoring of Excavations  
  
Trench excavations executed near railways, walls, roads, sewers, pipes, structures, etc., where there is a risk of subsidence, shall be shored to prevent possible injury to construction personnel and the public. Shoring shall be carried out to the satisfaction of the Engineer or authorities concerned.
- 5.2.4      Classification of Excavations  
  
Excavations shall be classified as described under SSE 3.1.
- 5.2.5      Protection of Existing Structures and Services  
  
The requirements of Sub-Clause SSA 5.2 shall apply.
- 5.2.6      Guarding, Barricading, Lighting and Traffic Crossings  
  
The requirements of Sub-Clause SSA 5.11 shall apply.



5.2.7 Restrictions

5.2.7.1 Machine Excavations

Mechanical excavation equipment shall be used only in areas where the Contractor has satisfied himself that there are no underground services present. When necessary the records of other authorities shall be referred to prior to any excavations. Excavation work within 2 (two) m of any main underground service shall be done by hand.

5.2.8 Base Width and Depths

Typical cable trench cross-sections are given in Appendix A of SSE.

5.2.8.1 Width

The width of a trench will be determined by the minimum width at its base. This width shall be sufficient for the installation of cables at the spacing specified hereunder, in Appendix A of SSE or in the Project Specification. Each trench shall be excavated such that half of the specified width is on each side of the designated centre line of the cable or group of cables. Standard trench widths of 450 mm, 600 mm and 900 mm in accordance with Appendix A of SSE shall apply unless otherwise specified in the Project Specification or drawings. Standard trench widths are determined by the following considerations:

- Single cable: 450 mm width
- Groups of HV cables: Side of trench 100 mm from outer sheath of outside cables. A minimum horizontal spacing of 300 mm shall be maintained between the outer sheaths of adjacent HV cables.
- Groups of LV Distribution Cables: Side of trench 100 mm from outer sheath of outside cables. A minimum horizontal spacing of 100 mm shall be maintained between the outer sheaths of adjacent LV distribution cables.
- Groups of Service Connection and/or Street Light Cables: No specific spacing requirements shall apply to such cables provided they are not laid directly on top of one another or unduly bunched in the trench.

5.2.8.2 Depth:

Depths of cable trenches are measured from the final finished ground level to the levelled and prepared trench base, before application of the bedding layer. The following trench depths in accordance with Appendix A of SSE shall apply unless otherwise specified in the Project Specification or on the drawings (measurements in mm):

| HV                 | LV | Service | Street | Connections | Lighting |
|--------------------|----|---------|--------|-------------|----------|
| Public open spaces |    |         | 1150   | 1000        | 850      |
| Private property   |    |         | 1150   | 1000        | 850      |
| Road reserves      |    |         | 1150   | 850         | 700      |

Trench depths for multiple layers of cables shall make allowance for a vertical spacing of 150 mm between the centre lines of successive cable layers, as typically illustrated by trench section 3 in Appendix A of SSE.



5.2.9 Distance from Erf Boundaries or Other Beacons

Cable trenches shall be excavated such that the centre lines of trenches are subsequently at the distances from erf boundaries or other beacons as indicated on the road section details on the drawings or specified in the Project Specification.

5.3 **BACKFILLING**

5.3.1 Bedding Layer

A 100 mm uncompacted bedding layer of selected fill material, in accordance with 3.3.1 of this Specification, shall be installed at the base of the trench before the cables are laid. The bedding material shall be evenly spread over the full width of the trench base.

5.3.2 Backfilling after Cable Installation

Selected fill material shall be used to cover cables after laying and correct spacing of the cables on the bedding layer. Selected fill shall be placed in uncompacted layers of 100 mm over the full width of the trench and be compacted with hand tampers until a minimum compacted depth of 250 mm is achieved above the cables. The remainder of the cable trench shall be backfilled in a similar fashion with 150 mm layers of uncompacted backfill material and be compacted level with the surrounding finished ground level. Unless prior approval has been obtained, no filling shall be placed in water. Should the cable trenches subside excessively during the contract or defects liability period, they shall be deemed to be not properly backfilled and compacted. Such subsidences shall be repaired by re-excavation, backfilling and compaction or by the importation and compaction of additional fill material, as directed by the Engineer. The Contractor will not be entitled to any payment for the activities arising from the repair of subsidences along cable trenches.

5.3.3 Compaction

5.3.3.1 Roads: In areas subject to road traffic loads and in any other such area specified in the Project Specification, trenches shall be backfilled in accordance with 5.3.2 above and shall be compacted to 93% of modified AASHTO maximum density in the case of cohesive soil (clay material) or 98% of modified AASHTO maximum density in the case of non-cohesive soil (sandy materials).

5.3.3.2 Machine Compaction: Machine compaction shall not be used until at least 250 mm of hand compacted fill has been placed above the cables or cable ducts. Machine compaction shall be such that loads transmitted to the cables or ducts are not greater than would be imposed by normal pedestrian or light traffic when the depth of cover is at least 600 mm.

5.3.3.3 Areas not Subject to Road Traffic Loads

In areas not subject to road traffic loads, trenches shall be backfilled in accordance with 5.3.2 above and be compacted to the highest compaction level of the undisturbed surrounding soil or to 90% of modified AASHTO maximum density.





5.3.3.4 Compaction Tests

The Engineer may request that the Contractor arranges for independent compaction tests to be carried out at positions indicated by him. These tests are to be carried out by a Civil Engineering Laboratory and test certificates shall be handed to the Engineer within 5 days of his request.

5.3.4 Cables at Different Depths

Where cables are installed at different depths in the same trench, the procedure for the backfilling and compaction for all cable layers shall be in accordance with 5.3.1, 5.3.2 and 5.3.3 above.

5.3.5 Disposal of Surplus Material

Excavation material from the trench that has become surplus because of bulking, displacement by cables, etc. and importation, shall be disposed of along the trench route within a distance of 0,5 km, or the freehaul distance (whichever is the greater) from the source of such excavation material unless otherwise required in terms of the Project Specification.

5.3.6 Disposal of Intermediate and Hard Rock Material

Where the quantity of intermediate or hard rock material exceeds that which the Engineer allows to be incorporated in the backfill, the surplus shall be disposed of as specified in 5.3.5 or removed to designated sites.

5.3.7 Deficiency of Backfill Material

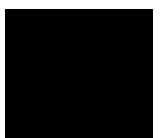
Any deficiency of backfill material from trench excavations because of the removal of excessive quantities of organic material or clay (see 3.4), unsuitable parts of the trench bottom, or excessive quantities of intermediate or hard rock material (see 5.3.6), shall be made up from suitable surplus material from other excavations on the site within the freehaul distance. If, in the opinion of the Engineer, insufficient or no suitable material is available for this purpose from such excavations, and the shortage of such material has not been caused by the methods used by the Contractor, the Engineer shall authorise the Contractor to import sufficient suitable material. The Contractor shall so arrange his work that the importation of backfill material is kept to a minimum in respect of both quantity and overhaul.

5.3.8 Completion of Backfilling

The Contractor shall complete backfilling of trenches expeditiously and in reasonable lengths.

5.3.9 Trenches in Road Reserves and Paved Areas

Where trenches are in road reserves or paved areas, the Contractor shall clean the road surface or paved area (as applicable) adjacent to the trench.



**5.4 REINSTATEMENT OF TAR, CONCRETE AND PAVED SURFACES**

**5.4.1 Minimum Surface Damage**

Where cables or ducts are to be installed below surfaced areas, the Contractor shall take care to disturb as little as possible of the surface.

**5.4.2 Width to be Reinstated**

The total actual excavation area, regardless of the base width, shall be reinstated. The reinstatement of the surfaced area shall, unless otherwise specified in the Project Specification, be confined to that portion of the road reserve that had a permanent surface or has been prepared for surfacing.

**5.4.3 Gravel Roads**

The Contractor shall reinstate the road surface immediately after completion of the backfilling to the top of the subgrade level of a trench across or along a gravel road. This shall be done by filling the remainder of the trench with a well graded, approved and compacted hard-wearing gravel surface with a thickness of at least 150 mm and of a quality equal to that of the existing road surface. The gravel layer may be finished with a slight camber in order to compensate for initial settlement but, shall not be left so far proud of the adjacent road surface as to cause excessive jolting of any vehicle proceeding at normal speed. If at any time the Engineer is satisfied that subsidence of a backfilled surface in any road having a permanent gravel surface is such that the backfilled surface requires no more maintenance than the remainder of the road surface and can be maintained without extra cost in the course of ordinary maintenance of the road, he will relieve the Contractor of any further responsibility for maintenance of such backfilled surface.

**5.4.4 Bitumen Roads - Subbase and Basecourse**

**5.4.4.1** Method: In a bitumen road the Contractor shall, as soon as practicable after completion of backfilling to subgrade level, reinstate the subbase and basecourse using material of quality at least equal to that of the material used in the construction of the road. The depth of each course in the reinstated portion shall be at least equal to the thickness of the existing subbase or basecourse, as applicable, or at least 100 mm, whichever is greater. Each course shall be compacted to a density at least equal to that of the adjacent existing materials, except that where there is no existing subbase, the thickness of basecourse that is placed directly on subgrade shall be at least 150 mm.

**5.4.4.2** Finish: The basecourse shall be finished slightly above road surface to compensate for initial settlement but shall not be left so far proud of the adjacent road surface as to cause excessive jolting of any vehicle proceeding at normal speed. The Contractor shall maintain the gravel surface to a standard suitable for normal traffic until the bitumen surfacing has been reinstated. The bitumen surface shall only be completed after sufficient time has elapsed to show up inadequately compacted areas and repair of such areas, unless otherwise ordered by the Engineer.

**5.4.4.3** Damage to Road Surface: If the surface of a road with a stabilised base has been disturbed, the basecourse shall be replaced with crusher run basecourse compacted with sufficient moisture to give a density of at least 98% of modified AASHTO maximum density.



5.4.5 Bitumen Roads - Surfacing

5.4.5.1 General: The surface of a bitumen road shall be reinstated with a bitumen premix of the thickness specified in the Schedule of Quantities or the Project Specification. The basecourse material shall be graded to a level sufficiently below the final road surface to allow the bitumen surfacing to be accommodated, and the edges of the existing bitumen wearing course shall be cut back vertically to a straight line. Before the bituminous construction is commenced, all loose materials and dust shall be removed with brooms and the surface shall have been approved.

5.4.5.2 Premix Carpet: A prime coat consisting of an approved primer shall be sprayed on the basecourse. A compacted premix bitumen carpet shall then be laid. The material may be any of the two referred to under 3.5. The materials shall be thoroughly mixed in a mechanically operated mixer for at least 1,5 minutes before being spread evenly over the surface to obtain the specified compacted thickness and then compacted with a 5 - 10 ton roller to a surface matching the existing surface in line and level.

5.4.6 Concrete Surfaces

5.4.6.1 General: Where concrete surfaces were damaged or had to be broken up for excavation of trenches, the backfilling shall be compacted to the density of the original ground. The backfilling shall be compacted slightly above the existing surrounding surface to compensate for initial settlement, but shall not be left so far proud as to cause inconvenience to traffic or pedestrians. The concrete surface shall only be completed after sufficient time has elapsed to show up inadequately compacted areas.

5.4.6.2 Method: The backfilling shall be cut back to below the final concrete level so as to accommodate the concrete finish. The edges of the concrete slab shall be cut back vertically to a straight line. The compacted backfilling shall be swept clean of all loose material and dust. Areas subject to traffic loads shall then be repaired with 20 MPa concrete and those for pedestrians with 15 MPa concrete.

5.4.7 Paved Areas

5.4.7.1 General: The Contractor shall remove paving slabs or bricks along the cable route carefully and stack them for reuse when repairing the surface. The excavation shall be backfilled and compacted to its original density.

5.4.7.2 Method: A sand or cement mixture bedding layer, depending on the original method used, shall be spread evenly over the compacted backfilling, to a thickness sufficient for the proper bedding of the pavers. Pavers shall be replaced in their original formation and be bedded with a plate compactor or light roller until level with the existing surrounding finish. If required by the Engineer, the joints shall be grouted and be finished off neatly. The Contractor shall regularly inspect and maintain the repaired surface and repair any subsidence or breaking up immediately.

5.4.8 Maintenance: The Contractor shall, at his cost, maintain the reinstated surfaces and make good any damage due to any subsidence, pothole or other unevenness immediately it occurs during the period of the contract. During the execution of the contract, the Contractor shall carry out regular inspections of repairs to reinstated surfaces and make good any damage or have such damage repaired at his own cost.



**5.5. SURPLUS MATERIAL**

The requirements of Sub-Clause SSA - 5.10 shall apply.

**5.6 GUARDING, BARRICADING, LIGHTING AND TRAFFIC CROSSINGS**

The requirements of Sub-Clause SSA - 5.11 shall apply.

**5.7 ACCESS TO PROPERTIES**

The requirements of Sub-Clause SSA - 5.14 shall apply.

**5.8 DAMAGE TO MADE-UP SURFACES**

Where, during the execution of the Works, any road or paved surface adjacent to a trench has been damaged in any way whatsoever by the Contractor's equipment, he shall, at his own expense and as soon as is practicable, repair and restore such surface to a condition at least equivalent to that previously existing, and to the satisfaction of the Engineer.

**5.9 INSTALLATION OF CABLE DUCTS**

**5.9.1 Depth**

Cable ducts for HV cables shall be installed at 900 mm and for all LV cables at 750 mm depth, measured from the centre line of the duct to the final finished road level. At road crossings for both HV and LV cables, the vertical spacing between cable ducts shall be in accordance with the requirements of 5.9.3 of this Specification.

**5.9.2 Bedding and Backfilling for Cable Ducts**

The bedding of cable ducts, backfilling and compaction of the excavation shall comply with the requirements of 5.3 of this Specification. The repair of surfaces where cable ducts are installed as road crossings shall comply with the requirements of 5.4 of this Specification.

**5.9.3 Spacing**

Cable ducts shall be installed with a horizontal spacing of 50 mm and a vertical spacing of 75 mm between ducts. The backfilling shall be carefully worked in between the ducts and be compacted with a T-shaped hand tamper to avoid movement of pipes during subsequent compaction.

**5.9.4 Reference Points or Beacons for Installation**

Cable ducts shall be installed with reference to the centre of the road and protrude equally on both sides of the road surface. Cable ducts shall always be installed across roads with reference to boundary pegs or other fixed available beacons. Duct ends shall be marked with a cable marker directly above each end (or group of duct ends), or in accordance with alternative methods specified in the Project Specification.



5.9.5 Drawwire

A 2,5 mm diameter galvanised drawwire shall be left in the cable duct after cleaning and ensuring that the duct is free from any obstructions. Both ends of the drawwire shall be secured to a brick or preservative treated wooden stake and the marker shall be buried just below the final finished sidewalk surface to help with the future location of the duct ends. Where there is more than one duct at a crossing, all the drawwires at each end of the crossing shall be bound together to the same marker.

5.9.6 Sealing of Duct Ends

Ducts installed for future use shall be sealed after installation to prevent ingress of sand. The ducts shall be sealed with a double layer of plastic warning tape, tied around the ends with galvanised wire or with a purpose made PVC sealing cap or with a styrofoam plug.

6. TOLERANCES

Degree of Accuracy II shall apply to all aspects of the works carried out in accordance with this Specification, unless otherwise specified in the Project Specification or on the drawings.

7. TESTS

7.1 DENSITY OF BEDDING AND BACKFILLING

The Engineer may order density tests to be carried out to determine the degree of compaction of the bedding and backfill material. If the density is inadequate the Engineer may order the re-compaction of the material or the removal of the material, replacement and recompaction, all at the Contractor's expense.

7.2 COST OF DENSITY TESTS

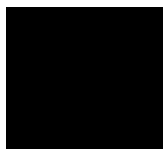
If the result of the density tests show that the material has been compacted to a density equal to or in excess of the specified value, the compaction will be accepted and the Employer shall bear the cost of the tests. If the density is found to be below the specified value, the cost of the testing shall be borne by the Contractor.

8. MEASUREMENT AND PAYMENT

8.1 PRINCIPLES

8.1.1 Excavations

The basic principle of measurement and payment for trenching is that the rate tendered for excavation covers the cost of excavation, re-use of the excavated material for backfilling and the disposal of any surplus material along the route of the trench within 0,5 km of source or within the freehaul distance, whichever is the greater.



8.1.2 Import of Selected Fill or Backfill

Payment for the import of selected fill or backfill from commercial sources will only be made where specific instructions have been issued by the Engineer for the import of such fill. The Contractor may be instructed to obtain selected fill or backfill by treating the excavated material, by opening and repairing borrow pits in approved locations on site or from other sources within the specified freehaul distance.

8.1.3 Freehaul of Selected Fill, backfill, Unsuitable Material or Vegetation

Provided that it is described or indicated on drawings that the boundaries of the site are not greater in extent than 1,5 x 1,5 km, or the locations of excavations, designated borrow pits or dumping sites are indicated, and on condition that the freehaul distance has not been specifically stated elsewhere in the contract documents, the freehaul distance within which the Contractor will be required to move material without separate compensation, shall be 0,5 km. The freehaul distance will be measured in one direction only along surfaces or roads which, in the opinion of the Engineer, are suitable and adequate for the transport of the material.

8.1.4 Overhaul

Transportation of material beyond the freehaul distance will be regarded as overhaul. The Contractor shall not incur overhaul expenses without prior approval. Volumes will be calculated from the specified travel dimensions. No allowance will be made for bulking. Distances will be measured to the nearest 0,1 km, in one direction only, by the shortest practicable route.

8.1.5 Price Adjustment

The price of material and labour shall be adjusted in accordance with the method(s) or formula(s) given in the Special Conditions of Contract.

**8.2 COMPUTATION OF QUANTITIES**

8.2.1 Cable Trenches

The length of cable trenches will be measured along the centreline from end to end. Excavations will be measured as if taken out with vertical sides regardless of whether they have been taken out with sloping sides. The depth of cable trenches will be measured along the centre line of the trench to the bottom of the specified bedding layer. Volumetric measurement shall be computed from the specified depth and base width of the cable trench.

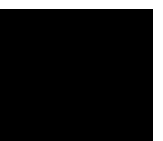
In all cases the surface from which measurements are taken will be the commencing ground surface present after all bulk earth works have been completed.

8.2.2 Imported Selected Filling Material

Imported selected fill material shall be computed volumetrically in accordance with the specified trench width and the compacted thickness of the bedding and backfill required. No allowance shall be made for loss of volume during compaction of the material.

8.2.3 Shoring

Where shoring is specified or ordered the length of shoring measured for payment will be the length of the centreline of the shored section of the trench.



## 8.2.5 Remeasurement of Quantities

All quantities will be remeasured on site and the tender quantities adjusted accordingly. The Contractor shall establish exact quantities on site before ordering. Deviations from the tendered quantities shall immediately be brought to the Engineer's attention. The Employer will only pay for the material actually installed.

Measurements will be made to the nearest 0.1 running metre or 0.01 m<sup>3</sup>. Any excess material will remain the Contractor's property.

## 8.3 SCHEDULED ITEMS

### 8.3.1 Route Clearance

#### 8.3.1.1 Clearing of vegetation and trees up to a maximum of 75 mm Girth ..... Unit : m

The length of the cable route cleared in accordance with the Engineer's instructions, will be measured. The rate shall cover the clearance of all vegetation and the removal of such material within the freehaul distance.

#### 8.3.1.2 Removal of trees with a girth exceeding 75 mm and designated obstacles ..... Unit : Number

The rate shall cover the clearance of specified trees and obstacles and removal within the freehaul distance.

### 8.3.2 Excavations

#### 8.3.2.1 Excavation in all materials for trenches and pole holes, backfilling, compaction and removal of surplus material ..... Unit : m, m<sup>3</sup> or No

Excavations are scheduled according to depth, width or pole dimensions. The rate shall cover the cost of complying with all the safety and protection requirements (except where items are scheduled to cover particular costs), excavation, backfilling, compaction and disposal of surplus material as specified in 5.2, 5.3 and 8.1.3 within the freehaul distance. The rate shall also cover the cost of the same operation in headings where the Contractor elects to use such a method of excavation. No additional payment will be made for such headings, nor will deductions be made for reduced excavation quantities.

#### 8.3.2.2 Extra-over for item 8.3.2.1 above

- a) Intermediate excavation ..... Unit : m<sup>3</sup>
- b) Hard rock excavation ..... Unit : m<sup>3</sup>
- c) Boulder excavation, Class A ..... Unit : m<sup>3</sup>
- d) Boulder excavation, Class B ..... Unit : m<sup>3</sup>

Classification of material shall be as specified in Sub-clause SSE 3.1. Volumetric quantities will be computed from the specified width and the depth from the top of the intermediate or hard rock excavation or boulder excavation, Class A or Class B, as the case may be, to the bottom of the same material or to the bottom of the trench, whichever is the lesser.



The rate shall cover the additional cost of excavation and handling the most difficult material, the disposal of unsuitable bedding or backfill material within the freehaul distance and the replacement of the unsuitable material with suitable bedding or backfill material.

8.3.3 Excavation Ancillaries

8.3.3.1 Make up Deficiency in Backfill Material (Provisional)

- a) from other necessary excavations on site ..... Unit : m<sup>3</sup>
- b) by importation from designated borrow pits ..... Unit : m3
- c) by importation from commercial or off-site sources selected by the Contractor ..... Unit : m3

Items (b) and (c) above will not be measured for payment unless importation has been ordered in writing. The volume will be computed from the trench width determined in accordance with 8.2.1 and the depth from the top of the backfill to the top of the bedding or the actual depth of backfill used to make up the deficiency as applicable.

The rate for material from other necessary excavations on site shall cover the cost of selection of suitable material, the moving of the material to points alongside the trench spaced to suit the Contractor's method of working and the disposal of the material that is replaced, all within freehaul distance.

The rate for material from designated borrow pits shall cover the cost of royalties, if applicable, excavation and selection of suitable material, the moving of the material to points alongside the trench spaced to suit the Contractor's methods of working, and the disposal of the material that becomes surplus as a result of the importation, all within the freehaul distance.

The rate for material from commercial or off-site sources selected by the Contractor shall cover the cost of the acquisition of the material (including royalties, if applicable), the moving of the material to points alongside the trench spaced to suit the Contractor's methods of working, and the disposal of the material that becomes surplus as a result of the importation, all within freehaul distance (see Sub-Clause 5.2.5.1 of SABS 1200 D or Sub-Clause 5.2.6.1 of SABS 1200 DA, as applicable).

8.3.3.2 Opening Up and Closing Down of Designated Borrow Pit..... Unit : Sum

This item will only be scheduled when a new borrow pit has to be established or when access to an existing borrow pit has to be established.

With the exception of the cost of the removal and spreading back of the topsoil (if scheduled), the sum shall cover the cost of opening up and of restoring the site as specified in Sub-Clause 5.2.2.2 of SABS 1200 D or Sub-Clause 5.2.2(f) of SABS 1200 DA, as applicable.





8.3.3.3      Compaction in Road Reserves..... Unit : m<sup>3</sup>

The volume will be measured as specified in 8.2.1 and 8.3.3.1.

The rate shall cover the cost of the additional compactive effort required as specified in 5.3.3, and of the additional selection of material as specified in 5.3.2 to comply with the requirements for areas subject to road traffic loads, etc.

8.3.3.4      Overhaul.....Unit : m3 km

The rate shall cover the cost of loading and overhaul of material beyond the freehaul distance, measured from the point of loading to the point of unloading, in one direction only and by the shortest practicable route. The volume will be calculated from the specified dimensions of the excavations and no allowance will be made for the increase in volume due to the fact that materials are transported in uncompacted form.

8.3.3.5      Shore Trench Opposite Structure or Service..... Unit : m

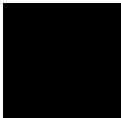
The length measured for payment will be that of the centre-line of the trench regardless of whether supports are placed on one or on both sides of the trench. The rate shall cover the cost, for both sides of the trench if necessary, of the supply, placing, maintenance and removal of timbering and other support measures together with any cost that results from the inconvenience or working in the supported trench and the cost of any risks inherent in the operation providing that shoring has been called for in the Project Specification or has been instructed by the Engineer.

8.3.3.6      Screening of Material

The rate shall cover all costs associated with the working and screening of unsuitable material to produce acceptable bedding or backfill material. Covered shall be, inter alia, the loading up and transporting of the unsuitable material to a suitable location on the site, the working and screening of the material using sieves of suitable diameter to obtain bedding or backfill material, the loading, transport and placing of the worked material next to the excavation to suit the working method of the Contractor.

The volume will be computed based on the initial volume of the unsuitable material.

- a)    Bedding Material (sieve to exclude stones of greater than  
15 mm diameter ..... Unit : m3
- b)    Backfill Material (sieve to exclude stones of greater than  
150 mm diameter ..... Unit : m3



8.3.4      Excavations crossing existing services ..... Unit : Number

The rate shall cover the cost of the detection and protection of an existing service, or group of services, with horizontal dimensions smaller than 450 mm, where the excavations are to cross such existing services or a discovered service, at an angle of 45° or more between the centre lines, the costs of any risks inherent to the operation, including the repair of services damaged during the detection of the existing service or execution of the works, as well as any cost that results from the inconvenience of working in close proximity to the existing services. The unit refers to one service but services that are so grouped that they can be contained within a horizontal dimension of 200 mm measured at right angles to the axis of the services, will be measured as one unit.

8.3.5      Excavations parallel to existing services ..... Unit : m

The rate shall cover the detection and protection of existing services, where excavations are to cross such existing services or discovered services at an angle of 45° or less, measured between centre lines, from the position where the existing service enters a 500 mm zone, measured from the edge of the specified trench to the position where the service clears a similar 500 mm zone on the other side of the specified trench, the cost of any risks inherent to the operation, including the repair of services damaged during the detection of the existing service or the execution of the works, as well as any cost that results from the inconvenience of working in close proximity to the existing services.

8.3.6      Reinstate road surface complete with all courses

8.3.6.1      Gravel on road shoulders ..... Unit : m<sup>2</sup>

8.3.6.2      Bitumen premix, ..... mm thick on pavements, driveways  
and parking areas ..... Unit : m<sup>2</sup>

8.3.6.3      Bitumen premix, ..... mm thick in roadways ..... Unit : m<sup>2</sup>

8.3.6.4      Concrete, ..... mm thick on pavements, driveways and parking  
areas ..... Unit : m<sup>2</sup>

8.3.6.5      Concrete, ..... mm thick in roadways ..... Unit : m<sup>2</sup>

8.3.6.6      Brick paving ..... Unit : m<sup>2</sup>

8.3.6.7      Other finishes (to be specified by the Engineer) ..... Unit : m<sup>2</sup>

The area will be computed from the length and width of finished road or paved surface as applicable. Payment for finishing will be additional to that for excavation covered in 8.3.2.1. The rate shall cover the cost of temporary accommodation of traffic (including signs and bypasses), the additional cost of excavation, breaking up, removal and stockpiling of material (where required) of the original road or paved surface and the subsequent compaction and reinstatement, as specified in Sub-Clauses 5.3 and 5.4. It shall also include maintenance and the risk of having to bear the cost of maintenance and repairing damage to road or paved areas thus reinstated.



8.3.7            Compaction Test ..... Unit : Number

The rate shall cover the cost of having a compaction test carried out by a Civil Engineering Laboratory and the provision of a test certificate giving the result of such a test. (See Sub-Clause 7.1 and 7.2.)

8.3.8            Cable Ducts

8.3.8.1        Supply and install cable duct ..... Unit : m

Cable ducts shall be measured linearly over the length installed. Separate items will be scheduled for each size and type of pipe. The rate will be additional to the rate for excavations covered by 8.3.2 and shall cover the cost of supplying the pipes and couplings, handling, transportation, inspection, laying, checking, supply and installation of draw wires and markers and sealing of unused ducts.

8.3.8.2        Extra-over to item 8.3.8.1 for installation of groups of cable ducts ..... Unit : Number

The rate shall be additional to the rate as per 8.3.8.1 above and will cover the cost of the installation of groups of cable ducts. Separate items will be scheduled for each size, type and number of ducts in a specific group. The rate shall cover the additional costs due to special backfilling and compaction between ducts, as well as the time lost due to the greater degree of accuracy required during installation of the groups of ducts.

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## **APPENDIX A**

### **TYPICAL CABLE TRENCH CROSS-SECTIONS**

#### **GENERAL NOTES:**

The four typical trench cross-sections that follow have to be read in conjunction with Clauses SSE 5.2, SSE 5.3, SSC 5.3 and SSC 5.4. Note the following:

**1. Trench and installation depths**

Installation depths are given from the centre lines of cables to the final finished level of the ground surrounding the trench or to the lower edge of the trench in sloping ground conditions. The dimensions given on the sections are for cables installed in road reserves. For cables in Public open spaces or private property a further allowance of 150 mm shall be added to all the dimensions given for trench and installation depths on the cross-sections.

**2. Bedding**

On all the cross-sections an allowance of 100 mm was made for a bedding layer in arriving at the various trench depths. Where conditions are favourable and no special bedding layers have to be provided (e.g. excavations in clean sand, without stones), trench depths given on the cross-sections shall all be decreased by 100 mm when computing the volumetric quantities for excavations.

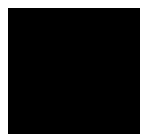
**3. Multiple LV Distribution Cables**

Where more than 3 LV distribution cables have to be installed in the same trench, they shall preferably be installed in layers as indicated on Section 3 (600 mm wide trench). Section 4 shall only be applicable when a 900 mm trench has to be provided in any event to cater for 3 HV cables.

**4. Service Connection and Street Light Cables**

These cables need not be spaced like HV or LV distribution cables and shall be installed at a depth of 600 mm in road reserves (150 mm deeper in Public Open Squares and Private Property). In cases where backfill material has to be treated or imported, it may be more economical to install service connection and/or street light cables at the same depth as LV distribution cables where the routes of such cables coincide. The onus is on the Contractor to refer such cases to the Engineer for approval and for a ruling on the spacings that shall apply under these circumstances.

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# **ANNEXURE 4**

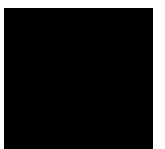
**(SSG: Standard Specification – Earthing)**



STANDARD SPECIFICATION

SSG - EARTHING

*(GENERAL REVISION - JANUARY 1996)*



**STANDARD SPECIFICATION**

**SSG - EARTHING**

*(GENERAL REVISION - JANUARY 1996)*

**C O N T E N T S**

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**STANDARD SPECIFICATION**  
**SSG - EARTHING**  
***(GENERAL REVISION - JANUARY 1996)***

**1. SCOPE**

This Specification covers the material, methods and installation requirements for the earthing of equipment and accessories normally associated with electrical distribution networks.

**2. INTERPRETATION**

**2.1 SUPPORTING SPECIFICATIONS**

This Specification will always be part of a contract document and contains clauses primarily concerned with the earthing of electrical distribution systems.

Amendments and interpretation of this Specification shall be elucidated under the appropriate sections of the Project Specification.

**2.2 APPLICABLE STANDARDS**

The standards quoted and referred to in the text include the latest issues of the following publications:

|                 |   |                                                                                                      |
|-----------------|---|------------------------------------------------------------------------------------------------------|
| SABS 0142       | : | Wiring of Premises                                                                                   |
| SABS 0199       | : | The Design and Installation of an Earth Electrode                                                    |
| SABS 1063: 1985 | : | Earth Rods, Couplers and Clamps                                                                      |
| NRS 016: 1992   | : | Code of Practice for the Use of Combined Neutral and Earth (CNE) on Low Voltage Distribution Systems |
| NRS 016: 1995   | : | Code of Practice for the earthing of LV Distribution Systems                                         |

**2.3 DEFINITIONS**

The meaning of certain words or terms used in this Specification:

Earth Continuity Conductor: An electrical conductor, copper or other similar approved metal of sufficient cross sectional area to ensure the immediate safe discharge of electrical energy to the general mass of earth.

Earth Conductor, Earth Wire: Generally accepted terms for earth continuity conductor.

Earth Point: The creation of a direct bond between the earth mass and the earthing network of a system to be earthed. This may consist of earth spike(s) or earth mat(s) or a combination of both driven in or laid at a sufficient depth to make contact with earth formations of low resistivity in order to safely discharge electrical energy.

Earth Spike: A metal rod driven into the ground to create an earth point. An earth spike may also consist of a number of separate lengths mechanically coupled to form a unit.

Trench Earthing: A section of bare copper conductor buried in the ground at a minimum depth of 600 mm and of sufficient length to obtain the required resistance.





Earthing Electrode: One or more conductive parts that are embedded in the earth for the purpose of making effective electrical contact with the general mass of the earth.

Earth Bar: A length of copper or brass bar of suitable or specified dimensions and cross sectional area, and having sufficient connection points for the mechanical connection of earth conductors by means of bolts, nuts or screws, as the case may be.

## 2.4 **ABBREVIATIONS**

The abbreviations listed in other enclosed standard specifications and the following shall apply:

|      |   |                             |
|------|---|-----------------------------|
| EC   | : | Earth Conductor             |
| EB   | : | Earth Bar                   |
| ES   | : | Earth Spike                 |
| ECC  | : | Earth Continuity Conductor  |
| BCEC | : | Bare Copper Earth Conductor |

## 3. **MATERIAL**

### 3.1 **CONDUCTORS**

#### 3.1.1 Underground Distribution Networks

Only materials manufactured from, or combined with, electrolytic copper shall be used on the earthing systems of underground reticulation and internal wiring. BCEC serving as trench earthing shall be hard drawn copper.

#### 3.1.2 Overhead Distribution Systems

Where earth conductors of overhead systems are required to be of materials other than copper, they shall be manufactured in accordance with the Project Specification. The materials may be steel reinforced aluminium, aluminium alloy or galvanised steel wire.

### 3.2 **CONNECTIONS**

Connections to the earth stud or earth bar shall be made with brass bolts, nuts and washers, or alternatively with stainless steel accessories. Connections to equipment housed indoors may be made with cadmium-plated accessories. However, cadmium-plated accessories may not be used on equipment such as kiosks, mini-substations etc.

35 mm<sup>2</sup> and 70 mm<sup>2</sup> lugs shall be used for lugging 40 mm<sup>2</sup> and 63 mm<sup>2</sup> hard drawn copper conductor respectively. Care shall be taken that lugs are not split or not too tightly crimped. The onus shall be on the Contractor to obtain an electrically and mechanically sound connection.



### **3.3 EARTH SPIKES**

#### **3.3.1 Category and Type**

Earth spikes shall be of the following types in accordance with the Project Specification:

- Solid Copper
- Solid Stainless Steel
- Solid Steel Core covered with copper of minimum thickness of 250 micron, similar or equal to Copperweld

Earth spikes shall be round in cross-section and the total length shall be achieved by the joining of standard sections. Spikes shall have a nominal diameter of 16 mm, except where spikes are placed into pre-drilled holes in which case a nominal diameter of 12 mm will be accepted.

#### **3.3.2 Couplings and Clamps**

3.3.2.1 Couplings: The coupling of lengths of earth spikes shall be achieved by means of screw-on type couplings. The couplings shall be mechanically strong enough to allow the normal driving in of coupled lengths and shall provide sound electrical connections.

3.3.2.2 Clamps: Conductor clamps shall suit the type of earth spike, conductor material and size specified.

#### **3.3.3 Driving Caps or Nuts**

Driving caps or nuts shall be screwed onto the spike to protect the spike end during driving.

### **4. CONSTRUCTION EQUIPMENT**

The Contractor shall supply all the necessary equipment for the driving of earth spikes, excavations for earth mats and trench earths and the drilling of holes for earth spikes in hard rock formations.

### **5. INSTALLATION**

#### **5.1 GENERAL**

##### **5.1.1 Trench Earths**

Trench earths shall consist of sections of hard drawn bare copper conductors laid in trenches with HV or LV Cables or in separate trenches at a depth of 600 mm below finished ground level. Trench earths shall either be laid over the full cable length or in 30 m sections as required by the Project Specification. The following standard earth conductor sizes shall be used except where stated differently in the Project Specification or drawings.

Revised  
2001-05-21



| EARTH CONDUCTOR<br>Size (mm <sup>2</sup> ) | LV CABLES               |                         | HV CABLES                  |
|--------------------------------------------|-------------------------|-------------------------|----------------------------|
|                                            | (Al) (mm <sup>2</sup> ) | (Cu) (mm <sup>2</sup> ) |                            |
| 10                                         | 25                      | 16                      | -                          |
| 16                                         | 35, 50                  | 25                      | -                          |
| 25                                         | 70                      | 35, 50                  | -                          |
| 40                                         | 95, 120                 | 70                      | -                          |
| 63                                         | 150, 185                | 95, 120                 | -                          |
| 80                                         | 240                     | 150 plus                | Throughout where specified |

#### 5.1.2 Spike Earths

Spike earths shall consist of a single earth spike or coupled lengths of the type and total length stated in the Project Specification. The spike shall be driven into the ground until the top end of the spike is at a depth of 600 mm below ground level. Multiple earth spikes shall be separated by a distance not less than their length.

The conductor clamp shall be suitable for clamping conductors with a total effective cross sectional area of up to 100 mm<sup>2</sup>. All connections to earth spikes shall be clamped and then brazed. The connection shall be painted to an approved standard after all excess flux has been removed.

A marker or earthing manhole shall be placed above the earth spike if so specified in the Project Specification. The earthing manhole shall have a removable concrete lid and shall be approximately 350 mm high, 460 mm long and 460 mm wide, similar or equal to the manholes manufactured by Messrs Cape Concrete. In addition the Contractor shall supply and install a 110 mm outside diameter Class 4 PVC pipe, 300 mm long, over all earth spikes such that the connection to the earth spike is visible. The earthing manhole shall be installed over this pipe, flush with finished ground level.

Should hard rock formations be encountered, it may be necessary to drill holes to position earth spikes. The hole shall have a diameter large enough to accommodate the earth spike and coupling without the latter occupying more than 50% of the volume of the hole. The hole shall be filled with a carbon coke/soil mixture (50/50) during and after the installation of the spike. The length of spike and therefore the depth of the hole shall be as stated in the Project Specification or as directed by the Engineer.

#### 5.1.3 Pole Base Earths

Pole base earths shall consist of hard drawn bare copper earth conductor coiled not less than six (6) times around the buried section of the pole and stapled in position using heavy duty galvanised staples. The coils shall start not less than 600 mm below ground level. The buried earth conductor shall be connected to a length of 50 mm<sup>2</sup> (Cu) black PVC insulated conductor which shall be taken up the pole and terminated to the overhead line. Two brass line taps or an exothermic welding process (Cadweld or similar approved) shall be used to join the conductors under the ground. The conductor up the pole shall be protected by a 50 mm diameter SABS 533 Class 12 HDPE pipe from 300 mm below ground level to 2 m above ground level unless otherwise specified in the Project Specification or drawings. The pipe and conductor shall be fixed to the pole by means of stainless steel strapping spaced at 600 mm intervals.

The size of the conductor shall be 63 mm<sup>2</sup> for HV earth systems or 40 mm<sup>2</sup> for LV earth systems, except where otherwise specified in the Project Specification or drawings.

Where both an HV earth point and an LV earth point are required at a particular pole an alternative method must be used to provide the HV earth point with a minimum separation of 5 m between the HV and the LV earth electrode unless the earth resistance reading is less than or equal to 1 ohm in which case the HV and LV electrode can be combined.

#### 5.1.4 Ohmic Values of Earthing Resistances

The required maximum ohmic values of the resistance to earth of certain systems or points are as follows:

|                                                                                     |                                                |
|-------------------------------------------------------------------------------------|------------------------------------------------|
| Transformer neutrals .....                                                          | 1 ohm                                          |
| HV Switchgear (indoors or outdoors) .....                                           | 1 ohm                                          |
| HV Pole-mounted equipment and surge arresters .....                                 | 1 ohm                                          |
| LV Distribution neutral at kiosks or on overhead lines (start and end points) ..... | 30 ohm (11 kV system)<br>70 ohm (22 kV system) |

#### 5.1.5 Interconnection of Various Earth Systems

5.1.5.1 Surge Arrester Earths: The earth system of surge arresters may be connected to the HV earth system.

5.1.5.2 HV and LV Earth Systems: These systems shall only be interconnected if the individual earth resistances are in the order of 1 ohm or less.

5.1.5.3 If the individual earth resistances are not of the order of 10 ohm or less, then the HV and LV earth systems must be separated in accordance with the requirements of NRS 016: 1995.

### 5.2 SUBSTATIONS

#### 5.2.1 Transformers on Bases with HV Primary and Secondary Windings (22 kV /11 kV Typical)

5.2.1.1 Earth Point: One common HV earth point consisting of spike, trench or any combination of these earths, as required by the Project Specification, may be supplied.

5.2.1.2 Connections: The transformer tank shall be connected to the HV earth point by means of 63 mm<sup>2</sup> hard drawn bare copper earth conductor. Connections shall be made with the correct size crimped cable lugs.

5.2.1.3 Cable End Boxes: Where cable end boxes are utilised on primary or secondary side terminations, wiping glands shall be connected to the earth stud of the transformer tank by means of 25 mm<sup>2</sup> bare copper earth conductor. Special requirements may apply when single core cables are used. These will be clarified in the Project Specification.

#### 5.2.2 Transformers on Bases or Racks, HV and LV Windings (11 kV/400 V Typical)

5.2.2.1 Earth Points: Separate earth points shall be created for HV and LV systems, except where individual resistances to earth are found to be 1 ohm or less in which case only one earth point may be utilised. The earth points may consist of spike, trench or a combination of these earths and HV and LV earth points shall be separated by a minimum distance of 5 m should both earth types be necessary.



- 5.2.2.2 Connections: All connections between equipment and earth points shall be done with a minimum of 70 mm<sup>2</sup> black PVC insulated stranded copper or else to suit the actual fault level. The connection between the transformer neutral and the neutral bar in the LV distribution box or distribution board shall be effected by means of the fourth core of the multicore cable connecting the transformer to the LV distribution system or by means of the neutral conductor where single core cables are employed.
- If specified in the Project Specification a 70 mm<sup>2</sup> copper conductor shall connect the neutral bar to the earth bar in the box or distribution board.
- Connections between the earth bar in the box or distribution board and to the neutral conductor of LV overhead installations shall be effected by means of 50 mm<sup>2</sup> black PVC insulated stranded copper conductors.
- 5.2.3 Mini-Substations
- 5.2.3.1 The earthing of mini-substations shall comply with the requirements for transformers on bases as stated in 5.2.2 above. All metal parts of the various compartments shall be bonded by means of 70 mm<sup>2</sup> bare copper conductors and connected to the HV earth system.
- 5.2.3.2 All conducting sheaths of cables shall be insulated from the mini-substation metalwork if the overall resistance to earth exceeds 1 ohm.
- 5.2.4 Fence Earths
- 5.2.4.1 Earth Conductors and Spikes: A 16 mm<sup>2</sup> bare copper earth conductor shall be buried at a depth of 600 mm and at a distance of 1 m outside the fence for the full circumference of this fence. Earth spikes shall be installed at each corner and connected to the above-mentioned earth conductor.
- 5.2.4.2 Installation: Vertical earth conductors shall be installed on the fence at all corner and gate posts and at intervals of 20 m. These vertical conductors shall be solidly bonded to the straining and barbed wire by means of binding wire. 16 mm<sup>2</sup> Copper conductors shall be used (or Mosquito aluminium conductor on aluminium fences).
- 5.2.4.3 Connections: The vertical copper conductors shall be connected to the surrounding trench earth by coiling them 4 times around the trench earth conductor and then brazing. Aluminium conductors shall be connected by means of bi-metal clamps. Aluminium conductors shall not be buried and copper connectors shall be used to connect underground conductor to the aluminium conductors on the fence, where applicable.
- 5.2.4.4 Gates: Gates shall be connected to the earth systems by means of braided copper wire, bolted to the gate frame and bonded to the vertical copper or aluminium fence earths.
- 5.2.5 HV Switchgear
- 5.2.5.1 Earth Bar: A tinned pre-drilled copper busbar (1 000 mm x 40 mm x 5 mm) shall be mounted on isolators against the back wall of the concrete cable trench. All earth conductors from installed equipment and from earth systems shall be connected to this bar by means of brass or stainless steel bolts and nuts.
- 5.2.5.2 Connections: Connections between the equipment and the earth bar shall be by means of 120 mm<sup>2</sup> green PVC insulated copper conductors with crimped cable lugs. A minimum of two connections to the earth bar shall be utilised per switchgear installation.



- 5.2.5.3 Earth System: The type of earth system shall be stated in the Project Specification or drawings. Connections between the earth system and earth bar shall be made with bare copper conductors. The amount of connections and the size of conductors shall be as indicated in the Project Specification or on the drawings.

### 5.3 CABLE NETWORKS

#### 5.3.1 Armouring of LV Cables

The cable armouring shall be bonded to the neutral conductor at the positions detailed in the Project Specification. Where cables are terminated on gland plates, the plates shall be insulated from the equipment metalwork and shall be linked to the neutral busbar.

Where cables are not terminated with glands, enough cable armouring wires shall be grouped together to fit tightly into a cable lug. After the lug has been crimped it shall be bolted to the earth system. A cable lug of 16 mm<sup>2</sup> minimum shall be used for cables up to 50 mm<sup>2</sup> and 25 mm<sup>2</sup> minimum for cables larger than 50 mm<sup>2</sup>. At LV overhead line connections, the cable armouring shall be connected to the neutral conductor by means of a suitable clamp.

#### 5.3.2 Trench Earths

Trench earths shall be installed where and as required by the Project Specification. Where possible, trench earth conductors shall not be installed through cable ducts but such that they are in contact with ground along their full length in the trench.

#### 5.3.3 Meter and Distribution Kiosks

Meter and distribution kiosks shall be supplied complete with a connection between the neutral bar and earth bar or stud. Earth systems, whether spike or trench earths, shall be bolted to the earth stud or bar utilising crimp lugs and stainless steel or brass nuts and washers.

### 5.4 OVERHEAD NETWORKS

#### 5.4.1 Earthing of the Neutral Conductor on LV Overhead Systems (Also Refer 5.2.2)

The neutral conductor of LV overhead systems shall be earthed at least at the start of the conductor and at the end of the conductor if called for in the Project Specification. The method of earthing shall be spike, trench or pole base earthing as required by the Project Specification or shown on the drawings.

Where HV earth systems appear on the same pole, the LV earth system shall be connected to the neutral conductor by means of black PVC insulated conductors and LV and HV earth system points shall be separated by a minimum of 5 m.

The connecting conductor size shall be a minimum of 50 mm<sup>2</sup> for PVC insulated conductors and 40 mm<sup>2</sup> in the case of hard drawn bare copper conductors.

#### 5.4.2 Earthing of HV Equipment on Overhead Networks

- 5.4.2.1 General: HV earthing shall be carried out with 70 mm<sup>2</sup> bare copper or black PVC insulated conductors, as required by the Project Specification. Where HV and LV earthing appear on the same pole or poles, insulated conductors shall be used and LV and HV earth system points shall be separated by at least 5 m.



5.4.2.2 Surge Arresters: Surge arresters shall be connected to the HV earth system point via a 70 mm<sup>2</sup> black PVC insulated conductors. Only one conductor is required per set of surge arresters.

5.4.2.3 Operator Earths: An earth mat shall be installed at the operating position of air break switches. The earth mat shall measure 1 m x 1 m and shall be manufactured of 20 mm x 3 mm copper strips to form a mesh size of 200 mm. The mat shall be buried at a depth of 150 mm below the operating position and connected to the operating handle by means of two 70 mm<sup>2</sup> black PVC insulated conductors.

5.4.2.4 Earth Connections: All earth points or steel work of HV equipment, including support steel work on HV poles, shall be bonded with 70 mm<sup>2</sup> conductor (refer 5.4.2.1) and connected to the HV earth system. Exceptions are operator earthing which are not connected to HV earth systems, but to the dedicated earth system described above.

Any pole(s) bearing the following equipment or combination thereof shall be provided with a HV earth system.

- Transformer
- Instrument or measuring transformers
- Air break switches
- Single pole isolating links
- Drop out fuses
- HV cable ends
- Oil switches, auto reclosers or sectionalisers

#### 5.4.3 Binding and Protection of Earth Conductors

Earth conductors shall be installed against poles in galvanised steel pipe or SABS 533 Class 12 HDPE pipe, or in accordance with the Project Specification.

The pipe protection shall start 300 mm below finished ground level and end 2 m above ground level. The pipe with the conductor shall be strapped to the pole at intervals of 600 mm using stainless steel strapping. The Contractor shall ensure that earth systems are kept separate, and that HV and LV earths are not short-circuited by the strapping.

### 5.5 SERVICE CONNECTIONS

#### 5.5.1 Trench Earths

If specified in the Project Specification, hard drawn bare copper earth conductors shall be installed in cable trenches together with service connection cables. The earth conductor shall have a minimum size of 10 mm<sup>2</sup> unless stated otherwise in the Project Specification.



#### 5.5.2 Connections

Earth conductors installed with service connection cables shall be connected to the system neutral either at the meter kiosk or at the consumer's supply point, but not at both ends. The Contractor shall acquaint himself with the system in use by the Supply Authority and do connections accordingly.

### 5.6 STREET LIGHTS AND HIGH MASTS

#### 5.6.1 Street lights

5.6.1.1 Trench Earth: Where specified 10 mm<sup>2</sup> hard drawn bare copper conductors shall be installed with supply cables to form a separate earth system for the street lights.

5.6.1.2 Cable Installations: Where street lights are supplied via underground cables, the armouring shall be connected to the street light earth terminal in accordance with the requirements of SSF - 5.7. The armouring of the various cable runs shall be bonded to the neutral at upstream connection points. The armouring of cables shall be connected to LV earth systems at substations and distribution boxes.

5.6.1.3 Overhead Networks: The earth terminal of the street light fitting as well as the metal parts of the street light arm shall be connected to the neutral conductor by means of a separate 6 mm<sup>2</sup> bare copper earth conductor. The earth terminal and the neutral terminal shall not be interconnected inside the light fitting. The same method shall be used where bundle conductor systems are employed.

#### 5.6.2 High Mast Lighting

5.6.2.1 Mast Earthing: Unless stated otherwise in the Project Specification, at least 15 m of 63 mm<sup>2</sup> hard drawn bare copper earth conductor shall be placed at the bottom of the excavations for the high mast base. Prior to the casting of the concrete base the earth conductor shall be covered with a 150 mm layer of soil to prevent the copper conductor from touching the concrete.

5.6.2.2 Trench Earth Conductor: The trench earth conductor shall be installed with the supply cable(s) and bonded to the earth stud.

5.6.2.3 Special Measures: Due to the height of the masts and the increased possibility of a lightning strike, special earthing measures may be required. Additional earthing systems shall be supplied according to the requirements of the Project Specification or drawings or as instructed by the Engineer.

### 5.7 MEASUREMENT OF EARTH RESISTANCE

#### 5.7.1 Measurement

Earth resistance shall be measured in accordance with the four electrode bridge method, i.e. according to the Schlumberger or Wenner principles. The Contractor shall provide the necessary test equipment and demonstrate the test methods to the Engineer, so that the Engineer can satisfy himself that the tests are being conducted correctly.





5.7.2 Records

Resistance measurements shall be performed at all earth points, i.e. at any apparatus or equipment connected to the earthing systems. The Contractor shall record all measurements in detail and present these to the Engineer for approval. The Engineer reserves the right to have any 10% of measurements repeated without additional payment, in order to establish their authenticity.

5.7.3 Provision of Earth System

The provision of an acceptable earthing network shall be accomplished within the construction period and an extension of time or additional preliminary and general costs shall not be granted by the Engineer in order to allow the Contractor to provide an acceptable earth network.

6. **TOLERANCES**

Degree of Accuracy II shall apply to work carried out according to this specification unless stated otherwise in the Project Specification.

7. **TESTS**

The Contractor shall measure the resistance to earth of each earth system with the earth bar or earth point as reference. The Engineer shall be notified if the specified minimum values of earth resistance are exceeded or cannot be obtained. Refer also to Clause SSG - 5.7.3 above.

8. **MEASUREMENT AND PAYMENT**

8.1 **PRINCIPLES**

8.1.1 Earth Systems

The principle of measurement and payment for substation or equipment earth systems is that allowance must be made for all material and labour necessary to complete the earth system as specified. All additional work, such as further spike lengths or additional spikes needed to obtain the necessary resistance values, shall be covered under "extra over" items. No extra Preliminary and General costs will be paid when additional earthing is required.

8.1.2 Trench Earths

The rate for the supply and installation of earth conductors as trench earthing shall cover the cost of handling and placing conductors in trenches, based on linear measurements. The rate for the termination of earth conductors shall include cable lugs, bolts, nuts, washers and connection to the earth stud or bar.

8.2 **COMPUTATION OF QUANTITIES**

8.2.1 Trenching

Trenching quantities shall be determined in accordance with SSE-8.2.1.



## 8.2.2 Provisional Quantities

Provisional quantities will be identified as such in the Schedule. These quantities may be based on estimates or are not easily determined during the design stage.

No changes to rates, including P & G rates, shall be made in the event that extra-over earthing is required in order to comply with the minimum earthing requirements.

## 8.3 SCHEDULED ITEMS

### 8.3.1 Substations

#### 8.3.1.1 Supply and Install Earth System for Transformer on Base, Both Windings HV .....Unit : Number

The rate shall cover the supply and installation, according to the specification, of all earth conductors and earth electrodes, including the connections between equipment, conductors and earth electrodes.

#### 8.3.1.2 Supply and Install Earth System for Transformer on Base, HV and LV Windings .....Unit : Number

As for 8.3.1.1 above but with separate earth electrodes for HV and LV neutral earthing.

#### 8.3.1.3 Supply and Install Earth System for Pole-mounted Transformer, HV and LV windows .....Unit : Number

As for 8.3.1.2 but with connections to overhead lines.

#### 8.3.1.4 Supply and Install Earth System for Mini-Substation .....Unit : Number

As for 8.3.1.2 but for mini-substations.

#### 8.3.1.5 Supply and Install Earth System for Indoor Switchgear in Substation Building .....Unit : Number

The rate shall cover the supply and installation, according to specification, of all earth conductors, electrodes, earth bars, connections to switchgear, etc such that a complete system is effected.

#### 8.3.1.6 Supply and Install Fence Earth System .....Unit : m

The rate shall cover the supply and installation of all conductors, earth electrodes, etc., including trenching and the earthing of the fence mesh and gates. The Contractor shall calculate the rate per meter to accommodate changes in fence lengths.

### 8.3.2 Distribution Networks

#### 8.3.2.1 Supply and Install Hard Drawn Bare Earth Conductor as Trench Earths .....Unit : m

Separate items are listed according to conductor sizes. The rate shall cover the supply, handling, transport, uncoiling and installation of earth conductors in cable trenches.



- 8.3.2.2      Supply and Install Black PVC Insulated Earth Conductors .....Unit : m  
As for 8.3.2.1 but for black PVC insulated conductors.
- 8.3.2.3      Connection of Earth Conductors ..... Unit : Number  
Separate items are listed according to size and type of conductors. The rate shall cover the supply of all materials, fitting, cutting and connection of the conductor to the earth stud, bar or electrode.
- 8.3.2.4      Supply and Install Earth Spikes .....Unit : Number  
The rate shall cover the supply and installation of an earth spike of specified length, complete with conductor clamp.
- 8.3.2.5      Supply and install Additional Lengths of Earth Spike .....Unit : Number  
The rate is extra over for 8.3.2.4 and shall cover the supply, coupling, and installation of additional lengths of earth spike.
- 8.3.2.6      Drill Hole in Hard Material for the Installation of Earth Spike .....Unit : m  
The rate shall cover the provision of the necessary equipment and operator, the drilling and filling of the hole with coke/soil mixture after the spike has been placed.
- 8.3.2.7      Supply and Install Concrete Manhole over Earth Spike .....Unit : Number  
The rate shall cover the supply and installation of a concrete manhole with lid as well as a length of PVC pipe placed over the earth spike already covered under item 8.3.2.4 above.
- 8.3.2.8      Supply and Install LV Earth Point on OH Line (Pole Base Earth Method) .....Unit : Number  
The rate shall cover the supply and installation of all earth conductors and leads, connection to LV line equipment with the specified connector, coiling of conductor around pole base and fixing of same, connection of the pole base earth wire to the earth lead on the pole as well as the supply and installation of the protective pipe and strapping of the pipe and earth lead to the pole.
- 8.3.2.9      Supply and Install LV Earth Point on OH Line (Spike Earth Method) .....Unit : Number  
The rate shall cover the supply and installation of all the earth conductors, leads and specified earth spike, connection to LV line equipment (with the specified connector) and to earth spike as well as the protective pipe and the strapping of the pipe and earth lead to the pole.
- 8.3.2.10     Supply and Install HV Earth Point on OH Line (Pole Base Earth Method) .....Unit : Number  
As for 8.3.2.8 but with connection to HV line equipment, excluding surge arresters (covered elsewhere).



- 8.3.2.11      Supply and Install HV Earth Point on OH Line (Spike Earth Method) .....Unit : Number
- As for 8.3.2.9 but with connection to HV line equipment, excluding surge arresters (covered elsewhere).
- 8.3.2.12      Supply and Install Surge Arrester Earth Point on OH Line ..... Unit : Number
- The rate shall be extra-over to the work done under items 8.3.2.10 and 8.3.2.11 above.
- The rate shall cover the additional cost of the supply, installation and connection of the earthing lead to the surge arrestors as specified.
- 8.3.2.13      Supply and Install Operator Earth .....Unit : Number
- The rate shall cover the manufacture and supply of the earth mat, the excavation and backfilling associated with its installation and its connection to the specified equipment.
- 8.3.3          High Mast Lighting Units
- 8.3.3.1        Supply and Install Earth System for High Mast Lighting Unit ..... Unit : Number
- The rate shall cover the supply and installation according to specification, of all earth conductors, earth electrodes, connections to equipment and electrodes, etc., such as to create a complete earth system.
- 8.3.4          Earth Resistance Tests
- 8.3.4.1        Earth Resistance Tests at Specified Earth Points .....Unit : Number
- The rate shall cover the provision of measuring equipment and operator, measurement of the resistance to earth and the maintenance of written records regarding resistance values measured all within the construction period.



# ANNEXURE 5

## (CoCT Standard drawings)

### LIST OF DRAWINGS

|                                       |                                               |
|---------------------------------------|-----------------------------------------------|
| SL37                                  | – 5,2m & 7,2m Streetlight Pole                |
| SL6<br>9m TYPE A<br>Streetlight Poles | – 4,6m / 5,8m / 7,3m TYPE A & B /<br>Concrete |
| SL27                                  | – Universal Baseplate                         |
| SL52<br>Adaptor 0° Rake Angle         | – Short Side Entry Luminaire                  |
| SL31<br>Streetlight Outreach          | – 1.5m Transmission Pole                      |
| SL32<br>Bracket                       | – 200mm Extension Street Lighting             |
| SL35<br>Arrangement                   | – 200mm Typical Streetlight                   |
| HP4 SH.1                              | – Road Crossing Sleeves                       |
| HP4 SH.2                              | – Road Crossing Sleeves                       |
| HP3<br>Typical                        | – Cable Sleeves Under Roads:                  |
| HP5<br>Trenches                       | – Sections Through Cable                      |
| DR3055/1 /2<br>Control Box            | – 30A Pole Mounted Street Light               |
| DR3055/2 /2<br>Control Box            | – 30A Pole Mounted Street Light               |
|                                       | Wiring layout                                 |
| DR3055/3<br>Wiring layout             | – 60A Street Light Control Box                |



## PROJECT SPECIFICATIONS FOR TRAFFIC SIGNALS

### PORTION 1 : GENERAL REQUIREMENTS

The following shall apply, which shall be in accordance with the latest City of Cape Town Traffic Signal Specification:

- Your appointed contractor for traffic signal works must contact our Project Coordinator before commencing with any work.
- Non hatch type 4m signals poles must be used to install the 210mm lanterns.
- Hatch type 5m signals poles must be used to install the 300mm lanterns.
- Hatch type 6m signals poles must be used when applicable.
- **No poles** can be installed before curbs are in place and final road marking positions are indicated on site.
- **No joints** are allowed to be made on cables.
- Cables under road surfaces must be housed in continuous 110mm PVC ducts.
- 2x 110mm PVC continuous ducts must be under all roadways and driveways.
- Traffic Signal cables may not share the same duct as other services.
- Our cables must be at a minimum depth of 0.5m in the trenches.
- New cables must be terminated in connection pillars.
- All cables under paved surfaces must be ducted.
- Lawula or Robotech polyethylene Traffic Signal “rounder type” stubbies must be used.
- T.S.A. 220-volt lantern housings with retro-reflective rounded backing screens must be used as specified in the METSPEC.
- Syntell 220-volt 300 mm lanterns housing with retro-reflective rounded backing screens must be used.
- Syntell or TSA 220-volt L.E.D. aspects must be used in all 210mm lanterns.
- Syntell 220-volt 300mm Bus L.E.D. aspects must be used in all 300mm lanterns.
- Lanterns must be mounted with Traffic Signal Clamp Mounting Kits.
- BPC Accessible Pedestrian Signal push buttons must be installed.
- Dipped curbs with bubble paving must be installed for pedestrian phases.
- A DUAT811 Audio tactile controller must be installed for each pedestrian phase.
- All controllers must be equipped with a licenced Sensys CPU, 3G Router, GPS clock card/module, a dual wire antenna and provision, in the form of a glanded PVC pipe, must be made for a comms cable between UPS and controller.
- **No existing or used materials may be re-used without consent of the Projects Coordinator**
- All materials used and all construction must comply with the Metropolitan specifications, **SARTSM and SANS 10142 standards**.
- You will be responsible for safe Traffic Accommodation during the construction period and until the signals are commissioned and accepted by the City of Cape Town.
- All traffic signal faults that occur during the construction period must be attended to by your appointed signals contractor at your cost.
- All Detector loops must be working during construction period.
- The traffic signals will not be commissioned unless detailed as built drawings, including cable runs and core allocations, as well as an Electrical Certificate of Compliance are supplied by the Contractor to this section.
- The traffic signals will also not be commissioned before the City of Cape Town has done a final inspection.
- The City of Cape Town reserves the right to amend requirements, as or if, required by site specific conditions.
- In the event of any discrepancy between the project specifications and part or parts of the CMA Specifications for Traffic Signals, the schedule of quantities or the drawings, the project specifications shall take precedence.



## **PORTION 2 : AMENDMENTS TO CMA SPECIFICATIONS FOR TRAFFIC SIGNALS**

All clause numbers preceded by this letters "PS" cover variations to the existing clause of the CMA Specifications to which the clause given in these amendments will indicate the clause in the CMA Specifications to which it refers.

Note: Clauses or sub-clauses referred to in brackets are the clauses or sub-clauses of the CMA Specifications for Traffic Signals.

### **PS 1 Uninterrupted Power Supply (UPS)**

- (a) Supply and install CoCT: Traffic Signal department approved UPS, 3.0 KVA Inverter (220VAC) 48 VDC with 3800Wh 36V (Lithium Ion based Battery) complete with concrete plinth and testing. Including the supply and installation of UPS cabinet (100% Vandal proof Galvanised Steel Cabinet and Base) Secure 3mm thickness Galvanised Steel. Includes all miscellaneous and sundry items for complete installation. All materials used during installation to be approved by CoCT Traffic Signals.
- (b) Relocate existing UPS, complete with concrete plinth and testing.

### **PS 2 Pedestrian Push Button Circuits**

- PS 2.1 The price tendered shall include the supply of the Audio Tactile push buttons complete with the control unit and all miscellaneous and sundry items required for installation.
- PS 2.2 Remove existing pedestrian push button assembly and return to City of Cape Town Traffic Signal Depot for storage. All miscellaneous and sundry items required for complete removal shall be included in the tendered price.

### **PS 3 Traffic Signal Aspects, Signs, Controller and Distribution Pillars**

#### **PS 3.1 Signal Aspects**

- (a) Include traffic signal aspect S1R (LED optics) with background screen to clause 9.3.8.
- (b) Include traffic signal aspect S1L (LED optics) with background screen to clause 9.3.8.

#### **PS 3.1.1 Relocate existing traffic signal face module**

Relocate existing traffic signal face module. All miscellaneous and sundry items for complete relocation and reinstatement at new location shall be included in unit price.

#### **PS 3.1.2 Remove existing traffic signal face module**

Remove existing traffic signal face module and return to City of Cape Town Traffic Signal Depot for storage. All miscellaneous and sundry items required for complete removal shall be included in the tendered price.

#### **PS 3.2 Signal Signs**

Supply and fit (including mounting brackets and pole strapping) of traffic signal arrow signs as per SARTSM Standards (Class4 reflectivity material).

#### **PS 3.3 Controller**

- (a) Remove existing controller and return to City of Cape Town – Traffic Signal depot for storage. Includes all miscellaneous and sundry items for complete removal.
- (b) In clause 9.3.2 - Include controller, class CJ – 18 phase.
- (c) Extra-over item for the removal of existing quad detectors.
- (d) Upgrade existing controller by adding 6 phases
- (e) Include Controller , 24 phase MX Plus to clause 9.3.2
- (f) Relocate existing controller, complete with concrete plinth, commissioning and testing.

#### **PS 3.4 Distribution Pillar**



(a) Relocation of existing distribution pillar/stubby

Relocate existing distribution pillar/stubby. All miscellaneous and sundry items (incl. earthworks) for complete relocation and reinstatement of surface to an acceptable condition shall be included in unit price.

(b) Remove existing distribution pillar/stubby

Remove existing distribution pillar/stubby. All miscellaneous and sundry items (incl. earthworks) for complete removal and reinstatement of surface to an acceptable condition shall be included in unit price.

(c) Temporary works – distribution pillar/stubby

Extra over item 9.3.12 for temporary works. Unit price to include all temporary works for relocation and installation of distribution pillar/stubby including the relocation of pillars into, and from, temporary positions. All miscellaneous and sundry items for all temporary works to be included in unit price.

**PS 4 Detectors**

PS 4.1 Traficam

Supply and install a Traficam (standard) including interface unit (4TI), power supply (24V DC Power supply, 1A, DIN rail mountable) and communications cable ((0.22 X 4 Core (Twisted pair) OAM PVC Grey)). All miscellaneous and sundry items for complete installation to be included in unit price.

PS4.1.1 Removal of existing Traficam

Remove existing Traficam and return to City of Cape Town – Traffic Signal depot for safe keeping. All miscellaneous and sundry items for complete removal to be included in unit price.

PS 4.2 Wireless vehicle detection system (WVDS)

This work shall consist of furnishing and installing wireless vehicle detection systems for vehicle detection at traffic signals. All materials used during installation to be approved by CoCT Traffic Signals.

**PS 5 Poles**

PS 5.1 Removal of existing poles

Remove existing pole, with aspects and pedestrian buttons and return to City of Cape Town – Traffic Signal depot for safe keeping. All miscellaneous and sundry items for complete removal to be included in unit price.

PS 5.1.1 Relocate existing signal pole

Relocate existing traffic signal pole. All miscellaneous and sundry items (incl. earthworks) for complete relocation and reinstatement of surface to an acceptable condition shall be included in unit price.

PS 5.2 Removal of existing aspects

Remove existing aspects and return to City of Cape Town – Traffic Signal depot for safe keeping. All miscellaneous and sundry items for complete removal to be included in unit price.





PS 5.3                      Removable signal pole – 4m

Supply and fit (including bracket) of 4m removable traffic signal pole as per City of Cape Town standards and details. All miscellaneous and sundry items for complete installation to be included in unit price.

PS 5.4                      Removable signal pole – 5m

Supply and fit (including bracket) of 5m removable traffic signal pole as per City of Cape Town standards and details. All miscellaneous and sundry items for complete installation to be included in unit price.

PS 5.5                      Removal of Overhead Cantilever Pole

Remove existing overhead cantilever pole and return to City of Cape Town – Traffic Signal depot for safe keeping. All miscellaneous and sundry items for complete removal to be included in unit price.

PS 5.6                      Removable signal pole – 6m

Supply and fit (including bracket) of 6m removable traffic signal pole as per City of Cape Town standards and details. All miscellaneous and sundry items for complete installation to be included in unit price.

PS 5.7                      Temporary Works - Poles

PS 5.7.1                      Extra over item 9.3.11 for temporary works. Unit price to include all temporary works for relocation and installation of signal poles and aspects including the relocation of signal poles and aspects into, and from, temporary positions.

PS 5.7.2                      Extra over item 9.3.11 for temporary works. Unit price to include all temporary works for relocation and installation of signal poles and aspects including the relocation of signal poles and aspects into, and from, temporary drums.

PS 5.8                      Supply and install 8m Galvanized mounting pole (for access points and repeaters). Unit price to include all work for installation of mounting pole including all miscellaneous and sundry items for complete installation.

**PS 6                      Cabling (Clause 7)**

PS 6.1                      Scheduled items (Sub-clause 7.1.3)  
In the first of the fifth paragraph include the word “not” between the words “shall” and “include” under the scheduled items sub-clause.

PS 6.2                      General (Sub-clause 7.5.1)  
In the first line of the first paragraph delete the words “1,8m square” and replace with “1,8m<sup>2</sup>”

PS 6.3                      Detector lead-in cable (Sub-clause 7.5.6)  
Include the words “The detector lead-in cable shall terminate at the distribution pillar. Cabling connecting the detector lead-in cable supply from the distribution pillar to the controller shall be an 8 pair cable. The 8 pair 1mm<sup>2</sup> per core, which is individual and overall screened shall be a SABS approved cable.”

PS 6.4                      Measurement and Payment (Clause 9)

(a)                      In sub-clause 9.3.16 (a) replace the word “controller” with “distribution pillar”.

(b)                      In sub-clause 9.3.13(b); 9.3.14(b); 9.3.15(b); 9.3.16(b) and 9.3.17(b) insert the word “not” between the words “shall” and “included” in the first line of the payment clauses.

(c)                      In clause 9.3.13(a) change 6mm<sup>2</sup> to 16mm<sup>2</sup> and replace the word “controller” with “distribution pillar”.

(d)                      In clause 9.3.15(a) change 12mm core to 19mm core.

PS 6.4.1                      8 Pair Mylar Cable

(a)                      Supply and install Mylar cable from distribution pillar to controller:  
8 pair 1mm<sup>2</sup> per core, I/O screened ..... Unit : m

(b)                      The length of the cable shall be measured horizontally in plan - see clause 7.1.3.



|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                     |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
|          | (c) Extra over items PS 6.4.1(a) for laying in trench .....                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Unit : m                                                                                                            |
|          | (d) Extra over item PS 6.4.1(a) for laying cable in duct<br>(itemised separately) .....                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Unit : m                                                                                                            |
|          | (e) Extra over item PS 6.4.1(a) jointing to detector loop but at<br>distribution pillar .....                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Unit : No                                                                                                           |
|          | (f) Extra over item PS 6.4.1(a) connecting to detector unit at<br>controller.....                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Unit : No                                                                                                           |
| PS 6.4.2 | Bare Copper Wire                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                     |
|          | (a) Supply and installation of bare copper wire with minimum<br>cross-sectional area 10mm <sup>2</sup> to be laid SWA cables .....                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Unit : m                                                                                                            |
|          | (b) Extra over item PS 6.4.2(a) for laying cable in trench .....                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Unit : m                                                                                                            |
|          | (c) Extra over item PS 6.4.2 (a) for laying cable in duct .....                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Unit : m                                                                                                            |
| PS 6.5   | Earthworks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                     |
|          | (a) The tendered rates for cable trenches shall include for .....                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Unit : m <sup>3</sup><br>excavating, backfilling and compacting and reinstating trenches<br>and for bedding cables. |
|          | (b) The tendered rates for cables ducts shall include for .....                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Unit : m <sup>3</sup><br>excavating, backfilling and compacting and reinstating surfaces                            |
|          | (c) The tendered rates for signal poles shall include for .....                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Unit : m <sup>3</sup><br>excavating, backfilling and compacting and reinstating surfaces                            |
| PS 7     | <b>Testing and Commissioning of installation .....</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>Unit: Sum</b>                                                                                                    |
|          | <p>The contractor shall provide all software and shall be responsible for its accuracy and proper functioning. Backup copies of operating software and site configuration data shall be supplied on tape, disk or pre-programmed EPROM's. Unless otherwise specified in the project specification, any hand held or other programming device necessary to modify site configuration data shall be supplied with the equipment.</p> <p>On completion of the installation, the contractor shall test each piece of equipment and each circuit for correct function. During this testing, any necessary adjustments and calibration procedures shall be carried out. When he is satisfied that the entire installation is functioning in accordance with this specification, he shall advise the engineer, who will arrange to witness such tests as he feels necessary to satisfy himself that installation is complete and fully functional.</p> <p>Acceptance tests to be carried out in the presence of the engineer shall include, inter alia, any or all of the following:</p> <ol style="list-style-type: none"> <li>All wiring shall be subjected to a test voltage of 2kV for one minute without any insulation failure. When tested with a 500 volt Megger immediately afterwards, insulation resistance shall exceed 20 Megohms.</li> <li>Operation of all loop detectors and pedestrian push buttons shall be demonstrated.</li> <li>Correct phase sequencing and timing shall be demonstrated for each of the specified operating modes and for each signal plan called for.</li> <li>Where the sequence and duration of phases vary, dependent on vehicle and pedestrian demands, these demands shall be simulated, using portable test unit to operate controller inputs if necessary, and the correct response of the controller to these demands demonstrated.</li> <li>In linked coordinated systems, calls from the master systems or computer shall be simulated for each controlled or slave system and its correct response demonstrated. In addition, all communications circuits shall be proven. Phase timing, extension times, offsets, force-off response and, where called for, pre-emption response shall be checked. Correct synchronization of real time coordinated signals shall be checked.</li> </ol> |                                                                                                                     |



- VI. The correct functioning of all safety circuits shall be demonstrated. In particular, green conflict monitoring circuits shall be tested by externally interconnecting all potentially conflicting circuits, one pair at a time, and demonstrating transfer to the emergency flashing mode. Independence of the two green conflict monitoring systems shall be demonstrated. Red failure detection shall be demonstrated by lamp removal or opening links or fuses in the terminals to which external circuits are connected.
- VII. Manual operation shall be demonstrated. Prohibited phase to phase or stage to stage movements and violation of pre-set minimum times shall be attempted and shown to be prevented.
- VIII. The specified start up procedure and recovery of normal operation after a power supply interruption shall demonstrated.

**PS 8                    Maintenance of installation during 12 month warranty period..... Unit: Sum**

(a) General

The contractor shall ensure that sufficient spares holding, programming equipment and fully trained personnel are available for operations during the maintenance period.

The telephone numbers of responsible technicians for emergency call-outs shall be made available to the engineer.

The contractor shall provide a list of spares, which he recommends should be held in stock by the operator, and shall provide a price list for such spares.

One spare fuse and two spare lamps of each size used in the equipment shall be supplied and stored in a suitable compartment or holder fixed inside the controller cabinet.

(b) Reprogramming

If requested by the engineer, the contractor shall reconfigure the controller once within three months after the completion and acceptance of the system.

**PS 9                    CHANGE IN SIGNAL EQUIPMENT**

The difference in the electronic traffic signal components (should the specification change from the time of tender to the time of installation) will be covered by the amount.



## C3.5 Management

### CONTENTS

- 3.5.1. FORMS FOR CONTRACT ADMINISTRATION
- 3.5.2. PARTICIPATION OF TARGETED LABOUR
- 3.5.3. COMMUNITY LIAISON OFFICER
- 3.5.4. PARTICIPATION OF TARGETED ENTERPRISES
- 3.5.5. ENVIRONMENTAL MANAGEMENT PROGRAMME
- 3.5.6. HEALTH AND SAFETY

#### 3.5.1. FORMS FOR CONTRACT ADMINISTRATION

The Contractor shall complete, sign and submit with each monthly statement for payment, the following updated returns (the format of which are attached in C3.6 Annexes as amended from time to time):

- a) Monthly Project Labour Report (Annex 1)
- b) B-BBEE Sub-contract Expenditure Report (Annex 2)
- c) Joint Venture Expenditure Report (Annex 3)
- d) Targeted Labour Contract Participation Expenditure Report (Annex 4)
- e) Targeted Enterprises Contract Participation Expenditure Report (Annex 5)

The Monthly Project Labour Report must include details of all labour (including that of sub-contractors) that are South African citizens earning less than **R500.00** per day, as adjusted from time to time (excluding any benefits), who are employed on a temporary or contract basis on this contract in the month in question.

In addition to the Monthly Project Labour Report the Contractor shall simultaneously furnish the Employer's Agent with copies of the signed employment contracts entered into with such labour, together with certified copies of identification documents, proof of attendance in the form of attendance register or timesheets as well as evidence of payments to such labour in the form of copies of payslips or payroll runs. If the worker is paid in cash or by cheque, this information must be recorded on the envelope and the worker must acknowledge receipt of payment by signing for it and proof of such acknowledgement shall be furnished to the Employer's Agent.

The Monthly Project Labour Reports shall be completed and submitted in accordance with the instructions therein and copies of all submitted documents must be kept on site be made available to the employer's agent upon request.

The **B-BBEE Sub-contract Expenditure Report** is required for monitoring the prime contractor's compliance with the sub-contracting conditions of the **Preference Schedule**.

The Joint Venture Expenditure Report is required for monitoring the joint venture's compliance with the percentage contributions of the JV partners as tendered, where the joint venture has been awarded preference points in respect of its consolidated B-BBEE scorecard.

The Targeted Labour Contract Participation Expenditure Report (if applicable) is required for monitoring the contractor's compliance for achieving the specified minimum targeted labour contract participation goal (CPG<sub>L</sub>) and, if applicable, for calculating any penalty in terms thereof.

The Targeted Enterprises Contract Participation Expenditure Report (if applicable) is required for monitoring the contractor's compliance for achieving the specified minimum targeted enterprises contract participation goal (CPG<sub>E</sub>) and, if applicable, for calculating any penalty in terms thereof.

The Expenditure Reports shall be verified by the Employer's Agent/Employer's Agent's Representative.



In respect of Annexes 2 and 3, the Employer shall, in addition to any other sanctions available to it, apply the financial penalties applicable to breach of preferencing conditions in the **Preference Schedule** Preference Schedule in Part T2.2 Returnable Schedules. In the case of joint ventures (Annex 3), the contractor shall prove his compliance with item 6) in Section 2 of the Preference Schedule by providing a consolidated scorecard at his own cost on instruction from the Employer's Agent.

### 3.5.2 PARTICIPATION OF TARGETED LABOUR

#### 3.5.2.1 Minimum targeted labour contract participation goal

In support of the National Department of Public Works' Expanded Public Works Programme which is aimed at alleviating poverty through the creation of temporary employment opportunities using labour intensive methodologies and practices where possible, the Employer is seeking to increase the intensity of labour, as appropriate, in all of its infrastructure sector projects.

It is a requirement of this contract, therefore, that the work be executed in such a manner so as to maximise the use of labour intensive construction methods in order to provide low and semi-skilled temporary employment opportunities.

To this end, a minimum targeted labour contract participation goal is specified below, which shall be achieved by the Contractor in the performance of the contract, failing which, penalties as described will be applied. The Contractor is required to provide all skills training where necessary, so as to ensure that a minimum level of competence is achieved and maintained, such that the various activities are carried out safely and to the required standard. The cost of training shall be included in the rates for the various work activities.

The specified minimum targeted labour contract participation goal (CPG<sub>L</sub>) is

3 %

The minimum CPG<sub>L</sub> is such that the Contractor will have to carry out some of the work that would normally have been undertaken using mechanised construction methods, by using labour intensive construction methods instead. It is left to the discretion of the Contractor to identify suitable work activities for the intensification of labour. The Contractor shall, within 5 working days of being requested in writing by the Employer's Agent to do so, submit details of his/her plan to achieve the minimum CPG<sub>L</sub>.

#### 3.5.2.2 Definitions

For the purposes of the requirements in respect of the participation of targeted labour, the following definitions shall apply:

**"Target area"** means the subcouncil 3 area shown on plan in Part C4: Site Information

**"Targeted labour contract participation goal (CPG<sub>L</sub>)"** means the sum of the wages (excluding any benefits), for which the Contractor, or any of his/her sub-contractors contracts targeted labour in the performance of the contract, expressed as a percentage of the value of the contract.

**"Targeted labour"** means low and semi-skilled individuals, whose wages (excluding any benefits) do not exceed the threshold value, who reside in the target area, that are employed by the Contractor, or any of his/her sub-contractors, in the performance of the contract.

**"Threshold value"** is R500.00 per day as adjusted from time to time (excluding any benefits). The threshold value is not to be confused with any industry sector minimum wage determined in accordance with the Basic Conditions of Employment Act, 75 of 1977.

**"Value of the contract"** means the contract sum (accepted contract amount) less provisional sums, contingencies and VAT.

#### 3.5.2.3 The selection and recruitment of targeted labour

Where targeted labour is to be drawn from specific local communities (defined in terms of the target area), such labour shall be identified using the relevant Sub-Council Job-Seekers Database. The Contractor shall request, via a Community Liaison Officer (if required in terms of the contract), a list of suitable candidates from the database, from which the Contractor shall make his/her final selection. The contractor shall enter into written contracts of temporary employment with all targeted labour.

Any difficulty experienced by the Contractor in identifying candidates through the Job-Seekers Database, or as regards any matter relating to the employment of targeted labour, shall be immediately referred to the Employer's Agent.

#### **3.5.2.4 Contract participation goal credits**

Credits towards the achieving the minimum CPG<sub>L</sub> shall be granted by converting the total monetary value of wages paid to targeted labour (including that of sub-contractors) to a percentage of the value of the contract. No credits shall be accorded should the contractor/sub-contractor fail to enter into written contracts with the targeted labour. Furthermore, no credits shall be accorded in respect of targeted labour employed on work in respect of provisional sums or prime cost items. Such labour shall nevertheless be recorded on the Project Labour Report which is required to be furnished by the Contractor.

#### **3.5.2.5 Training of targeted labour**

The Contractor is required to provide all informal (on-the-job) skills training so as to ensure that a minimum level of competence is achieved and maintained, such that the various activities are carried out safely and to the required standard. The cost of informal training shall be included in the rates for the various work activities.

#### **3.5.2.6 Penalties**

The financial penalty to be applied for failing to meet the specified minimum targeted labour contract participation goal in the performance of the contract (unless proven to be beyond the control of the Contractor), is as follows:

$$\text{Penalty} = (\text{CPG}_L^S - \text{CPG}_L^A) \times P^*$$

Where  $\text{CPG}_L^S$  = the specified minimum targeted labour contract participation goal (expressed as a percentage).

$\text{CPG}_L^A$  = the targeted labour contract participation goal achieved (expressed as a percentage).

$P^*$  = the value of the contract.

#### **3.5.3. COMMUNITY LIAISON OFFICER**

It is a requirement of this Contract that a Community Liaison Officer (CLO) shall be appointed by the Contractor. The primary functions of the CLO shall be to assist the Contractor with the selection and recruitment of targeted labour, to represent the local community in matters concerning the use of targeted labour (and/or enterprises) on the works, and to assist with and facilitate communication between the Contractor, the Employer's Agent and the local communities.

The identification of suitable candidates (maximum 5; minimum 3) for the CLO position shall be resolved by the relevant Sub-council Manager through a process of advertising and shortlisting. Should suitable candidates not be identified through this process, the Contractor shall be allowed to seek candidates from the relevant Sub-Council Job-Seekers Database. The final selection and appointment of the CLO in terms of the contract shall be the responsibility of the Contractor.

The period of appointment of the CLO shall be as stated in the Contract for Temporary Employment as a Community Liaison Officer referred to below. The date of commencement of temporary employment of the CLO shall be as agreed with the Employer's Agent.

It is required, therefore, that the Contractor enter into a contract of temporary employment with the selected CLO, the contracting parties being the Contractor and the CLO. To this end, a specimen Form of Contract of Temporary Employment as Community Liaison Officer is included in this document (Part C1.7: Agreement and Contract Data). This Form of Contract sets out, inter alia, the agreement between the parties, the duties and conditions of employment of the CLO. The rate of remuneration for the CLO, payable by the Contractor, is currently **R460.00** per day.. As said contract will be between the Contractor and the CLO, all costs involved shall be borne by the Contractor and the tender shall be deemed to include for this.

#### **3.5.4. PARTICIPATION OF TARGETED ENTERPRISES**

##### **3.5.4.1 Minimum targeted enterprises contract participation goal**



It is a requirement of this contract that enterprises located within the target area, as defined, be engaged by the Contractor for the provision of supplies, services or works necessary for the performance of this contract.

To this end, a minimum targeted enterprises contract participation goal is specified below, which shall be achieved by the Contractor in the performance of the contract, failing which, penalties as described will be applied.

**The specified minimum targeted enterprises contract participation goal (CPG<sub>E</sub>) is**

**2 %**

The Contractor shall engage targeted enterprises directly or indirectly in the performance of the contract to the extent that the total monetary value of such engagements (exclusive of VAT), expressed as a percentage of the value of the contract, is sufficient to achieve the specified minimum CPG<sub>E</sub>.

#### **3.5.4.2 Definitions**

For the purposes of the requirements in respect of the participation of targeted enterprises, the following definitions shall apply:

**“Target area”** means the subcouncil 3 area shown on plan in Part C4: Site Information

**“Targeted enterprises contract participation goal (CPG<sub>E</sub>)”** means the value of supplies, services or works (exclusive of VAT), for which the Contractor contracts targeted enterprises, either directly or indirectly, in the performance of the contract, expressed as a percentage of the value of the contract.

**“Targeted enterprises”** means any sole trader, partnership or legal entity that acts as a supplier, manufacturer, service provider or sub-contractor, and which has its base of operations in the target area.

**“Value of the contract”** means the contract sum (accepted contract amount) less provisional sums, contingencies and VAT.

#### **3.5.4.3 Achieving the contract participation goal**

The contractor may achieve the specified minimum CPG<sub>E</sub> as follows:

- a) by engaging one or more targeted enterprises to perform commercially useful functions in the performance of the contract;
- b) by engaging non-targeted enterprises, who in turn engage one or more targeted enterprises to perform commercially useful functions in the performance of the contract;
- c) by a combination of the above.

The Contractor shall, within 5 working days of being requested by the Employer's Agent to do so, submit details of his/her plan to achieve the minimum CPG<sub>E</sub>.

#### **3.5.4.4 Contract participation goal credits**

Credits towards achieving the minimum CPG<sub>E</sub> shall be granted by converting the total monetary value (exclusive of VAT) of the agreements between the Contractor, or Contractor's sub-contractors, and targeted enterprises, to a percentage of the value of the contract.

No credits shall be accorded should the Contractor (or sub-contractors):

- a) make direct payment to third parties in connection with the contract on behalf of targeted enterprises, when such payment is recovered by making deductions from payments due to the targeted enterprise;
- b) fail to enter into written contractual agreements with the relevant targeted enterprises.

Credits claimed towards the contract participation goal shall be denied where such written contractual agreements contain any of the following:

- c) conditions which are more onerous than those that exist in the prime contract (this contract);



- d) payment procedures based on a pay when paid system;
- e) authoritarian rights given to the employing contractor, with no recourse to independent adjudication in the event of a dispute arising.

No credits may be claimed in respect of targeted enterprises that do not adhere to statutory labour practices.

No credits shall be accorded in respect of targeted enterprises engaged on work in respect of provisional sums or prime cost items.

In the event that a targeted enterprise sub-contracts to another targeted enterprise, only the value of the higher level sub-contract shall be granted as credit towards achieving the specified minimum CPG<sub>E</sub>.

In addition to the form required for contract administration (the Targeted Enterprises Contract Participation Expenditure Report), the Contractor shall furnish the Employer's Agent, upon written request, with documentary evidence that the targeted enterprises have their base of operations in the target area, copies of the contractual agreements with the various targeted enterprises, as well as documentary proof of payments made to the various targeted enterprises.

#### **3.5.4.5 Penalties**

The financial penalty to be applied for failing to meet the specified minimum targeted enterprises contract participation goal in the performance of the contract (unless proven to be beyond the control of the Contractor), is as follows:

$$\text{Penalty} = (\text{CPG}_E^S - \text{CPG}_E^A) \times P^*$$

Where  $\text{CPG}_E^S$  = the specified minimum targeted enterprises contract participation goal (expressed as a percentage).

$\text{CPG}_E^A$  = the targeted enterprises contract participation goal achieved (expressed as a percentage).

$P^*$  = the value of the contract.

#### **3.5.5. ENVIRONMENTAL MANAGEMENT PROGRAMME**

Particular Specification E: Environmental Management Specification and its Annexures are attached hereto.

#### **3.5.6. HEALTH AND SAFETY**

Particular Specification H: Health and Safety Specification is attached hereto.





## **E: ENVIRONMENTAL MANAGEMENT SPECIFICATION**

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## E: ENVIRONMENTAL MANAGEMENT SPECIFICATION

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

### E1 SCOPE

The Environmental Management Programme (EMP) for the project is comprised of this Environmental Management (EM) Specification and its Annexures, including the "Additional environmental issues deemed to form part of the Environmental Management Specification" attached as Annexure D hereto, which together cover the requirements for controlling the impact on the environment of construction activities.

### E2 INTERPRETATIONS

#### E2.1 Supporting specifications

The following standardised specification shall, *inter alia*, apply to this Contract:

- a) SANS 1200A, as may be varied or added to in the Scope of Work

#### E2.2 Application

This EM Specification contains clauses that are generally applicable to the undertaking of construction works in areas where it is necessary to impose pro-active controls on the extent to which the construction activities impact on the environment.

#### E2.3

In the event of any difference or discrepancy between the provisions of the Standardised Specifications and the provisions of the EM Specification, the latter shall prevail.

#### E2.4 Definitions and abbreviations

For the purposes of this EM Specification the following definitions and abbreviations shall apply:

##### E2.4.1 Environment

The surroundings within which humans exist and that are made up of –

- a) the land, water and atmosphere of the earth;
- b) micro-organisms, plant and animal life;
- c) any part or combination of i) and ii) and the interrelationships among and between them; and
- d) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

##### E2.4.2 Potentially hazardous substance

E2.4.3 A substance which, in the reasonable opinion of the Employer's Agent, can have a deleterious effect on the environment.

##### E2.4.4 Method Statement

A written submission by the Contractor to the Employer's Agent in response to the EM Specification or a request by the Employer's Agent, setting out the plant, materials, labour and method the Contractor proposes using to carry out an activity, in such detail that the Employer's Agent is enabled to assess whether the Contractor's proposal is in accordance with the Scope of Work and/or will produce results in accordance with the EM Specification.

##### Reasonable

Unless the context indicates otherwise, means reasonable in the opinion of the Employer's Agent after he has consulted with a person suitably experienced in "environmental implementation plans" and "environmental management plans" (both as defined in the National Environmental Management Act, 107 of 1998).

E2.4.5

E2.4.6 Solid waste

All solid waste, including construction debris, chemical waste, excess cement/ concrete, wrapping materials, timber, tins and cans, drums, wire, nails, domestic waste, dead vegetation, asphalt products, etc.

E2.4.7 Contaminated water

Water contaminated by the Contractor's activities containing cements, concrete, lime, paint products, thinners, turpentine, chemicals, fuels, oils washing detergents, etc.

E2.4.8 Working area

Any area within the boundaries of the Site where construction is taking place.

E2.4.9 Contractor's camp or construction camp

The area designated for all temporary site offices, storage areas, construction plant parking areas, staff welfare facilities, etc.

E2.4.10 Employer's Agent

The person/firm so named in the Contract Data, whose function is to administer the Contract as agent of the Employer.

E2.4.11 Employer's Agent's Representative (ER)

The natural person appointed by the Employer's Agent in terms of the Contract, who shall observe the execution of the Works, examine and test materials and workmanship, and deliver and receive communications to/from the Contractor.

E2.4.12 Environmental Officer (EO)

Appointed by the Employer's Agent as his environmental representative on Site, with the mandate to enforce compliance with the EMP. The duties of the EO are stipulated in the City's guideline document for the EO and ER.

E2.4.13 Environmental Control Officer (ECO)

An independent appointment to objectively monitor implementation of relevant environmental legislation, conditions of Environmental Authorisations (EAs), and the EMP for the project.

E2.4.14 Environmental Site Officer (ESO)

Employed by the Contractor as his environmental representative to monitor, review and verify compliance with the EMP by the Contractor. The ESO must ensure that he is involved at all phases of the construction (from site clearance to rehabilitation).

E2.4.15 Abbreviations

The following abbreviations occur in this EM Specification:

EMP - Environmental Management Programme  
EM Specification – Environmental Management Specification  
EO - Environmental Officer  
ECO – Environmental Control Officer  
ESO – Environmental Site Officer  
ER – Employer's Agent's Representative  
MSDS - Material Safety Data Sheets

## **E2.5 Employer's Agent's authority to delegate**

In terms of Clause 3.2.4 of the General Conditions of Contract, Third Edition, 2015 (GCC 2015), the Employer's Agent has the authority to appoint a representative. Other than the Employer's Agent's Representative (ER) in terms of Clause 3.2, this can be in the form of an Environmental Officer (EO), who shall be responsible for monitoring compliance with the EMP. All instructions given by the EO shall go through the ER, who will then convey these to the Contractor, except in the case of an environmental emergency, in which case the EO can issue an instruction directly to the Contractor. An environmental emergency is one which, in the opinion of the EO, would cause serious environmental harm if not addressed immediately.

Depending on the nature/environmental sensitivity of the Contract the following variations in the organisational structure are possible:

- a) The ER may work together with an EO; or
- b) There may be an ER only (for construction projects with low potential for causing significant environmental impacts). In this case the ER has responsibility for the EO's functions.
- c) There may be an independently appointed Environmental Control Officer (ECO) who will fulfil essentially the same functions as the EO. The ECO may work with just the ER (if there is no EO) or may work with both the ER and EO.

The term "Employer's Agent" in this EM Specification refers to the Employer's Agent as defined in Clause E2.3.9 acting through the ER/EO/ECO as delegated.

## **E3 MATERIALS**

### **E3.1 Materials handling, use and storage**

The Contractor shall ensure that any delivery drivers are informed of all procedures and restrictions (including "no go" areas) required to comply with the EM Specification. The Contractor shall ensure that these delivery drivers are supervised during off loading by someone with an adequate understanding of the requirements of the EM Specification.

Materials shall be appropriately secured to ensure safe passage between destinations. Loads, including but not limited to, sand, stone chip, fine vegetation, refuse, paper and cement, shall have appropriate cover to prevent them spilling from the vehicle during transit. The Contractor shall be responsible for any clean-up resulting from the failure by his employees or suppliers to properly secure transported materials.

All manufactured and or imported materials shall, where reasonably possible, be stored within the Contractor's camp and, if so required by the Employer's Agent, out of the rain. The location and method of protection of such materials stored outside of the Contractor's camp and the method of rehabilitation of these areas, shall be subject to the Employer's Agent's approval.

Stockpile areas shall be approved by the Employer's Agent before any stockpiling commences.

### **E3.2 Hazardous substances**

Hazardous chemical substances (as defined in the Regulations for Hazardous Chemical Substances in GN 1179 (25 August 1995)) stored on Site for use during construction shall be stored in secondary containers which are clearly and appropriately marked/signed. The relevant Material Safety Data Sheets (MSDS) shall be available on Site. Procedures detailed in the MSDSes shall be followed in the event of an emergency situation.

If potentially hazardous substances are to be stored on Site, the Contractor shall inform the Employer's Agent of such substances and provide a Method Statement detailing the substances/ materials to be used, together with the storage, handling and disposal procedures of the materials. Hazardous substances shall be stored out of flood risk areas and disposal of these substances shall be at a licensed waste disposal facility.

## **E4 PLANT (referring to "Construction Equipment" as defined in GCC 2015, and the Contractor's facilities as used in SANS 1200A)**

#### **E4.1 Fuel (petrol and diesel) and oil**

##### **E4.1.1 Storage**

If fuel and oil is to be stored on Site, then the Contractor shall submit a Method Statement covering the procedures for dealing with accidental hydrocarbon spillage and leaks, and detailing how these liquids will be stored, handled and disposed of.

The Employer's Agent shall approve the location of all fuel storage areas. All necessary approvals with respect to fuel storage and dispensing shall be obtained from the appropriate authorities. Symbolic safety signs depicting "**No Smoking**", "**No Naked Lights**" and "**Danger**" conforming to the requirement of SANS 1186 are to be prominently displayed in and around the fuel storage area. There shall be adequate fire-fighting equipment at the fuel storage area.

The Contractor shall ensure that all liquid fuels and oils are stored in tanks with lids, which are kept firmly shut and adequately secured. The capacity of the tank shall be clearly displayed and the product contained within the tank clearly identified using the emergency information system detailed in SANS 0232 part 1. Fuel storage tanks shall have a capacity not exceeding 9000 litres and shall be kept on site only for as long as fuel is needed for construction activities, on completion of which they shall be removed.

The tanks shall be situated on a smooth impermeable base with an earth bund. The volume inside the bund shall be 110% of the total capacity of the largest storage tank. The base may be constructed of concrete, or of plastic sheeting with impermeable joints, covered by a layer of compacted earth to protect the sheeting. The impermeable lining shall extend to the crest of the bund. The floor of the storage area shall be sloped to enable any spilled fuel and/or fuel-contaminated water to be removed easily.

If any rainwater collects in the bunded areas, it shall be promptly removed and taken off Site to a disposal site approved by the Employer's Agent.

Only empty and externally clean tanks may be stored on the bare ground. Empty and externally dirty tanks shall be sealed and stored on an area where the ground has been protected.

Adequate precautions shall be provided to prevent spillage during the filling of any tank and during the dispensing of the contents. If fuel is dispensed from 200 litre drums, the proper dispensing equipment shall be used, and the drum shall not be tipped in order to dispense fuel. The dispensing mechanism for the fuel storage tanks shall be stored in a waterproof container when not in use.

##### **E4.1.2 Refuelling**

Plant shall be refuelled at a designated refuelling area approved by the Employer's Agent. The surface under the temporary refuelling area shall be protected against pollution to the reasonable satisfaction of the Employer's Agent prior to any refuelling activities. The Contractor shall ensure that there is always a supply of absorbent material (e.g. Spill Sorb or Enretech #1 powder or equivalent) readily available that is designed to absorb, break down and encapsulate minor hydrocarbon spillage. The quantity of such material shall be able to handle a minimum of 200 litres of hydrocarbon liquid spill.

##### **E4.1.3 Treatment and remediation**

Treatment and remediation of hydrocarbon spill and leak areas shall be undertaken to the satisfaction of the Employer's Agent. In the event of a hydrocarbon spill the source of the spillage shall be isolated and the spillage contained.

#### **E4.2 Ablution and toilet facilities**

Washing, whether of the person or of personal effects, defecating and urinating are strictly prohibited other than at the facilities provided.

The Contractor shall provide ablution facilities for all personnel employed on the Site, including shelter, toilets and washing facilities. The Contractor's personnel will not be permitted to use the City's ablution facilities.

Toilet facilities provided by the Contractor shall occur in a ratio of not less than 1 toilet per 30 workers (1:15 is preferred) for each sex. Toilet facilities shall be located within the Contractor's camp, but also at work areas remote from the camp, all to the satisfaction of the Employer's Agent. All portable toilets shall be adequately secured to the ground to prevent them toppling over as a result of wind or any other cause.

The Contractor shall ensure that the entrances to these toilets are adequately screened from view, that they are maintained in a hygienic state, serviced regularly, that no spillage occurs when they are cleaned and that

contents are removed from Site. Toilets shall also be emptied before any temporary site closure for a period exceeding one week. Discharge of waste from toilets into the environment and burial of waste is strictly prohibited. The Contractor shall provide toilet paper at all times.

No ablution facilities shall be located closer than 50m to any water body

A Method Statement shall be provided by the Contractor detailing the provision, location, and maintenance of ablution facilities.

#### **E4.3 Eating areas**

The Contractor shall designate eating areas within the approved Contractor's camp. The feeding of, or leaving of food for, animals is strictly prohibited. Sufficient bins, as specified in Clause E4.4 below, shall be present in these areas.

Any cooking on Site shall be done on well-maintained gas cookers with fire extinguishers present. No open fires for cooking purposes shall be permitted, unless for occasional use in facilities specifically provided for this purpose and within the confines of the Contractor's camp.

#### **E4.4 Solid waste management**

##### **E4.4.1 Litter and refuse**

The site shall be kept neat and clean at all times, littering is prohibited.

No on-site burying or dumping of any waste materials, vegetation, litter or refuse shall occur. The Contractor shall provide scavenger and weatherproof bins with lids, of sufficient number and capacity to store the solid waste produced on a daily basis. The lids shall be kept firmly on the bins at all times. Bins shall not be allowed to become overfull and shall be emptied regularly, at least once a week. Waste from bins may be temporarily stored on Site in a central waste area that is weatherproof and scavenger-proof, and which the Employer's Agent has approved. Wherever possible refuse shall be recycled, and containers for glass, paper, metals and plastics shall be provided and the contents delivered to suitable recycling facilities when necessary.

All other litter and refuse shall be disposed of off Site at an approved landfill site. The Contractor shall supply the Employer's Agent with a certificate of disposal.

##### **E4.4.2 Construction waste**

Where possible all construction waste or spoil material shall be recycled, either on Site or elsewhere. As a last resort all construction waste shall be disposed of off Site at an approved landfill site. The Contractor shall supply the Employer's Agent with a certificate of disposal.

#### **E4.5 Contaminated water management**

Potential pollutants of any kind and in any form shall be kept, stored, and used in such a manner that any spill or escape can be contained and the water table and/or any adjacent water courses or bodies are not endangered. Spill kits which can be used to contain and/or mop up spills shall be available. Water containing such pollutants as cements, concrete, lime, chemicals, oils and fuels shall be discharged into a conservancy tank for removal from the Site to a licensed disposal facility. This particularly applies to water emanating from concrete batching plants and to runoff from fuel storage, refuelling or construction equipment washing areas. Wash down areas shall be placed and constructed in such a manner so as to ensure that the surrounding areas are not polluted.

No paint products, chemical additives and cleaners, such as thinners and turpentine, may be disposed of into the stormwater system or elsewhere on Site. Brush/roller wash facilities shall be established to the satisfaction of the Employer's Agent.

A Method Statement shall be provided by the Contractor detailing the management of contaminated water.

Should contaminated water be released into the environment, specifically into a water course, monitoring thereof shall commence in accordance to the National Water Act, 36 of 1998, Section 21(f) – refer to GN 399 (26 March 2004). Contaminated water must not be released into the environment without authorisation from the relevant authority.

The Contractor shall notify the Employer's Agent immediately of any pollution incidents on Site and, at his own cost, take all reasonable measures to contain and minimise the effects of the pollution.

Any rehabilitation of the environment required as a result of such pollution shall be carried out by the Contractor at his own cost in accordance with a Method Statement approved by the Employer's Agent.

#### **E4.6 Site structures**

The type and colour of roofing and cladding materials to the Contractor's temporary structures shall be selected to reduce the visual impact.

#### **E4.7 Lights**

The Contractor shall ensure that any lighting installed on the Site for his activities does not cause a reasonably avoidable disturbance to other users of the surrounding area.

Lighting installed shall, as far as practically possible, be energy efficient. Lighting utilised on Site shall be turned off when not in use.

#### **E4.8 Workshop, equipment maintenance and storage**

No workshops or plant maintenance facilities shall be constructed on Site for performing major or routine maintenance of equipment and vehicles.

The Contractor shall ensure that in those areas where, after obtaining the Employer's Agent's approval, the Contractor carries out emergency or minor routine plant maintenance, there is no contamination of the soil, water sources or vegetation. Drip trays to collect waste oil and other lubricants shall be provided in any areas of the Site where such maintenance takes place. Drip trays must be emptied regularly and after rain, and the contents disposed of at a licensed disposal facility.

All vehicles and plant shall be kept in good working order. Leaking vehicles and plant shall be repaired immediately or removed from the Site.

The washing of vehicles and plant on Site shall be restricted to emergency or minor routine maintenance requirements only. Washing may only be undertaken in areas designated by the Employer's Agent.

#### **E4.9 Noise**

The Contractor shall limit noise levels (for example, by installing and maintaining silencers on plant). The provisions of SANS 1200A Clause 4.1 regarding "built-up areas" shall apply.

Appropriate directional and intensity settings are to be maintained on all hooters and sirens.

No amplified music shall be allowed on Site. The use of audio equipment shall not be permitted, unless the volume is kept sufficiently low so as to be unobtrusive. The Contractor shall not use sound amplification equipment on Site, unless in emergency situations.

Construction activities generating output levels of 85 dB(A) or more in residential areas, shall be confined to the hours 08h00 to 17h00 Mondays to Fridays. Should the Contractor need to do this work outside of the above times, he shall do so only with the approval of the Employer's Agent, and the surrounding communities shall be informed prior to the work taking place.

### **E5 CONSTRUCTION**

#### **E5.1 Method Statements**

The Contractor shall submit the environmental method statements required within such reasonable time as the Employer's Agent shall specify or as required by the EM Specification. The Contractor shall not commence any activity until the Method Statement in respect thereof has been approved and shall, except in the case of emergency activities, allow a period of two weeks for consideration of the Method Statement by the Employer's Agent.

The Employer's Agent may require changes to a Method Statement if the proposal does not comply with the specification or if, in the reasonable opinion of the Employer's Agent, the proposal may result in, or carries a greater than reasonable risk of, damage to the environment in excess of that permitted by the EM Specification.



**E5.2** Approved Method Statements shall be readily available on the Site and shall be communicated to all relevant personnel. The Contractor shall carry out the Works in accordance with the approved Method Statement. Approval of the Method Statement shall not absolve the Contractor from any of his obligations or responsibilities in terms of the Contract.

Changes to the way the Works are to be carried out must be reflected by amendments to the original approved Method Statements, and these amendments require the signature of both the Contractor and the Employer's Agent.

Method Statements shall consider all environmental hazards and risks identified by the Contractor and/or Employer's Agent and shall contain sufficient information and detail to enable the Employer's Agent to assess the potential negative environmental impacts associated with the proposed activity and shall cover applicable details with regard to:

- a) construction procedures,
- b) materials and equipment to be used,
- c) getting the equipment to and from Site,
- d) how the equipment/material will be moved while on Site,
- e) how and where material will be stored,
- f) the containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur,
- g) the control of fire,
- h) timing and location of activities,
- i) compliance/non-compliance with the EM Specification,
- j) any other information deemed necessary by the Employer's Agent.

The format to be used for the required method statements is bound in Annexure A of this EM Specification. The Contractor (and, where relevant, any sub-contractors) must also sign the Method Statement, thereby indicating that the work will be carried out according to the methodology contained in the approved Method Statement.

**E5.1.1** Method Statements to be provided within 14 days from the Commencement Date

- a) Layout and Preparation of Contractor's Camp (E5.4).
- b) Ablution Facilities: number of, location, cleaning, method of securing to the ground, etc. of portable toilets (E4.2).
- c) Solid Waste Management: number of, type, location, cleaning, method of securing to the ground, etc. of bins (E4.4).
- d) Environmental Awareness Training: logistics for the environmental awareness courses for all the Contractor's management staff, as well as other employees (E5.2).
- e) Emergency Procedures for Accidental Hydrocarbon Leaks and Spillages (E4.1 and E5.8).
- f) Asphalt and Bitumen: details of all methods and logistics associated with the use of bitumen and asphalt (E5.11).

**E5.2 Environmental Awareness Training**

It is a requirement of this Contract that environmental awareness training courses are run for all personnel on Site. Two types of courses shall be run: one for the Contractor's and subcontractors' management, and one for all site staff and labourers. Courses shall be run during normal working hours at a suitable venue provided by the Contractor. All attendees shall remain for the duration of the course and sign an attendance register that clearly indicates participants' names on completion, a copy of which shall be handed to the Employer's Agent. The Contractor shall allow for sufficient sessions to train all personnel. Subsequent sessions shall be run for any new personnel coming onto Site. A Method Statement with respect to the organisation of these courses shall be submitted.

Notwithstanding the specific provisions of this clause, it is incumbent upon the Contractor to convey the spirit of the EM Specification to all personnel involved with the Works.

#### **E5.2.1     Training Course for Management and Foremen**

The environmental awareness training course for management shall include all management and foremen. The course, which shall be presented by the Employer's Agent or his designated representative, shall be of approximately one hour duration. The course shall be undertaken prior to the commencement of work on Site.

#### **E5.2.2     Training Course for Site Staff and Labour**

The environmental awareness training course for site staff and labour shall be presented by the Contractor from material provided by the Employer's Agent. The course shall be approximately one hour long. The course shall be undertaken not later than 3 working days after the commencement of work on Site, with sufficient sessions to accommodate all available personnel.

All the Contractor's employees, sub-contractors' employees and any suppliers' employees that spend more than 1 day a week or four days in a month on Site shall attend the Environmental Awareness Training Course for Site Staff and Labour

#### **E5.3        Contractor's Environmental Representative (ESO)**

The Contractor shall appoint an environmental representative, also called an Environmental Site Officer (ESO), who shall be responsible for undertaking a daily site inspection to monitor compliance with this EM Specification. The Contractor shall forward the name of the environmental representative (ESO) to the Employer's Agent for his approval. The environmental representative (ESO) shall complete Environmental Site Inspection Checklists (Annexure B attached hereto) and these shall be submitted to the Employer's Agent once a week.

#### **E5.4        Site division, demarcation and "no go" areas**

The Contractor shall restrict all his activities, materials, plant and personnel to within the Site or any particular working areas specified or indicated on the drawings.

The Contractor shall erect and maintain permanent and/or temporary fences of the type and in the locations specified elsewhere in the Scope of Work or on the drawings. Such fences shall, if so specified, be erected before undertaking any construction activities.

Where environmentally sensitive areas are specified as "no go" areas, the Contractor shall ensure that, insofar as he has the authority, no person, plant or material shall enter the "no go" areas at any time.

A Method Statement detailing the layout and method of establishment of the Contractor's camp (including all offices, shelters, eating areas, storage areas, ablution facilities and other infrastructure required for the running of the project) shall be provided.

#### **E5.5        Access routes/ haul roads**

On the Site and, if so required, within such distance of the Site as may be stated by the Employer's Agent, the Contractor shall control the movement of all vehicles and construction equipment, including that of his suppliers, so that they remain on designated routes, are distributed so as not to cause an undue concentration of traffic, and that all relevant laws are complied with. In addition, the movement of such vehicles and construction equipment shall be planned and operated so as to minimise disruption to regular users of the routes. As far as possible the Contractor shall use existing access and haul routes. Damage to existing access roads as a result of construction activities shall be repaired to the satisfaction of the Employer's Agent, using material similar to that originally used. The cost of the repairs shall be borne by the Contractor. New temporary access or haul routes may only be established with the prior approval of the Employer's Agent. The rehabilitation of such routes shall be to the Contractor's own cost and to the approval of the Employer's Agent.

Any directional signage required by the Contractor for the purposes of directing the movement of his own vehicles and construction equipment (or that of his subcontractors or suppliers) must be of a design and in a location approved by the Employer's Agent. Directional signage may not be erected in such a manner that it interferes with sight lines or pedestrian movement.

**E5.6****E5.7 Construction personnel information posters**

The Contractor shall erect and maintain information posters for the information of his employees, depicting actions to be taken to ensure compliance with aspects of the EM Specification. A2 information posters, printed on white vinyl, shall be erected at the eating areas and any other locations specified by the Employer's Agent.

The specification for the poster is presented in Annexure C of this EM Specification. The symbols shall be black and the circles shall be red lines. The Contractor shall ensure that the construction personnel information posters are not damaged in any way, and shall replace a poster if any part of it becomes illegible.

**E5.8 Fire control**

Other than for cooking purposes as specified in Clause E4.3, no fires may be lit on Site. Any fires which occur shall be reported to the Employer's Agent immediately.

Smoking shall not be permitted in those areas where it is a fire hazard. Such areas shall include fuel storage and refuelling areas, and any other areas where the vegetation or other materials are susceptible to the start and rapid spread of fire.

In terms of the National Environment Management: Air Quality Act, 39 of 2004 and Community Fire Safety By-law, burning is not permitted as a disposal method.

The Contractor shall appoint a Fire Officer (who may be the ESO) who shall be responsible for ensuring immediate and appropriate actions in the event of a fire and shall ensure that employees are aware of the procedure to be followed. The Contractor shall advise the relevant authority of a fire as soon as one starts and shall not wait until he can no longer control it. The Contractor shall forward the name of the Fire Officer to the Employer's Agent for his approval.

The Contractor shall comply with Clause 27 of the Construction Regulations, 2014 where applicable, and shall ensure that there is suitable and sufficient fire-fighting equipment available on Site at all times.

The Contractor shall be liable for any costs relating to the rehabilitation of burnt areas, should the fire be the result of the Contractor's activities on Site

The Contractor shall submit a Method Statement to the Employer's Agent covering the procedure to be followed in the event of a fire.

**E5.9 Emergency procedures**

The Contractor's attention is drawn to the Method Statements required in terms of Clauses E4.1 and E5.7 above. Such Method Statements shall include procedures to be followed by the Contractor in the event of an emergency.

Furthermore, in the event of an emergency the Contractor shall contact the City of Cape Town's Emergency Call Centre by telephoning 107 or 021 480 7700 (from a cell phone). Telephone numbers of emergency services, including the local fire fighting service, shall be posted conspicuously in the Contractor's office near the telephone.

**E5.10 Health and safety**

The Contractor shall comply with requirements of the Occupational Health and Safety Act, 85 of 1993 and Construction Regulations, 2014, the Health and Safety Specification and relevant clauses of GCC 2015, insofar as health and safety is concerned.

**E5.11 Community relations**

If so required, the Contractor shall erect and maintain information boards in the position, quantity, design and dimensions specified in the Scope of Work or as directed by the Employer's Agent. Such boards shall include contact details for complaints by members of the public in accordance with details provided by the Employer's Agent.

The Contractor shall keep a "Complaints Register" on Site. The Register shall contain all contact details of the person who made the complaint, and information regarding the complaint itself.

**E5.12****E5.13 General protections in terms of the National Heritage Resources Act, 25 of 1999**

The Contractor shall take cognisance of the provisions of the National Heritage Resources Act, 25 of 1999 in respect of, *inter alia*, structures older than 60 years; archaeology, palaeontology and meteorites; burial grounds and graves; and public monuments and memorials.

**E5.14 Protection of natural features**

The Contractor shall not deface, paint, damage or mark any natural features (e.g. rock formations) situated in or around the Site for survey or other purposes, unless agreed beforehand with the Employer's Agent. Any features affected by the Contractor in contravention of this clause shall be restored/ rehabilitated to the satisfaction of the Employer's Agent. The cost of restoration/rehabilitation shall be borne by the Contractor.

The Contractor shall not permit his employees to make use of any natural water sources (e.g. springs, streams, open water bodies) for the purposes of swimming, personal washing and the washing of machinery or clothes.

**E5.15 Protection of flora and fauna**

Except to the extent necessary for the carrying out of the Works, as specified by the Employer's Agent, no vegetation shall be removed, damaged or disturbed.

The presence of any wild animals found on Site shall be reported to the Employer's Agent, who shall issue an instruction with regard to their removal or relocation. If a wild animal needs removal from the Site the Cape Nature (Metro Region) Conservation Services Manager may be contacted for assistance (tel 021 955 9132/9121/3122/9130). Trapping poisoning, injuring or shooting animals is strictly forbidden. No domestic pets or livestock are permitted on Site, with the exception of controlled watchdogs approved by the Employer's Agent.

Where the use of herbicides, pesticides and other poisonous substances has been specified, the Contractor shall submit a Method Statement to the Employer's Agent for approval.

**E5.16 Erosion and sedimentation control**

The Contractor shall take all reasonable measures to limit erosion and sedimentation due to the construction activities and shall, in addition, comply with such detailed measures as may be required by the Scope of Work. Where erosion and/or sedimentation, whether on or off the Site, occurs, rectification shall be carried out in accordance with details specified by the Employer's Agent. Where erosion and/or sedimentation occur due to the fault of the Contractor, rectification shall be carried out to the reasonable requirements of the Employer's Agent, at the Contractor's cost. In particular, the Contractor shall ensure that the City's stormwater system is kept free from sediment arising from the Works.

Any runnels or erosion channels developed during the construction period or during the vegetation establishment period shall be backfilled and compacted, and the areas restored to a proper condition. Stabilisation of cleared areas to prevent and control erosion shall be pro-actively managed by the Contractor. The method of stabilisation shall be determined in consultation with the Employer's Agent.

**E5.17 Aesthetics**

The Contractor shall take any requisite measures to ensure that construction activities do not have an undue negative impact on the aesthetics of the area.

**E5.18 Temporary site closure**

In the event of temporary site closure (for a period exceeding one week), the Contractor's ESO shall carry out checks and ensure that, amongst others, the following conditions pertain and report on compliance with this clause:

- a) Fire extinguishers are serviced and accessible.
- b) There is adequate ventilation in enclosed spaces.
- c) All hazardous substance stores are securely locked.
- d) Fencing and barriers are in place.
- e) Emergency and management contact details are prominently displayed and available.
- f) Wind and dust mitigation measures, e.g. straw, brush packs, irrigation, etc. are in place.
- g) Excavated and filled slopes and stockpiles are at a stable angle and capable of accommodating normal expected water flows.
- h) There are sufficient detention ponds or channels in place.
- i) Cement and materials stores are secured.
- j) Toilets are empty and secured.
- k) Central waste area and all refuse bins are empty and secured.
- l) Contaminated water conservancy tank empty.

- m) Any bunded areas are clean and treated with an approved product where applicable (e.g. Spill Sorb or Enretech #1 powder or equivalent).
- n) Drip trays are empty and secure

#### **E5.19 Asphalt and bitumen**

Bitumen drums/products, if stored on Site, shall be stored in an area approved by the Employer's Agent. This area shall be indicated on the Method Statement for the Layout and Preparation of the Contractor's Camp. The storage area shall be constructed with an appropriate base, bunding and sump to the satisfaction of the Employer's Agent. A Method Statement shall be provided in this regard.

When heating bitumen products, the Contractor shall take cognisance of appropriate fire risk controls. Heating shall only be undertaken using LPG or similar zero emission fuels. Appropriate fire fighting equipment shall be readily available on Site.

#### **E5.20 Dust**

The Contractors shall be solely responsible, at his cost, for the control of dust arising from his activities on Site, and for any costs involved in damages resulting from the dust. The Contractor shall take all reasonable measures to minimise the generation of dust

#### **E5.21 Contractor's advertising signage**

Any advertising on the Site or any part of the Works shall remain at the sole discretion of the Employer, who reserves the right to order, via the Employer's Agent, its removal, covering or re-sizing, wherever placed, at no cost to the Employer.

Apart from at the Contractor's camp, no signage advertising the Contractor, or any of its subcontractors, manufacturers, suppliers or service providers shall be placed, fixed or erected anywhere on the Site or on the Works without the prior approval of the Employer's Agent. No advertising signage will be permitted on any designated scenic route. Notwithstanding any prior approval given, the Employer's Agent may instruct the Contractor to remove, cover or re-size any advertising signage at any time at no cost to the Employer.

Advertising signage at the Contractor's camp shall be appropriately designed and sized with due consideration to the surrounding environment, views and sight lines.

Branding or identification markings on the Contractor's and subcontractor's vehicles and equipment is generally permitted, although the Employer reserves the right to instruct, via the Employer's Agent, the removal, covering or re-sizing of any branding, markings or signage, on any equipment (scaffolding, for example), which it considers inappropriate in the environment in which it is placed.

No third party advertising (that is, in respect of any person, business or product that is not associated with the Works) shall be permitted anywhere on the Site or Works.

#### **E5.22 Clearance of Site on completion**

On completion of the Works, and at final completion when all defects have been remedied or corrected, the Contractor shall, in addition to the requirements for clearance of the Site in terms of the Contract, ensure that he has complied with the following requirements in terms of this EM Specification:

##### **E5.22.1 Clause E3.1**

Clean-up of improperly secured transported materials, and rehabilitation of storage areas.

##### **E5.22.2 Clause E4.1.3**

Remediation of hydrocarbon spill and leak areas.

##### **E5.22.3 Clause E4.4**

Disposal of litter, refuse and Contractor's waste.

##### **E5.22.4 Clause E5.4**

Removal of temporary fences and Contractor's camp.

E5.22.5

E5.22.6 Clause E5.5

Repair of access roads damaged by the Contractor, and rehabilitation of temporary access routes.

E5.22.7 Clause E5.7

Rehabilitation of burnt areas should a fire be the result of Contractor's activities on Site.

E5.22.8 Clauses E5.11 to 5.13

Rehabilitation of heritage and natural features, including vegetation which is damaged or disturbed, which required protection in terms of these clauses.

E5.22.9 Clause E5.14

Rectification where erosion and/or sedimentation has occurred due to the fault of the Contractor .

E5.22.10 Clause E5.19

Removal of Contractor's advertising signage.

## **E6 TOLERANCES**

### **E6.1 Fines**

Environmental management is concerned not only with the final results of the Contractor's operations, but also with the control of how these operations are carried out. Tolerance with respect to environmental matters applies not only to the finished product, but also to the standard of the day-to-day operations required to complete the Works.

It is thus required that the Contractor shall comply with the EM Specification on an on-going basis and any failure on his part to do so will entitle the Employer's Agent to certify the imposition of a fine. Fines may be issued per incident at the discretion of the Employer's Agent. Such fines will be issued in addition to any remedial costs incurred as a result of non-compliance with the environmental specifications. The Employer's Agent will inform the Contractor of the contravention and the amount of the fine, and will deduct the amount from monies due in payment certificates issued under the Contract.

Maximum fines for the following transgressions by either the Contractor and/or his sub-contractors may be imposed by the Employer's Agent, as follows:

|                                                                                                                                                                                                                                                                                      | Maximum fine |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
|                                                                                                                                                                                                                                                                                      | ██████████   |
| a) Vehicles, plant or materials related to the Contractor's operations, parked or stored outside the demarcated boundaries of the Site.                                                                                                                                              | ██████████   |
| b) Persons, vehicles, plant or materials related to the Contractor's operations, found within the designated boundaries of a "no go" area.                                                                                                                                           | ██████████   |
| c) Persistent and unrepaired oil leaks from machinery/not using a drip tray to collect waste oil and other lubricants/not using specified absorbent material to encapsulate hydrocarbon spillage/using inappropriate methods of refuelling (the use of a funnel rather than a pump). | ██████████   |
| d) Refuelling in areas not approved by the Employer's Agent.                                                                                                                                                                                                                         | ██████████   |
| e) Litter on Site.                                                                                                                                                                                                                                                                   | ██████████   |
| f) Deliberate lighting of fires on Site.                                                                                                                                                                                                                                             | ██████████   |
| g) Individual not making use of the Site ablution facilities.                                                                                                                                                                                                                        | ██████████   |
| h) Damage to trees not specified to be removed.                                                                                                                                                                                                                                      | ██████████   |
| i) Dust or excessive noise emanating from the site                                                                                                                                                                                                                                   | ██████████   |
| j) Not containing water contaminated with pollutants such as cement, concrete, fuel, etc.                                                                                                                                                                                            | ██████████   |

For each subsequent similar offence the fine shall be doubled in value to a maximum value of ██████████

**E7 TESTING**

Not applicable to this tender.

**E8 MEASUREMENT AND PAYMENT**

**E8.1 Basic principles**

Except where separate pay items have been measured in the Bills of Quantities, all costs in respect of complying with the EM Specification are deemed to be covered by the sum tendered for complying with the EM Specification.



## ANNEXURE A: ENVIRONMENTAL METHOD STATEMENT

**CONTRACT:**.....

**DATE:**.....

**PROPOSED ACTIVITY** (give title of method statement and reference number from the EMP):

**WHAT WORK IS TO BE UNDERTAKEN** (give a brief description of the works - attach extra information to ensure accurate description given):

**WHERE THE WORKS ARE TO BE UNDERTAKEN** (where possible, provide an annotated plan and a full description of the extent of the works):

**START AND END DATE OF THE WORKS FOR WHICH THE METHOD STATEMENT IS REQUIRED:**

Start Date:

End Date:





**HOW THE WORKS ARE TO BE UNDERTAKEN** (provide as much detail as possible, including annotated sketches and plans where possible):



Note: please give too much information rather than too little. Please ensure that issues such as emergency procedures, hydrocarbon management, wastewater management, access, individual responsibilities, materials, plant used, maintenance of plant, protection of natural features, etc. are covered where relevant



## **DECLARATIONS**

### **1) EMPLOYER'S AGENT'S REPRESENTATIVE/ENVIRONMENTAL OFFICER/ENVIRONMENTAL CONTROL OFFICER**

The work described in this Method Statement, if carried out according to the methodology described, appears to be satisfactorily mitigated to prevent avoidable environmental harm:

\_\_\_\_\_  
(signed)

\_\_\_\_\_  
(print name)

Dated: \_\_\_\_\_

### **2) CONTRACTOR**

I understand the contents of this Method Statement and the scope of the works required of me. I further understand that this Method Statement may be amended on application to other signatories and that the Employer's Agent's Representative/Environmental Officer/Environmental Control Officer will audit my compliance with the contents of this Method Statement. I understand that this method statement does not absolve me from any of my obligations or responsibilities in terms of the Contract.

\_\_\_\_\_  
(signed)

\_\_\_\_\_  
(print name)

Dated: \_\_\_\_\_

### **3) EMPLOYER'S AGENT**

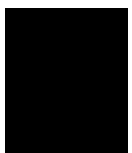
The works described in this Method Statement are approved.

\_\_\_\_\_  
(signed)

\_\_\_\_\_  
(print name)

\_\_\_\_\_  
(designation)

Dated: \_\_\_\_\_



**ANNEXURE B: ENVIRONMENTAL SITE INSPECTION CHECKLIST  
TO BE SUBMITTED TO THE EMPLOYER'S AGENT ONCE A WEEK**

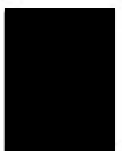
CONTRACT: .....

DATE: .....

| ENVIRONMENTAL ASPECT                                                                                                                   | YES/ NO<br>(✓ or X) | COMMENTS |
|----------------------------------------------------------------------------------------------------------------------------------------|---------------------|----------|
| • All new personnel on Site are aware of the contents of the EMP and have been through the environmental awareness course.             |                     |          |
| • Contractor's camp is neat and tidy and the labourers' facilities are of an acceptable standard.                                      |                     |          |
| • Sufficient and appropriate fire fighting equipment is visible and readily available in the appropriate places.                       |                     |          |
| • Waste control and removal system is being maintained.                                                                                |                     |          |
| • Fences are being maintained.                                                                                                         |                     |          |
| • Drip trays are being utilised where there is a risk of spillage.                                                                     |                     |          |
| • Bunded areas/drip trays are being emptied on a regular basis (especially after rain).                                                |                     |          |
| • No leaks are visible from construction vehicles.                                                                                     |                     |          |
| • Refuelling of vehicles and plant occurs within designated areas, and appropriate refuelling apparatus and drip trays are being used. |                     |          |
| • "No go" areas, natural features, vegetation, etc. have not been damaged.                                                             |                     |          |
| • Dust control measures (if necessary) are in place and are effectively controlling dust.                                              |                     |          |
| • Noise control measures (if necessary) are in place and are working effectively.                                                      |                     |          |
| • Erosion and sedimentation control measures (if necessary) are in place and are controlling effectively.                              |                     |          |
| • Material stockpiles are located within the boundary of the Site and are protected from erosion.                                      |                     |          |
| • Other                                                                                                                                |                     |          |

Completed by: .....

Signed: .....



## ANNEXURE C: CONSTRUCTION PERSONNEL INFORMATION POSTER

| ENVIRONMENTAL MANAGEMENT DO'S AND DON'TS                                              |                                                                                                                                                                                                                                                           |                                                                                      |                                                                                                                                                                              |
|---------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | Workers & equipment must stay inside the site boundaries at all times                                                                                                                                                                                     |    | Use the toilets provided<br>Report full or leaking toilets                                                                                                                   |
|    | Do not swim in or drink from streams<br>Do not throw oil, petrol, diesel, concrete or rubbish in the stream<br>Do not work in the stream without direct instruction<br>Do not damage the banks or vegetation of the stream                                |    | Only eat in demarcated eating areas<br>Never eat near a river or stream<br>Put packaging & leftover food into rubbish bins                                                   |
|    | Protect animals on the site<br>Ask your supervisor or Contract's Manager to remove animals found on site                                                                                                                                                  |    | Do not litter - put all rubbish (especially cement bags) into the bins provided<br>Report full bins to your supervisor<br>The responsible person should empty bins regularly |
|    | Do not damage or cut down any trees or plants without permission<br>Do not pick flowers                                                                                                                                                                   |    | Always keep to the speed limit<br>Drivers - check & report leaks<br>Ensure loads are secure & do not spill                                                                   |
|   | Put cigarette butts in a rubbish bin<br>Do not smoke near gas, paints or petrol<br>Do not light any fires without permission<br>Know the positions of fire fighting equipment<br>Report all fires<br>Do not burn rubbish or vegetation without permission |   | Know all the emergency phone numbers                                                                                                                                         |
|  | Work with petrol, oil & diesel in areas marked for this<br>Report any petrol, oil & diesel leaks or spills<br>Use a drip tray under vehicles & machinery<br>Empty drip trays after rain & do not throw this water into a river                            |  | Fines of between R1000 and R5000<br>Removal from site<br>Construction may be stopped                                                                                         |
|  | Try to avoid producing dust - wet dry ground & soil                                                                                                                                                                                                       |  | Report any breaks, floods, fires, leaks and injuries to your supervisor<br>Ask questions!                                                                                    |
|  | Do not make loud noises around the site, especially near schools and homes<br>Report or repair noisy vehicles                                                                                                                                             |                                                                                      |                                                                                                                                                                              |

## **ANNEXURE D: ADDITIONAL ENVIRONMENTAL ISSUES DEEMED TO FORM PART OF THE ENVIRONMENTAL MANAGEMENT PROGRAMME**

Listed below are issues pertaining to the environment that form part of the Contract Document. The clause references relate to the **General Conditions of Contract for Construction Works, Third Edition, 2015 (GCC 2015)**. They are listed here to emphasise that they form part of the environmental considerations and requirements for this project. They must be read together with any Contract Specific Data referring thereto in Part C1.2 Contract Data. The comments made below on the various issues are to be taken as explanatory, in so far as environmental matters are concerned, and do not modify the clauses in any way.

### **1. Monitoring**

Clause 3.1.1 makes provision for the Employer's Agent to administer the Contract in accordance with the provisions of the Contract, including the monitoring of any environmental variables.

### **2. Health and safety**

Clauses 3.1.4, 4.3.1, 4.3.2 and 4.10.1 remind the Contractor of his obligations in terms of the Occupational Health and Safety Act (No. 85 of 1993) and Construction Regulations 2014.

Clause 5.7 of SANS 1200A reinforces these requirements through the observation of proper and adequate safety arrangements.

### **3. Employer's Agent's authority to delegate**

Clause 3.2.4 gives the Employer's Agent the authority to appoint a representative to act as the Environmental Officer (EO) for the Contract. The EO, who shall be responsible for monitoring compliance with the EMP, may be the Employer's Agent's Representative or any other person accountable to the Employer's Agent.

### **4. Employer's Agent's instructions**

Clause 4.2.1 requires that the Contractor comply with the Employer's Agent's instructions on any matter relating to the Works. Moreover, Clause 4.2.2 ensures that the Contractor only takes instructions from the Employer's Agent, the Employer's Agent's Representative or a person authorised by the Employer's Agent in terms of Clause 3.2.4.

### **5. Compliance with applicable laws**

Clause 4.3.1 requires that the Contractor comply with all applicable laws, regulations, etc. in fulfilling the Contract.

### **6. Protection of fossils, etc.**

Clause 4.7.1 requires the Contractor to take reasonable precautions to prevent any person from damaging, *inter alia* anything of geological or archaeological interest, and requires that he inform the Employer's Agent and follows any instructions issued in this regard.

### **7. Housing, food and transport**

Clause 4.10.1 requires the Contractor to make his own arrangements for payment, housing, feeding and transport for his employees, provided that if he uses any part of the Site for such purposes he shall obtain the Employer's Agent's prior approval.

Clause 4.2 of SANS 1200A further requires that facilities provided comply with local authority regulations and are maintained in a clean and sanitary condition.

### **8. Competent employees**

Clause 4.11.1 requires that all persons employed on Site are careful, competent, and efficient. These attributes embrace knowledge of the environmental matters and issues dealt with in the EMP.

### **9. Removal from Site**

Clause 4.11.2 makes provision for the Employer's Agent to instruct the removal from the Works and Site of any person who is guilty of misconduct, or is incompetent or negligent, or is an undesirable presence on Site.

Clause 7.1.1 requires that all Construction Equipment be in good working order. Accordingly, the Employer's Agent may order that any Construction Equipment not complying with the environmental specifications be removed from Site.

**10. Unacceptable documentation**

Clauses 5.3.1 and 5.3.2 require the Contractor to provide documentation required before commencement with Works execution, failing which the Employer may terminate the Contract. Such documentation includes the Protection of the Environment Declaration provided for in the Contract Document.

**11. Programme and Method Statements**

Clause 5.6.1 makes provision for the Employer's Agent to request the programmes for carrying out the Works.

Clause 5.6.2 makes provision for the Employer's Agent to request statements from the Contractor for the entire scope of the work. In the case of the environmental specifications, these would be submitted as Method Statements.

**12. Hours of operation**

Clause 5.8.1 restricts the Contractor's hours of operation to between sunrise and sunset on working days (usually from Monday to Saturday), unless, *inter alia*, permitted by the Employer's Agent in writing.

Clause 5.7.2 further requires that in the event that permission is granted for night work, then such work shall be carried out without excessive noise and disturbance.

**13. Suspension of Works**

Clause 5.11.1 enables the Employer's Agent to suspend the progress of the Works or any part thereof, which may be as a result of some default or breach of the Contract on the part of the Contractor.

**14. Site clean-up**

Clause 5.15.1 requires that, on completion of the Works, the Contractor shall clear away and remove from the Site all Construction Equipment, surplus materials, rubbish and Temporary Works of every kind and leave the whole of the Site and Works clean and in a safe condition. All streams and watercourses shall be restored to the condition as at the commencement of the Works. Should the Contractor fail to do the work upon notice from the Employer's Agent, the Employer may in terms of Clause 7.8.3, employ others to carry out the work and recover the cost of doing so from the Contractor.

**15. Access to the Works**

Clause 7.3.1 makes provision for the Employer's Agent to authorise the Environmental Officer (EO) to have access to the Works and Site.

**16. Pollution prevention and interferences**

Clause 8.1.2 requires that all operations necessary for the execution of the Works be carried out so as not to cause unnecessary noise or pollution, or to interfere unnecessarily or improperly with public services, or the access to, use and occupation of public or private roads and footpaths or properties.

Clause 5.6 of SANS 1200A further requires the Contractor to minimise dust nuisance and pollution of streams and inconvenience to or interference with the public.

**17. Dust**

Clause 8.1.2 requires that all operations necessary for the execution of the Works be carried out so as not to cause unnecessary pollution.

Clause 5.6 of SANS 1200A requires that the Contractor take all reasonable measures to minimise any dust nuisance.



**18. Noise**

Clause 8.1.2 requires that all operations necessary for the execution of the Works be carried out so as not to cause unnecessary noise.

Clause 4.1 of SANS 1200A requires that when working in built-up areas, the Contractor shall provide and use suitable and effective silencing devices for pneumatic tools and other plant that would otherwise cause a noise level exceeding 85dB.

**19. Protection of existing environment**

Clause 8.1.3 requires that the Contractor uses every reasonable means to prevent any roads or bridges to or in the vicinity of the Site being subjected to damage by excessive loads, or disruption due to excessive traffic, occasioned by his transport arrangements.

**20. Reinstatement**

Clauses 8.2 and 8.4 make provision for the Contractor to repair and make good any damage to the Works in his care (other than "excepted risks"), and bear any costs associated with such reinstatement.

**21. Reporting accidents**

Clause 8.5.1 requires the Contractor to report to the Employer's Agent every occurrence on the Site which causes environmental damage.



## ANNEXURE E: PROJECT SPECIFIC CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

### ABBREVIATIONS AND ACRONYMS

For the purposes of this document the following acronyms shall apply:

|                 |                                                                      |
|-----------------|----------------------------------------------------------------------|
| <b>CBA</b>      | Critical Biodiversity Area                                           |
| <b>CCT</b>      |                                                                      |
| <b>CCT: ERM</b> |                                                                      |
| <b>CEMP</b>     | Construction Environmental Management Programme                      |
| <b>CFSF</b>     | Cape Flats Sand Fynbos                                               |
| <b>CLO</b>      | Community Liaison Officer                                            |
| <b>ECO</b>      | Environmental Control Officer                                        |
| <b>EO</b>       | Environmental Officer                                                |
| <b>ESA</b>      | Ecological Support Areas                                             |
| <b>HWC</b>      | Heritage Western Cape                                                |
| <b>NEMA</b>     | National Environmental Management Act (No. 107 of 1998)              |
| <b>NHRA</b>     | National Heritage Resources Act (No. 25 of 1999)                     |
| <b>NWA</b>      | National Water Act (No. 36 of 1998)                                  |
| <b>NEMBA</b>    | National Environmental Management: Biodiversity Act (No. 10 of 2004) |

### DEFINITIONS

For the purposes of this document the following definitions shall apply:

**Affected Environment:**

Those parts of the socio-economic and biophysical environment impacted on by the development

**Bund:**

Enclosure under / around a storage facility to contain any spillage.

**Batch plant:**

Site for the large-scale mixing and production of concrete or plaster, and associated equipment and materials.

**Contractor:**

The principal persons /company undertaking the construction of the development.

- The main contractor as engaged by the developer;
- Selected subcontractors; and
- Any other contractor from time to time engaged by the developer directly in connection with the construction part of the works.

**Contaminated water:**

Means water contaminated by the contractor's activities, e.g. concrete water and runoff from plant/personnel wash areas.

**Construction camp:**

Means the area designated for all temporary site offices, storage sheds and areas, parking areas, maintenance workshops, staff welfare facilities, accommodation, etc.

**Construction Environmental Management Programme (EMPr):**

The construction phase Environmental Management Programme, containing the environmental specifications for civil and building works, also forming part of the civils and building contract documentation.

**Engineer:**

A person representing the developer on site and who is responsible for the technical and contractual implementation of the works to be undertaken. This is usually the engineer, but may be any other person, such as an architect or project manager, authorised by the developer to fulfil this role.

**Environment:**

Means the surroundings within which humans exist and that are made up of the land, water and atmosphere of the earth:

- micro-organisms, plant and animal life;
- any part or combination of the above and the interrelationships among and between them; and



- the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

**Environmental Education Programme:**

An environmental education course for the contractor's management staff and labour force, which informs them of the requirements of the EMPr. The ECO will present and co-ordinate courses.

**Environmental Control Officer (ECO):**

The individual or company appointed by the developer to ensure the implementation of the CEMP and suitable environmental management practices on site for the duration of the construction phase of the project.

**Environmental Impact Assessment (EIA):**

A process of collecting, analysing, interpreting and communicating data as it pertains to possible impacts (positive and negative) upon the environment due to a development.

**Environmental Officer (EO):**

The person appointed by the Contractor to ensure implementation of the EMPr on site.

**Heritage Western Cape (HWC):**

The statutory provincial body responsible for heritage resource management, in the Western Cape.

**Method Statement:**

A written submission by the contractor to the engineer and ECO in response to the specifications or a request by the engineer, setting out the plant, materials, labour and method the contractor proposes using to carry out an activity, identified by the relevant specification or the engineer when requesting the Method Statement, in such detail that the engineer is enabled to assess whether the contractor's proposal is in accordance with the specifications and/or will produce results in accordance with the specifications.

The Method Statement shall cover applicable details with regard to:

- construction procedures,
- materials and plant to be used,
- getting the plant to and from site,
- how the plant/ material will be moved while on site,
- how and where material will be stored,
- the containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur,
- timing and location of activities,
- compliance/ non-compliance with the specifications,
- any other information deemed necessary by the engineer.

**Mitigation:**

The implementation of practical measures to reduce adverse impacts

**No Go Areas:**

Areas identified as being environmentally sensitive in some manner and delineated on plan, and on the site with pegs or fencing and which are out of bounds to unauthorised persons. Authorisation must be obtained prior to entry.

**Potentially hazardous substance:**

Is a substance, which, in the reasonable opinion of the engineer, can have a deleterious effect on the environment.

**Reasonable:**

Means, unless the context indicates otherwise, reasonable in the opinion of the engineer after he has consulted with a person, not an employee of the Employer, suitably experienced in "environmental implementation plans" and "environmental management plans" (both as defined in the National Environmental Management Act (No. 107 of 1998)).

**Site:**

The boundary and extent of development works and infrastructure, including any areas off the main site on which works are to be carried out in order to allow the development to proceed successfully.

**Solid waste:**

Means all solid waste, including construction debris, chemical waste, excess cement/ concrete, wrapping materials, timber, tins and cans, drums, wire, nails, food and domestic waste (e.g. plastic packets and wrappers).



**Specification:**

A technical description of the standards of materials and workmanship that the contractor is to use in the works to be executed, the performance of the works when completed and the manner in which payment is to be made.

**Top material:**

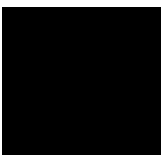
This refers to any surface material in the construction area, whether it is soil, fine material or stones including vegetation.

**Topsoil:**

Means the top 100mm of soil and may include vegetation and rocks.

**Works:**

The construction operations and all related and incidental works, such as site works, earthworks, installation of services, rehabilitation etc., in connection with the execution and carrying to completion of the development.



# 1. INTRODUCTION

## 1.1. PURPOSE OF THE CEMP

The purpose of the CEMP is to provide a framework within which all environmental requirements during construction activities can be met and adverse impacts can be avoided and mitigated, where possible.

The CEMP provides specific environmental guidance for the construction phase activities for the Voortrekker Road Upgrade project and stipulates the required environmental monitoring and reporting that is anticipated for the duration the construction activities.

The CEMP presents the project's environmental commitment, management planning, works procedures and implementation. It is a proactive tool that provides the developer, contractors, and sub-contractors an overview of the measures that will ensure that potential environmental hazards and the associated risks will be minimised or mitigated during the construction works. Thus, this CEMP will aid in minimizing the environmental footprint of the projects, ensures compliance with regulations, protects ecosystems, and maintains positive relationships with the surrounding community.

The intent of CEMP is to achieve the following overarching objectives,

- Ensure that principal contractors have a clear understanding of environmental requirements for the site and receive appropriate training to perform their duties in a competent manner;
- Comply with relevant regulatory environmental management legislation; and
- Ensure to prevent and minimise environmental incidents during demolition and construction activities on site.

## 1.2. SCOPE OF CEMP

The upgrade of Voortrekker Road through road widening, redesigning intersections and improvement of pedestrian infrastructure would entail various construction related activities. This CEMP document covers the Construction Phase of the project.

As such, this Construction Environmental Management Plan (CEMP) must be implemented during the proposed construction activities associated with the upgrade of the Voortrekker roadway. The measures herein must also be read in conjunction with the Record of Decision (ROD) issued by the Heritage Western Cape (HWC), and any further conditions stipulated by the City of Cape Town.

The CEMP consists of the following components:

|                                                                                  |                                                                                                                                                                                                       |
|----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Section 1:</b> Introduction                                                   | Provides background information regarding the site, the proposed development and the CEMP.                                                                                                            |
| <b>Section 2:</b> Implementation of the CEMP during the Construction Phase       | Provides details of the communication and organisational structures within which the CEMP will be implemented, responsibilities of key role players, and provides the terms of reference for the ECO. |
| <b>Section 3:</b> Environmental Management Specifications for Construction Phase | Provides all construction phase environmental management requirements applicable to the principal construction contractors, and their subcontractors.                                                 |

## 1.3. BACKGROUND & SITE LOCATION

The proposed upgrade project is located within Voortrekker Road, Maitland. The construction footprint extends from the intersection with the M5 highway to 12th Avenue (refer to Figure 2).



Figure 2.

The site lies within the Ward 56 of Subcouncil 3. Details of the landowner's representative are detailed in Table 1 below.

Table 1. Landowner representative

| Landowner Details              |  |
|--------------------------------|--|
| Full Name                      |  |
| Contact Representative Details |  |
| Physical Address               |  |
| Telephone                      |  |

Based on a desktop investigation and site inspection, the site is located within a densely urban area that has been completely transformed by historic development activities. The site itself is an existing road that is abutted by both commercial properties as well as the Maitland cemetery.

Vegetation within the site is limited to landscaped trees which are located on either side of the roadway throughout the construction footprint.





Figure 3. Voortrekker roadway (captured 08/05/2024)



Figure 4. Intersection with M5 highway (captured 08/05/2024)



Figure 5. Pedestrian road reserve (captured 08/05/2024)



Figure 6. Road Median (captured 08/05/2024)



Figure 7. MyCiTi bus stop with pedestrian crossing. Commercial buildings and apartments visible in the background (captured 08/05/2024)



Figure 8. Landscaped mature trees observed along the roadway (captured 08/05/2024)





Figure 9. Degraded road infrastructure (captured 08/05/2024)

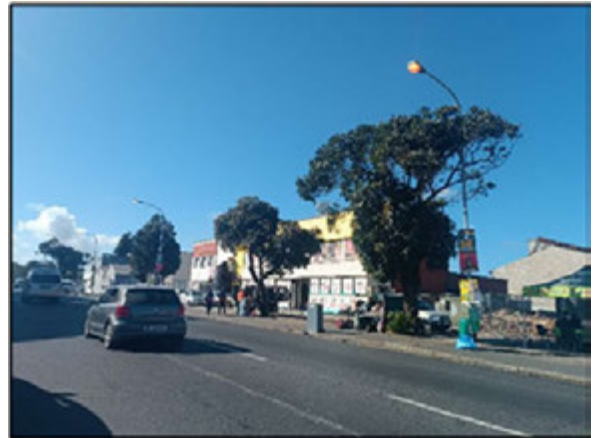


Figure 10. Landscaped mature trees observed along the roadway (captured 08/05/2024)



Figure 11. Landscaped mature trees observed along the roadway (captured 08/05/2024)



Figure 12. Degraded cemetery wall (captured 08/05/2024)

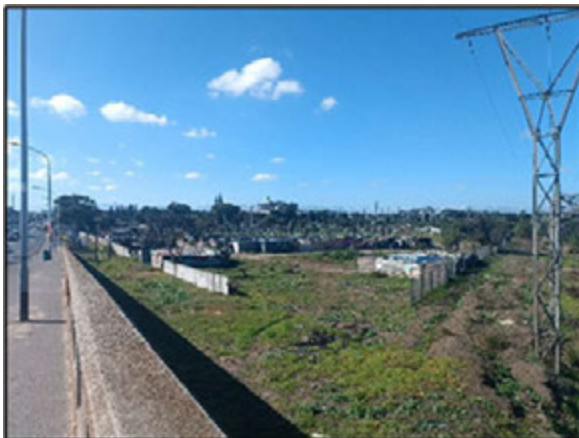


Figure 12. Open field and informal settlement located adjacent to the road area (captured 08/05/2024)



Figure 13. Central railway line (captured 08/05/2024)



#### 1.4. PROJECT SCOPE

The site layout and development plans (not exclusive list) of the Voortrekker Road upgrade project is noted in **Figure 14** to **Figure 16** below.

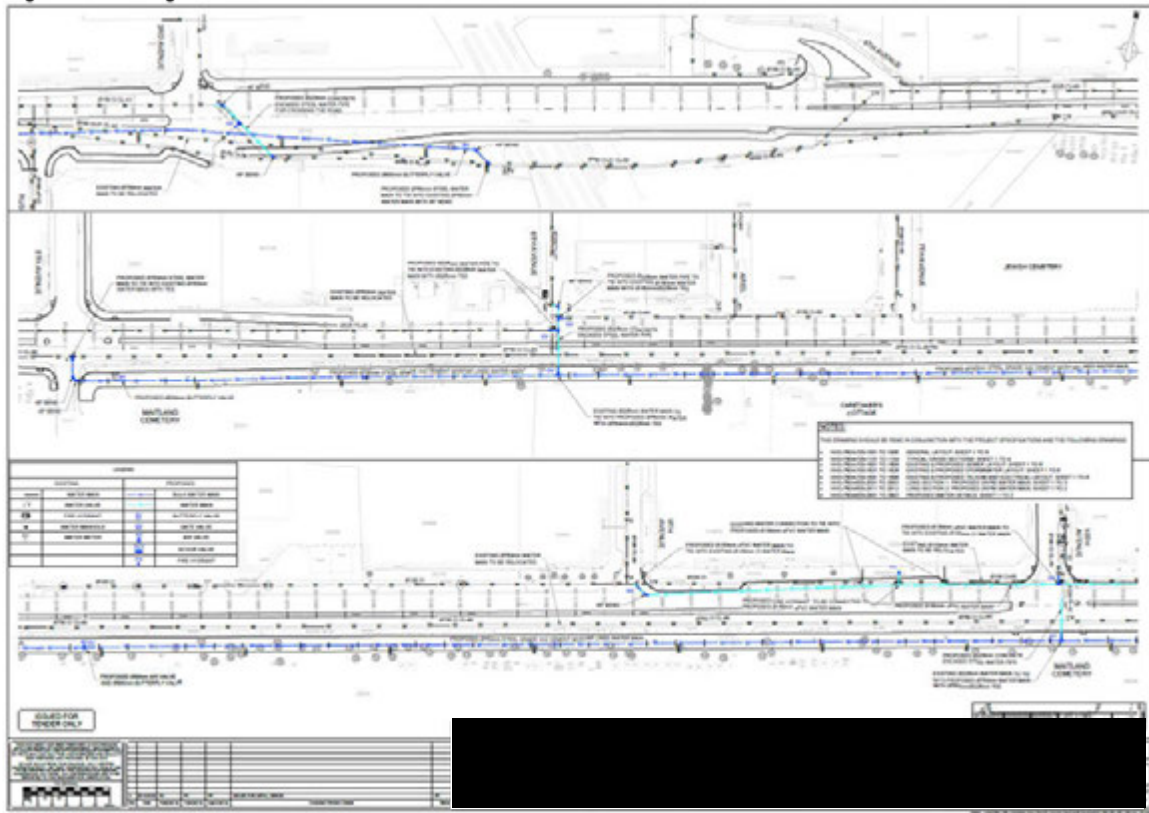


Figure 14. Site Development Plan 1

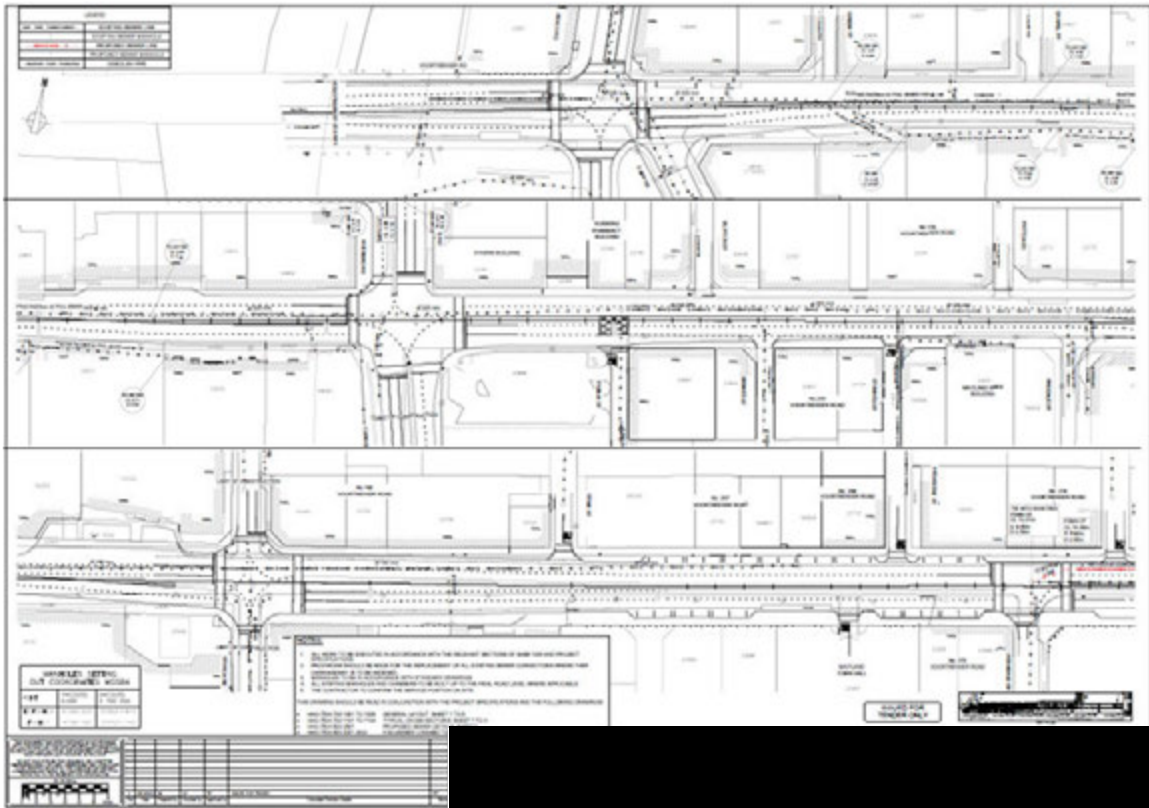


Figure 15. Site Development Plan 2



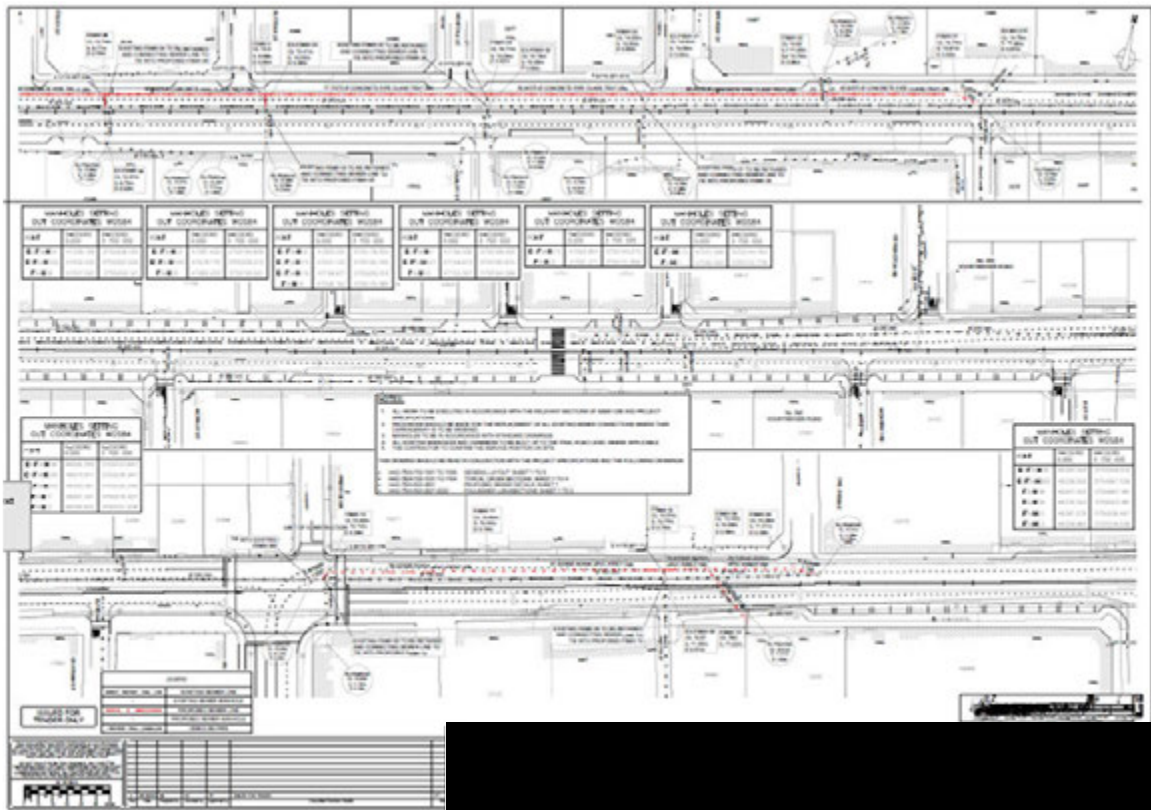


Figure 16. Site

The proposed development would include the upgrade of Voortrekker Road from the intersection of the M5 to just past 12<sup>th</sup> Street. Most of the upgrade is related to road widening, realignment of services, and the improvement of NMT facilities to the area. Several trees located within the construction footprint will be removed due to obstruction with construction and operational activities.

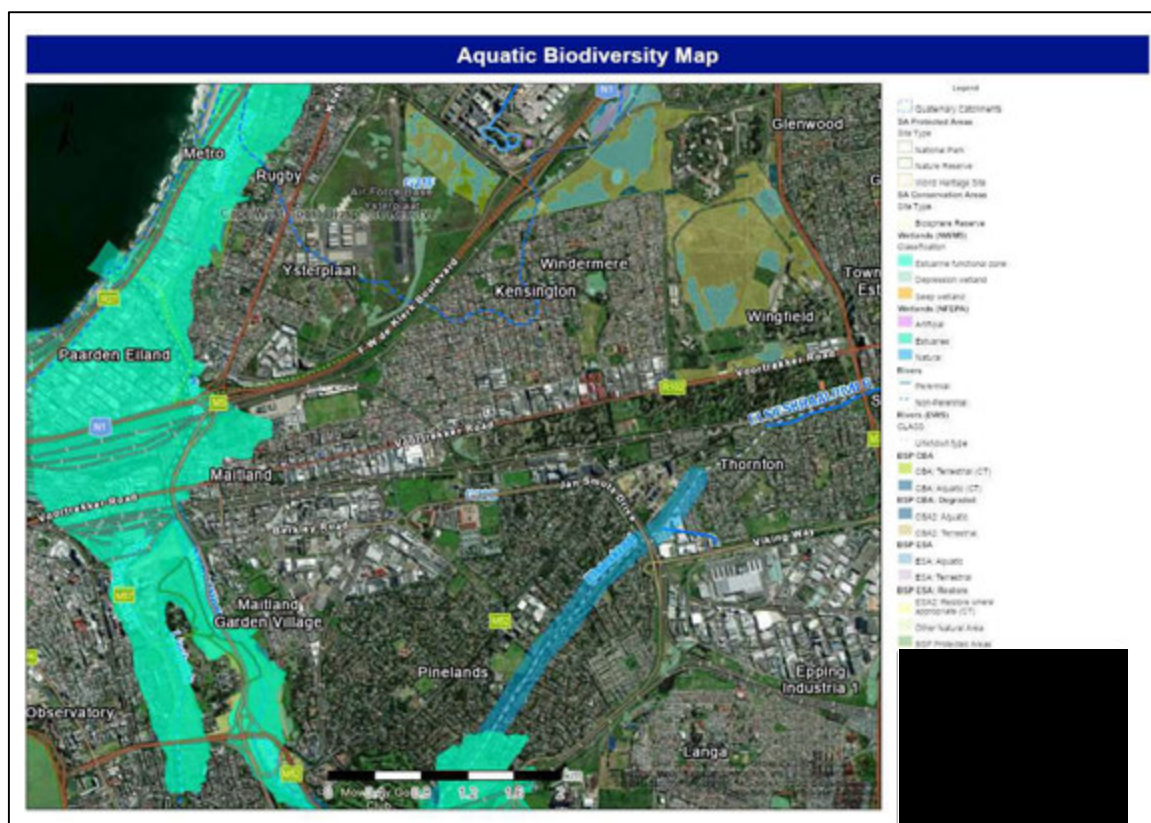
The Maitland Cemetery boundary wall will be repaired according to the Record of Decision issued by Heritage Western Cape.

### 1.5. AFFECTED NATURAL ENVIRONMENT

#### Aquatic Biodiversity

The site is located within the Berg Water Management Area within quaternary catchment G22C. Within the site it is noted that no existing aquatic features occur. Additionally, no extant watercourses, wetlands or stormwater retention ponds are located adjacent or in close proximity to the site (refer to **Figure 17** below).

**Please note:** Within Figure 18 below, an estuary has been mapped within the western portion of the development footprint. However, as noted by the satellite imagery, this is a historic estuary that has since been infilled by urban development.



## Terrestrial Biodiversity

The regional area is located within both the Peninsula Shale Renosterveld and the Cape Flats Sand Fynbos (refer to **Figure 18**). Peninsula Shale Renosterveld is listed as Critically Endangered (Category B1(i), B2(i), B1(iii), B2(iii)) and Cape Flats Sand Strandveld is listed as Critically Endangered (Category B1(i), B1(iii)) according to the *Revised National List of Ecosystems that are Threatened and are in Need of Protection, 18 November 2022 (National Environmental Management: Biodiversity Act, Act 10 of 2004)*. However, the site is significantly transformed as a result of previous infrastructure development. As such, no observation of these vegetation types was noted within the construction footprint.

There are no Critical Biodiversity Areas, Ecological Support Areas or Protected Areas within or surrounding the construction development and establishment footprint.

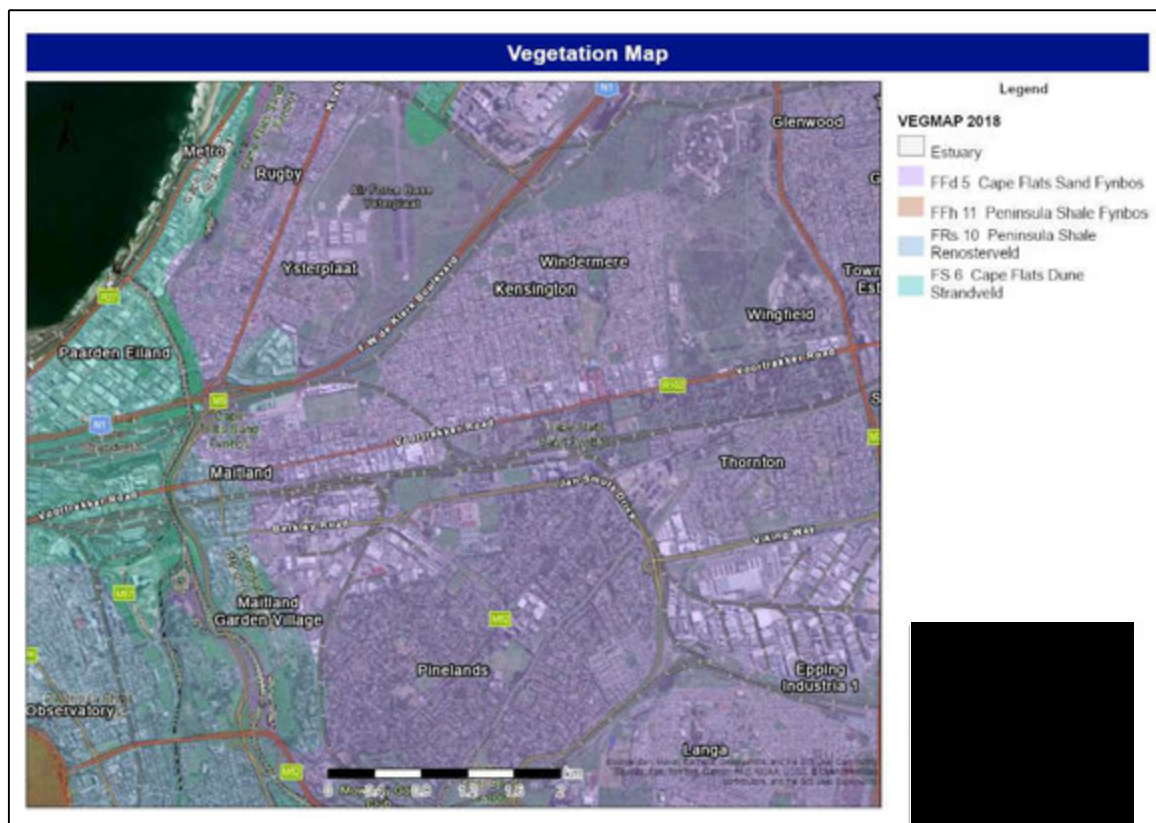


Figure 18. Vegetation Map (Created using Cape Farm Mapper, May 2024)

Several landscaped tree species are noted to occur within and adjacent to the site boundaries (refer to Error! Reference source not found., Error! Reference source not found. and Error! Reference source not found.).

Based on past surrounding development and transformation, as well as the lack of surrounding groundcover and vegetation, it is highly unlikely that any naturally occurring indigenous vegetation that could constitute a functioning ecosystem still remains within the proposed development site.

#### Groundwater

The site is located in quaternary catchment G22C. The affected aquifer is classified as a major intergranular aquifer with an average yield of 0.1 - 0.5 l/s. The water quality of the aquifer has an electrical conductivity of 70-150mS/m. The depth to groundwater has average depth of the groundwater ranges from ~6.4m to ~6.8m below ground level which indicates to a relatively high-water table.

#### Heritage

Identified heritage resources on site include:

- Maitland Cemetery (Grade IIIA) and associated structures (including the Caretaker's Cottage);
- Historic Stone Wall at Maitland Cemetery;
- Jewish Cemetery (Grade IIIA);
- Wingfield Air Base;
- Maitland Town Hall (Grade IIIA); and
- Various building structures along the route including the SAPS Building.

| Heritage Resource | Erf No. | Grading | Nature of Impact                                                                                                              | Proposed Mitigation                                                                                                  |
|-------------------|---------|---------|-------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
|                   |         | IIIA    | Servitude used for road. Amendment to current boundaries. Modern burials will be impacted. Stone boundary wall to be impacted | Exhumation and reburial<br>Dismantling and reconstruction of stone boundary wall. Additional tree planting required. |
|                   |         | IIIA    | None anticipated as expansion only to the South                                                                               | None required                                                                                                        |
|                   |         | IIIA    | Minor encroachment onto the forecourt, no impacts to structure                                                                | None required                                                                                                        |
|                   |         | IIIA    | Encroachment onto the south boundary, no structures to be impacted                                                            | None required                                                                                                        |
|                   |         | IIIB    | None                                                                                                                          | None required                                                                                                        |
|                   |         | IIIB    | None                                                                                                                          | None required                                                                                                        |
|                   |         | IIIB    | Alterations and portion to be demolished (partial demolition)                                                                 | None required                                                                                                        |
|                   |         | IIIC    | None                                                                                                                          | None required                                                                                                        |
|                   |         | NCW     | None                                                                                                                          | None required                                                                                                        |
|                   |         | IIIC    | None                                                                                                                          | None required                                                                                                        |
|                   |         | IIIB    | None                                                                                                                          | None required                                                                                                        |
|                   |         | IIIC    | None                                                                                                                          | None required                                                                                                        |
|                   |         | IIIB    | None                                                                                                                          | None required                                                                                                        |
|                   |         | NCW     | None                                                                                                                          | None required                                                                                                        |

Figure 19. Heritage resources identified along the construction route. Mitigation activities are noted per resource (sourced: ECO Element, May 2024).

|      |                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                    |
|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|      |                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                    |
| IIIB | None                                                                                                                                                                                                                                               | None required                                                                                                                                                                                                                                                                                      |
| NCW  | None                                                                                                                                                                                                                                               | None required                                                                                                                                                                                                                                                                                      |
| NCW  | None                                                                                                                                                                                                                                               | None required                                                                                                                                                                                                                                                                                      |
| IIIC | None                                                                                                                                                                                                                                               | None required                                                                                                                                                                                                                                                                                      |
| IIIC | Near Gate 1, No direct impact anticipated                                                                                                                                                                                                          | None required                                                                                                                                                                                                                                                                                      |
| NCW  | Near Gate 1, No direct impact anticipated                                                                                                                                                                                                          | None required                                                                                                                                                                                                                                                                                      |
| NCW  | Near Gate 1, No direct impact anticipated                                                                                                                                                                                                          | None required                                                                                                                                                                                                                                                                                      |
| IIIB | <p>The road reserve is located 3m away from the cottage structure and no direct impact is anticipated, however the pillars and fencing will need to be moved. The <i>figus</i> tree may be impacted.</p> <p>See Appendix 6 for further detail.</p> | <p>The <i>figus</i> tree must be retained. While the pillars and fencing can be moved, the replacement structure must retain the look and feel of the existing wall and must retain its visual permeability. In addition, the cycle lane must be the closest element to the cottage structure.</p> |
| NCW  | Likely                                                                                                                                                                                                                                             | Demolition required                                                                                                                                                                                                                                                                                |

Figure 20. Heritage resources identified along the construction route. Mitigation activities are noted per resource (sourced: ECO Element, May 2024).



## IMPLEMENTATION OF THE CEMP DURING THE CONSTRUCTION PHASE

### 1.6. INTRODUCTION

This document describes mitigation measures in detail, and is partly prescriptive, identifying specific people or organisations to undertake specific tasks in order to ensure that impacts on the environment are minimised during the construction phase of this project (which is anticipated to continue over a period of approximately 130 weeks).

The CEMP is applicable to all works comprising the project. It is an open-ended document implying that information gained during construction activities and/or monitoring of procedures on site could lead to changes in the CEMP.

The appointed Environmental Control Officer (ECO) will monitor compliance with the CEMP and other Conditions of Approval, if applicable. This CEMP gives direction and guidance to all responsible parties. The responsible parties are expected to co-operate closely to minimise or avoid unnecessary environmental impacts.

Non-compliance penalties are described in this CEMP and are thus to be included into the official contract documentation. **The contractor is obliged to inform the ECO immediately of events that may cause serious environmental damage or breach the requirements of the CEMP.** The ECO in turn will immediately inform the Engineer and Project Manager and, if necessary, the environmental branch of the Local Authority, of such events.

### 1.7. ROLES AND RESPONSIBILITIES

The key role-players during the construction phase of the project, for the purposes of environmental management on site, include but are not limited to; the City of Cape Town, The Engineer (HHO Consulting Engineers), the main contractors (direct appointments including civil works contractor, building contractor, landscape contractor etc.) the Environmental Control Officer, the Community Liaison Officer and representatives of the relevant Authority/ies.

Details of the responsibilities of each of the key role-players have been provided in Sections 2.2.1. to 2.2.5.

#### The City of Cape Town Municipality (CCT)

With respect to the construction phase of the Development, the CCT is to:

- Ensure that all relevant approvals and permits have been obtained prior to the start of construction activities on site;
- Appoint a suitably qualified or experienced Environmental Control Officer prior to the start of construction activities on site, for the duration of the construction contract.

#### The Engineer / Project Manager (HHO Consulting Engineers)

For the purposes of this document, "The Engineer" refers to the engineer / project manager for the development, or any other person authorised by the CCT, to be responsible for the technical and contractual implementation of the works to be undertaken.

The responsibilities of the Engineer are to:

- Ensure that the requirements as set out in this CEMP and by the local authority are adhered to and implemented.
- Ensure that the proposed development is developed as per the intention and design approvals included in this plan.
- Ensure that the development footprint is contained within site limits.
- Assist the ECO in ensuring that the conditions of the CEMP are being adhered to and promptly issue instructions requested by the ECO, to the Contractor.
- Assist the ECO in making decisions and finding solutions to environmental problems that may arise during the various phases of the development.
- Liaise with the local community in response to complaints or concerns raised.
- Review and approve construction Method Statements in consultation with the ECO.
- Order the removal of person(s) and/or equipment not complying with the specifications (as required by the ECO or otherwise).

- Issue penalties for transgressions of Environmental Specifications.

### **The Contractor**

For the purposes of this document “The Contractor” refers to any directly appointed company or individual undertaking the implementation of the works. The Contractor will be responsible for the day-to-day implementation of the CEMP.

The Contractor is to:

- Compile the required Method Statements for submission to the Engineer and the ECO for approval;
- Ensure implementation of all applicable Environmental Management Specifications, including all additional requirements related to approved method statements, during all works on site, failing which penalties, as outlined in the CEMP may be imposed by the ECO via the Engineer;
- Ensure that all of its sub-contractors, employees, suppliers or agents etc. are fully aware of the environmental requirements detailed in the Environmental Specifications of this CEMP (the main contractor will be held liable for any penalties incurred by sub-contractors);
- Liaise closely with the Engineer and the ECO and ensure that the works on site are conducted in an environmentally sensitive manner;
- Nominate a member of personnel as the contractors' Environmental Officer who will be responsible for enforcing the CEMP specifications on a daily basis. This individual shall liaise closely with the ECO and inform the Engineer, as well as the ECO, should environmental issues on site arise, e.g. dumping, pollution, littering etc.
- Carry out instructions issued by the Engineer, on request of the ECO, required to fulfil his/her compliance with the CEMP;
- Investigate and comply with all existing regulations and laws/by-laws unless the relevant authority grants specific written compliance with any legislation;
- Comply with the Occupational Health and Safety Act (Act 85 of 1993) and in particular the requirements of the current Construction Regulations; and
- Make provision for inspections of the site by any Authority and/or any party authorised by the Engineer or the ECO.
- Comply with the “Duty of Care” principle (section 28 of NEMA, 1998) to avoid and prevent any pollution incidents from occurring on site.

Upon failure by the contractor or contractor's employee to show adequate consideration to the environmental aspects of this contract, monetary penalties for breach of the CEMP (and thus the contract) may be imposed by the ECO via the Engineer or to have the Contractor's representative or any employee(s) removed from the site or work suspended until the matter is remedied. No extension of time will be considered in the case of such suspensions and all costs will be borne by the Contractor.

### **Environmental Control Officer (ECO)**

A suitably qualified ECO shall be employed throughout the duration of the construction phase.

During the construction of the development, the ECO is to:

- Review and approve construction Method Statements together with the Engineer.
- Ensure that the Contractor has a copy of the CEMP and all agreed Method Statements;
- Undertake monthly site inspections (frequency may change as required) to audit compliance of all parties with the requirements of the CEMP.
- Compile and distribute of environmental audit checklists following each site inspection.
- Attend meetings on a monthly basis to provide updates on the site's environmental compliance.
- Advise/recommend on actions or issues impacting on the environment to the Engineer, who shall issue any required site instructions to the contractor;
- Environmentally educate and raise the awareness of the Contractor and his staff as to the sensitivity of the site and facilitate the appropriate attitude during works on site;
- Assist the Contractor in finding environmentally responsible solutions to problems;
- Recommend to the Engineer the issuing of a penalty for any environmental damage caused on site, or non-compliance with the Environmental Specifications;
- Recommend to the Engineer the removal of person(s) and/or equipment not complying with the Specifications;
- Undertake photographic monitoring of the construction site;
- Keep records of all activities/ incidents on site concerning the environment;
- Complete temporary and permanent site closure checklists;



- Prepare an environmental closure audit report at the conclusion of the construction works. This report would need to outline the implementation of the CEMP and highlight any problems and issues that arose during the construction period to report on a formal basis, the lessons learned from this project.
- Take immediate action on site to stop works where significant and irreparable damage is being inflicted on the environment, and inform the Engineer immediately of the occurrence and action taken; and
- Undertake a continual internal review of the CEMP and make recommendations to the Engineer and CCT.

The ECO has the authority to recommend to the CCT that works be stopped, if in his/her opinion serious harm to, or impact on, the environment is imminent, is likely to occur or has occurred. Furthermore, the ECO may also recommend that works be stopped if such actual or potential harm or impact is in contravention of this CEMP and which is, or may be, caused by construction, or related works.

Upon failure by the contractor or contractor's employees to show adequate consideration to the environmental aspects of this contract, the ECO may recommend to the Engineer and the project management team to have the contractor's representative, or any employee(s) removed from the site or work suspended until the matter is remedied. No extension of time will be considered in the case of such suspensions and all costs will be borne by the Contractor.

**The ECO is not responsible for issuing instructions, ensuring, or enforcing compliance with the Environmental Authorisation or CEMP. The ECO is not responsible for addressing design requirements. The ECO fulfils a role of monitoring and guidance as well as communication with role players.**

**The ECO will not and cannot be held liable, legally, or otherwise, as a result of non-compliance with the Environmental Authorisation or this CEMP.**

#### **Community Liaison Officer**

If deemed necessary, a suitable individual from must be appointed to act as the Community Liaison Officer (CLO) for the duration of the construction contract to:

- Engage the local residents and businesses on an *ad-hoc* basis throughout the construction phase on important matters arising that may have an impact on them;
- Liaise with those residing in the surrounding areas as and when valid complaints, issues or concerns are raised in relation to the construction works; and
- Propose additional mitigation for consideration by the CCT and the Engineer if required / warranted. Instructions in this regard will be issued to the Contractor by Engineer.

**Note: The CLO does not need to be an independent appointment, unless deemed necessary by the CCT.**

### **1.8. MONITORING AND REPORTING**

#### **Site Instructions and monitoring**

Site Instructions, stipulating recommended actions required to improve compliance with the CEMP by the Contractor will be issued by the ECO to the Engineer, who in turn will ensure that the Contractor is informed of the said instruction.

The ECO will undertake monthly site inspections for the duration of the construction phase.

Comments made by the ECO in the Site Instruction Book are advisory and all site instructions required may only be issued by the Engineer. Site Instructions will also be used for the issuing of stop work orders for the purposes of immediately halting any particular activity(ies) of the Contractor deemed to pose immediate and serious risk of unnecessary damage to the environment.

#### **Temporary Site Closure Checklist**

If the site is closed for a period exceeding one week, a checklist procedure shall be carried out by the Contractor in consultation with the ECO.

The Contractor's Safety Officer(s) (in terms of the Occupational Health and Safety Act) are to check the site and report to the Engineer regarding the following:



Fuels / flammables / hazardous materials stores:

- Ensure fuel stores as low in volume as possible;
- No leaks;
- Outlet secure / locked;
- Bund empty;
- Fire extinguisher serviced and accessible;
- Secure area from accidental damage e.g. vehicle collision;
- Emergency and Management telephone numbers to be available and displayed; and
- Adequate ventilation.

Other:

- All trenches and manholes secured;
- Fencing and barriers in place per the Occupational Health and Safety Act (No. 85 of 1993);
- Notice boards applicable and secured;
- Security persons briefed and have facility for contact;
- Traffic management is applied in terms of safety for road users and pedestrians;
- Night hazards checked e.g. reflectors, lighting, traffic signage;
- Fire hazards identified – local authority notified of any potential threats e.g. large brush stockpiles, fuels etc.;
- Pipe stockpile wedged / secured;
- Any scaffolds are secure; and
- Inspection schedule and log by security or contracts staff.

The ECO is to check and report to the Engineer:

- Wind and dust mitigation in place e.g. straw, brush packs, irrigation;
- Slopes and stockpiles at stable angle;
- Any landscaped areas' watering schedules & supply secured;
- Fuels/hazardous substances stores secure;
- Cement and materials stores secured;
- Toilets empty and secured;
- Refuse bins empty and secured (lids);
- Any oil or hydrocarbon spills are treated e.g. Spill Sorb or Enretech #1 powder;
- Drip trays empty & secure (where possible); and
- Structures vulnerable to high winds secure.

The Contractor is to ensure that all temporary closure requirements are met before leaving the site.

### **Construction Site Closure Report**

The ECO will compile a Final Closure Checklist for site closure auditing purposes. Once the site has been cleared of all construction related debris, materials and equipment the ECO will undertake an audit and report on the condition of the site and the adequacy of site clean-up / restoration/rehabilitation measures. The construction site will be regarded as being "closed" on agreement between the ECO and the Engineer that the Contractor has met all requirements to "make good".

## **1.9. COMMUNICATION STRUCTURES ON SITE**

### **Site Meetings during Construction Phase**

The ECO is required to attend monthly site meetings of the project management team during the construction phase to facilitate the transfer of information and to update all parties on the environmental compliance of the project as a whole and minute requirement.

The ECO will report on the main construction activities as they relate to the environment and any impacts and the mitigation thereof, at this meeting.

## **1.10. COMMUNITY RELATIONS**

All third party or public queries and/or complaints relating to the works will be handled by the Community Liaison Officer, who will in turn engage the Developer and the Engineer to agree on the way forward. In addition, the Community Liaison Officer and/or the CCT shall be responsible for dissemination of information to the community and the media (press releases, notice boards, etc.), as required. Refer to **Section 1.7** above for more detail.

The Contractor shall keep a "Complaints Register" on site to record any complaints received and action taken. The Register shall contain all contact details of the person who made the complaint and information regarding the complaint itself. Copies of all entries into the complaints register should be kept in the environmental site file. The Contractor shall notify the Community Liaison Officer and ECO immediately of complaints lodged.

The Contractor shall erect and maintain information boards in the position, quantity, design and dimensions specified. Such boards shall include contact details for the Developer, the Community Liaison Officer and ECO for complaints by members of the public in accordance with details provided by the Engineer.

#### **1.11. ENVIRONMENTAL EDUCATION PROGRAMME**

The Contractor in consultation with the ECO shall arrange for a presentation to site staff to familiarise them with the environmental aspects of the CEMP within seven days from the commencement date of construction. This presentation should take cognisance of the level of education, designation and language preferences of the staff. General site staff would commonly receive a basic environmental awareness course highlighting general environmental "do's and don'ts" and how they relate to the site. Management on site e.g. site agents and foremen, who require more detailed knowledge about the environmental sensitivities on site and the contents and application of the construction phase of the CEMP document itself, will benefit from a separate presentation dealing with these issues.

Environmental awareness training courses shall be run for all personnel on site. All attendees shall remain for the duration of the course and sign an attendance register on completion that clearly indicates participants' names, a copy of which shall be filed in the (site) environmental file.

The Contractor's general site staff shall attend an initial presentation of approximately 45 minutes, and approximately half an hour a month thereafter for the duration of the contract shall be allowed for employees to attend any follow-up lectures, should this be deemed necessary by the ECO. In addition, all new staff and sub-contractor's employees that spend more than 1 day a week or four days in a month are to attend the environmental education program within 1 (one) week of commencement of work on site. The Contractor shall on request of the ECO provide documented proof (signed attendance registers) that all employees have received such training.

Notwithstanding the specific provisions of this clause, it is incumbent upon the Contractor to convey the sentiments of the CEMP to all personnel involved with the works.

The initial environmental awareness training course shall be presented by the ECO. Subsequent courses to be held as and when required should be presented by the Contractor's Environmental Officer or the Health and Safety Officer.

#### **1.12. OCCUPATIONAL HEALTH & SAFETY REQUIREMENTS**

The Occupational Health and Safety Act (Act 85 of 1993) and in particular the requirements of the Construction Regulations issued in July 2003, must be complied with but fall beyond the scope of this CEMP.

#### **1.13. DISPUTE RESOLUTION**

Any disputes or disagreements between role players on site (with regard to environmental management) will firstly be referred to the Engineer. If no resolution on the matter is possible then the matter will be referred to the CCT Environmental Resource Management for clarification.

## **2. Environmental Management Specifications**

### **2.1. METHOD STATEMENTS**

The Contractor shall provide Method Statements for approval by the ECO and the Engineer prior to work commencing on aspects of the project identified to be of greater risk to the environment and/or which may not be covered in sufficient detail in the CEMP, when called upon to do so by the Engineer or ECO.

A Method Statement is a "live document" in that modifications are negotiated between the Contractor and the ECO/project management team, as circumstances unfold. All Method Statements will form part of the CEMP documentation and are subject to all terms and conditions contained within the CEMP.

Note that a Method Statement is a 'starting point' for understanding the nature of the intended actions to be carried out and allows for all parties to review and understand the procedures to be followed in order to minimise risk of harm to the environment.

A Method Statement describes the scope of the intended work in a step-by-step description in order for the ECO and the Engineer to understand the Contractor's intentions. For each instance where it is requested that the Contractor submit a Method Statement to the satisfaction of the Engineer and ECO, the format should clearly indicate the following:

- **What** - a brief description of the work to be undertaken;
- **How** - a detailed description of the process of work, methods and materials;
- **Where** - a description/sketch map of the locality of work (if applicable);
- **When** - the sequencing of actions with due commencement dates and completion date estimates;
- **Who** - The person responsible for undertaking the works described in the Method Statement; and
- **Why** - a description of why the activity is required.

**The Contractor shall provide Method Statements for approval by the ECO and the Engineer prior to work commencing** on aspects of the project deemed to pose environmental risks. Changes to, and adaptations of Method Statements should be made in response to changes in construction methods or where effectiveness of environmental management measures requires improvement.

The Engineer / ECO may request a Method Statement for any activity he believes may impact on the environment. The Engineer / ECO may also require changes to a Method Statement if the proposal does not comply with the Specification or if, in the reasonable opinion of the Engineer, the proposal may result in, or carries a greater than reasonable risk of damage to the environment in excess of that permitted by the Specifications.

Approved Method Statements shall be readily available on the site and shall be communicated to all relevant personnel. The Contractor shall carry out the works in accordance with the approved Method Statement. Approval of the Method Statement shall not absolve the Contractor from any of his obligations or responsibilities in terms of the Contract.

#### **Specific Method Statements Required**

The following initial Method Statements shall be provided by the Contractor and submitted to the ECO at least seven working days before site establishment:

- **Site Establishment, Site Camp Division & No-Go Areas**

The location, layout and method of establishment of the construction camp (including all no-go areas, buildings, offices, lay down yards, vehicle wash areas, fuel storage areas, batching areas and other infrastructure required for the running of the project) shall be detailed and presented in a drawing.

- **Access/Haul Routes & Traffic Management**

Details, including a drawing, showing where and how the access points and routes (including areas where plant would be parked) will be located and managed, including traffic safety measures that will be utilised.

- **Fuel Storage and Use**

The design, location and construction of the fuel storage and service areas as well as for the filling and dispensing from storage tanks and management of drip trays.

- **Solid Waste Management**

Expected solid waste types, sorting methods, quantities, methods and frequency of collection and disposal, as well as location of disposal sites. Include details of the proposed recycling program.

- **Contaminated Water**

Methods of minimising, controlling, collecting and disposing of contaminated water.

- **Stormwater management**

Methods of managing, controlling, stormwater runoff during construction.

- **Hazardous Substances**

Details of any hazardous substances / materials to be used, together with the transport, storage, handling and disposal procedures for the substances.

- **Cement and Concrete Batching**

Location, layout and preparation of cement / concrete mixing areas including the methods employed for the mixing of concrete, particularly the containment of runoff water from such areas and the method of transportation of concrete.

- **Dust**

Details on the methods employed for reducing dust on the site.

- **Emergency Procedures**

Emergency procedures for fire, accidental leaks and spillages of hazardous substances (including fuel and oil). Include details of risk reduction measures to be implemented including fire-fighting equipment, fire prevention procedures and spill kits (materials and compounds used to reduce the extent of spills and to breakdown or encapsulate hydrocarbons).

- **Noise mitigation methods**

Detail the steps to be implemented to reduce/avoid noise impacts on the surrounding area.

- **Tree protection**

Detail the methods in which retained trees are to be protected from construction activities.

Any additional Method Statements that may be required by the Engineer and ECO during the course of construction are to be provided by the Contractor within a minimum of 10 working days prior to the commencement of works or activities to which they apply.

## **2.2. ENVIRONMENTAL MANAGEMENT REQUIREMENTS**

The environmental management requirements take account of the typical measures needed to prevent or at least minimise potential adverse environmental effects associated with construction activities. Method Statements must take account of these requirements. Environmental management requirements cover the following:

- Site camp establishment/laydown areas;
- Waste management;
- Protection of existing and retained trees;
- Protection of any paleontological and archaeological resources;
- Noise management;
- Dust management;
- Aesthetics;
- Hazardous substances management;
- Site access, access routes, and traffic management;
- Labour relations, facilities and site health and safety;
- Incident management; and
- Site clean-up.

**Table 2: Environmental Management Requirements / Specifications for the Construction Phase**

| ISSUE                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | MANAGEMENT / MITIGATION MEASURES |
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| <b>SITE CAMP ESTABLISHMENT/LAYDOWN AREAS</b>                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                  |
| <u>Management Statement and objective:</u> To ensure that the site camp and laydown areas are located and laid out in an environmentally sensitive manner and contained to the site, which also does not adversely affect surrounding land-users or properties. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                  |
| <u>Impact Management Outcomes:</u> No deviations from the below and no damage to environmentally sensitive areas as a result of the location and setup of the site camp and associated laydown areas.                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                  |
| • <b>General requirements</b>                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>The site camp and construction materials should be situated within the site boundaries in areas where no vegetation that will be retained on site has the potential to be impacted.</li> <li>The site camp is not permitted to be established within any areas of Medium, High or Very High environmental sensitivity.</li> </ul>                                                                                                                                                                                                                                               |                                  |
| • <b>Ablutions management</b>                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Ablution facilities should be contained within the site camp area and must be secured to prevent toppling.</li> <li>Ablution facilities are to be cleaned at least once a week with proof of maintenance filed on site to serve as evidence.</li> <li>There should be at least one toilet for every 30 workers. Sufficient toilet paper and cleaning materials are to be provided.</li> </ul>                                                                                                                                                                                   |                                  |
| • <b>Laydown areas</b>                                                                                                                                                                                                                                          | <ul style="list-style-type: none"> <li>Workers may use laydown areas within the development boundaries.</li> <li>Materials should be stored in piles that do not exceed 1.5m in height and should be protected from the wind to prevent spread of fine materials across the site.</li> <li>No equipment, materials, stockpiling or waste is to be stored outside of the site boundaries unless permission is obtained to store elsewhere from the ECO.</li> <li>Should additional capacity be required for storage of materials the ECO is to be consulted before laydown of materials or equipment occurs.</li> </ul> |                                  |
| • <b>No-Go areas</b>                                                                                                                                                                                                                                            | <ul style="list-style-type: none"> <li>The following areas shall be demarcated as "no-go" areas on site: <ul style="list-style-type: none"> <li>Any areas located outside of the site boundaries; and</li> <li>Areas located within the demarcated vegetation/tree hoarding.</li> </ul> </li> </ul>                                                                                                                                                                                                                                                                                                                    |                                  |

| ISSUE                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | MANAGEMENT / MITIGATION MEASURES |
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| <b>WASTE MANAGEMENT</b>                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                  |
| <u>Management Statement and objective:</u> To prevent pollution/contamination associated with the generation and temporary storage of general waste, hazardous waste construction rubble and litter generated by the workforce on site. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                  |
| <u>Impact Management Outcomes:</u> No non-conformances and no pollution of soil, groundwater and/or stormwater and freshwater as a result of waste generation and management activities.                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                  |
| • <b>General requirements</b>                                                                                                                                                                                                           | <ul style="list-style-type: none"> <li>The management of waste under all circumstance must be done in accordance with section 16, the "general duty in respect of waste management", of the National Environmental Management: Waste Act, 2008 (Act 59 of 2008) which states: "A holder of waste must, within the holder's power, take all reasonable measures to manage waste in such a manner that it does not endanger health or the environment or cause a nuisance through noise, odour or visual impacts."</li> <li>Contractor's and sub-contracting staff must comply with the "Duty of Care" principle (section 28 of NEMA, 1998) to avoid and prevent any pollution incidents from occurring on site.</li> </ul> |                                  |



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|                                                                                                            | <ul style="list-style-type: none"> <li>Construction related waste will typically include general waste (such as plastic packaging, strapping, and lunch wrappers.), rubble (like broken bricks, tiles, waste concrete) and limited quantities of hazardous waste items (e.g. paint tins, oily rags etc.).</li> <li>The Contractor shall be responsible for the establishment of an integrated waste management system that is acceptable to the Engineer and ECO, and <b>a Method Statement is required in this regard</b>. The Method Statement must include a description of the estimated quantity and types of waste, a description of the services required to store, collect, transport and dispose of waste and a procedure for separating recyclable and non-recyclable material. The local authority must be notified of any changes to the estimated quantities and types of waste.</li> <li>No refuse, building rubble or waste material will be disposed of by burying.</li> <li>Construction waste must be sorted into recyclable and non-recyclable waste, where practical.</li> <li>The Contractor will be responsible for ensuring the removal of the waste to City-approved recycling facilities (where possible), as well as the final disposal of non-recyclable wastes at a registered landfill facility.</li> </ul> |
| <ul style="list-style-type: none"> <li><b>Storage, handling and disposal of general waste</b></li> </ul>   | <ul style="list-style-type: none"> <li>Waste may be temporarily stored on site in a central waste storage area that is weatherproof and scavenger-proof, and which both the Engineer and the ECO have approved.</li> <li>All waste shall be sorted in the waste handling / storing area. The location of the waste storage area shall be approved by the ECO and shall be sited a suitable distance from the adjacent wetlands to prevent impacts.</li> <li>Colour-coded or clearly marked skips / bins will be utilised in order to differentiate the various waste types suitable to each receptacle.</li> <li>Receipts for the safe disposal of solid waste shall be kept on record by the Contractor.</li> <li>General waste must be removed from the site at least once every two weeks provided that it does not pose a risk to human health.</li> <li>As far as possible, materials used or generated by construction shall be recycled.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                               |
| <ul style="list-style-type: none"> <li><b>Litter prevention and housekeeping</b></li> </ul>                | <ul style="list-style-type: none"> <li>Litter and general waste materials (excluding rubble and hazardous waste materials) shall be disposed of into scavenger-and weather-proof bins.</li> <li>The Contractor shall provide sufficient bins with lids on site to store the waste produced on a daily basis. Bins shall not be allowed to become overfull and shall be emptied as required, but at least weekly, to prevent overtopping.</li> <li>The Contractor shall provide dedicated resources to clean up the Contractor's camp and working areas <b>daily</b> and ensure that refuse is placed within the central waste storage area to prevent spreading as a result of wind.</li> <li>Empty cement bags must be collected from the construction area by the end of every day and before rain events and shall be stored in bins that are fitted with lids.</li> <li>Wind-blown litter beyond the site boundary that are in the opinion of the ECO emanating from works on site must be cleared as part of the waste management of the site.</li> </ul>                                                                                                                                                                                                                                                                           |
| <ul style="list-style-type: none"> <li><b>Storage, handling and disposal of hazardous waste</b></li> </ul> | <ul style="list-style-type: none"> <li>Hazardous and general waste must be stored separately. Hazardous waste containers must be stored in a secure area with bunding / secondary containment. The location of the storage area is to be approved by the Engineer and the ECO.</li> <li>All hazardous waste must be placed in drums / containers labelled for this purpose. These containers must be kept securely closed when not in use and must be protected from the ingress of rain.</li> <li>Hazardous waste may not be disposed to a General Landfill site and waste must be removed by a registered hazardous waste Contractor for disposal to a licensed hazardous waste landfill. This must be done at least once every three months in</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |



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|                                                                                                             | <p>accordance with the limit applicable to the temporary storage of hazardous waste, provided that it does not pose a risk to human health.</p> <ul style="list-style-type: none"> <li>Records of hazardous waste disposal must be maintained. The Contractor shall retain copies of receipts from such waste disposal sites to the Engineer and ECO as proof of proper disposal.</li> <li>Storage and disposal of waste items are also controlled through other relevant legislation which must be complied with e.g. Occupational Health &amp; Safety Act.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <ul style="list-style-type: none"> <li><b>Storage, handling and disposal of vegetative waste</b></li> </ul> | <ul style="list-style-type: none"> <li>Cleared vegetative material is not to be disposed anywhere other than a licenced composting facility or licenced waste disposal site.</li> <li>Any invasive alien plant species, which are removed from the site, are not to be chipped for mulch if they are in a seed-bearing state. Such material is to be disposed of at a suitable waste disposal site.</li> <li>Plant material removed from the site is not to be burnt for disposal on site given the proximity to dwellings in the surrounding area.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <ul style="list-style-type: none"> <li><b>Storage, handling and disposal of builders rubble</b></li> </ul>  | <ul style="list-style-type: none"> <li>In accordance with the integrated waste management approach to be followed through the construction phases of the development, materials used or generated by construction, or the construction areas of other City of Cape Town projects nearby shall be re-used as far as possible. Clean builders' rubble and soil/sand/rock may therefore be used as infill material / backfill material at the ECO's discretion or disposed of at the nearest licenced facility under the guidance of the City of Cape Town.</li> <li>All builders' rubble is to be removed from the works area on a weekly basis and taken to the temporary storage area at the site camp.</li> <li>The Contractor shall provide resources to clean up the Contractor's camp and working areas of rubble generated in the course of construction work at least twice a week, or more frequently if specifically required.</li> <li>Rubble shall be temporarily stockpiled in a waste skip or a central stockpile and shall be removed from site to an approved landfill site as soon as it constitutes a practical load for removal and before temporary closure of the site.</li> <li>No plastics, shrink wrap, paint buckets or any other debris that do not constitute clean building rubble, shall be stored at such stockpile sites.</li> </ul> |

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| <b>PROTECTION OF EXISTING AND RETAINED TREES</b> <ul style="list-style-type: none"> <li><u>Management Statement and objective:</u> To ensure that no vegetative cover is removed and/or impacted on outside of the approved works area. To protect any trees species that will be retained as per the site plans. To preserve the top layers of soil for use in the final landscaping. Appropriate temporary storage and stockpiling of topsoil to prevent erosion, sedimentation, and dust pollution. To avoid intrusion into the adjacent areas and prevent related impacts.</li> <li><u>Impact Management Outcomes:</u> No removal of vegetation and/or other impacts on any vegetative cover in the area outside of site limits. No damage or defacing of any natural features situated in or around the site. No harm or destruction of faunal habitats outside the site limits or the death of any animals on the site or as a result of actions of removing fauna off site.</li> </ul> |                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <ul style="list-style-type: none"> <li><b>General Requirements</b></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"> <li>During site camp establishment, demarcation of any trees to be protected, as identified within the Engineering Drawings, are to be undertaken by the contractors.</li> <li>In relation to the installation of the demarcation within the tree canopy drip line, each condition needs to be individually assessed with a view to minimizing damage to the roots of the trees.</li> </ul> |

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|  | <ul style="list-style-type: none"> <li>When working around the tree stem, all measures must be taken not to damage the tree branches, bark, roots, and leaves. Hoarding must be replaced once work has been completed.</li> <li>The demarcation is to be kept intact at all times, if any portion of the hoarding/netting/danger tape becomes damaged it is to be repaired immediately to the cost of the main contractor and reported to the ECO.</li> <li>No materials, equipment or items of a personal nature are to be stored under the trees or against the hoarding.</li> <li>No excavations may occur beneath the drip lines of the tree canopies, unless within the construction footprint. The existing roots zones are to be protected as far as possible.</li> </ul> |
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| <ul style="list-style-type: none"> <li><b>PROTECTION OF ANY PALEONTOLOGICAL AND ARCHAEOLOGICAL RESOURCES</b></li> </ul> <p><u>Management Statement and objective:</u> Protection of archaeological and/or palaeontological resources on, or adjacent to the site.</p> <p><u>Impact Management Outcomes:</u> No non-conformances terms of the specifications contained in the CEMP and no impacts on such resources.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <ul style="list-style-type: none"> <li><b>General</b></li> </ul>                                                                                                                                                                                                                                                                                                                                                        | <p>Conditions of the Heritage Western Cape Record of Decision is to be implemented on site.</p> <ul style="list-style-type: none"> <li>Heritage permits and authorisations are to be displayed on site.</li> <li>The applicant must engage with the appropriate authorities to facilitate the process of relocating the graves in the western extension of the cemetery.</li> <li>The development must avoid any direct impacts to the Caretakers Cottage. <ul style="list-style-type: none"> <li>While the pillars and fencing can be moved, the replacement structure must retain the look and feel of the existing wall and must retain its visual permeability. In addition, the cycle lane must be the closest element to the cottage structure.</li> </ul> </li> <li>The structures identified as 434 Voortrekker Road (5) and (6) must be approved for demolition as part of the HIA.</li> <li>The historic stone wall between Gates 1 and 4 be dismantled, relocated and rebuilt in the newly designated location, under the supervision of an appropriately qualified and /or experienced stone mason and structural engineer.</li> <li>The <i>Ficus</i> tree adjacent to the cottage must be retained.</li> <li>Additional trees must be planted along the cemetery side of the relocated wall to ensure that the experience of the cemetery from both sides of the wall remains intact.</li> <li>Alterations be permitted to the Maitland Police Station building to facilitate the construction of the necessary junction proposed for the intersection of Patton Street and Voortrekker Road.</li> <li>A detailed method statement must be compiled by a heritage practitioner with architectural experience for the repositioning of the historic stone wall and be submitted to IACom prior to any demolition and relocation work.</li> <li>Detail drawings must be submitted to the IACom for approval prior to the commencement of any demolition work.</li> <li>Should any heritage resources, including evidence of grave, human burials, archaeological material, and paleontological material be discovered during the excavation of activities, all works must be stopped immediately, and Heritage Western Cape (HWC) notified without delay so that they can determine the significance of the remains and a way forward. This could include the appointment of an archaeologist, at cost to the client, to record and/or mitigate through excavation. Failure to notify the HWC of a find will result in a penalty.</li> </ul> |



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|  | <ul style="list-style-type: none"> <li>Heritage remains uncovered or disturbed during earthworks must not be disturbed until the necessary approval has been obtained from Heritage Western Cape. Heritage remains include: archaeological remains (including fossil bones and fossil shells); coins; indigenous and/or colonial ceramics; any articles of value or antiquity; marine shell heaps; stone artifacts and bone remains; structures and other built features; rock art and rock engravings; shipwrecks; and graves or unmarked human burials.</li> <li>This aspect must be carefully explained to workers during the Environmental Education Programme undertaken by the ECO.</li> </ul> |
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| <ul style="list-style-type: none"> <li><b>NOISE MANAGEMENT</b></li> </ul> <p><u>Management Statement and objective:</u> To avoid and/or minimise impacts on the adjacent residential communities and ensure that any such impacts are appropriately dealt with to prevent further impacts in the longer term. To provide a forum for any Interested and/or Affected Parties to raise their concerns and log complaints for remediation action and prevention of similar incidents.</p> <ul style="list-style-type: none"> <li><u>Impact Management Outcomes:</u> No disruptions or nuisance to adjacent communities caused by noise from the construction site. Effective complaints handling. No repeat complaints received</li> </ul> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <ul style="list-style-type: none"> <li><b>Management of potential noise disturbance</b></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <p>Noise, at a level typically associated with construction activities, would be experienced by surrounding land users as well as the users of the road during the course of construction works</p> <ul style="list-style-type: none"> <li>The Contractor's attention is drawn to the Noise Regulations as promulgated in terms of the Environment Conservation Act and relevant Local Authority bylaws.</li> <li>All noise and sounds generated by machinery, equipment and construction activities must adhere to SABS 0103 specifications for the maximum permissible noise levels for construction in residential areas as well as the Western Cape Noise Control Regulations, P.N. 200/2013 (WCNCR).</li> <li>In terms of noise legislation, a noise exemption permit needs to be obtained if the limits as contemplated in legislation will be exceeded for any given period of time. This requires obtaining of signatures from affected parties within a 150 m radius of a site.</li> <li>Working hours must be restricted to normal daily working hours considered in the construction regulations. Should works be necessitated outside of these hours, surrounding residents must receive timeous notification.</li> <li>Construction activities generating noise outputs are restricted to the hours of 08h00 to 17h00 (Mondays to Fridays).</li> <li>Machinery to be fitted with silencers and no sound amplification equipment such as sirens, loud hailer and hooters may be used on site except in emergencies.</li> <li>No amplified music or the use of audio equipment shall be permitted on site.</li> <li>No noise generating work may take place at night unless prior approval was granted by the local municipality and notification was sent to the surrounding residents.</li> <li>If excessive noise is expected on the boundary of the site, neighbouring residents must be informed in writing and in advance of when the high noise levels will occur and for how long they will occur.</li> <li>The Contractor shall take preventative measures, such as screening, muffling, timing and pre-notification of affected parties to minimise complaints regarding noise.</li> <li>The Contractor shall control the movement of all vehicles and plant including that of his suppliers so that they remain on designated routes/haul roads, so as not to cause an undue environmental damage.</li> </ul> |

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| <ul style="list-style-type: none"> <li><b>DUST MANAGEMENT</b></li> </ul> <p><u>Management Statement and objective:</u> No unacceptable levels of dust. To avoid and/or minimise impacts on the adjacent road network and communities and ensure that any such impacts are appropriately dealt with to prevent further impacts in the longer term. To prevent wind and water erosion and/or sedimentation of any natural features. To provide a forum for any Interested and/or Affected Parties to raise their concerns and log complaints for remediation action and prevention of similar incidents.</p> <p><u>Impact Management Outcomes:</u> No disruptions to traffic, no nuisance to adjacent communities caused by dust. Effective complaints handling. No repeat complaints received.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <ul style="list-style-type: none"> <li><b>Prevention of dust nuisance</b></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"> <li>All Local Authority Bylaws as well as the National Dust Control Regulations, Notice R.827 of 2013 and the City of Cape Town Air Quality By-Law and NEM: AQA, National Dust Control Regulations (Government Notice No. R. 827) of 1 November 2013 must be adhered to.</li> <li>The activities conducted on site must comply with the provisions set out in the City of Cape Town Air Quality Management By-law dated 17 August 2016, which states the following under Section 26: Dust Emissions:             <ol style="list-style-type: none"> <li>(1) Any person who conducts any activity or omits to conduct any activity which causes or permits dust emissions into the atmosphere that may be harmful to public health and wellbeing or is likely to cause a nuisance to persons residing or present in the vicinity of such land, activity or premises shall adopt the best practical environmental option to the satisfaction of the authorised official, to prevent and abate dust emissions.</li> <li>(2) An authorised official may require any person suspected of causing a dust nuisance to submit a dust management plan within the time period specified in the written notice.</li> <li>(3) The dust management plan contemplated in subsection (2) must:                 <ol style="list-style-type: none"> <li>(a) identify all possible sources of dust within the affected site;</li> <li>(b) detail the best practicable measures to be undertaken to mitigate dust emissions;</li> <li>(c) detail an implementation schedule;</li> <li>(d) identify the person responsible for implementation of the measures;</li> <li>(e) incorporate a dust fall monitoring plan; and</li> <li>(f) establish a register for recording all complaints received by the persons regarding dust fall, and for recording follow up actions and responses to the complaints.</li> </ol> </li> <li>(4) The authorised official may require additional measures to be detailed in the dust management plan.</li> <li>(5) The dust management plan must be implemented within a time specified by the authorised official in a written notice.</li> <li>(6) Failure to comply with the provisions of this section constitutes an offence.</li> </ol> </li> <li>Depending on the impact on the receiving environment or complaints received or if conditions so warrant, the City of Cape Town reserves the right to call for a dust fall monitoring programme to be implemented in accordance with the local regulatory provisions.</li> </ul> <p>Monitoring methodology: The method to be used for measuring dust fall rate and the guideline for locating sampling points shall be ASTM D1739: 1970, or equivalent method approved by any internationally recognised body.</p> <p>The standard for the acceptable dust fall rate is set out in Table 3 for residential and non-residential areas.</p> |

Table 3. Acceptable dust fall rates

|  |  | Restriction Areas                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Dust fall rate (D) (mg/m <sup>2</sup> /day, 30-days average) | Permitted frequency of exceeding dust fall rate |
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|  |  | Residential area                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | D < 600                                                      | Two within a year, not sequential months.       |
|  |  | Non-residential area                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 600 < D < 1200                                               | Two within a year, not sequential months.       |
|  |  | <p><b>Note:</b> with regards to the conditions stipulated above, it is to be noted the National Dust Control Regulations are currently undergoing review and amendments. Once promulgated the applicable methodology and standards to be complied with must be adhered to at all times.</p> <ul style="list-style-type: none"> <li>No dust nuisance is to be created during the construction activities and provision must be made for sufficient dust mitigation measures to be implemented in order to prevent dust emissions causing a nuisance to human health and the surrounding environment.</li> <li>The Contractor shall take all reasonable measures to minimize any dust nuisance, pollution of streams and inconvenience to or interference with the public (or others) as a result of the execution of the works. <a href="#">A Method Statement will be required in this regard as determined by the Engineer and ECO.</a></li> <li>During windy and dry conditions, dust suppression methods must be employed. NOTE: The use of potable water for dust suppression is not permitted when water restrictions are in place and discouraged even when water restrictions are not in place. The use of waterless methods for dust suppression during the construction phase must be prioritised. These methods are to be approved by the ECO and EO prior to implementation.</li> <li>Stockpiles of materials as well as the loads on all trucks transporting any material that could lead to dust pollution should be covered with a tarpaulin or similar cover to minimise dust / windblown sand.</li> <li>Topsoil stockpiles are to remain under 1.5m in height.</li> <li>During extremely high winds, dust generating activities should be avoided.</li> <li>Excavation, handling and transport of erodible materials shall be avoided under high wind conditions or when a visible dust plume is present.</li> <li>All access and haul routes/ roads shall be cleared from sand and/or mud or debris deposited by construction vehicles associated with this project.</li> <li>The Contractor shall be responsible for any clean-ups resulting from the failure by his employees or suppliers to properly secure transported materials.</li> <li>The Contractor shall take preventative measures, such as screening, dust control, timing and pre-notification of affected parties to minimise complaints regarding dust.</li> <li>If, in the reasonable opinion of the ECO, excessive dust is noted or complaints regarding dust exceed 1 complaint a week, the ECO may request dust fallout monitoring to be undertaken to determine the need for additional control measures.</li> <li>The site should be swept regularly to ensure the roadway is clear of dust. More frequent sweeping during the windy months may be required.</li> </ul> |                                                              |                                                 |

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| <ul style="list-style-type: none"> <li><b>AESTHETICS (VISUAL)</b></li> </ul> <p><u>Management Statement and objective:</u> To ensure that visual impacts are avoided as far as possible, and where these cannot be altogether avoided, that it is reduced to acceptable limits.</p> <p><u>Impact Management Outcomes:</u> No unacceptable visual impacts occur as a result of construction activities.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <ul style="list-style-type: none"> <li><b>Site Housekeeping</b></li> </ul>                                                                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"> <li>Good housekeeping must always be observed on site.</li> <li>The Contractor shall take appropriate measures to ensure that construction activities do not have an unreasonable impact on the aesthetics of the area.</li> <li>Should it be deemed necessary, the ECO may request that activities which may have a high visual impact be suitably screened off to the surrounding environment. Site construction hoarding / fencing should be dark in colour and free of excessive branding.</li> <li>The Contractor shall supply and maintain adequate and suitable sheds or containers for the storage of materials. Sheds for the storage of materials that may deteriorate or corrode if exposed to the weather shall be weather-proof, adequately ventilated and provided with raised floors.</li> <li>All site establishment components (as well as equipment) shall be positioned to limit visual intrusion on neighbours and the size of the area disturbed.</li> <li>The type and colour of roofing and cladding materials to the Contractor's temporary structures shall be selected to reduce reflection.</li> <li>The Contractor shall ensure that any lighting installed on the site for his activities does not interfere with road traffic or cause a reasonably avoidable disturbance to the surrounding community or other users of the area. Site lighting should be kept to a minimum and should not be flood type lighting where possible.</li> <li>Neon, spot or up lighting are visually inappropriate. Light sources should be screened and filtered as far as possible.</li> <li>Construction signage should not be excessively sized or located along sensitive visual corridors.</li> </ul> |

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| <ul style="list-style-type: none"> <li><b>HAZARDOUS SUBSTANCES MANAGEMENT</b></li> </ul> <p><u>Management Statement and objective:</u> To prevent pollution or fire associated with the handling storage and use of materials deemed hazardous to human health or the environment.</p> <p><u>Impact Management Outcomes:</u> No non-conformances and no pollution of soil, groundwater and/or stormwater as a result of the construction activities. No fires as a result of the handling / use of fuel.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <ul style="list-style-type: none"> <li><b>Hazardous substances handling, use and storage</b></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"> <li>All fuel is to be stored within a demarcated area. No refuelling of vehicles or machinery is to take place outside of this demarcated area unless authorised by the Engineer. The Engineer shall be advised of the area that the Contractor intends using for the storage of fuel.</li> <li>The Contractor shall ensure that all liquid fuels (petrol and diesel) are stored in tanks with lids, which are kept firmly shut. Only empty and externally clean tanks may be stored on the bare ground. All empty and externally dirty tanks shall be sealed and stored on an area where the ground has been protected.</li> <li>Tanks containing fuels shall be situated on a smooth impermeable surface (plastic or concrete) base with a bund (if plastic, it must have sand on top to prevent perishing) to contain any possible spills and prevent infiltration of fuel into the ground. The impermeable</li> </ul> |

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|                                                                                              | <p>lining shall extend to the crest of the bund and the volume inside the bund shall be 110% x the total capacity of the largest storage tank / vessel inside the bund.</p> <ul style="list-style-type: none"> <li>• The floor of the bund shall be sloped towards an oil trap or sump to enable any spilled fuel to be removed. An Enretech or similar hydrocarbon absorption/remediation product approved by the ECO shall be installed in the sump to reduce the risk of pollution. Bulk fuel storage and bunded areas shall have overhead cover to prevent rain from entering the bunded area.</li> <li>• The Contractor shall keep fuel under lock and key at all times.</li> <li>• Note that a Flammable Liquid License must be obtained for the storage of diesel volumes greater than 200 litres in terms of the City's related by-law. The local Fire Chief must be consulted for any other specific requirements.</li> <li>• If fuel is dispensed from 200 litre drums, the proper dispensing equipment shall be used, and the drum shall not be tipped in order to dispense fuel. The dispensing mechanism of the fuel storage tank shall be stored in a waterproof container when not in use.</li> <li>• When parked, a drip tray must be placed under the temporary fuel storage tanker (bowzer) to contain incidental drips and spills.</li> <li>• Refuelling must take place on a concrete / hard standing area or over a drip tray.</li> <li>• During fuel delivery, a trained individual must be present at all times during offloading of product. An emergency cut off switch must be installed to immediately stop fuel delivery should an accident occur. An anti-flash nozzle must be installed at the end of the vent pipe with a fuel dispenser equipped with an automatic cut off switch to prevent fuel tank overfills.</li> <li>• Areas for storage of fuels and other flammable materials shall comply with standard fire safety regulations and may require the approval of the municipal fire prevention officer.</li> <li>• The relevant Material Safety Data Sheets (MSDS) shall be available on site.</li> <li>• Procedures detailed in the MSDSs shall be followed in the event of an emergency situation.</li> <li>• If potentially hazardous substances are to be stored on site, the Contractor shall provide a Method Statement detailing the substances/ materials to be used, together with the storage, handling and disposal procedures of the materials.</li> <li>• No paint products and chemical additives and cleaners such as thinners and turpentine, may be disposed of on site. Brush / roller wash facilities shall be established to the satisfaction of the Engineer.</li> <li>• All vehicles and machinery are to have drip trays underneath them and these drip trays are to be cleaned at least once a week.</li> </ul> |
| <ul style="list-style-type: none"> <li>• <b>Cement batching and concrete work</b></li> </ul> | <ul style="list-style-type: none"> <li>• Cement powder has a high pH. Spillage of dry cement powder and concrete slurry will affect both soil and water pH adversely.</li> <li>• Cement mixers shall have drip trays to contain oil and fuel leaks – these must be cleaned regularly.</li> <li>• Cement is to be stored in a secure weatherproof location to avoid contamination of the environment.</li> <li>• There must be no run-off from batching areas so that contaminated water does not enter the environment including stormwater.</li> <li>• Any cement batching must be done on bunded trays. Dagga boards without sides are not permitted for use. Mixing trays with sides must be used.</li> <li>• Any cement-contaminated or paint-contaminated water is to be placed in settling tanks before the solids are removed from site.</li> <li>• Cleaning of equipment and flushing of mixers shall not result in pollution of the surrounding environment.</li> <li>• Sediment should be left to dry out before being removed to skip.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |



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| <ul style="list-style-type: none"> <li><b>SITE ACCESS, ACCESS ROUTES AND TRAFFIC MANAGEMENT</b></li> </ul> <p><u>Management Statement and objective:</u> To avoid and/or minimise impacts on the adjacent road network and road users any such impacts are appropriately dealt with to prevent further impacts in the longer term. To avoid construction related impacts associated with the movement of construction vehicles on adjacent residents.</p> <p><u>Impact Management Outcomes:</u> No disruptions to traffic or adjacent residents, no damage to vehicles and related claims and no nuisance to adjacent communities caused by dust.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <ul style="list-style-type: none"> <li><b>General</b></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"> <li>Whenever possible existing access routes should be used.</li> <li>Any work that needs to be undertaken in areas outside of the road reserve should be closely monitored by the ECO and should be carried out within the approved development footprint.</li> <li>Access to the site must be carefully managed to avoid unauthorised entry onto the site, and to prevent loitering of construction contractors beyond the development area.</li> <li>The Contractor shall control the movement of all vehicles and plant including that of his suppliers so that they remain on designated routes, are distributed so as not to cause an undue concentration of traffic and comply with all relevant laws and specifications. In addition, such vehicles and plant shall be so routed and operated as to minimise disruption to regular users of the routes not on the site.</li> <li>All construction vehicle movement shall as far as possible be limited to off-peak hours wherever possible. Delivery of materials or collecting waste shall be scheduled outside of peak periods.</li> <li>The vehicles of the Contractor and his suppliers shall not exceed the 40 km/h speed restriction within the site and surrounding road network.</li> <li>Where necessary, additional traffic control measures should be implemented.</li> <li>Subsequent to construction works, all access routes must be inspected and any repairs necessary as a result of the construction of the roadway must be undertaken.</li> </ul> |

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| <ul style="list-style-type: none"> <li><b>INCIDENT MANAGEMENT</b></li> </ul> <p><u>Management Statement and objective:</u> To guide the way in which emergencies and/or environmental incidents are handled on site and remediate any damage appropriately. To prevent the starting of fires on site.</p> <p><u>Impact Management Outcomes:</u> No non-conformances and no adverse impacts on the environment as a result of emergency situations and/or environmental incidents. No fires started on the site.</p> |                                                                                                                                                                                                                                                                                              |
| <ul style="list-style-type: none"> <li><b>General</b></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>Method Statements are required for the management of incidents as well as for accidental leaks and spills.</li> </ul>                                                                                                                                 |
| <ul style="list-style-type: none"> <li><b>Prevention of fires</b></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>No fires shall be permitted on site. Notices are to be prominently displayed that no fires are allowed. Any fires that occur, shall be reported to the Engineer immediately.</li> <li>Burning is not permitted as a waste disposal method.</li> </ul> |

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|                                                                                         | <ul style="list-style-type: none"> <li>Smoking shall only be permitted in designated smoking areas, depicted by the appropriate signage. Such areas shall not be located close to fire hazards. Notices are to be prominently displayed prohibiting smoking in areas that are deemed fire hazards. Such areas shall include the workshop and fuel storage areas and any areas where the vegetation or other material is such as to make liable the rapid spread of an initial flame.</li> <li>The Contractor shall advise the relevant authority of a fire as soon as one starts and shall not wait until he can no longer control it.</li> <li>A fire evacuation route is to be clearly demarcated and kept clear of obstruction at all times. The Contractor shall ensure that his employees are aware of the procedure to be followed in the event of a fire.</li> <li>The Contractor shall appoint a Fire Officer who shall be responsible for ensuring immediate and appropriate actions in the event of a fire and shall ensure that employees are aware of the procedure to be followed. The Contractor shall forward the name of the Fire Officer to the Engineer for his approval seven days prior to the date of the environmental awareness training course.</li> <li>The Contractor shall supply all site offices, kitchen areas, workshop areas, materials, stores and any other areas identified by the ECO with tested and approved firefighting equipment. Firefighting equipment is to be maintained in good working order.</li> <li>Welding, gas cutting or cutting of metal will only be permitted within specifically designated and adequately marked areas on the site. These sites are to be approved by the ECO.</li> <li>All flammable material is to be stored in a suitable lockable storage area and combustible materials may not accumulate on site.</li> <li>Symbolic safety signs depicting "No Smoking", "No Naked Lights" and "Danger" are to be provided, and are to conform to the requirement of SABS 1186. The volume capacity of any fuel tanks shall be displayed. The product contained within the tank shall be clearly identified; using the emergency information system detailed in SABS 0232 part 1. Any electrical or petrol-driven pump shall be equipped and positioned, so as not to cause any danger of ignition of the product.</li> <li>In the event of a fire emergency: <ul style="list-style-type: none"> <li>The site supervisor or worker should sound the fire alarm;</li> <li>The site supervisor or worker should notify the City of Cape Town (107 from a landline and 021 480 7700 from a cell phone).</li> <li>All workers on site should go to the designated emergency assembly point;</li> <li>The Fire Officer shall do a head count of all workers and ensure all personnel are present; and</li> <li>When the Fire Brigade arrives, the Fire Officer shall provide them with all the information they require regarding the incident.</li> </ul> </li> </ul> |
| <ul style="list-style-type: none"> <li><b>Accidental Leaks and Spillages</b></li> </ul> | <ul style="list-style-type: none"> <li>The Contractor shall ensure that his employees are aware of the procedure to be followed for dealing with spills and leaks, which shall include notifying the Engineer and the relevant authorities.</li> <li>All machinery must be in excellent condition and there must be no oil/fuel leaks from the equipment.</li> <li>Treatment and remediation of the spill areas shall be undertaken to the reasonable satisfaction of the Engineer.</li> <li>The site shall have a suitable number of spill kits available. A spill kit (with the supply of absorbent material) shall be readily available at works areas to absorb any emergency hydrocarbon spills, and where possible be designed to encapsulate minor hydrocarbon spillage. There are a number of products on the market, which are designed and suitable as absorbents and encapsulators of hydrocarbons.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                                                                         | <ul style="list-style-type: none"> <li>Treatment and remediation of spill areas shall be undertaken to the satisfaction of the ECO. In the event of a spill: <ul style="list-style-type: none"> <li>The source of the spillage shall be isolated.</li> <li>The Contractor shall contain the spillage using sand berms, sandbags, pre-made booms, and sawdust or other absorbent materials.</li> </ul> </li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |



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|  | <ul style="list-style-type: none"> <li>- Cordon off and ensure safety of the spillage area.</li> <li>- Notify the Engineer, ECO and the Pollution Control Inspectorate (if serious spillage has occurred in a sensitive environment).</li> <li>- The ECO (in consultation with the Pollution Control Inspectorate where necessary) shall determine the need for further remedial actions.</li> <li>- All cleared materials will be treated as hazardous waste and disposed of as such, in accordance with the waste management specifications of this EMP.</li> </ul> |
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| ISSUE                                                                                                                                                                                                                                                                                                                                                                                            | MANAGEMENT / MITIGATION MEASURES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
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| <b>SITE CLEANUP AND LANDSCAPING</b><br><u>Management Statement and objective:</u> To prevent impacts on the environment as a result of the conclusion of construction activities and any related impacts requiring rehabilitation actions prior to the contractors leaving the site.<br><u>Impact Management Outcomes:</u> No non-conformances with the specifications contained within the EMP. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <ul style="list-style-type: none"> <li>• <b>Site clean-up and landscaping</b></li> </ul>                                                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"> <li>• After construction, any areas within the maintenance footprint that have been degraded from their condition prior to construction and as a result of the construction activities must be restored to their former condition.</li> <li>• All construction scars are to be rehabilitated immediately after construction is complete</li> <li>• Any areas of intact natural vegetation outside the site that are disturbed during construction should be rehabilitated, to the satisfaction of the ECO and engineer.</li> <li>• The Contractor shall ensure that all temporary structures, equipment, materials, waste and facilities used for construction purposes are removed upon completion of the project.</li> <li>• Any waste material should be removed from the site after construction works is complete and disposed of at a licensed facility.</li> <li>• No fencing, danger tape, netting etc. should be left on site.</li> <li>• The site clean-up shall be to the satisfaction of the Engineer and the ECO.</li> </ul> |



### 3.1 PENALTIES AND BONUSES

Where the Contractor inflicts damage upon the environment or fails to comply with any of the Environmental Specifications contained within this CEMP he shall be liable to pay a penalty for breach of the conditions of the Environmental Specifications which form part of the works contract.

The Contractor is deemed NOT to have complied with these Environmental Specifications if:

- There is evidence of contravention of the Environmental Specifications within the boundaries of the site, site extensions and haul/ access roads;
- Environmental damage ensues due to negligence;
- The Contractor fails to comply with corrective or other instructions issued by the Engineer within a specific time; or
- The Contractor fails to respond adequately to complaints from the public.

Penalties shall be issued per incident and per individual for the Contractor's responsibility. The amount of the penalty shall be determined by the Engineer, in consultation with the ECO. The Engineer shall inform the Contractor of the contravention and he shall notify the consulting quantity surveyor to deduct such a penalty from monies due under the Contract prior to the issuing of the monthly payment certificates.

Payment of any penalties in terms of the contract shall not absolve the offender from being liable from prosecution in terms of any law.

The following penalties (not an exclusive list) shall be issued in addition to any remedial costs incurred as a result of non-compliance with the Environmental Specifications and shall be imposed by the Engineer on the Contractor for contraventions of the Environmental Specifications by individuals or operators employed by the Contractor and/or his sub-contractors. Where there are ranges, the amount shall depend on the severity and extent of the damage done to the environment, as indicated in the table below:

| OFFENCE                                                                                                                                      | PENALTY                    |
|----------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| A Contractor fails to inform the ECO immediately of events that may cause serious environmental damage or breach the requirements of the EMP | R 500                      |
| The Contractor fails to produce Method Statements on identified aspects of the project prior to commencement of that aspect                  | R 300 per Method Statement |
| The Contractor's Environmental Site File is incomplete/non-existent                                                                          | R 500                      |
| The Contractor fails to keep activities within the site boundaries                                                                           | R 1,000                    |
| Dust and/or erosion occurs because of lack of appropriate implementation of mitigation measures                                              | R 200                      |
| Green waste is not disposed of at an approved waste site or composting facility                                                              | R400                       |
| Trespassing of people into no-go areas                                                                                                       | R 500                      |
| Trespassing of machinery or equipment into no-go areas                                                                                       | R 500 – R 2 000            |
| Delivery drivers are off-loading without supervision                                                                                         | R 300                      |
| Loads for transporting are unsecured or uncovered                                                                                            | R 500                      |
| Temporary storage of fuel used for construction purposes is not within specifications                                                        | R 100- R1,000              |
| Fuel is dispensed with the incorrect equipment                                                                                               | R 400                      |
| Individuals are smoking in the vicinity of the fuel stores                                                                                   | R 200                      |
| Appropriate safety signs (e.g. Danger) are not displayed                                                                                     | R 200                      |
| There is a lack of firefighting equipment at the fuel stores                                                                                 | R 500                      |
| The storage areas fail to comply with standard fire safety regulations                                                                       | R 200                      |
| Inadequate supply of material to absorb / breakdown and encapsulate minor hydrocarbon spillage                                               | R 500- R1000               |
| An integrated waste management system is not established                                                                                     | R 100- R1000               |
| Waste is buried as a means of disposal                                                                                                       | R 1000- R3000              |
| There is evidence of littering                                                                                                               | R 20 per item              |
| Appropriate scavenger and weatherproof bins are not supplied                                                                                 | R 400- R1000               |
| Bins are overflowing                                                                                                                         | R 150 per bin              |
| Refuse is not removed or disposed of at an approved site                                                                                     | R 100-R1000                |
| Empty cement bags are not removed from the construction area and placed under cover or discarded in the hazardous waste stream               | R 500- R2000               |
| Hazardous waste is not stored in an enclosed area                                                                                            | R 1000                     |
| Hazardous waste is not disposed of at a hazardous waste disposal facility                                                                    | R 500 – R1000              |
| Rubble is not appropriately stored in a skip or central stockpile                                                                            | R 500                      |
| Materials that do not constitute clean building rubble are stored at the stockpiling site                                                    | R 200                      |
| An individual makes use of areas other than the designated facilities for ablutions                                                          | R 200                      |

|                                                                                                            |                                         |
|------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| Latrine facilities and first-aid services are not in a sanitary condition                                  | R 500                                   |
| Insufficient provision of toilets                                                                          | R 1000                                  |
| Toilet waste (sewage) is discharged or buried in the environment                                           | R 1000 – R2000                          |
| Potential pollutants are not stored safely away to prevent pollution of ground or surface water            | R 500                                   |
| Washing of vehicles or cement chutes occurs on site or in the vicinity of wetlands                         | R 800                                   |
| Hazardous chemical substances are not stored in secondary containers                                       | R 800- R2000                            |
| Paint products, chemical additives or cleaners are being disposed of on site                               | R 200 – R 1500                          |
| Adequate sheds/ dry containers for the storage of materials are not provided                               | R 500                                   |
| Maintenance of plant occurs on site when only emergency maintenance is permitted                           | R 200                                   |
| Emergency maintenance is performed without efforts to prevent contamination of the surrounding environment | R 100 – R1500                           |
| Individuals fail to repair leaking equipment immediately                                                   | R 100 per item                          |
| Drip trays are not provided in construction areas under all relevant plant/equipment                       | R 100 – R500<br>per absent drip<br>tray |
| Effective silencing devices are not in use to reduce noise impacts                                         | R 50                                    |
| Amplified music is heard on site                                                                           | R 50                                    |
| Failure to provide environmental awareness training to all site personnel                                  | R 200 per staff<br>member/ worker       |
| Necessary Information posters (procedures for ensuring compliance) are not displayed                       | R 500                                   |
| Lighting of fires occurs on site                                                                           | R 200 – R 10<br>000                     |
| Smoking occurs outside of designated areas                                                                 | R 20 – R 50                             |
| Unnecessary spillage of cement due to inadequate prevention measures, or haphazard working procedures      | R 500 – R 1 500                         |
| Spillage of cement products are not rectified to the satisfaction of the ECO                               | R 50 – R 1000                           |
| Cement is not stored in a suitable weatherproof location                                                   | R 500                                   |
| Polluted runoff is reaching groundwater/stormwater                                                         | R 200 – R 3 000                         |
| Screening and suitable containment is not in place /constructed in the concrete batching area              | R 100 – R 500                           |
| Hydrocarbon spills are not isolated, contained, cleared and rehabilitated                                  | R 100 – R 2 000                         |
| Appropriate safety precautions are not implemented                                                         | R 20 – R 1 000                          |
| Unauthorised firearms are present on site                                                                  | R 1 000                                 |
| Personnel other than security staff are living on site                                                     | R 1 000                                 |
| An individual is not attempting to protect natural features during construction                            | R 50 – R 2 000                          |
| Individuals are swimming or washing (clothes, equipment etc.) in natural water bodies on or near the site  | R 500- R1000                            |
| An individual's activities are resulting in the removal or damage of flora                                 | R500- R1500                             |
| Animals are being trapped, poisoned, shot or harmed                                                        | R 100 – R 1 500                         |
| Erosion or sedimentation caused by construction is not rectified                                           | R 400 – R 2 000                         |
| The ECO is not notified of heritage or archaeological remains found                                        | R 1 000                                 |
| Trenching is conducted without the specified environmental specifications                                  | R 1000                                  |
| Failure to avoid stormwater impacts through the adequate protection of stormwater inlets                   | R 100 per inlet                         |
| Unapproved materials are used for landscaping (e.g. invasive plant seeds)                                  | R 50 – R 2000                           |
| All elements of the site are not removed during clean-up for closure                                       | R 100 – R 3000                          |
| A specialist is not employed for rehabilitation where necessary                                            | R 500- R2000                            |
| The site not fenced and/or demarcated as required                                                          | R 300- R3000                            |
| The site is not fully secured                                                                              | R 50 – R 500                            |
| Water wastage                                                                                              | R 100 – R 1000                          |
| Method statements not appropriately and/or fully implemented                                               | R 50 – R 300 per<br>Method<br>Statement |
| Speed limit on site not adhered to                                                                         | R 100                                   |

Note that for each subsequent similar offence, the penalty shall be doubled in value to a maximum value of R10 000.00.

The following penalties are suggested for transgression where damage has been done to the environment:

|   |                                  |                                                                                                    |
|---|----------------------------------|----------------------------------------------------------------------------------------------------|
| a | Erosion                          | A penalty equivalent in value to the cost of rehabilitation plus 20%                               |
| b | Oil Spills                       | A penalty equivalent in value to the cost of clean-up operation plus 20%                           |
| c | Damage to sensitive environments | A penalty equivalent in value to the cost of restoration plus 20%                                  |
| d | Damage to archaeological finds   | A penalty to a maximum of R 100 000 shall be paid for any damage to any archaeological sites/finds |

A summary page is to be included with the monthly payment certificates as a record of penalties issued to date. Funds shall be allocated for the purposes of contributing to environmental education efforts in the local community e.g. for environmental books for the library, posters, excursions or trees for local schools or environmental resource material for the local public library.

The CCT, in consultation with the ECO, Engineer and possibly the local authority, will make a final decision regarding the precise allocation of all penalty funds.



## H: HEALTH AND SAFETY SPECIFICATION

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## H: HEALTH AND SAFETY SPECIFICATION

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

### H1 DEFINITIONS

For the purposes of this Specification, the definitions given in the Occupational Health and Safety Act, 85 of 1993 and the Construction Regulations, 2014, and the following definitions, shall apply:

- a) "Construction Regulations, 2014" means the Construction Regulations (GNR. 84 of 7 February 2014) published in terms of the OHS Act.
- b) "Contractor" means the Principal Contractor as defined in the Construction Regulations, 2014.
- c) "Employer" means the Client or his agent as defined in the Construction Regulations, 2014.
- d) "Employer's Agent" means the person/firm so named in the Contract Data whose function is to administer the Contract as agent of the Employer, acting through, if appointed, a Health and Safety Agent.
- e) "OHS Act" means the Occupational Health and Safety Act, 85 of 1993.
- f) "subcontractor" means any contractor employed by the Contractor to perform construction work.

### H2 SCOPE

In terms of the OHS Act and the Construction Regulations, 2014 the Employer must provide the Contractor with a Health and Safety Specification, to which the Contractor must respond with a Health and Safety Plan for approval by the Employer.

The purpose of this Specification is to ensure that a contractor entering into a contract with the Employer maintains an acceptable level of compliance with regard to health and safety issues during the performance of the Contract. In this regard the Health and Safety Specification forms an integral part of the Contract and the Contractor shall ensure that his subcontractors and/or suppliers comply with the requirements of this Specification.

### H3 INTERPRETATION

The OHS Act and its associated regulations shall have precedence in the interpretation of any ambiguity or inconsistency between it and this Specification.

Responsibility for health and safety relating to the Works lies with the Contractor as described in this Specification. Nothing stated in or omitted from this Specification shall in any way limit the Contractor's obligations and liabilities in terms of the OHS Act.

### H4 GENERAL REQUIREMENTS

The Contractor shall:

- a) create and maintain a safe and healthy work environment;
- b) execute the Works in a manner that complies with all the requirements of the OHS Act and all its associated regulations, and in so doing, minimize the risk of incidents occurring; and
- c) respond to the instructions issued by the Employer's Agent through the Employer's Agent's Representative, except in the case of a health and safety issue which requires the Contractor's immediate attention, in which case the Employer's Health and Safety Agent can issue an instruction directly to the Contractor.

## **H5 ADMINISTRATION**

### **H5.1 Application for construction work permit**

In terms of Regulation 3 of the Construction Regulations, 2014, read together with the exemptions published by the Department of Labour in Government Notice dated 7 July 2015, a client who intends to have construction work carried out, must at least thirty days before that work is to be carried out apply to the Provincial Director in writing for a construction work permit to perform construction work if the works contract is of a value exceeding one hundred and thirty million Rand (R130 000 000) or Construction Industry Development Board (CIDB) grading level 9. In such cases, the Employer's Agent will not issue an instruction to commence executing the Works, and the Contractor will not be permitted to commence with Works execution, until such time as the required construction work permit has been issued by the Provincial Director.

The employer will apply for the construction work permit as soon as possible after its Bid Adjudication Committee has awarded the contract based on the draft Health and Safety Plan submitted. Should the issuing of a construction work permit be delayed by the submission of a draft Health and Safety Plan which, in the opinion of either the Employer's Health and Safety Agent, or the Provincial Director of the Department of Labour, is unacceptable, no claim for an extension of time will be entertained.

The issuing of a construction work permit by the Department of Labour shall in no way nullify the requirement to submit a Health and Safety Plan to the Employer's Health and Safety Agent for discussion and approval (in terms of Clause H8.3 of this specification) before commencement with Works execution.

### **H5.2 Notification of intention to commence construction work**

The Contractor shall notify the Provincial Director of the Department of Labour in writing using the pro forma contained in Annexure 2 of the Construction Regulations, 2014 before construction work commences, and retain a copy of such notification in the health and safety file, if such work will:

- a) include excavation work;
- b) include working at a height where there is a risk of falling;
- c) include the demolition of a structure; or
- d) include the use of explosives to perform construction work.

The Contractor shall ensure that no work commences on an electrical installation which requires a new supply or an increase in electricity supply before the person who supplies or contracts or agrees to supply electricity to that electrical installation has been notified of such work.

The Contractor shall ensure that no asbestos work is carried out before the Provincial Director of the Department of Labour has been notified in writing.

### **H5.3 Occupational Health and Safety Agreement**

The Contractor shall enter into an Agreement with the Employer before the commencement of the Works on Site.

### **H5.4 Good standing with the Compensation Fund or a licensed compensation insurer**

The Contractor shall provide the Employer's Agent with a letter of good standing from the Compensation Commissioner or a licensed compensation insurer before the commencement of the Works on Site.

### **H5.5 Emergency procedures**

The Contractor shall submit for acceptance to the Employer's Agent a health and safety emergency procedure, which includes but is not limited to fire, spills, accidents and exposure to hazardous substances, which:

- a) identifies the key personnel who are to be notified of any emergency;
- b) sets out details of available emergency services, including contact particulars; and
- c) the actions or steps which are to be taken during an emergency.

The Contractor shall within 24 hours of an emergency taking place notify the Employer's Agent in writing of the emergency and briefly outline what happened and how it was dealt with.

### **H5.6 Health and safety file**

The Contractor shall ensure that a Health and Safety file, which shall include all documentation required in terms of the provisions of the OHS Act, the Construction Regulations, 2014 and this Health and Safety Specification, is open and kept on Site at all times.

The Health and Safety file shall be made available for inspection by any inspector, subcontractor, the Employer, the Employer's Agent, the Employer's Health and Safety Agent, or employee of the Contractor, upon the request of such persons.

The Contractor shall hand over the Health and Safety file to the Employer's Agent upon Works completion of the Contract and, if applicable, a certificate of compliance accompanied by a test report for the electrical installation in accordance with the provisions of the Electrical Installation Regulations, 1992.

### **H5.7 Health and safety committee**

Where applicable, the Contractor shall establish a health and safety committee, and shall convene health and safety meetings as provided for in the OHS Act.

The Employer's Agent or the Employer's Health and Safety Agent shall be invited to attend such meetings as an observer.

The Contractor shall ensure that minutes of the health and safety committee meetings are kept.

### **H5.8 Inspections, formal enquires and incidents**

The Contractor shall inform the Employer's Agent:

- a) beforehand of inspections, investigations or formal inquiries of which he has been notified by an inspector; and
- b) as soon as reasonably practicable of the occurrence of an incident (as defined in the OHS Act) on the Site.

The Contractor shall record all incidents and notify the Employer's Agent of any incident, except in the case of a traffic accident on a public road, as soon as possible after it has occurred and report such incident to an inspector as designated in terms of the OHS Act.

The Contractor shall investigate all incidents and issue the Employer's Agent with copies of such investigations.

### **H5.8 Personal protective equipment and clothing**

The Contractor shall ensure that all workers are issued with the necessary personal protective clothing.

## **H6 APPOINTMENTS**

### **H6.1 Appointment of construction manager**

The Contractor shall, prior to commencing the Works on Site, appoint a full-time competent person as the construction manager, with the duty of managing all construction work on a single site, including the duty of ensuring occupational health and safety compliance. In the absence of the construction manager an alternative must be appointed by the Contractor.

The Contractor may, having considered the size of the project, appoint, in writing, one or more assistant construction managers for different sections thereof.

No construction manager may manage any construction work on or in any construction site other than the Site in respect of which he or she has been appointed.



## **H6.2 Appointment of construction supervisor, and health and safety officers**

The construction manager shall appoint a competent employee(s) in writing as the construction supervisor(s) for the Site, who will be responsible for construction activities and ensuring occupational health and safety compliance on the construction site. The Contractor may, having considered the size of the project, appoint, in writing, one or more competent employees to assist the appointed construction supervisor(s).

The Contractor may, having considered the size of the project, the degree of danger likely to be encountered or the accumulation of hazards or risks on the Site, appoint a full-time or part-time construction health and safety officer in writing, who has in the Contractor's opinion the necessary competencies and resources, to assist the Contractor in the control of all health and safety related aspects on the Site.

The Contractor shall compile and maintain an organogram which outlines the roles and responsibilities of the construction supervisor's assistants, and health and safety officers.

## **H6.3 Other competent persons**

The Contractor shall appoint in writing competent persons to supervise or inspect, as relevant, any of the following:

- a) temporary works operations;
- b) excavation work;
- c) demolition work;
- d) scaffolding work operations;
- e) suspended platform work operations;
- f) rope access work;
- g) material hoists;
- h) operation of bulk mixing plant;
- i) explosive activated fastening device;
- j) cranes;
- k) construction vehicles and mobile plant (equipment);
- l) the stacking and storage of articles on the Site; and
- m) fire equipment.

The Contractor shall appoint in writing competent persons to:

- l) induct employees in health and safety; and
- m) prepare a fall protection plan.

## **H6.4 Health and safety representative(s)**

The Contractor shall appoint in writing, if necessary in terms of the OHS Act, a health and safety employee representative(s), whose duties shall be as described in the OHS Act.

## **H7 EMPLOYER'S HEALTH AND SAFETY AGENT**

The Employer's Health and Safety Agent shall:

- a) audit the Contractor's compliance with the requirements of this Specification prior to the commencement of any physical construction activities on the Site;
- b) accept or reject all safety plans, giving reasons for rejecting such plans;
- c) monitor the effective implementation of all safety plans;
- d) conduct periodic and random audits on the health and safety file to establish compliance with the requirements of this Specification and the Contractor's health and safety plan; and
- e) visit the site at regular intervals to conduct site inspections, and based upon such visits issue, wherever necessary, any notices and/or instructions to the Contractor or any of the Contractor's subcontractors with a copy to the Employer's Agent and, where relevant, to the Contractor.

The Contractor shall invite the Employer's Health and Safety Agent to audit compliance with the requirements of this Specification before commencing with any new construction activity on the Site.

The Contractor shall permit the Employer's Health and Safety Agent to audit the Contractor's compliance with the approved Health and Safety Plan, and shall provide any assistance and/or documentation as may be required in this regard.



## H8 CREATING AND MAINTAINING A SAFE AND HEALTHY WORK ENVIRONMENT

### H8.1 General

The Contractor shall with respect to the Site and the construction works that are contemplated:

- a) cause a preliminary hazard identification to be performed by a competent person before commencing any physical construction activity;
- b) evaluate the risks associated with such work constituting a hazard to the health and safety of such employees and the steps that need to be taken to comply with the OHS Act; and
- c) as far as is reasonably practicable, prevent the exposure of such employees to the hazards concerned or, where prevention is not reasonably practicable, minimize such exposure.

The Contractor shall ensure that:

- d) all reasonably practicable steps are taken to prevent the uncontrolled collapse of any new or existing structure or any part thereof, which may become unstable or is in a temporary state of weakness or instability due to the carrying out of construction work;
- e) no structure or part of a structure is loaded in a manner which would render it unsafe;
- f) relevant information, if any, provided by the designer of the structure is taken into account in the risk assessment; and
- g) the designer of any temporary works complies with the requirements of regulation 6(2) of Construction Regulations, 2014.

The Contractor shall carry out regular inspections and audits to ensure that the Works are being performed in accordance with the requirements of this Specification and the Contractor's health and safety plan.

### H8.2 Risk assessment

The Contractor shall before the commencement of any construction work on Site and during such construction work, cause risk assessment(s) to be performed by a competent person appointed in writing. Such assessment(s) shall as a minimum:

- a) identify the risks and hazards to which persons may be exposed to;
- b) analyse and evaluate the identified risks and hazards based on a documented method;
- c) document a plan of safe work procedures, including the use of any personal protective equipment or clothing and the undertaking of periodic "toolbox talks" or inductions before undertaking hazardous work, in order to mitigate, reduce or control the risks and hazards that have been identified;
- d) provide a monitoring plan; and
- e) provide a review plan.

The Contractor shall ensure that as far as is reasonably practicable, ergonomic related hazards are analysed, evaluated and addressed in the risk assessment.

The Contractor must review the relevant risk assessment -

- f) where changes are effected to the design and or construction that result in a change to the risk profile; or
- g) when an incident has occurred.

### H8.3 Health and safety plans

The Contractor shall prior to commencing the Works to which this Specification applies, submit to the Employer's Health and Safety Agent for approval a suitable and sufficiently documented health and safety plan, based on this Specification and the risk assessment that is conducted.

The health and safety plan shall include, but not be limited to, the following:

- a) The safety management structure, including the names of all designated persons such as the construction supervisor and any other competent persons;
- b) Safety method statements and procedures to be adopted to ensure compliance with the OHS Act; Construction Regulations, 2014 and this Health and Safety Specification;
- c) The provision and use of temporary services;
- d) Personal protective equipment, devices and clothing required;
- e) Emergency procedures;
- f) Provision of workers' welfare facilities;

- g)
- h) Induction and training;
- i) Arrangements for monitoring and control to ensure compliance with the safety plan; and
- j) Provision and maintenance of the health and safety file and all other relevant documentation.

The Contractor shall provide each subcontractor with the sections of this Health and Safety Specification pertaining to the construction work to be performed by that subcontractor. The subcontractor shall provide the Contractor with a health and safety plan pertaining to his work, for incorporation into the Contractor's health and safety plan.

The Contractor shall discuss the submitted health and safety plan with the Employer's Health and Safety Agent, modify such plan in the light of the discussions and resubmit the modified plan for approval.

The Contractor shall apply the approved health and safety plan from the date of its approval and for the duration of the Works to which this Specification applies.

The Contractor shall conduct periodic audits for compliance with the approved health and safety plan at intervals agreed upon with the Employer's Health and Safety Agent, but at least once every month.

The Contractor shall update the health and safety plan whenever changes to the Works are brought about.

#### **H8.4 Responsibilities towards employees and visitors**

The Contractor shall, as far as is reasonably practicable, cause every employee to be made conversant with the hazards to his health and safety attached to any work which he has to perform, any article or substance which he has to produce, process, use, handle, store or transport and any plant or machinery which he is required or permitted to use, as well as with the precautionary measures which should be taken and observed with respect to those hazards or safe work procedures.

The Contractor shall ensure that all employees under his control are informed, instructed and trained by a competent person regarding any hazard and the related work procedures before any work commences, and thereafter at such times as may be determined in the risk assessment.

The Contractor shall cause a record of all induction training to be kept, which indicates the names, identity numbers and job description of all those who attended such training.

The Contractor shall not allow or permit any employee to enter the Site, unless such person has undergone health and safety induction training pertaining to the hazards prevalent on the Site at the time of entry.

The Contractor shall ensure that all of his employees have a valid medical certificate of fitness specific to the construction work to be performed and issued by an occupational health practitioner on the prescribed form.

The Contractor shall ensure that each visitor to the Site, save where such visitor only visits the site office and is not in direct contact with the construction work activities:

- a) undergoes health and safety instruction pertaining to the hazards prevalent on the Site; and
- b) is in possession of and using the necessary personal protective equipment.

The Contractor shall cause a record of all induction training to be kept in the Health and Safety file.

The Contractor shall provide suitable on-site signage to alert workers and visitors to health and safety hazards and requirements. Such signage shall include but not be limited to:

- c) prohibited unauthorized entrance;
- d) signage to indicate what personal protective equipment is to be worn; and
- e) activity related signs.

The Contractor shall not permit any person who is or who appears to be under the influence of intoxicating liquor or drugs, to enter or remain at a workplace.

### **H8.5 Subcontractors**

The Contractor may only subcontract work in terms of a written subcontract and shall only appoint a subcontractor should he be reasonably satisfied that such a subcontractor has the necessary competencies and resources to safely perform the work falling within the scope of the subcontract.

The Contractor shall ensure that all of his obligations in respect of subcontractors in terms of the Construction Regulations, 2014 are adhered to.

### **H8.6 Work permits and wayleaves**

The Contractor shall be responsible for obtaining all the wayleaves, permissions or permits applicable to working near any existing services or other infrastructure on Site, and shall abide by the safety conditions imposed by such wayleaves, permissions or permits.

### **H8.7 Access to the Site**

The Contractor shall ensure that access to the Site is strictly controlled and that, where possible, only authorised persons are permitted onto the Site.

The Contractor shall control the access to Site of his own personnel and equipment, and that of his subcontractors and suppliers, in such a way so as to ensure that the safety of all public pedestrian and vehicular traffic is not compromised.

### **H8.8**

### **H8.9 First aid and emergency procedures**

The Contractor shall, where more than five employees are employed at a workplace, provide a first aid box or boxes at or near the workplace, which shall be available and accessible for the treatment of injured persons at that workplace. Such first aid boxes shall contain suitable first aid equipment.

The Contractor shall ensure, where there are more than 10 employees employed on the Site, that for every group of up to 50 employees at that workplace at least one person is readily available during normal working hours who is in possession of a valid certificate of competency in first aid.

The following information shall be conspicuously posted in the offices of the Contractor for the duration of the Contract:

- a) Telephone numbers of emergency services;
- b) The names of all safety representatives and safety officers; and
- c) The name(s) of the competent first aider(s).

The Contractor shall post, in prominent places, notices indicating where the first aid box(es) is/are kept, as well as the name of the person in charge of the first aid box.

### **H8.10 Housekeeping**

The Contractor shall ensure, *inter alia*, that suitable housekeeping is continuously implemented on the Site, including provision for the:

- a) removal of scrap, waste and debris, and materials which are no longer required for use, at appropriate intervals (in accordance with Construction Regulation 27); and
- b) proper stacking and storage of materials and equipment (in accordance with Construction Regulations 27 and 28).

### **H8.11 Fire precautions**

The Contractor shall ensure that all appropriate measures are taken to minimize the risk of fire and that appropriate procedures and equipment are in place to deal with the event of a fire, all in accordance with Construction Regulation 29 and the Environmental Management Specification in Part C3.5 of the Scope of Work.

#### **H8.12 Facilities for workers**

The Contractor shall provide ablution facilities and eating areas all as specified in the Environmental Management Specification in Part C3.5 of the Scope of Work.

#### **H9 GENERAL HAZARDS AND RISKS APPLICABLE TO WORK REQUIRED IN TERMS OF THIS TENDER**



## INTRODUCTION AND BACKGROUND

### Background to The Health and Safety Specification

The Construction Regulations (February 2014) place the onus on the Client to prepare a preconstruction Health and Safety specification, highlighting all risks not successfully eliminated during design setting standards for Health and Safety during construction phase. The Health and Safety Specification will be based on the findings of the Baseline Risk Assessment.

### Purpose of The Health and Safety Specification

To assist in achieving compliance with the Occupational Health and Safety Act 85/1993 and the promulgated Construction Regulations (February 2014) to reduce incidents and injuries. This specification shall act as the basis for the drafting of the construction phase Health and Safety plan by the Principal Contractor.

The specification sets out the requirements to be followed by the Principal Contractor and their contractors so that the Health and Safety of all persons potentially at risk may receive the same priority as other facets of the project e.g., Cost, programme, environment, quality etc.

## DEFINITIONS

|                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Agent                   | means a competent person who acts as a representative for a client.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Angle Of Repose         | means the steepest angle of a surface at which a mass of loose or fragmented material will remain stationary in a pile on the surface, rather than sliding or crumbling away.                                                                                                                                                                                                                                                                                                                                                                                                      |
| Bulk Mixing Plant       | means machinery, appliances or other similar devices that are assembled in such a manner so as to be able to mix materials in bulk for the purposes of using the mixed product for construction work.                                                                                                                                                                                                                                                                                                                                                                              |
| Client                  | means the <b>City of Cape Town</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Competent Person        | means a person who-<br>(a) has in respect of the work or task to be performed the required knowledge, training, and experience and, where applicable, qualifications, specific to that work or task: Provided that where appropriate qualifications and training are registered in terms of the provisions of the National Qualification Framework Act, 2000 (Act No.67 of 2000), those qualifications and that training must be regarded as the required qualifications and training, and<br>(b) is familiar with the Act and with the applicable regulations made under the Act. |
| Construction Manager    | means a competent person responsible for the management of the physical construction processes and the coordination, administration, and management of resources on a construction site.                                                                                                                                                                                                                                                                                                                                                                                           |
| Construction Site       | means a workplace where construction work is being performed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Construction Supervisor | means a competent person responsible for the management of the physical construction processes and the coordination, administration, and management of resources on a construction site.                                                                                                                                                                                                                                                                                                                                                                                           |
| Construction Vehicle    | means a vehicle used as a means of conveyance for transporting persons or material, or persons and material, on and off the construction site for the purposes of performing construction work.                                                                                                                                                                                                                                                                                                                                                                                    |
| Construction Work       | means any work in connection with -<br>a) the construction, erection, alteration, renovation, repair, demolition or dismantling of or addition to a building or any similar structure. or<br>b) the construction, erection, maintenance, demolition or dismantling of any bridge, dam, canal, road, railway, runway, sewer, or water reticulation system. or the moving<br>c) Page 7 of 79<br>d) of earth, clearing of land, the making of excavation, piling, or any similar civil engineering structure or type of work.                                                         |
| Contractor              | means an employer who performs construction work.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Demolition Work         | means a method to dismantle, wreck, break, pull down or knock down of a structure or part thereof by way of manual labour, machinery, or the use of explosives.                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Design                  | in relation to any structure, includes drawings, calculations, design details and specifications.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

|                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Designer                                                     | <p>means-</p> <ul style="list-style-type: none"> <li>a) a competent person who- <ul style="list-style-type: none"> <li>I. prepares a design.</li> <li>II. checks and approves a design.</li> <li>III. arranges for a person at work under his or her control to prepare a design, including an employee of that person where he or she is the employer. or</li> <li>IV. designs temporary work, including its components.</li> </ul> </li> <li>b) an architect or engineer contributing to or having overall responsibility for a design.</li> <li>c) a building services engineer designing details for fixed plant.</li> <li>d) a surveyor specifying articles or drawing up specifications.</li> <li>e) a Contractor carrying out design work as part of a design and building project. or</li> </ul> <p>an interior designer, shopfitter, or landscape architect.</p> |
| Excavation Work                                              | means the making of any man-made cavity, trench, pit, or depression formed by cutting, digging, or scooping.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Explosive Actuated Fastening Device                          | means a tool that is activated by an explosive charge and that is used for driving bolts, nails, and similar objects for the purpose of providing fixing.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Fall Arrest Equipment                                        | means equipment used to arrest a person in a fall, including personal equipment, a body harness, lanyards, deceleration devices, lifelines, or similar equipment.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Fall Prevention Equipment                                    | means equipment used to prevent persons from falling from a fall risk position, including personal equipment, a body harness, lanyards, lifelines, or physical equipment such as guardrails, screens, barricades, anchorages, or similar equipment.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Fall Protection Plan                                         | <p>means a documented plan, which includes and provides for-</p> <ul style="list-style-type: none"> <li>a) all risks relating to working from a fall risk position, considering the nature of work undertaken.</li> <li>b) the procedures and methods to be applied in order to eliminate the risk of falling. and</li> <li>c) a rescue plan and procedures.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Fall Risk                                                    | means any potential exposure to falling either from, off or into.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Health And Safety File                                       | means a file, or other record containing the information in writing required by these Regulations.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Health And Safety Plan                                       | means a site, activity, or project specific documented plan in accordance with the client's H&S specification.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Health And Safety Specification                              | <p>means a site, activity or project specific document prepared by the client pertaining to all health and safety.</p> <p>Page 8 of 79</p> <p>requirements related to construction work.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Material Hoist                                               | means a hoist used to lower or raise material and equipment, excluding passengers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Medical Certificate Of Fitness                               | means a certificate contemplated in CR 7(8).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Mobile Plant                                                 | means any machinery, appliance or other similar device that is able to move independently and is used for the purpose of performing construction work on a construction site.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Principal Contractor                                         | means an employer appointed by the client to perform construction work, used interchangeably with the term "Principal Contractor".                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| "Professional Construction Health And Safety Agent           | means a person holding registration as a Professional Construction Health and Safety Agent in terms of the Project and Construction Management Act (Act No. 48 of 2000).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| "Professional Engineer Or Professional Certificated Engineer | <p>means a person holding.</p> <p>registration as either a Professional Engineer or Professional Certificated Engineer in terms of the Engineering Profession Act, 2000 (Act No. 46 of 2000).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Professional Technologist                                    | means a person holding registration as a Professional                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |



|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |         |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| Project Electrical Engineer:De Villiers & Moore                                                                                                                                                                                                                                                                                                                                                                                                                                   | Tel:    |
| Contact Person:                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | e-mail: |
| Project Quantity Surveyor:                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Tel:    |
| Contact Person:                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | e-mail: |
| Construction Safety Agent:                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Tel:    |
| Contact Person:                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | e-mail: |
| <b>OTHER PARTIES DIRECTORY</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |
| Department of Labour for submission of Annexure 2:<br>Notification of Construction Work                                                                                                                                                                                                                                                                                                                                                                                           | Tel:    |
| WESTERN CAPE                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | e-mail: |
| <b>PROJECT DETAILS</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                            |         |
| Description of Works includes but not limited to:                                                                                                                                                                                                                                                                                                                                                                                                                                 |         |
| Voortrekker Rd widening (south side from Station Rd - 12th Ave)<br>Realignment of intersection at Camp Road<br>Koeberg Rd widening<br>Resurfacing<br>Protection, relocation and upgrading of existing services (incl up to DN750 steel water mains and HV & MV cables.<br>New traffic signals (for 9 intersections)<br>Railway bridge widening<br>Relocation of existing cemetery sandstone wall and fencing<br>Streetlighting, signage, landscaping, IS&T, ducting, roadmarkings |         |
| Provisional Start Date:<br>July 2026                                                                                                                                                                                                                                                                                                                                                                                                                                              |         |
| Completion Date:<br>Due Completion Date                                                                                                                                                                                                                                                                                                                                                                                                                                           |         |
| Contract Duration: Clause 1.1                                                                                                                                                                                                                                                                                                                                                                                                                                                     |         |

## HEALTH AND SAFETY SPECIFICATION

### Scope

This specification covers the requirements for eliminating and mitigating incidents and injuries on **Upgrade of Voortrekker Road from Beach Road to 12<sup>th</sup> Avenue, Maitland Project**.

The scope also addresses legal compliance, hazard identification and risk assessment, risk control and promoting a Health and Safety culture amongst those working on the project. The specification also makes provision for the protection of those persons other than employees.

### Provision for Health & Safety Cost

The Principal Contractor and their contractors shall make adequate provision for the cost of Health & Safety Measures during the construction process as required by the Construction Regulation 5(1)(g).

## INTERPRETATIONS

### Application

This specification is a compliance document drawn up in terms of the South African legislation and is therefore binding. It must be read in conjunction with relevant legislation as noted previously.



## MINIMUM ADMINISTRATIVE REQUIREMENTS

### Notification of Intention to Commence Construction Work

A client who intends to have construction work carried out, must at least 30 days before that work is to be carried out apply to the provincial director in writing for a construction work permit to perform construction work if the intended construction work starts from the [REDACTED] and will –

1. exceed 365 days and will involve more than 3600 person days of construction work.

the tender value limit is grade 7, 8 or 9 of the Construction Industry Development Board (CIDB) grading

#### CIDB Grading chart

Tender Value Range Adjustments TVR)

| CIDB Grade | Current TVR | Proposed Adjustment TVR |
|------------|-------------|-------------------------|
| 1          | 200 000     | 500 000                 |
| 2          | 650 000     | 1 000 000               |
| 3          | 2 000 000   | 3 000 000               |
| 4          | 4 000 000   | 6 000 000               |
| 5          | 6 500 000   | 10 000 000              |
| 6          | 13 000 000  | 20 000 000              |
| 7          | 60 000 000  | 60 000 000              |
| 8          | 130 000 000 | 200 000 000             |
| 9          | No Limit    | N/A                     |

Construction work permit:

#### Condition 1:

- is intended to exceed 365 days; or will involve more than 3600 person days of construction work; or

#### Condition 2:

Condition 2 is dependent on the Construction Industry Development Board (CIDB) grading, which are as follows:

- Grade 7 = R60 000 000
- Grade 8 = R130 000 000
- Grade 9 = No limit

### Assignment of Contractor's Responsible Persons to Manage and Supervise Health and Safety on Site.

The Principal Contractor shall submit management and supervisory appointments as well as any relevant Appointments in writing (as stipulated by the OHS Act and Construction Regulations), prior to commencement of work. Proof of competency must be included.

**Note:** All appointments shall be done by the Chief Executive Officer/Managing Director or his/her assistant in terms of Section 16 of the OHS Act 85/1993 with exception to the Construction Manager in terms of Construction Regulation 8. The Construction Manager shall be full time on site unless an Alternate Competent Construction Manager has been appointed in writing.

*The appointed Construction Manager shall be competent and have a minimum of a three year diploma in the Built Environment or any other relevant qualification as long as it is not short courses, or be registered with SACPCMP as Professional Construction Manager as required by the Department of Employment & Labour and in line with the definition of "Competence" The Construction Manager shall be full-time on site.*

#### CV required with previous/similar projects

The Principal Contractor shall ensure that competent Construction Supervisors and where applicable that assistant construction supervisors are appointed in writing. This shall apply to all contractors. *The Principal Contractor shall forward proof of competence of their Construction Manager/s and Site Supervision to the Client/Client Representative for assessment & approval prior to commencement of any activities. The Principal Contractor shall immediately inform the Client/Client Representative of their intent to replace any site management and shall follow due processes as above*

### Competency of Principal Contractor Responsible Persons

The Principal Contractors' competent persons for the various risk management portfolios shall fulfil the criteria as stipulated under the Definition of Competent in accordance with the Construction Regulations (February 2014). Proof of competence for the various appointments must be included prior to start of work.

**The Principal Contractor shall ensure that all his/her employees including their contractors have the relevant competence and training for them to perform their duties and or carry out construction activities. Note, the guidelines provided by the Department of Employment & Labour regarding competence must be taken into consideration when appointing site management. Note: The Principal Contractor and their contractors shall ensure that all Site Management and Site Supervision have at least training in Legal Liability.**

**All certificates provided shall be issued by an accredited service provider and must be in line with the National Qualification Framework Act 67/2000 & 2008 and the South African Qualifications Authority (SAQA)**

### Compensation for Occupational Injuries and Diseases Act (Coida) 130 Of 1993.

The Principal Contractor and their contractors shall submit a valid Letter of Good Standing from their Compensation Insurer-FEM or Compensation Commissioner to the Client's Representative as proof of registration before they commence work on site.

**Note:**

**A client must ensure before any work commences on a site that every Principal Contractor is registered and in good standing with the compensation fund or with a licensed compensation insurer as contemplated in the Compensation for Occupational Injuries and Diseases Act, 1993 (Act No. 130 of 1993).**

**Principal Contractor must ensure prior to work commencing on the site that every contractor is registered and in good standing with the compensation fund or with a licensed compensation insurer as contemplated in the Compensation for Occupational Injuries and Diseases Act, 1993.**

### Occupational Health and Safety Policy

The Contractor and their contractors shall submit a Health and Safety Policy signed by their Chief Executive Officer. The Policy must outline objectives and how they will be achieved and implemented by the Company / Contractor.

### Health and Safety Organogram.

The Principal Contractor and their contractors shall submit an organogram with contact numbers, outlining the Health and Safety Site Management Structure including the relevant appointments / competent persons. In cases where appointments have not been made, the organogram shall reflect the intended positions. The organogram shall be updated when there are any changes in the site Management Structure and must be site specific.

### Preliminary Hazard Identification and Risk Assessment

The Principal Contractor and their contractors shall develop Risk Assessments and Method statements by a competent person for the risk that they foresee during construction.

**Note, the Principal Contractor shall ensure that a competent Risk Assessor is appointed in writing and shall be Full Time on site for the duration of the project.**

**Principal Contractor to provide a 14-day Look Ahead Hazard Identification Risk Assessment (HIRA) for upcoming activities before they are encountered on a bi-weekly basis and forward an electronic copy to the appointed Health and Safety Agent. Contractor to ensure that provision is made should physically impaired/challenged employees be employed.**

**Furthermore, the Principal Contractor and their contractors to ensure that Daily Safe Task Instruction/ Planned Tasked Observations are conducted prior to any activity with proof placed on file. Contractors may use their own Formats/Templates.**

**The following is a site-specific source of risks that have been identified but is not limited to and must as a minimum, be appropriately addressed by the Principal Contractor in their Health & Safety Plan with Control Measures but is not limited to:**

#### Site Establishment

- Offloading of containers/site office

- Secure / Safe Storage of Material, Plant & Equipment
- Ablution Facilities
- Eating facilities
- Vehicle Access to Site
- Location of existing Services
- Hoarding Permits (If Applicable)
- Dealing with existing structures and Traffic
- Establishing near coastal areas
- Provision for drinking water for all staff

#### **Crane Management System (i.e., All Cranes)**

- Competency and Medical Certificates of Operator
- Load Test Certificates
- Rescue Plan
- Crane Management Plan/System to be provided.
- (Emergency Procedures)
- CR 23 and Driven Machinery Regulations (2015) must be adhered to
- Relevant Inspections conducted by an LMI as per DMR 18 (2015)

**Should the crane be found not to be fitted with a gauge/anemometer due to its Design, then the Principal Contractor must provide alternative control measures e.g. the use of a handheld wind gauge/anemometers. The Principal Contractor, their contractors and service providers shall ensure that all vehicles and plant are adequately earthed especially when in close proximity of electrical cables.**

#### **Hoarding & Access Control**

- Public Liability / Access Control / Compliance to Section 9
- Site needs to be Adequately Secured.
- Relevant Construction Warning Signage
- Daily inspections with proof placed on file.
- Hoarding to be in line with approved Design Drawings.

#### **Public Liability**

- Effect of Construction Work on members of the public and existing property e.g. Neighboring Property
- Guiding members of the public through a construction site onto the beach.
- Noise Control
- Dust Control
- Temporary lighting
- Relevant signage



- Hazardous Chemical Substances

#### **Working near existing services**

- Identification and protection of existing services
- Electrical Cables, Telkom, Data etc.

#### **Plant & Machinery**

- Principal Contractor to provide designated area should any plant and machinery be parked at night. Plant to be fully secured to avoid possible unauthorized access.

#### **Lateral Support**

- Design Drawings
- Full Method Statement and risk assessment
- Competent operators
- Task specific PPE
- Compliance to Construction Regulations 13 and 23.

#### **Unplanned collapse of Material or structures- Contractor to provide control measures.**

- Principal Contractor to provide adequate protection to avoid falling objects e.g., Crash Decks, Catch Nets, Apron Fans etc. or any other similar protection as and where needed. Principal Contractor to assess all work areas prior to start of work.
- Structure to be inspected periodically by a competent person to render the structure safe. The structure to be maintained in such a manner so that it remains safe for continuous use.
- Records of inspections and maintenance are to be kept on file and must be made available on request to an inspector.
- Principal Contractor to provide full method statement and risk assessment.

#### **Civils Work**

- Compliance to Construction Regulation 23
- Excavation & Compliance to Construction Regulation 13
- Persons/Equipment falling into Excavations.
- Edge Protection
- Asphalt
- Road Cleaning to be maintained daily.
- Traffic and Pedestrian Accommodation
- Kerbs and channel
- Brick paving
- Heavy Construction Vehicles/Mobile Plant

#### **Structural Steel**

- Principal Contractor to submit Task Specific Method Statements and Task Specific Risk Assessments of their lifting and installation procedures e.g. Manually or Mechanically.
- Full compliance with CR 9, 10, CR 23 and DMR 18 (2015)
- Guide Ropes shall be used as far as reasonably practicable when busy with all lifting operations to assist with possible uncontrolled loads especially during inclement weather and restricted areas.
- Only competent persons to conduct operations
- Task Specific Fall Protection & Rescue Plan
- All work areas shall be adequately demarcated with spotters' present
- Safe Access required at all times



**Temporary Works**

- Competent Temporary Works Designer to be appointed in writing
- Erecting and Stripping of Temporary Works
- Authorization for stripping to be given by the structural engineer
- Design Drawings issued by a competent person
- Casting of Concrete
- Drilling / Cutting into Slab
- Adequate Edge Protection- No Danger Tape
- Authorization to be provided in writing by a competent person (Before Concrete Pour) and Handover Certificates/Signed off by a Competent Person before Stripping any temporary works structures
- Daily Inspections to be conducted

**Demolition during construction phase**

- Adequate measures to ensure the safety of public
- Identifying services of live services
- PPE
- Relevant signage to be displayed
- Noise- Procedure to control noise to be in place.
- Use of Portable Power Tools
- Combustibles
- Housekeeping
- Demolition method statement
- Demolition Permit
- Dust inhalation

**Asbestos**

- Principal Contractor to provide a method statement on how asbestos will be removed.
- Relevant signage to be displayed
- Site demarcation/no go areas
- Appropriate PPE to be worn
- Decontaminating/wash area
- Awareness session to be held weekly
- Site storage of Asbestos in close bin and double bagged
- Removal of asbestos to Vissershok
- Compliance to Asbestos work plan and Asbestos Abatement Regulations 2020.
- Safe disposal certificates on file

**The Use of Troxler's: Contractors to ensure compliance and provide i.e.**

- License for use of Troxler and density material and equipment
- Leak Test Certificates
- Calibration Certificate
- Procedure when transporting with relevant signage displayed.
- Risk Assessments
- Proof of Competency for operators

**Note: Principal Contractor to take caution with regards to adjacent roads**

**Procedure to identify underground HV/Electrical Cables  
Compliance to the Driven Machinery Regulations (2015)**



**Traffic Management Plan to include but is not limited to i.e.:**

- Traffic Safety Officer to be appointed.
- Stop and Go management not extending more than 500m at a time unless approved by the principle agent
- Daily traffic accommodation inspections at least 3 times a day.
- Inspections for during night traffic management
- Delivering of Material and Equipment
- Signage, Competent Flagmen and Compliance with all relevant regulation and legislation including the South African Road Traffic Signs Manuel (**SARTSM**) Chapter 13.
- Plan to be Monitored and Reviewed at least monthly (Every 30 Days) or as the building program / activities changes.
- Adequate barriers and delineators to be provided and placed strategically as needed.
- Procedure for maintaining road signage.
- All employees working in or close to the road to wear Hi-Viz vests always.
- Competent Flagmen shall be provided and readily available to assist with all Deliveries.
- Flagmen shall not be on duty for a period longer than 8 (eight) hours per day.
- Flagmen to be rotated as needed (If Applicable)
- **Heat and Inclement weather to be considered for all Flagmen. Sufficient control measures required as needed.**
- **Relevant notification to be done ahead of timeline.**
- **Traffic Management Plan to be approved prior to roadworks being done.**
- **High volume traffic area**
- **Accommodation of construction vehicles and machinery along busy roads.**

**Electrical Installations**

- A competent contractor must be appointed to install all specialized cables such as low/high/mega voltage cables in and around the site.
- Must be carried out under competent supervision.
- Lock out/Tag out procedures
- Working with live cables/live installations
- Working in existing/new substations
- Tying in of new electrical lines onto existing lines
- Switching process and Isolation operations
- Working with & in close proximity of live apparatus
- Compliance with SANS 10142
- Relevant Permits to be obtained
- Diverting of existing cables
- Protecting of existing cables

**The Principal Contractor must communicate with the appropriate Consultant and Client when/if they need any amendments to the design relating to improve safety.**

**Lifting and Installation Procedures**

- Principal Contractor to submit Full Method Statements of their lifting and installation procedures e.g., manually, or mechanically.
- All lifting equipment to comply with *Driven Machinery Regulation* (2015)

**Waste Management Plan/System to be implemented.**

- Rubble to be stored neatly in bags/bins and collected as needed.
- Principal Contractors to provide sufficient Bins / Bags always and must be removed on a regular basis or as and when needed.
- All hazardous material to be stored separately and must be disposed of at an authorized landfill site. Proof of Disposal to be provided.
- Rubble shall not be allowed to accumulate on site and shall be removed at regular intervals.

**Hot Works**

- Principal Contractors and their contractors to ensure that Fire Equipment and adequate precaution measures are in place when grinding, welding / hot works etc. including PPE and demarcation.
- Hot work permits to be issued once the area has been inspected by a responsible person and declared safe with proof placed on file. (Note- All permits should not exceed one (1) working day)
- Compliance with CR 25& 29

**Temporary Flammable Liquid/Material Storage**

- Principal Contractor to ensure that adequate ventilation is provided with Relevant Signage and Fire Precautions provided.
- Adequate Fire Equipment to be readily available.
- Compliance with all relevant legislation and regulations including the Community Fire Safety By-law Compliance and CR 25& 29.

**Working near of Electrical Cables**

- Contractor to provide full method statement and risk assessment when working on live electrical Cables. Must be communicated to all staff prior to the activity.
- All Staff must be provided with the relevant Personal Protective Equipment (PPE)

**Procedure to identify HV/Electrical Cables  
Electrical Installations – High and Low Voltage  
Compliance to the Driven Machinery Regulations (2015)****Safe Use of Portable Electrical Equipment**

- Electrical Drilling Machine
- Angle Grinder
- Kango / Jack Hammer
- High Pressure Equipment
- Any Other Equipment used by Principal Contractor.

**Emergency Preparedness**

- Emergency Evacuation Plan with Relevant Emergency Numbers
- Revision of Emergency Plan
- Principal Contractor to monitor site conditions and conduct Evacuation Drills as and when needed with proof placed on file (Roll call, report to be placed on file etc.)
- Enough workers are Trained (Competent) in the use of Fire Extinguishing Equipment
- Emergency assembly point to be established with the relevant signage displayed.
- Air horn/alarm/siren to be provided on site.



**Manual and Mechanical Handling  
Mechanical Installations**

**Protection of Storm Water System**

- Method to Prevent Run Off into Storm Water System

**Health Hazards**

- Storage of hazardous materials
- Working with cementitious material
- Dust
- Noise
- Contaminated land
- Vibration
- Inhaling of Bituminous and cementitious material
- Exposure to Anime bases epoxy products

**Additional Activities foreseen on site.**

- Public Safety- Relevant precautions to be taken (Hoarding/Physical Barriers, signage etc.)
- Process to move equipment, tools, scrap material, etc. to and from elevated positions.
- Storage/control of Hazardous substances
- Wet Works
- Concrete Works
- Use of Temporary Access
- Landscaping & Planting Plants
- Kerbing
- Breaking up of Existing Pavements
- Milling
- Asphalt
- Mole Barriers
- Guard Rails
- Road Signs and Markings
- Patching & Repairing of Edge Breaks
- Paving
- Working with large precast concrete units that are delivered by truck and placed using a crane.
- Accommodation of construction vehicles and machinery along busy coastal road.
- Working within coastal zone – high tides
- Unforeseen activities

**N.B. A risk assessment will be performed for all unplanned work and submitted to Health and Safety Agent for approval prior to work commencing.**

**Principal Contractors and their contractors to ensure that the risk assessments, as well as other risks identified by them, are updated at least every 30 days or as the risk changes are recorded and communicated to all relevant parties with proof placed on file- CR 9. Note: All reviews must be signed off by the appointed Risk Assessor.**

**Note: All identified risks and hazards must be based on a documented method (method statements)**

**Furthermore, the Principal Contractor and their contractors shall provide a Monitoring and a Review Plan including a Risk Register indicating all activities.**





**Note: Principal Contractor must ensure as far as is reasonably practicable, ergonomic related hazards are analysed, evaluated, and addressed in a risk assessment.**

**Fall Protection Plan: Erecting and Working on Scaffolding, Working at Heights, and Working near Excavation Edges**

Working at heights includes any work that takes place in an elevated position. The Principal Contractor and their contractors must submit a risk/task-specific Fall Protection Plan in accordance with Construction Regulations 10. The Fall Protection Plan must be job specific, be reviewed at least monthly (Every 30 Days) or as the risk changes or after any incident. Contractors to ensure that medicals are provided for all persons exposed to elevated positions.

Scaffolding must comply with the requirements of **SANS 10085-1:2004**. Scaffolds are used extensively by Contractors and strict control measures must be in place to prevent Unauthorized alterations to scaffolding such as removing ties and scaffold boards.

Competent persons to be appointed in writing to:

- erect scaffolding (Scaffold Erector/s)
- act as Scaffold Team Leaders
- inspect Scaffolding daily and after inclement weather (Scaffold Inspector/s).
- **The Scaffolding must comply with SANS 10085:1-2004, fully cladded including, Crash Decks etc. as and when needed.**

**Note: No Trestle or Walkthrough Scaffolds may be used on site.**

**Furthermore, the Contractor shall provide a site-specific Risk Assessment based on their Fall Risk.**

**Written Proof of Competency of above appointees to be available on Site.**

Where scaffolding or work from scaffolding may negatively affect the public, it must include a scaffold fan/apron or access tunnel. Shade cloth must be used to enclose the scaffolding below the first fan/apron. Should the scaffolding be adjacent to an existing pavement of similar public walkway, a pavement **gantry and crash deck** will be required (overhead protective structure).

**All employees working on heights must have a Medical Certificate issued by an Occupational Health Practitioner (OHP)**

**Note, The Principal Contractor shall provide a programme for the training of employees working from a fall risk position and the records thereof.**

**A fall protection plan must include.**

- a) a risk assessment of all work carried out from a fall risk position and the procedures and methods used to address all the risks identified per location.
- b) the processes for the evaluation of the employees' medical fitness necessary to work at a fall risk position and the records thereof.
- c) a programme for the training of employees working from a fall risk position and the
- d) records thereof.
- e) the procedure addressing the inspection, testing and maintenance of all fall protection equipment; and
- f) a rescue plan detailing the necessary procedure, personnel and suitable equipment required to affect a rescue of a person in the event of a fall incident to ensure that the rescue procedure is implemented immediately following the incident.

## Health and Safety Officer 8(5)

The Principal Contractor shall provide a Full-Time Health and Safety Officer on site with proof of SACPCMP registration placed on file. **The Safety Officer shall be fully registered with the South African Council for the Project and Construction Management Professions (SACPCMP). This is applicable to all contractors. The appointed Principal Contractor and their contractors may determine and agree on the frequency of their contractors' safety officers' visits to site but at least include weekly inspections.**

**The following health & safety officer related duties will be required and must be carried out but is not limited to.**

- a) Health & safety audits and inspections including administrative and physical audits of all Contractors' health & safety plans, files and activities, and record findings in the form of audit reports to be kept in the health & safety file;
- b) Weekly inspection reports – site hazard survey findings recorded, and actions taken recorded;
- c) Assess, and finally approve Contractor H&S plans and supporting documents;
- d) Maintain and co-ordinate the Principal Contractor health & safety management plan and file;
- e) Investigate near misses, incidents and injuries;
- f) Co-ordinate the function of reviewing the hazard identifications and risk assessments;
- g) Assist with method statements and safe work procedures and checking whether the responsible persons follow these safe work procedures;
- h) Enforcing discipline on the site and checking on compliance with safety procedures, standards and rules;
- i) Implement and enforce the site hot work permit system;
- j) Ensure that public protection protocols are adequate and well maintained;
- k) Conduct planned job observations to check whether workers are carrying out activities in accordance with the safe work procedures;
- l) Fire risk assessments and enforcement;

**Note:** "No contractor may appoint a construction health and safety officer to assist in the control of health and safety related aspects on the site unless he or she is reasonably satisfied that the construction health and safety officer that he or she intends to appoint is registered with a statutory body approved by the Chief Inspector and has necessary competencies and resources to assist the contractor".

***NOTE, NO CANDIDATES WILL BE ALLOWED TO MANAGE HEALTH AND SAFETY ON THIS PROJECT***

## Traffic safety officer

The Contractor shall submit a CV of the candidate to the Engineer for approval before the Traffic Safety Officer is appointed. The Traffic Safety Officer shall be made available to discuss road safety and traffic accommodation matters whenever required by the Engineer."

- Be responsible for contacting all the relevant authorities in the event of an accident on the site of the Works. Arrange for the removal of broken-down vehicles that obstruct the normal traffic flow.
- Be responsible for the erection and maintenance of all traffic signs necessary for the accommodation of traffic.
- Escort delivery vehicles and other plant into and out of the site in accordance with the procedures instructed by the Engineer.

The Contractor shall provide the traffic safety officer with all the necessary resources to carry out his duties as specified, inter alia a light delivery van (LDV), personnel, warning signs and revolving amber flashing lights. A warning sign with the words "CONTRACTOR TRAFFIC CONTROL" in clearly legible letters shall be mounted on the vehicle at least 1,5 m above ground level to be clearly visible.

The vehicle shall be equipped with two revolving amber-coloured flashing lights with a minimum intensity of 55 W. The flashing lights shall be switched on and the warning sign be displayed at all times when the vehicle is used on the Site."

## Flagmen and flags

Where required by the Engineer, sufficient, suitably trained flagmen shall be provided for the control of traffic. Flagmen shall be a responsible employee, adequately trained in the standard flagging techniques as described in the South African Road Signs Manual (Volume 2 Chapter 13) on figure 13.23 (detail 13.23.1). They shall be provided with conspicuous clothing as described hereunder.

During the summer months and only during the day the waterproof jacket may be replaced with a waistcoat HV202 supplied by Pienaar Bros. or equal approved. The minimum coefficient of retroreflection (RA) of the reflective material fabric shall be 500 cd/lux/m<sup>2</sup>.

Flagmen shall always have in their possession certification that they have attended and passed an accredited course in flagging techniques before being allowed to carry out their duties. No flagmen shall be on duty for a period of more than 10 hours per day.

Flags shall be made from fluorescent orange material with trimmings and shall be 700 mm square. The minimum coefficient of retro-reflection (RA) of the material fabric shall be 175cd/lux/m<sup>2</sup>. The flags shall have a 50 mm wide strip of 'Scotch lite' or similar approved reflective material along all the edges and on both sides of the flag.

Furthermore, two 50 mm wide strips of 'Scotch lite' or similar approved reflective material (300 mm long) shall also be sewn on both sides of the flag. The minimum coefficient of retroreflection (RA) of the reflective material fabric shall be 500 cd/lux/m<sup>2</sup>.

Flags shall be maintained in a clean and pristine condition. The flag shall be mounted on a staff of adequate length, not shorter than 1.0 m. Wherever possible, flagmen shall stand at least 1.2m outside of the lane of traffic that is being controlled. Under no circumstances shall flagmen be permitted to stand within the traffic lane. Flagmen shall stand alone in order to enhance the visual impact upon the travelling public.

## Medicals

The Principal Contractor to ensure that all his or her employees including all appointed contractors have a valid medical certificate of fitness specific to the construction work to be performed and issued by an Occupational Health Practitioner in the form of an Annexure 3. **Failing to comply may result in the relevant employees being stopped without compensation to protect the Client in terms of CR 5. Furthermore, the Principal Contractor and their contractors shall provide a tracking register clearly indicating the full names, surnames of employees and Expiry Dates**

**Expiry Dates of all medicals shall be clearly displayed on all induction cards.  
Only certified copies will be allowed where original certificates is not available**

***Where there is uncertainty the Principal Contractor shall consult an Occupational Medical Health Practitioner to determine what inoculation is required. All employees that may be exposed to sewage shall have received the relevant inoculation, be trained for the task, be in possession of the prescribed personal protective equipment.***

***Furthermore, the Principal Contractor shall provide task specific risk assessments with proof of training placed on file prior to any activity.***

**Furthermore, the Principal Contractor must ensure that all work-related activities are highlighted to the medical practitioner when conducting the examination.**

Furthermore, the Principal Contractor must ensure that a Biological Monitoring Plan is implemented and conducted on all employees exposed/or working close to a sewer area or exposed to raw sewage. These employees must undergo a Hepatitis Antibody injection.

## Health and Safety File (HSF)

The Principal Contractor and their contractors shall, in terms of CR 7(1), maintain the HSF on site always. The HSF is a file with permanent records containing information on aspects of the construction project - which will be necessary to ensure the health and safety of any persons who may be affected by the construction work.

The HSF must include all documentation required in terms of the Act and Regulations and must also include a list of all Contractors on site that are accountable to the Principal Contractors and the agreements between the parties and details of work being done.

The Principal Contractors shall appoint a suitably qualified person to prepare the HSF and to keep it up to date for the duration of the contract.

Health and Safety Requirements as per the framework contract:

Note that all contractors appointed by the Principal Contractor must provide the below documentation as a minimum.

| Contractor Requirements                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Health and Safety File that includes but is not limited to the below:</b></p> <ol style="list-style-type: none"> <li>1) Permit/Notification of Construction Work to Department of Employment Labour</li> <li>2) COIDA Letter of Good standing</li> <li>3) Health and Safety Policy</li> <li>4) Health and Safety Plan</li> <li>5) Risk Assessments</li> <li>6) Method Statement and Safe Work Procedure</li> <li>7) Fall Protection Plan (if required)</li> <li>8) Section 37.2 Mandatory Agreement</li> <li>9) Contractor Appointment</li> <li>10) Appointment Letters <ul style="list-style-type: none"> <li>• Competency Letters</li> </ul> </li> <li>11) Emergency Procedures (in line with the premises)</li> <li>12) Incident &amp; Accident Procedure</li> <li>13) Inspection Registers</li> <li>14) Training <ul style="list-style-type: none"> <li>• Induction</li> <li>• Toolbox Talk</li> </ul> </li> </ol> |

**The HSF Shall Include At Least The Following Information:**

- a) Notification of Construction Work (CR 3) or construction work permit depending on the contract.
- b) Copy of OHSA (updated) (GAR 4.)
- c) Proof of Registration and good standing with a COIDA Insurer (CR 5(1)(j)) (The Principal Contractors shall submit a letter of good standing with the compensation insurer, at the tender stage).
- d) OHSP agreed with client including the underpinning Risk Assessment/s & Method Statements CR 9(1)
- e) Designs/drawings including scaffolding and form work.
- f) A list of Contractors (Sub-Contractors) including copies of the agreements between the parties and the type of work being done by each Contractor (CR 7)
- g) Appointment/Designation forms h) Registers
- h) Inductions

The HSF/CD shall be handed over to the Client on completion of the contract. It must contain all the documentation as set out above, or as instructed, as well as any handed to the Principal Contractor by any subcontractors together with a record of all drawings, designs, materials used and other similar information concerning the completed project.

**Health and Safety Representative(S)**

The Principal Contractor and their contractors shall ensure that competent Health and Safety Representative(s) are appointed under consultation and trained to carry out their functions as soon as the total workforce has reached a number of 20 employees or more. Should the Principal Contractor and their contractors have less than 20 employees, then the accumulative amount shall apply. The appointments must be in writing. The Health and Safety Representative shall carry out regular inspections at least monthly, keep records and report all findings to the Responsible Person forthwith and at Health and Safety meetings.

**Note: The Principal Contractor and their contractors shall ensure that all certificates provided are issued by an accredited service provider as required by the National Qualification Framework Act 67/2000.**

**The number of representatives for each contractor shall be as per Section 17 of the OHS Act 85/1993, but as a minimum, The Principal Contractor shall appoint at least one competent Health and Safety Representative on the project.**

#### **Health and Safety Committees**

Principal Contractor shall organize at least monthly Health & Safety meetings. Minutes and records shall be kept. Principal Contractors Health & Safety representative and responsible person shall attend this meeting. Principal Contractor to ensure that all Contractor Representatives attend these meetings.

**Note: These meetings shall be conducted regardless how many contractors are appointed.**

#### **Health and Safety Training**

##### **Induction**

Principal Contractor shall ensure that all (including site visitors etc.) undergo site- specific induction presented by a competent person and proof placed in the Safety File prior to start of work. Employees to carry proof of inductions. **Induction cards shall clearly indicate the full names, surnames (No Nick Names), picture of employees, including the expiry dates of all medical certificates of the relevant employee. Note, Visitors shall also have proof of induction training**

##### **Awareness**

The Principal Contractor shall ensure that, on site, toolbox talks take place at least once per week. These talks should deal with risks relevant to the construction work at hand. A record of attendance shall be kept in the Health and Safety file. All Principal Contractors have to comply with this minimum requirement. Contractors to ensure that the discussion is recorded on file (Topics with notes).

#### **Health and Safety Site Rules**

The Principal Contractors must develop a Set of Site-Specific Health and Safety Rules that will be applied to regulate the Health and Safety aspects on Site. Security and Access control must be included in the rules and those non-employees or visitors will not be allowed on site unaccompanied.

#### **Competency**

In accordance with the Construction Regulation the Principal Contractors shall appoint, in writing, competent persons (in addition to the Construction Managers – CR 8 (1)(2) & Construction Supervisor/s-8(7)(8) responsible for supervising construction work for the following work situations that may be expected on the site of the works, as applicable to the project.

A competent person may be appointed for more than one part of the construction work with the understanding that the person must be suitably qualified and able to manage and supervise at the same time the construction work on all the work situations for which he/she has been appointed.

The appointment of competent persons to supervise parts of the construction work does not relieve the Principal Contractors from any of his responsibilities to comply with all requirements of the Construction Regulations.

**Note: The Principal Contractor and their contractors shall ensure that all certificates provided are issued by an accredited service provider as required by the National Qualification Framework Act 67/2000 and the South African Qualifications Authority (SAQA).**

#### **Environmental**

Environmental terms and conditions are to be adhered to. All relevant legislation and bylaws are to be adhered to. All necessary permits are to be applied for by the contractor such as transport permits, possession permits and flammable certificates.

#### **GENERAL RECORD KEEPING**

The Principal Contractor and their contractors shall keep and maintain Health and Safety records to demonstrate compliance with this Specification, with the OHS Act 85/1993, and with the Construction Regulations (February 2014).

The Principal Contractor and their contractors shall ensure that all records of incidents / accidents, emergency procedures training, inspections, audits, etc. are kept in a Health and Safety file held in the site office.

The Principal Contractor must ensure that every contractor keeps and maintains its own Health and Safety file and must be readily available at all times. (The file must include the Contractor's health and safety plan). These records are crucial for inclusion in the Principal Contractors' consolidated health and safety file for handover to the Client on completion of construction work.

#### **HEALTH AND SAFETY AUDITS, MONITORING AND REPORTING**

**The Client's Health & Safety Agent shall conduct monthly Health and Safety audits/inspections with follow up audits of the work. Operations including a full audit of physical site activities as well as an audit of the administration Health and Safety. The Health and Safety Agent may conduct unannounced visits as and when needed.**

The Principal Contractor and their contractors are obligated to conduct similar audits on their contractors.

Detailed reports of the audit findings and results shall be reported on at all levels of project management meetings.

Copies of the reports shall be kept on file and must be readily available for inspection. The Principal Contractor must audit their contractors and keep records of these audits in their Health and Safety files and must be available on request.

Note: The Principal Contractor shall ensure that all contractors documentation is assessed and approved prior to start of work with proof placed on file.

#### **Internal Audits/Inspections**

The Principal Contractor's safety manager/responsible person must conduct weekly inspections/audits with a detailed report. A copy of these inspections/audits must be placed on file for perusal by the Health and Safety Agent.

**Principal Contractor to provide a Corrective Action Plan within 3 days for all non-compliances noted in the Audits conducted by the Client's Health and Safety Agent. Note: An electronic copy must be sent to the Client Representative including the appointed Health and Safety Agent.**

#### **EMERGENCY PROCEDURES**

The Principal Contractor/s shall submit a detailed Emergency Procedure and Evacuation Plan with assembly point and contact details in the case of any emergency. The procedure shall detail the response plan including the following key elements:

- ❖ List of key competent personnel; Details of emergency services.
- ❖ Actions or steps to be taken in the event of the specific types of emergencies; Information on hazardous material/situations.
- ❖ Emergency procedure(s) shall include, but shall not be limited to, fire, spills, accidents to employees, use of hazardous substances, bomb threats, major incidents/accidents, etc.

The Principal Contractors shall advise the Client, Agent, Engineer, and all relevant authorities forthwith, of any emergencies, together with a record of action taken. This shall be confirmed in writing as soon as possible after the incident.

A contact list of all service providers (Fire Department, Ambulance, Police, Medical and Hospital, etc.) must be maintained and available to site personnel. These procedures shall form part of the OHSF. The Principal Contractor to ensure that the relevant staff is trained to perform such duties as required by the OHS Act. All emergency procedures must be monitored on a regular basis and must be in line with the building program.

The Emergency/Evacuation plan and routes must be revised on a regular basis for all employees and contractor (including staff) should any unforeseen event take place during the implementation phase/s of the project.

Evacuation Drills must be conducted as and when needed. Contractor to assess all activities to ensure this is implemented with proof placed on file.

#### **FIRST AID BOXES AND FIRST AID EQUIPMENT**

The Principal Contractor and their contractors shall appoint in writing First Aider(s).

The appointed First Aider(s) are to be sent for accredited first aid training. Valid certificates are to be kept on site. All Contractors with more than 5 employees shall supply their own first aid box. Principal Contractor with more than 10 employees shall have trained, certified first aider on site at all times & First aid Box adequately stocked always.

#### **RESCUE**

The procedure to rescue persons from contact with a live conductor cannot definitely be laid down for all cases. However, certain principles and methods are outlined which all persons working on electrical apparatus or assisting in such work should know.

#### **ACCIDENT / INCIDENT REPORTING AND INVESTIGATION**

Injuries are to be categorized into first aid, medical, disabling, and fatal. The Principal Contractor and their contractors must stipulate in its construction phase Health and Safety plan how it will handle each of these categories. When reporting injuries to the Client, these categories shall be used. All contractors must investigate and report on the 4 categories of injuries to the Principal Contractor at least monthly.

Contractors must investigate injuries and accidents involving their employees within seven days of the incident in the form on Annexure1 (General Administrative Regulations) and forward a copy on the investigation report to the Principal Contractor forthwith.

**All incidents reportable in terms of the provision of Section 24 of the OHS Act 1993 must be reported to the local Dept. of Labour in the prescribed manner.**

**Should construction work be finished within 3 days after any occurrence, the investigation shall be conducted before such construction work is completed.**

The Principal Contractor and their contractors must report all injuries to the Client in the form of a spreadsheet, which includes all contractor injuries/incidents including near misses, property damage and man-hours worked for the month as well as the cumulative total. This report must be done on a monthly basis and must form part of the Principal Contractor's progress report.

**The Principal Contractor shall immediately notify the Client and Client's Health & Safety Agent of any hazardous or potentially hazardous situations that may arise during the performance of construction activities immediately or within 24 hours by means of a flash report.**

**In case of any Section 24 Incident, the Principal Contractor shall ensure that the Health and Safety Agent verify and peruse the report and all relevant documentation before it is sent to the Department of Labour.**

#### **HAZARDS AND POTENTIAL SITUATIONS**

The Principal Contractor shall immediately notify the Client and Client's Health & Safety Agent of any hazardous or potentially hazardous situations that may arise during the performance of construction activities.

#### **PERSONAL PROTECTIVE EQUIPMENT (PPE) AND CLOTHING**

The Principal Contractor shall ensure that all workers are issued and wear but is not limited to i.e., hard hats, protective footwear, Hi-Viz vests and overalls. The Principal Contractor and their contractors shall make provision and keep adequate quantities of SANS approved PPE on site always.

Contractors to provide control measures should employees continuously fail to use the prescribed PPE.

#### **OCCUPATIONAL HEALTH AND SAFETY SIGNAGE**

The Principal Contractor shall provide adequate on-site OHS signage. Including but not limited to: "no unauthorized entry", "report to site office", "site office", and "hard hat area". Signage shall be posted up at all entrances to site as well as on site in strategic locations e.g., Access routes, entrances to structures and buildings, scaffolding and other potential risk areas / operations. All Contractors to adhere.

#### **CONTRACTORS**

The Principal Contractor shall ensure that all Contractors appointed by them comply with this Specification, the OHS Act 85/1993, and Construction Regulation (February 2014).

The Principal Contractor may only appoint a contractor after approving the contractor's health & safety plan with proof placed on file. The Principal Contractor must audit each of its Contractors at least monthly, with audit reports filed in the health & safety file on site.

The audit must include an administrative assessment as well as a physical inspection of the contractor's health & safety system.

The Principal Contractor must stop any Contractor from carrying out construction work that is not in accordance with the Principal Contractor's or Contractor's health & safety plan or if there is an immediate threat to the health and safety of persons.

The Principal Contractor shall take all reasonable steps necessary to ensure co-operation between all Contractors to enable each of those Contractors to comply with the provisions of these regulations.

The Principal Contractor must ensure that their contractors are registered and in good standing with a recognized compensation fund or with a licensed compensation insurer prior to work commencing on site.

The Principal Contractor must ensure that potential Contractors submitting tenders have made provision for the cost of health and safety measures during the construction process; The Principal Contractor shall discuss and negotiate with their Contractor the contents of the health and safety Plan and shall finally approve that plan for implementation.

#### **NO-GO AREAS**

Principal Contractor and their contractors to avoid all no-go areas and ensure that all relevant parties/employees and visitors are adequately informed. These areas will be identified by the Client.

#### **PHYSICAL REQUIREMENTS**

##### **Demolition During Construction Process- (Method Statement/Procedure)**

The Client/Principal Contractor must ensure that a demolition permit is obtained from the Local Authority prior to demolition work commencing on site. Proof of the permit must be placed on file for inspection.

The Principal Contractor and their contractors shall always appoint a competent person in writing to supervise and control all Demolition work on site.

Prior to any demolition work being carried out, the Principal Contractor shall submit a method statement and a detailed engineering survey for approval by the Client/Engineer. Acceptance will then be issued to the Principal Contractor to proceed with the demolition work. The Principal Contractor shall ensure that demolition work complies with the Construction Regulations section 14 (February 2014). Principal Contractor to ensure that:

***All Demolition work to comply with the Engineers methodology, procedures, requirements, and drawings.***

- Work should be carried out by competent operatives experienced in demolition work under the control of an experienced, competent supervisor.
- Restricted areas and safe distances should be established.
- Underground services to be considered, including electrical cables, water mains, etc. (If Applicable)
- All services should be disconnected prior to demolition.
- Adequate precautions against accidental collapse of the structure or adjacent structures should be in place.
- Pre-stressed reinforced concrete should be demolished under supervision of a suitability qualified and experienced engineer. (If Applicable)
- Measures should be taken to protect the public, e.g., 2m high fence, debris fans, etc.
- Floors should not be overloaded.
- All plant and equipment should be suitable for the task, well maintained, and inspected and tested in accordance with legislation.
- Work at heights should be minimized.
- Measures should be taken to protect persons working at height, e.g., working platforms, harness, nets, etc.
- Appropriate personal protective equipment (PPE) should be worn.
- Adequate Dust Control

#### **Asbestos Work**

##### **Asbestos**

- Provide an asbestos work plan in full compliance with the OHS Act, 1993, as amended, the Asbestos Abatement Regulations 2020 relating to demolition\* work (\*as defined in AR 1) to be performed by a Registered Asbestos Contractor (RAC) and brief the RAC on the details contained therein.
- Notification of Asbestos Work given to the Department of Labour regarding the asbestos work as soon as the RAC is appointed
- Monitor the activities of the RAC to ensure compliance with the Asbestos Regulations of the OHS Act, 1993, as amended, according to the following inspection schedule or as prescribed by the AIA.
- Conduct asbestos air monitoring, associated laboratory tests and submit test results and reports. The reports shall include for remedial work/action to be taken by the RAC, where applicable, and the AIA shall brief of the RAC accordingly, all according to the following schedule:
- Feedback of tests results, inspections, and respective reports to be available within at least 2 (two) working days of the said test, inspection etc.



- Conduct a final inspection at the conclusion of the work and issue a site clearance certificate and job completion report certifying that all asbestos waste has been safely and correctly disposed of in full compliance with the Asbestos Abatement Regulations 2020 of the OHS Act, 1993, as amended.”

#### **Cranes (All) including a Crane Management Plan, Rescue Plan & (Emergency Procedures)**

The Principal Contractor and all Contractors shall ensure that lifting machinery and tackle is inspected before use and thereafter in accordance with the Amended Driven Machinery Regulations (2015). There must be competent lifting machinery and lifting tackle inspectors who must inspect the equipment daily or before use, considering that:

- Contractors to plan carefully when crane work is required. Overhead electrical cables to be kept in planning.
- All lifting machinery and tackle must carry a load test certificate and must have an inspector register.
- All lifting machinery and tackle have a safe working load clearly indicated,
- Regular inspections and servicing are carried out.

**Note: Records are kept of inspections and of service certificates conducted by an approved LMI**

- There is proper supervision in terms of guiding the loads that includes a trained banksman/rigger to direct lifting operations and check lifting tackle,
- Rescue Plan to be provided.
- Inventory to be provided and updated as and when needed.

**The operators are competent as well as physically and psychologically fit to work and in possession of a medical certificate of fitness to be available on site.**

#### **High & Low Voltage Electrical Installations**

Should high voltage electrical lines/fencing be present on the site perimeter, the Contractor must take extra caution and demarcate as far as reasonably practicable. These demarcations must be maintained for the duration of the construction work. The minimum safety clearances as per Electrical Machinery Regulations must be adhered to.

**The Principal Contractor and their contractors must ensure that prior notice is given to Local Authority Electrical Department of any work involving electrical installation. A lock-out certificate must be issued to the relevant Principal Contractor. The Principal Contractor must ensure that a lock-out procedure is adhered to by his/her employees whenever required. The Principal Contractor must ensure that safety measures stipulated in the Electrical Installation Regulations, Machinery Regulations, General Machinery Regulations and Construction Regulations are always adhered to.**

**All installations must comply with SANS 10142 & the regulations of the OHS Act 85/1993 and Construction Regulation 24.**

**All temporary electrical installations must be inspected at least weekly with proof placed on file.**

#### **Temporary Works and Support Work Structures**

The Principal Contractor shall ensure that the provisions of Section 12 of Construction Regulations (February 2014) are adhered to. These provisions must include but not be limited to ensuring that all equipment used is examined for suitability before use, that all Temporary Works and support work is inspected by a competent person immediately before, during and after placement of concrete or any other imposed load and thereafter daily until the Temporary Works and support work has been removed. Records of all inspections must be kept in a register on site. Temporary Works Design Drawings shall be provided by a competent person for all Temporary Works Structures

**Authorisation shall be provided in writing by a competent person before concrete is poured and before any temporary works structures is removed with proof placed on file.**

#### **Definition**

**"temporary works" means any falsework, formwork, support work, scaffold, shoring or other temporary structure designed to provide support or means of access during construction work;**

### Temporary works

12. (1) A contractor must appoint a temporary works designer in writing to design, inspect and approve the erected temporary works on site before use.

(2) A contractor must ensure that all temporary works operations are carried out under the supervision of a competent person who has been appointed in writing for that purpose.

(3) A contractor must ensure that—

- (a) all temporary works structures are adequately erected, supported, braced and maintained by a competent person so that they are capable of supporting all anticipated vertical and lateral loads that may be applied to them, and that no loads are imposed onto the structure that the structure is not designed to withstand;
- (b) all temporary works structures are done with close reference to the structural design drawings, and where any uncertainty exists the structural designer should be consulted;
- (c) detailed activity specific drawings pertaining to the design of temporary works structures are kept on the site and are available on request to an inspector, other contractors, the client, the client's agent or any employee;
- (d) all persons required to erect, move or dismantle temporary works structures are provided with adequate training and instruction to perform those operations safely;
- (e) all equipment used in temporary works structure are carefully examined and checked for suitability by a competent person, before being used;
- (f) all temporary works structures are inspected by a competent person immediately before, during and after the placement of concrete, after inclement weather or any other imposed load and at least on a daily basis until the temporary works structure has been removed and the results have been recorded in a register and made available on site;

**The Principal Contractor shall ensure that all employees erecting temporary works (False Work, Formwork, Support Work) are competent to perform such work, including the Temporary Works Designer, Temporary Works Supervisor and Temporary Works Inspector**

**The Principal Contractor shall appoint a competent Engineer/ Professional Engineering Technologist to Design and inspect all temporary works and forward such proof of competence to the relevant Engineer prior to commencement. The Client/Client Representative reserves the right to comment and approve/decline such person.**

### Lateral Support

Principal Contractor shall comply with but not limited to, CR 9, DMR 18(2015), CR 23 and Section 8 & 9 of the OHS Act 85/1993. The appointed Principal Contractor shall provide Task Specific Method Statements and Risk Assessments. Method Statements to be discussed with Engineers for comment. The appointed Contractor shall consider the following hazards/risk and control measures when compiling their Method Statements and Risk Assessments and must include but is not limited to,

- Machinery, operation and control;
- Exposure to hazardous Chemical Agents
- Task Specific PPE
- Dust suppression;
- Exposed openings;
- Impact vibration;
- Overhead power lines and underground services;
- Only competent persons to perform activities and use of all equipment with proof of training
- Inspection and service records to be readily available including manuals/specifications of all machinery used.
- Control measures to avoid persons from falling from machinery (Fall protection);
- Control measures to avoid persons and plant falling into excavations/openings
- Noise control required
- Fall Protection
- Competent persons to conduct inspections and surveys
- The lateral support design must be accepted by the consulting civil and structural engineers assigned to the project.
- Full-time Competent supervision required

### Construction Vehicles

Construction Vehicles and Mobile Plant may be inspected by the Client prior to being allowed on a project site and suppliers of hired vehicles, plant and equipment will be required to comply with this specification as well as the OHS Act and Regulations.

**Construction Vehicles and Mobile Plant (CV & MP) to be:**

- of acceptable design and construction
- maintained in good working order.
- used in accordance with their design and intention for which they were designed.
- Operated/driven by trained, licensed competent and authorised operators/drivers. No unauthorised persons to be allowed to drive or operate CV & MP.
- Operators and drivers of CV must be in possession of a valid medical certificate declaring the operator/driver physically and psychologically fit to operate or drive CV.
- fitted with adequate signalling devices to make movement safe including reversing.
- excavations and other openings must be provided with sufficient barriers to prevent CV from falling into same
- Provided with roll-over protection, appropriate seat fitted which shall be used during CV operations.
- inspected daily before start-up by the driver/operator/user and the findings recorded in a register/logbook.
- CV to be fitted with two head and two taillights whilst operating under poor visibility conditions, in addition they shall be equipped with 'hazard warning' lights, which must be used whenever the CV is on site.
- No loose tools, material etc. is allowed in the driver/operator's compartment/cabin nor in the compartment in which any other persons are transported.
- CV used for transporting persons must have seats firmly secured and sufficient for the number of persons being transported.
- Operators to be issued with Personal Protective Equipment as required and identified by the Risk Assessments.
- Only licensed and road worthy vehicles will be allowed on the public roads.

No person may ride on a CV except in a safe place provided by the manufacturer for this purpose.

The construction site must be organized to facilitate the movement of CV so that pedestrians and other vehicles are not endangered. Traffic routes are to be suitable, sufficient in number and adequately demarcated. CV left unattended after hours adjacent to roads and areas where there is traffic movement must be fitted with lights reflectors or barricades to prevent moving traffic meeting the parked CV.

In addition, CV left unattended after hours must be parked with all buckets, booms etc. fully lowered, the emergency brakes engaged and, where necessary, the wheels chocked, the transmission in neutral and the motor switched off and the ignition key removed and stored safely.

Workers employed adjacent to, or on public roads must wear reflective safety vests.  
All CV inspection records must be kept in the OH&S File.

**Access Routes/ Haul Roads**

On the Site and, if so required, within such distance of the Site as may be stated by the Engineer, the Contractor shall control the movement of all vehicles and construction equipment, including that of his suppliers, so that they remain on designated routes, are distributed so as not to cause an undue concentration of traffic, and that all relevant laws are complied with.

In addition, the movement of such vehicles and construction equipment shall be planned and operated to minimise disruption to regular users of the routes.

As far as possible the Contractor shall use existing access and haul routes. Damage to existing access roads because of construction activities shall be repaired to the satisfaction of the Engineer, using material like that originally used. The cost of the repairs shall be borne by the Contractor. New temporary access or haul routes may only be established with the prior approval of the Engineer. The rehabilitation of such routes shall be to the Contractor's own cost and to the approval of the Engineer.

Any directional signage required by the Contractor for the purposes of directing the movement of his own vehicles and construction equipment (or that of his subcontractors or suppliers) must be of a design and in a location approved by the Engineer. Directional signage may not be erected in such a manner that it interferes with sight lines or pedestrian movement.

**Excavations, Shoring, Dewatering or Drainage**

The Principal Contractor and any relevant Principal Contractor shall make provision in their tender for shoring, dewatering or drainage of any excavations as per this specification.

The Principal Contractor shall make sure that:

- Excavations/trenches are inspected before every shift, after blasting, after unexpected fall of ground, after substantial damage of supports, and after rain.
- A record of these inspections must be kept.
- The location and nature of all existing services must be established before trenching operation is undertaken.
- Safe work procedures have been communicated to the workers.
- The safe work procedures are enforced and maintained by the Principal Contractor's and Contractors' Responsible Persons always.
- Safe access/egress is provided to all levels.
- No load, material, plant, or equipment is placed or moved near the edge of any excavation or trench which may undermine the stability of the same unless adequate steps are taken to prevent the sides from collapsing.
- All excavations and trenches that are adjacent to public access routes must be barricaded and illuminated. The barrier shall be at least orange plastic webbing of 1m height (day and night) with delineators and orange traffic lights for night-time.
- All excavations next to existing buildings to be carefully monitored during such an operation.
- Permit to be provided by competent person prior to entering the Excavation.

Should an HV cable be discovered, the Principal Contractor and their contractors shall cease all current works and activities, make the area safe and then immediately contact the Electrical Consultant/Principal Agent to provide a method statement prior to re-commencement. Proof of Communication shall be provided.

Furthermore, the Principal Contractor and their contractors shall ensure that the excavated sides are battered and include considering dewatering/creating site run offs during winter.

### Civil Works

#### Laying of Pipes / Backfilling

- A competent site person to supervise lifting operations always.
- No employee to stand under any suspended load.
- Loads must not be slewed over personnel, plant, site huts or property.
- All lifting equipment and accessories must be marked with the Safe Working Load.
- Slings must not be placed on sharp edges.
- Work to be stopped when weather conditions prevent safe operations during trenching work or laying of pipes.
- Everyone to stand clear of area being backfilled by mobile plant.
- Method statement to be developed for connection to main sewer line and to water mains.

**The Principal Contractor must ensure that the correct Lifting Machinery is used and must be used for its intended purpose as required by Section 10 and 44 of the OHS Act 85/1993 and Driven Machinery Regulation (DMR) 18(2015).**

**Note, Excavators and Digger Loaders may not be used as lifting machinery, for lifting pipes or any slewing of material. All machinery shall be used for its intended purpose.**

### Erosion and Sedimentation Control

The Contractor shall take all reasonable measures to limit erosion and sedimentation due to the construction activities and shall, in addition, comply with such detailed measures as may be required by the Scope of Work.

Where erosion and/or sedimentation, whether on or off the Site, occurs, rectification shall be carried out in accordance with details specified by the Engineer.

Where erosion and/or sedimentation occur due to the fault of the Contractor, rectification shall be carried out to the reasonable requirements of the Engineer, at the Contractor's cost.

The Contractor shall ensure that the City's storm water system is kept free from sediment arising from the Works.

Any runnels or erosion channels developed during the construction period or during the vegetation establishment period shall be backfilled and compacted, and the areas restored to a proper condition. Stabilisation of cleared areas to prevent and control erosion shall be pro-actively managed by the Contractor. The method of stabilisation shall be determined in consultation with the Engineer.

### Existing Structures

Any adjacent structures that may be affected by work must be considered in the planning process. Precautionary measures must be detailed and applied to prevent damage, uncontrolled collapse of existing structures and/or loss to property and persons during the entire construction phase.

#### Confined Space Entry (If Applicable)

"confined space" means an enclosed, restricted, or limited space in which, because of its construction, location or contents, or any work activity carried on therein, a hazardous substance may accumulate or an oxygen-deficient atmosphere may occur, and includes any chamber, tunnel, pipe, pit, sewer, container, valve, pump, sump, or similar construction, equipment, machinery or object in which a dangerous liquid or dangerous concentration of gas, vapour, dust or fumes may be present;

The Principal Contractor to prepare a confined space procedure in line with General Safety Regulation (GSR) 5 OHS Act including the following but is not limited to,

- **Confined Space Training**

- The areas have been declared safe to use by a competent person in writing
- Task Specific Risk Assessments,
- Method Statements
- Emergency Procedures
- Adequate Supervision
- Permit to work in confined space (including entry and exit)
- Adequate Lighting
- Safe Access
- Adequate Ventilation and with breathing apparatus available
- Buddy System with ropes to be implemented
- Proof that continuous Gas assessments are being conducted
- Duration of working hours when working inside confined spaces
- Competent person/s and equipment to be readily available to assist with resuscitation
- Two Way Radios
- Tank Guards
- Gas/Oxygen Detectors
- Gas Free Certificates

**No breaks shall be taken in any confined spaces or when working in any restricted areas**

#### Deliveries

The contractor will need to engage the Project Manager to agree delivery times during the day for various activities, preferably at least 24 hours notice.

Delivery of materials and the safe movement of construction vehicles will be always controlled by the Contractor to alleviate any congestion or interference with the northern delivery yard operations and public delivery roads for access/egress.

Principal Contractor shall ensure vehicle management procedures are in place by way of flagmen control during contractor deliveries.

- No contractor vehicles are to be left unattended during deliveries.
- Existing parking bays, other than what has been agreed for the use by the Contractor, are not for the contractor or construction vehicles.

#### Hazardous Chemical Agents (HCA)

The Principal Contractor working with Hazardous chemical substances to obtain copies of all the (SDS) Safety Data Sheets and this to be kept on site in the Health and Safety File. Risk Assessments to be compiled. First Aider to have copies of SDS.

All hazardous waste shall be disposed of at an authorised landfill site and proof of disposal shall be provided upon request. Employees shall be provided with suitable PPE including Respirators as and when needed. Adequate control measures shall be taken to avoid possible exposure to employees and members of the Public.

#### Removal of Rubble & Debris

The Principal Contractor must ensure the safe removal of debris and rubble from all levels where demolition occur. A safe work procedure or method statement detailing the removal process and steps to be taken to contain the debris and rubble must be drafted and placed on File.

### **Edge Protection and Penetrations**

The Principal Contractor and their contractors must ensure that all exposed edges and openings are guarded at all times until permanent protection has been erected. The Principal Contractor has the following options when contemplating the protection of openings, slabs and edges:

- A physical barrier at the edge of the opening, which must be strong enough to carry the weight of **any** person in the process of falling.
- External façade scaffold with fully boarded platform with a handrail.
- Any other suitable means of protection may be used that will prevent a fall.
- Timber to be nailed on all penetrations, alternatively any other means of protection may be used that will prevent a fall.
- Any person working on an unprotected slab/deck to wear fall arrest and prevention equipment devices, like safety harness, life lines etc.

The Principal Contractors' risk assessment must include these items. E.g. all other openings and areas where a person may fall. **All Lifelines shall be certified as per the relevant standards and Anchorage points shall be load/pull tested by a competent person**

**Note: Danger Tape and shade cloth shall not serve as edge protection.**

**Furthermore, the Principal Contractor shall provide adequate control measures to avoid Falling Objects especially at all walkways.**

### **Permits**

All relevant permits must be obtained from Local Authority (where needed) before any demolition and construction work commences. (Site hoarding permit, demolition permit, way leaves, traffic, etc.). **The principal contractor to apply timeously for permits required when working near the railway lines.**

### **Plant and Machinery**

#### **Pressure Equipment Regulations**

The Principal Contractor and their contractors shall comply with the Pressure Equipment Regulations and SANS 10087, including:

- Providing competency and awareness training to the operators,
- Providing PPE or clothing,
- Inspect Equipment regularly and keep record of inspections,
- Providing appropriate firefighting equipment (Fire Extinguishers) on hand.
- Correct storage of cylinders

#### **Fire Extinguishers and Firefighting Equipment**

The Principal Contractor shall provide adequate, regularly serviced fire-fighting equipment located at strategic points on site, specific to the classes of fire likely to occur. The appropriate notices and signs must be posted up as required. All fire extinguishers to be handled and inspected by competent persons in compliance with CR 29.

The Principal Contractor to provide an initial Fire Risk Assessment. Note: The Principal Contractor shall ensure that sufficient and suitable storage is provided for all flammable liquids, solids, and gases.

**The Principal Contractor shall ensure that sufficient number of workers is trained in the use of Fire Equipment.**

### **Hired Plant and Machinery**

The Principal Contractor shall ensure that any hired plant and machinery used on site is safe for use. The necessary requirements as stipulated by the OHS Act 85/1993 and Construction Regulations (February 2014) shall apply. The Contractor shall ensure that operators hired with machinery are competent and that certificates are kept on site in the Health and Safety file. All relevant Contractors must ensure the same.

## **General Machinery**

The Principal Contractor shall ensure compliance with the amended Driven Machinery Regulations (2015), which include inspecting machinery regularly, appointing a competent person to inspect and ensure maintenance, issuing PPE or clothing, and training those who operate machinery.

## **Portable Electrical Tools**

The Principal Contractor and their contractors shall ensure that the use of all portable electrical tools follows relevant legislation.

The Contractor shall ensure that all electrical tools, electrical distribution boards, extension leads, and plugs are kept in safe working order. Regular inspections and toolbox talks must be conducted to make workers aware of the dangers and control measures to be implemented e.g., Personal protection equipment, guards, etc.

A competent person to undertake routine/daily inspections and records are kept. Only authorized trained persons to use the tools, the safe work procedures to apply. Awareness training to be carried out and compliance enforced at all times, and PPE and clothing are provided and maintained.

**Note: All power tools shall be inspected by the Authorised Operator on a daily basis with proof placed on file.**

## **Welding Equipment**

- Only authorized / competent persons to use the equipment. **(Proof of training to be provided in line with all relevant unit standards)**
- Welder using correct PPE - eye/ face/foot/body/respirator.
- Flashback arrestors fitted when using gas welding equipment.
- Fire prevention methods to be applied.
- Where electric arc welders are used, equipment only to be used in a dry area, protected from wetness.
- All welding to be carried out in designated area, where not applicable welding screens to be used.
- Demarcation and signage
- Task Specific Risk Assessments and Method Statements Required
- Hot Work Permits to be issued (Refer above hot work permit requirements)

## **PUBLIC AND SITE VISITOR'S HEALTH AND SAFETY**

Both the Client and the Principal Contractor have a duty in terms of the OHS Act 85/1993 to do all that is reasonably practicable to prevent members of the public and site visitors from being affected by the construction activities. Site visitors must be briefed on the hazards and risks they may be exposed to and what measures are in place or should be taken to control these hazards and risks. A record of these inductions must be kept on site in accordance with the Construction Regulations.

Appropriate Nets, Canopies, Hoarding. Fencing, Gantry's, and Crash Decks etc. must be provided to protect members of the public and their vehicles passing / entering the site, in accordance with Construction Regulation 27. Sufficient Safety, direction Signage and Flagmen to be placed to direct traffic near the site.

**Principal Contractor to ensure that no unauthorized persons enter the construction area by implementing access control measures / registers.**

## **NIGHT WORK**

Adequate lighting/illumination to be provided where required with backup generators. Security to be provided as and when needed. All emergency procedures to be in place. Adequate PPE to be provided for all employees e.g., Hi-Viz Vests.

## **WORKING HOURS**

Working Hours to be agreed with the Client for reasons that facilities might be in use by end users. Alternative arrangements to be agreed upon in advance to avoid any Health and Safety incidents.

## **OCCUPATIONAL HEALTH**

## **Occupational Hygiene**

Exposure of workers to occupational health hazards and risks is common in any work environment, especially in construction. Occupational exposure is a major problem and Principal Contractor must ensure that proper health and hygiene measures are put in place to prevent exposure to these hazards.

### **Noise**

Tasks identified where noise exceeds 85 dBA. All reasonable steps to be taken to reduce noise levels at the source. Hearing protection to be used where noise levels cannot be reduced below 85dBA.

Where noise is identified as a hazard the requirements of the NIHL regulations must be complied with and the following must be included / referred to in the Health and Safety Plan:

- Proof of training with regards to these regulations.
- Risk assessment
- Monitoring carried out by an AIA and done according to SABS 083.
- Medical surveillance programme established and maintained for the necessary employees.
- Control of noise by referring to:
  - Engineering methods considered.
  - Admin control (number of employees exposed) considered.
  - Personal protective equipment considered/decided on.
- Describe how records are going to be kept for 40 years.

### **Dust**

Principal Contractor to ensure that employees working with grinders, drills, etc. are issued with dust masks and dust exposure to be minimized at all times. Suitable measures to be implemented by the Principal Contractor to ensure that members of the public are not detrimentally affected by such activities. Working Area to be fully clad with a Hundred Percent Shade Cloth or anything similar.

### **Welfare Facilities**

The Principal Contractor to provide at least one sanitary facility for every 30 employees on site, including changing facilities & hand washing facilities. Safe and adequate eating areas must be provided. Waste bins must be strategically placed and emptied regularly. Safe and clean storage areas must be provided for workers to store personal belongings and personal protective equipment.

### **Waste Management**

Principal Contractor must implement their waste management in line with Environmental Terms and Conditions.

### **Alcohol and Other Drugs**

The Principal Contractor and their contractors to ensure that no alcohol and other drugs are allowed on site. No person may be under the influence of alcohol or any other drugs while on the construction site. Any person on prescription drugs must inform his/her superior, who shall in turn report this to the Contractor forthwith. Any person suffering from any illness / condition that may have a negative effect on his/her safety performance must report this to his/her superior, who shall in turn report this to the Principal Contractor forthwith.

Any person suspected of being under the influence of alcohol or other drugs must be sent home immediately, to report back the next day for a preliminary inquiry. The Contractor concerned must follow a full disciplinary procedure and a copy of the disciplinary action must be forwarded to the Principal Contractor for his records. No Smoking is allowed on site.

### **Hazardous Biological Agents**

Covid-19 directives have since been repealed. However the virus is still prevalent, it is for this reason that all contractors like any other Employer is expected to comply with Hazardous Biological Agent Regulations promulgated under the OHS Act 85/1993 and provide control measures as needed.

The Principal Contractor and their contractors must therefore determine mitigation measures to minimize risk as far as reasonably practicable, allowing work to continue safely and without harm to all relevant stakeholders, including Clients, Employees, Contractors, Suppliers, Manufacturers and all interested and affected parties.



**ANNEXURE A- ACKNOWLEDGEMENT OF H & S SPECS**

**Annexure A: Acknowledgement of Health and Safety Specification**

**Acknowledgement of Receipt of the Health and Safety Specifications:**

I, \_\_\_\_\_ representing.

\_\_\_\_\_ Contractor

Have satisfied myself with the content of the construction Health and Safety Specification and shall ensure that the Contractor and its personnel comply with all obligations / requirements in respect thereof.

\_\_\_\_\_  
Signature of Principal Contractor

\_\_\_\_\_  
DATE

\_\_\_\_\_  
Signature of Client Agent

\_\_\_\_\_  
DATE

**COMMENTS:**

## ANNEXURE B APPOINTMENT OF PRINCIPAL CONTRACTOR

Appointment of Principal Contractor

IN TERMS, OF

OCCUPATIONAL HEALTH AND SAFETY ACT, ACT 85 OF 1993 & CONSTRUCTION REGULATIONS 2014

CONSTRUCTION REGULATION 5(1)(k)

I, ..... Client Responsible Person,  
for ..... do hereby appoint:  
..... as the Principal Contractor  
of ..... Project.

### Responsibilities:

- Prepare a Health and Safety Plan to comply with the requirements of the Construction Regulation 5(1)(b), and in compliance with the Health and Safety Specification for the Project.
- Ensure co-operation between all contractors to enable each of those contractors to comply with the provisions of these regulations.
- Provide all contractors with the required safety specification for their area of responsibility.
- Appoint each contractor in writing in accordance with Construction Regulations.
- Ensure implementation of the contractor's health and safety plan.
- Stop contractors from working if not in accordance with the client specification.
- Provide health and safety information to contractors should their design change.
- Ensure all contractors are registered and in good standing with the compensation commissioner.
- Ensure contractors submitting tenders have made provision for health and safety during construction.
- Ensure risk assessments are conducted & the identified controls are communicated to all employees and visitors.
- Ensure Compliance to Occupational Health and Safety Act 85/1993, Construction Regulations 2014, Community Fire Safety Bylaw and Relevant Sans Codes.

Signature: .....

Date: .....

**Client / Principal Agent**

### Acceptance

I, ..... hereby accept and acknowledge that I understand the requirements of this appointment.

Signature: .....

Date: .....

## Baseline Risk Assessment

| Baseline Risk Assessment for Health and Safety Specification: Upgrade of Voortrekker Road from Beach Road to 12 <sup>th</sup> Avenue, Maitland Project |                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Activity                                                                                                                                               | Hazard                                                                                                                                                 | Control Measure                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Off-loading of Material/deliveries and                                                                                                                 | <ul style="list-style-type: none"> <li>Possible load falling</li> <li>Public Safety-potential injuries to workers and members of the public</li> </ul> | <ul style="list-style-type: none"> <li>All work areas to be adequately demarcated-All Activities to be done under supervision.</li> <li>Ensure a spotter is available when needed.</li> <li>Once site has been secured it must be maintained to avoid unauthorised.</li> <li>Site security to be available.</li> <li>Relevant construction signage to be displayed.</li> <li>Contractors to be aware of live services e.g., electrical cables.</li> </ul> |
|                                                                                                                                                        | <ul style="list-style-type: none"> <li>Possible Collision/contact with property or stationary vehicles, workers, and members of the public</li> </ul>  | <ul style="list-style-type: none"> <li>Driver to be in possession of a valid driver's licence.</li> <li>All notices and signs to be obeyed. Driver to adhere to the speed limits. Employer and Driver to ensure that he is not intoxicated and must be of sober habits.</li> </ul>                                                                                                                                                                        |
| Carrying of material                                                                                                                                   | <ul style="list-style-type: none"> <li>Possible Contact with fellow employees and results into possible injuries.</li> </ul>                           | <ul style="list-style-type: none"> <li>Employees to take caution when walking on site.</li> <li>Employees to keep material as close to themselves or structure as possible to avoid possible contact with persons.</li> <li>Ensure your vision is not obstructed.</li> <li>Watch your blind spots and get assistance when carrying heavy and large objects</li> </ul>                                                                                     |
|                                                                                                                                                        | <ul style="list-style-type: none"> <li>Possible Falling material and possible foot and body injuries</li> </ul>                                        | <ul style="list-style-type: none"> <li>Operatives to ensure that all material are adequately secured.</li> <li>Appropriate PPE to be worn always.</li> <li>Do not carry material in precarious (dangerous) positions so as to obstruct your vision etc.</li> </ul>                                                                                                                                                                                        |
|                                                                                                                                                        | <ul style="list-style-type: none"> <li>Possible Ergonomics /Possible back injuries</li> </ul>                                                          | <ul style="list-style-type: none"> <li>Employees to ensure that they use correct bending techniques. Please get assistance when lifting heavy objects.</li> </ul>                                                                                                                                                                                                                                                                                         |
| Working with Cement (Bagging/Plastering, Mortar etc.)                                                                                                  | <ul style="list-style-type: none"> <li>Cement dust, Respiratory problems.</li> </ul>                                                                   | <ul style="list-style-type: none"> <li>Only Competent Persons to conduct Activities. Task Specific Risk Assessments to be provided.</li> <li>Dust masks to be used when spending even short periods of time in high dust areas and when using concrete saws/cutters or cement mixers.</li> </ul>                                                                                                                                                          |
|                                                                                                                                                        | <ul style="list-style-type: none"> <li>Possible Contact with cement dermatitis, skin burns, skin irritation</li> </ul>                                 | <ul style="list-style-type: none"> <li>Avoid contact with the skin as far as reasonably practicable. Remove clothing that has been contaminated by wet concrete.</li> <li>Wear suitable PPE e.g., Gum boots.</li> <li>Wash hands thoroughly after contact and use a barrier cream.</li> </ul>                                                                                                                                                             |
|                                                                                                                                                        | <ul style="list-style-type: none"> <li>Possible Eye injuries</li> </ul>                                                                                | <ul style="list-style-type: none"> <li>Follow Safety instructions (MSDS) when using concrete additives.</li> </ul>                                                                                                                                                                                                                                                                                                                                        |
|                                                                                                                                                        | <ul style="list-style-type: none"> <li>Faulty hand tools and the excessive inhalation of cement dust.</li> </ul>                                       | <ul style="list-style-type: none"> <li>Hand tools to be in good condition. Persons mixing mortar should wear dust masks when required.</li> </ul>                                                                                                                                                                                                                                                                                                         |
| Working with Hazardous Substances                                                                                                                      | <ul style="list-style-type: none"> <li>Possible Respiratory problems.</li> </ul>                                                                       | <ul style="list-style-type: none"> <li>Respirators to be used when spending even short periods of time. Adequate ventilation required. Ensure that all containers are clearly identified when decanting</li> </ul>                                                                                                                                                                                                                                        |
|                                                                                                                                                        | <ul style="list-style-type: none"> <li>Dermatitis, Skin burns, Skin sensitization</li> </ul>                                                           | <ul style="list-style-type: none"> <li>Avoid contact with the skin as far as reasonably practicable. Use barrier cream if possible.</li> </ul>                                                                                                                                                                                                                                                                                                            |
|                                                                                                                                                        | <ul style="list-style-type: none"> <li>Possible Eye injuries</li> </ul>                                                                                | <ul style="list-style-type: none"> <li>Remove clothing that has been contaminated by wet hazardous substances.</li> </ul>                                                                                                                                                                                                                                                                                                                                 |
|                                                                                                                                                        |                                                                                                                                                        | <ul style="list-style-type: none"> <li>Wear suitable PPE as listed below. Wash hands thoroughly after contact and use a barrier cream.</li> </ul>                                                                                                                                                                                                                                                                                                         |

|                                                                                  |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                  |                                                                                                           | <ul style="list-style-type: none"> <li>Follow Safety instructions (MSDS) as indicated by the MSDS.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Storage of Hazardous Substances</b>                                           | <ul style="list-style-type: none"> <li>Possible Explosion/fires Possible</li> </ul>                       | <ul style="list-style-type: none"> <li>Comply with CR 25 &amp; CR 29. Store all Hazardous Substances in the correct categories. Store all flammable material separately. Ensure relevant signage is clearly displayed. Adequate fire extinguishers to be readily available. Fire Risk Assessment to be conducted by a competent person. Hazardous bins to be provided</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Electrical Installations</b>                                                  | <ul style="list-style-type: none"> <li>Possible Electrocution, even fatal. Damage to equipment</li> </ul> | <ul style="list-style-type: none"> <li>Task Specific Method statements and Risk Assessments required as per CR 9.</li> <li>Competent contractor to be appointed if necessary.</li> <li>Equipment to be used to detect live/high voltage cables.</li> <li>Restricted areas to be identified.</li> <li>All installations must comply with SANS 10142 &amp; the regulations of the OHS Act 85/1993 and Construction Regulation 24 and Electrical Installation Regulations</li> <li>Toolbox Talks to be conducted on Risk Assessments with declarations / acknowledgement signed daily.</li> <li>Relevant PPE to be used.</li> <li>Lockout procedures to be provided where applicable.</li> <li>Only competent persons to be used with proof of competency to be provided.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                                                                                  |                                                                                                           | <ul style="list-style-type: none"> <li>CoC must be issued for all electrical installations.</li> <li>All temporary electrical installations to be inspected at least weekly and prior to use.</li> <li>All cables to be treated as live</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Working at Heights including but is not limited to Scaffolds and Ladders.</b> | <ul style="list-style-type: none"> <li>Possible Fall of persons, Possible Death</li> </ul>                | <ul style="list-style-type: none"> <li>Task Specific Method statements and Risk Assessments required as per CR 9.</li> <li>All work to be done under supervision.</li> <li>Compliance with Fall Protection Plan.</li> <li>All exposed to heights to medically fit issued by OHP/OHN.</li> <li>Scaffolding to be SANS 10085-1:2004 compliant.</li> <li>Daily inspections to be conducted as per CR 12. PPE to be worn always.</li> <li>Rope Access work must comply with Construction Regulations 18 which includes and not limited to: <ul style="list-style-type: none"> <li>Competent and appointed Rope Access Supervisors</li> <li>Competent and licensed rope access operators</li> <li>The design, selection and use of the equipment and anchors</li> <li>Life lines to be installed as and when needed and must be secured to a fixed structure</li> <li>How the roof work was planned/Method Statements.</li> <li>That the roof workers are competent (trained, experienced, knowledgeable)</li> <li>Life lines (Proof of Certification) and anchor points (Load Tested) are provided and installed by a competent person and with proof placed on file</li> <li>That no Roof work is carried during inclement weather or where conditions are hazardous to workers.</li> <li>Rescue Plan</li> </ul> </li> </ul> |
|                                                                                  | <ul style="list-style-type: none"> <li>Possible Falling Objects / Equipment. Falling/slipping</li> </ul>  | <ul style="list-style-type: none"> <li>As far as reasonably practicable, all equipment to be tied to rope.</li> <li>No Items to be thrown from elevated positions but must be safely lowered.</li> <li>No persons to work underneath overhead work area or ground.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

|                                            |                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                            |                                                                                                                                                                               | <ul style="list-style-type: none"> <li>• No work on open structures at heights during inclement weather.</li> <li>• No work on scaffolding during wet conditions/inclement weather.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Scaffold erecting &amp; dismantling</b> | <ul style="list-style-type: none"> <li>• Possible Falling of persons, Collapse of Scaffold structures and damage property and employees.</li> </ul>                           | <ul style="list-style-type: none"> <li>• Design Drawings required.</li> <li>• Work on scaffolds to be coordinated by appointed scaffold supervisor.</li> <li>• Lanyard to be used when erecting &amp; dismantling scaffolding. (Scaffold erectors) Compliance with SANS 10085-1:2004, CR 12 and CR 16.</li> <li>• All scaffolding to be inspected daily and after inclement weather and findings recorded in a register.</li> <li>• Fully boarded platforms must always be provided.</li> <li>• Only those employees who are authorised may be on the scaffold.</li> <li>• Where safe platforms cannot be erected, safety harnesses are compulsory.</li> </ul> |
|                                            |                                                                                                                                                                               | <ul style="list-style-type: none"> <li>• Guard rails and toe boards compulsory.</li> <li>• PPE required for persons working on scaffolding: safe shoes; hardhats.</li> <li>• Area below to be cordoned off.</li> <li>• Platforms to be cleaned daily.</li> <li>• Only competent erectors to change structure of scaffold.</li> <li>• No overloading of scaffold. PPE used: Safety boots, helmets, overalls.</li> </ul>                                                                                                                                                                                                                                         |
| <b>Brickwork and stacking thereof.</b>     | <ul style="list-style-type: none"> <li>• Possible cuts, fractures to employees' body. Stacks falling over or collapsing, or bricks knocked from scaffold platform.</li> </ul> | <ul style="list-style-type: none"> <li>• Only Competent Persons to conduct Activities. Task Specific Risk Assessments to be provided.</li> <li>• Stacking of bricks must not be higher than two pallets and when stacking. Bricks shall not be stacked higher than toe boards when working on scaffolds.</li> <li>• Stay clear of suspended loads and ensure that only authorised persons give signals to crane operator when applicable.</li> </ul>                                                                                                                                                                                                           |
| <b>Working with Power Tools</b>            | <ul style="list-style-type: none"> <li>• Possible Contact with moving parts.</li> </ul>                                                                                       | <ul style="list-style-type: none"> <li>• Task Specific Method statements and Risk Assessments required as per CR 9.</li> <li>• Only competent personnel should operate these tools.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                                            |                                                                                                                                                                               | <ul style="list-style-type: none"> <li>• Machines to be checked before use, guards are correctly fitted and work properly.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                            | <ul style="list-style-type: none"> <li>• Noise above 85Dba</li> </ul>                                                                                                         | <ul style="list-style-type: none"> <li>• Employees to be issued with relevant PPE including hearing protection.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                                            | <ul style="list-style-type: none"> <li>• Possible Malfunction of Blade</li> </ul>                                                                                             | <ul style="list-style-type: none"> <li>• Blades should be regularly inspected to ensure they are sharp/good condition</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                            | <ul style="list-style-type: none"> <li>• Possible Back Injuries</li> </ul>                                                                                                    | <ul style="list-style-type: none"> <li>• Employees to be trained on proper lifting and bending techniques.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Working with Hand Tools</b>             | <ul style="list-style-type: none"> <li>• Possible Eye injury</li> </ul>                                                                                                       | <ul style="list-style-type: none"> <li>• Visual checks must be completed by operatives on tools prior to their use.</li> <li>• Eye protection is to be provided and used whenever work is done using cold chisels or other tools where there is risk of flying particles or other pieces of the tool breaking off.</li> </ul>                                                                                                                                                                                                                                                                                                                                  |
|                                            | <ul style="list-style-type: none"> <li>• Possible Injury to hands, feet, and body</li> </ul>                                                                                  | <ul style="list-style-type: none"> <li>• Tools are required to be suitable for the purpose for which they to be used.</li> <li>• Open bladed knives, screwdrivers, and other sharp tools are to be carried and used so as not to cause injury to the user or others.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                |
|                                            | <ul style="list-style-type: none"> <li>• Possible Tripping over tools</li> </ul>                                                                                              | <ul style="list-style-type: none"> <li>• Tools should not be left lying around, they constitute a severe tripping hazard, and they are liable to get damaged.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Lifting Operations</b>                  | <ul style="list-style-type: none"> <li>• Uncontrolled release of material</li> </ul>                                                                                          | <ul style="list-style-type: none"> <li>• Task Specific Method Statements and Risk Assessments required with proof of communication.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

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|                                       |                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>• Rescue Plan and task specific Fall Protection Plan required, to be compiled by competent person.</li> <li>• Competent Banksman/Rigger to be readily available</li> </ul>                                                                                                                                                                                                                                                                                                                           |
|                                       |                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>• Banksman/Rigger to have signalling device.</li> <li>• No person to be under suspended load.</li> <li>• No Crane operations when banksman/Rigger is not available or present.</li> <li>• Only appointed banksman/rigger to assist with lifting operations.</li> </ul>                                                                                                                                                                                                                               |
| <b>Working in Confined Space</b>      | <ul style="list-style-type: none"> <li>• Possible Body Injuries, Property Damage, Possible</li> </ul>                                                                                                                       | <ul style="list-style-type: none"> <li>• The Principal Contractor to prepare a confined space procedure in line with General Safety Regulation (5) OHS Act including Task Specific Risk Assessments, Method Statements and Emergency Procedures. Ensure that all work areas are adequately demarcated.</li> <li>• Ensure that all ducts are adequately secured and that it can take the relevant loads</li> </ul>                                                                                                                           |
|                                       | <ul style="list-style-type: none"> <li>• Respiratory complication due to Lack of Ventilation</li> <li>• Hazardous Material being used e.g., Sealants etc.</li> </ul>                                                        | <ul style="list-style-type: none"> <li>• Safe Access Required at all times. Adequate Ventilation and supervision required at all times.</li> <li>• All hazardous substances to be assessed and ensure that MSDS are provided, all employees to be informed and First Aider has copies.</li> </ul>                                                                                                                                                                                                                                           |
| <b>Working alongside public roads</b> | <ul style="list-style-type: none"> <li>• Motor vehicles hitting employees</li> </ul>                                                                                                                                        | <ul style="list-style-type: none"> <li>• Employees must work within demarcated area.</li> <li>• Only crossroads at pedestrian crossings.</li> <li>• Reflective vests to be worn to ensure visibility.</li> <li>• Traffic Management Plan in place.</li> </ul>                                                                                                                                                                                                                                                                               |
| <b>Material access to site</b>        | <ul style="list-style-type: none"> <li>• Possible Public Safety-potential injuries to workers and members of the public.</li> <li>• Possible multiple, injury to staff.</li> <li>• Possible damage to property.</li> </ul>  | <ul style="list-style-type: none"> <li>• Access route to and from the site will be clearly demarcated and identifiable as per the design report rules.</li> <li>• Contractor will make the relevant resources available to carry material to and from site.</li> <li>• Flagman placed to control traffic when delivery trucks enters or leave work area.</li> <li>• Flagman will wear reflective vest.</li> <li>• Traffic management Plan will be in place as per SARTSM Chapter 13.</li> <li>• Signage will be inspected daily.</li> </ul> |
| <b>Cutting of Asphalt</b>             | <ul style="list-style-type: none"> <li>• Accident due to faulty equipment.</li> <li>• Not visible to other road users.</li> <li>• None authorized personnel operating equipment.</li> <li>• Running people over.</li> </ul> | <ul style="list-style-type: none"> <li>• Pre-Start checklist to be completed by operators.</li> <li>• Only competent employee to operate.</li> <li>• PPE to be worn.</li> </ul>                                                                                                                                                                                                                                                                                                                                                             |
| <b>Lay Asphalt Mixture</b>            | <ul style="list-style-type: none"> <li>• Asphalt getting in contact with skin.</li> <li>• Asphalt paver running over workers.</li> <li>• Burns.</li> </ul>                                                                  | <ul style="list-style-type: none"> <li>• Induction and task specific training.</li> <li>• Wearing of correct PPE to be enforced.</li> <li>• Work to be supervised always.</li> <li>• Traffic to be controlled and workers must be trained on traffic awareness.</li> </ul>                                                                                                                                                                                                                                                                  |

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|                                               | <ul style="list-style-type: none"> <li>• Hitting employees, public, possibly fatal.</li> <li>• Damage by hitting property</li> </ul>                                                                                                                                                                                                                         | <ul style="list-style-type: none"> <li>• Only authorised personnel to operate machinery.</li> <li>• Pre-Start checklist to be completed by operators.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Compaction of Asphalt Mixture</b>          | <ul style="list-style-type: none"> <li>• People or other vehicles being trampled on.</li> <li>• Burns from hot premix.</li> <li>• Risks when plant is stationary</li> </ul>                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>• Competent person who is medically fit must operate mobile plant. This is required from hiring company.</li> <li>• Employees to stand away from Roller.</li> <li>• Do not operate Roller if there is anyone in the working area.</li> <li>• Always be aware of other plant in your area and if the plant comes too close or in your working area rather stop operating and be safe.</li> </ul>                                                                                                                                                                                                                                                                                 |
| <b>Traffic accommodation method statement</b> | <ul style="list-style-type: none"> <li>• Getting run down by-passing traffic.</li> <li>• Leaving material in road causing accidents</li> <li>• Mobile plant crossing active road, causing accident.</li> <li>• Signage falling into roadway causing obstruction/accident.</li> <li>• Placement of signage workers getting hit by oncoming traffic</li> </ul> | <ul style="list-style-type: none"> <li>• Workers to work with designated work way. Hi vis vest to always be worn. Look left and right before crossing the road.</li> <li>• Workers and supervisors to ensure all material is kept within working area. Area to be checked before shift ends for material in roadway.</li> <li>• Flags man to be present when crossing or entering active road.</li> <li>• Signage to be checked day and night by appointed traffic safety officer with proof placed on file</li> </ul>                                                                                                                                                                                                 |
| <b>Worker's levelling materials by hand</b>   | <ul style="list-style-type: none"> <li>• Injury to body/misuse of equipment.</li> <li>• Being hit by oncoming traffic or hitting other traffic</li> </ul>                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>• Training to be given to all employees on the safe work procedures of the operation. Corrects PPE to be worn.</li> <li>• Supervisor to be present always while work commence.</li> <li>• Corrects PPE to be worn.</li> <li>• Traffic control to warn all road users.</li> <li>• Training to be given to all employees on the safe work procedures.</li> </ul>                                                                                                                                                                                                                                                                                                                  |
| <b>Operating of Mobile plant</b>              | <ul style="list-style-type: none"> <li>• Colliding with employees, public, possibly fatal. Damage to property</li> </ul>                                                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>• Only Competent Persons to conduct Activities. Task Specific Risk Assessments to be provided. All operators to comply with CR 13 and CR 23.</li> <li>• Competent person who is medically fit must operate mobile plant. This is also required from hiring companies.</li> <li>• Always be aware of other plant in your area and if the plant comes too close or in your working area rather stop operating and be safe. Never reverse without checking behind you to ensure that it is safe to do so. Operator must be on the lookout for fellow employees and members of the Public coming onto site unnoticed. All plant shall a fully functional reverse buzzer.</li> </ul> |

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| <b>Temporary Works</b> | <ul style="list-style-type: none"> <li>• Possible Collapse of Structure</li> </ul>                                                                                                                                                                              | <ul style="list-style-type: none"> <li>• Task Specific Risk Assessment s and Method Statement Required prior to activity</li> <li>• Compliance with CR 12.</li> <li>• Competent Contractor to be appointed</li> <li>• Temporary Works designer to be appointed</li> <li>• Design drawings to be approved by engineer and must be current</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                        |                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"> <li>• Handover Certificates required Before Concrete Pours and Before Stripping any Temporary Works material (Proof to be placed on file)</li> <li>• Task specific risk assessment to be compiled and Formwork to be inspected daily by competent person with proof placed on file</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                        | <ul style="list-style-type: none"> <li>• Falling of Persons/Material/Equipment</li> </ul>                                                                                                                                                                       | <ul style="list-style-type: none"> <li>• All material to be adequately secured</li> <li>• Task Specific Fall Protection Plan</li> <li>• Adequate Signage and Demarcation required.</li> <li>• Only Authorised persons to enter these areas- erecting and stripping. Area must be declared safe prior to any person entering decks</li> <li>• Compliance with CR 12.</li> <li>• All RISK assessments and method statements to be communicated with relevant persons (Proof placed on file.)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Demolition</b>      | <ul style="list-style-type: none"> <li>• Uncontrolled or premature collapse of structure</li> <li>• Dust control (Possible dust inhalation)</li> <li>• Temporary stockpiling of rubble (Overloading)</li> <li>• Possible Damage to existing services</li> </ul> | <ul style="list-style-type: none"> <li>• Competent person appointed in writing to control demolition.</li> <li>• Demolition operation inspected regularly to prevent premature collapse.</li> <li>• Structural engineering survey report obtained before demolition commences.</li> <li>• Existing services to be located and made safe before demolition commences.</li> <li>• Appropriate personal protective equipment issued.</li> <li>• Back propping to engineer's approval</li> <li>• Undertaking to wear signed and wearing enforced.</li> <li>• Wetting of work area. Dust Masks</li> <li>• Get permissible loading from engineer</li> <li>• Use dedicated areas</li> <li>• Wayleaves or drawings to be obtained from Engineer/Client.</li> <li>• Mark out of structure.</li> <li>• Approval to be obtained from engineer before demolition commences</li> </ul> |



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| <b>Excavations with Plant or Manually</b>                  | <ul style="list-style-type: none"> <li>Possible Electrocution due to unknown electrical cables</li> </ul>                      | <p>Only Competent Persons to conduct Activities. Task Specific Risk Assessments to be provided. All operators to comply with CR 13 and CR 23.</p> <p>Way leaves or drawings to be obtained from the Client.</p> <p>Where way-leaves are not available adequate control measures must be implemented eg using a Cable Detector to determine the presence of possible services especially electrical cables.</p> <p>All work to be conducted under supervision</p>                                                                                                                          |
|                                                            | <ul style="list-style-type: none"> <li>Damage to existing services</li> </ul>                                                  | <p>Way leaves or drawings to be obtained from the Client.</p> <p>Where way-leaves are not available adequate control measures must be implemented eg using a Cable Detector to determine the presence of possible services especially electrical cables.</p> <p>Only competent persons to excavate.</p> <p>Compliance with CR 13.</p> <p>All work to be conducted under supervision</p>                                                                                                                                                                                                   |
|                                                            | <ul style="list-style-type: none"> <li>Possible Excavation collapse</li> </ul>                                                 | <p>Competent person appointed in writing to supervise excavations.</p> <p>Daily inspections to be conducted</p> <p>Adequate bracing and shoring required as and when needed. Plant to stay at least 1m clear of Embankment</p>                                                                                                                                                                                                                                                                                                                                                            |
| <b>Lifting of Pipes</b>                                    | <ul style="list-style-type: none"> <li>Possible fatalities/injuries</li> <li>Unplanned release or dropping of load.</li> </ul> | <p>Task Specific Method statements and Risk Assessments required as per CR 9</p> <ul style="list-style-type: none"> <li>Load Test certificates of chains and slings to be obtained and put on file.</li> <li>Compliance with CR 23 and DMR 18.</li> <li>All machinery to be used for its intended purpose.</li> <li>No excavators and digger loaders allowed for lifting pipes</li> </ul>                                                                                                                                                                                                 |
|                                                            | <ul style="list-style-type: none"> <li>Objects falling from boom/bucket</li> </ul>                                             | <ul style="list-style-type: none"> <li>Lifting to be supervised to ensure the stability of the machine and the load.</li> <li>Loads must not be slewed over personnel, public vehicle or where there is a risk of possible injuries or property damage.</li> <li>Spotter to be used where driver's vision is impaired or where operating in congested areas</li> </ul>                                                                                                                                                                                                                    |
| <b>Handling of asbestos related products.</b>              | <ul style="list-style-type: none"> <li>Possible exposure to</li> <li>Asbestos fibres.</li> </ul>                               | <ul style="list-style-type: none"> <li>Monitoring of exposure to be done by AIA as per Asbestos Plan</li> <li>Registered Asbestos Contractor</li> <li>Contractors to adhere to approved asbestos plan requirements and the Asbestos Abatement Regulations 2020.</li> <li>Asbestos PPE to be issued, ex. FFP2 dust mask, disposable full asbestos overalls.</li> <li>All workers to make use of the decontaminating area will be established prior to work starting.</li> <li>Disposal of asbestos to be done at Visser'shok and obtaining of an Asbestos disposal certificate.</li> </ul> |
| <b>Working near live existing 150mm Asbestos Watermain</b> | <ul style="list-style-type: none"> <li>Possible damage to asbestos watermain</li> </ul>                                        | <ul style="list-style-type: none"> <li>All works near asbestos watermain to be supervised.</li> <li>Task Specific Risk Assessment and method statements required</li> <li>Works to stop and client to be informed if damages to watermain occurs.</li> </ul>                                                                                                                                                                                                                                                                                                                              |
| <b>Working in Vicinity of Moving Trains/railway lines</b>  | <ul style="list-style-type: none"> <li>Injury to workers caused by being struck by trains</li> <li>Electrocution</li> </ul>    | <p>The Principal contractor to ensure that relevant permits are obtained prior to working near any railway line</p> <p>All working near railway to undergo metrorail/PRASA induction training.</p>                                                                                                                                                                                                                                                                                                                                                                                        |

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|  | <ul style="list-style-type: none"> <li>• Damage to trains or train operators and/or staff by contractors works</li> </ul> |  |
|  | <ul style="list-style-type: none"> <li>•</li> </ul>                                                                       |  |

**Note:**

The above list is by no means exhaustive and should not be limited to these activities but must cover all activities that forms part of the said construction work. Each activity must be split down to individual tasks and all associated hazards identified and listed in the risk assessment. This ensures that the critical tasks and subsequent critical hazards are not missed.

All Activities are to be re-assessed by the Principal Contractor and their contractors prior to start of work and must be communicated with all relevant employees with proof placed on file.

**NB:**

Although some of the work related to health and safety work is mentioned /noted in certain measured items in the bill of quantities it remains the contractor's responsibility to allow in his tender price for all work related to health and safety and the requirements as per this Health and Safety Specification and the OH'S Act 85/1993.

**Additional Information/General Notes**

1. The site is located at Beach Road to 12th Avenue, Maitland.
2. All work operations shall be limited within site boundary.
3. The existing environment will be operational and live including buildings, shops, traffic and structures. The Principal Contractor and their contractors shall co-ordinate their activities including deliveries in a safe manner and so far as reasonably practicable to reduce traffic congestion. **Cognizance must be taken of all pedestrians and tenants.**
4. Hoarding and Signage shall be maintained on a daily basis and shall be erected within the construction zone and or as needed.
5. The road shall be kept clean at all times and deliveries and vehicle movement will be limited to prevent noise.
6. Where unidentified services are located on site, the contractor is to report this immediately to the principal agent and is to adequately protect these services until identified and the necessary instruction issued by the principal agent.

Active Buildings– **The Principal Contractor shall provide adequate control measures when planning works around these areas.**

Park all vehicles in designated area as provided by the Client.

Principal Contractor and their Contractors to only use access routes that has been identified by the Client.

Adequate signage and demarcation required.

The Principal Contractor and their contractors shall avoid direct contact with members of the public unless their safety is at risk.

Working hours shall be confirmed with the Client.

Traffic Accommodation to be in line with SARTSM chapter 13 and strict adherence to the times allowed for closures.

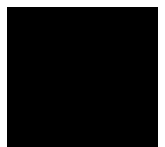
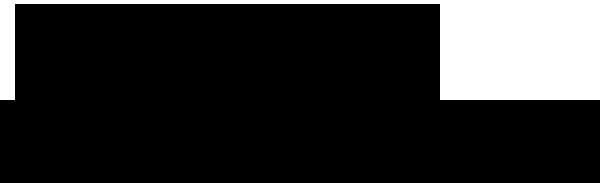
**The principal contractor to take into account PRASA requirements when working close proximity to the existing railway bridge.**

**Principal Contractor and their Contractors to monitor wind conditions when erecting site camp and or outside fencing/hoarding. Note this includes deliveries and any other activities.**

**Principal Contractor to take into account load shedding schedules when planning and risk assessing all work activities.**

**Important Note:**

The Health and Safety Specification was compiled with the input of all Designers. The Principal Contractor must ensure that continuous monitoring of risk and hazards are conducted.



CITY OF CAPE TOWN

ROADS AND STORMWATER

CONTRACT NO. 72Q/2025/26

UPGRADE OF VOORTREKKER ROAD, FROM 4TH AVENUE TO 12TH AVENUE, MAITLAND

## **C3.6 Annexes**

### **CONTENTS**

Annex 1: Monthly Project Labour Report

Annex 2: B-BBEE Sub-contract Expenditure Report

Annex 3: Joint Venture Expenditure Report

Annex 4: Targeted Labour Contract Participation Expenditure Report

Annex 5: Targeted Enterprises Contract Participation Expenditure Report



## ANNEX 1

## CITY OF CAPE TOWN MONTHLY PROJECT LABOUR REPORT

### Instructions for completing and submitting forms

#### General

- 1 The Monthly Project Labour Reports must be completed in full, using typed, proper case characters; alternatively, should a computer not be available, handwritten in black ink.
- 2 Incomplete / incorrect / illegible forms will not be accepted.
- 3 Any conditions relating to targeted labour stipulated in the Contract (in the case of contracted out services or works) shall apply to the completion and submission of these forms.
- 4 This document is available in Microsoft Excel format upon request from the City's EPWP office, tel 021 400 9406, email EPWPLR@capetown.gov.za.

#### Project Details

- 5 If a field is not applicable insert the letters: NA
- 6 Only the Project Number supplied by the Corporate EPWP Office must be inserted. The Project Number can be obtained from the Coordinator or Project Manager or from the e-mail address in point 4 above.
- 7 On completion of the contract or works project the anticipated end date must be updated to reflect the actual end date.

#### Beneficiary Details and Work Information

- 8 Care must be taken to ensure that beneficiary details correspond accurately with the beneficiary's ID document.

- 9 A new beneficiary is one in respect of which a new employment contract is signed in the current month. A certified ID copy must accompany this labour report on submission.
- 10 Was the beneficiary sourced from the City's job seeker database?
- 11 The contract end date as stated in the beneficiary's employment contract.
- 12 Where a beneficiary has not worked in a particular month, the beneficiary's name shall not be reflected on this form at all for the month in question.
- 13 Training will be recorded separately from normal working days and together shall not exceed the maximum of 23 days per month.
- 14 Workers earning more than the maximum daily rate (currently R450 excluding any benefits) shall not be reflected on this form at all.
- Submission of Forms**
- 15 Signed hardcopy forms must be scanned and submitted to the City's project manager in electronic (.pdf) format, together with the completed form in Microsoft Excel format.
- 16 Scanned copies of all applicable supporting documentation must be submitted along with each monthly project labour report. Copies of employment contracts and ID documents are only required in respect of new beneficiaries.
- 17 If a computer is not available hardcopy forms and supporting documentation will be accepted.

### PROJECT DETAILS

Numbers in cells below e.g (5) refer to the relevant instruction above for completing and submitting forms

|                                                                                                 |     |                                                |              |
|-------------------------------------------------------------------------------------------------|-----|------------------------------------------------|--------------|
| CONTRACT OR WORKS<br>PROJECT NAME: (6)                                                          |     | EPWP SUPPLIED<br>PROJECT NUMBER: (6)           |              |
| DIRECTORATE:                                                                                    |     | DEPARTMENT:                                    |              |
| CONTRACTOR OR<br>VENDOR NAME:                                                                   |     | CONTRACTOR OR VENDOR<br>E-MAIL ADDRESS:        |              |
| CONTRACTOR OR VENDOR<br>CONTACT PERSON:                                                         |     | CONTRACTOR OR VENDOR<br>TEL. NUMBER:           | CELL<br>WORK |
| PROJECT LABOUR REPORT CURRENT MONTH (mark with "X")                                             |     |                                                |              |
| JAN                                                                                             | FEB | MAR                                            | APR          |
| MAY                                                                                             | JUN | JUL                                            | AUG          |
| SEP                                                                                             | OCT | NOV                                            | DEC          |
| YEAR                                                                                            |     |                                                |              |
| ACTUAL START DATE (yyyy/mm/dd)                                                                  |     | ANTICIPATED / ACTUAL END DATE (yyyy/mm/dd) (7) |              |
| TOTAL PROJECT EXPENDITURE / VALUE OF WORK DONE TO-DATE (INCLUDING ALL COSTS, BUT EXCLUDING VAT) |     |                                                |              |
| R                                                                                               |     |                                                |              |

MONTHLY PROJECT LABOUR REPORT



BENEFICIARY DETAILS AND WORK INFORMATION

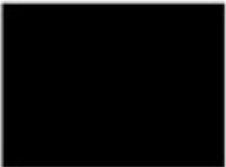
|                                      |  |  |  |      |  |       |  |       |  |  |  |  |
|--------------------------------------|--|--|--|------|--|-------|--|-------|--|--|--|--|
| CONTRACT OR WORKS<br>PROJECT NUMBER: |  |  |  | Year |  | Month |  | Sheet |  |  |  |  |
|                                      |  |  |  |      |  |       |  | 1 of  |  |  |  |  |

|     |            |         |           |                       |              |                |                           |                              |                            |                                             |               |                             |
|-----|------------|---------|-----------|-----------------------|--------------|----------------|---------------------------|------------------------------|----------------------------|---------------------------------------------|---------------|-----------------------------|
|     | (8)        | (8)     | (8)       | (9)                   |              |                | (10)                      |                              | (11)                       | (12)                                        | (13)          | (14)                        |
| No. | First name | Surname | ID number | New Beneficiary (Y/N) | Gender (M/F) | Disabled (Y/N) | Job seeker database (Y/N) | Contract start date (DDMMYY) | Contract end date (DDMMYY) | No. days worked this month (excl. training) | Training days | Rate of pay per day (R - c) |
| 1   |            |         |           |                       |              |                |                           |                              |                            |                                             |               |                             |
| 2   |            |         |           |                       |              |                |                           |                              |                            |                                             |               |                             |
| 3   |            |         |           |                       |              |                |                           |                              |                            |                                             |               |                             |
| 4   |            |         |           |                       |              |                |                           |                              |                            |                                             |               |                             |
| 5   |            |         |           |                       |              |                |                           |                              |                            |                                             |               |                             |
| 6   |            |         |           |                       |              |                |                           |                              |                            |                                             |               |                             |
| 7   |            |         |           |                       |              |                |                           |                              |                            |                                             |               |                             |
| 8   |            |         |           |                       |              |                |                           |                              |                            |                                             |               |                             |
| 9   |            |         |           |                       |              |                |                           |                              |                            |                                             |               |                             |
| 10  |            |         |           |                       |              |                |                           |                              |                            |                                             |               |                             |
| 11  |            |         |           |                       |              |                |                           |                              |                            |                                             |               |                             |
| 12  |            |         |           |                       |              |                |                           |                              |                            |                                             |               |                             |
| 13  |            |         |           |                       |              |                |                           |                              |                            |                                             |               |                             |
| 14  |            |         |           |                       |              |                |                           |                              |                            |                                             |               |                             |
| 15  |            |         |           |                       |              |                |                           |                              |                            |                                             |               |                             |
| 16  |            |         |           |                       |              |                |                           |                              |                            |                                             |               |                             |
| 17  |            |         |           |                       |              |                |                           |                              |                            |                                             |               |                             |
| 18  |            |         |           |                       |              |                |                           |                              |                            |                                             |               |                             |
| 19  |            |         |           |                       |              |                |                           |                              |                            |                                             |               |                             |
| 20  |            |         |           |                       |              |                |                           |                              |                            |                                             |               |                             |

00 R -

|                                                          |      |  |           |  |
|----------------------------------------------------------|------|--|-----------|--|
| Declared by Contractor or Vendor to be true and correct: | Name |  | Signature |  |
|                                                          | Date |  |           |  |

|                                                |      |  |           |  |
|------------------------------------------------|------|--|-----------|--|
| Received by Employer's Agent / Representative: | Name |  | Signature |  |
|                                                | Date |  |           |  |



ANNEX 2



CONTRACT NO. AND NAME: \_\_\_\_\_

CONTRACTOR: \_\_\_\_\_

**B-BBEE SUB-CONTRACT EXPENDITURE REPORT BASED ON PAYMENT CERTIFICATE NO. ....**

|                                                                                     |   |                                         |  |
|-------------------------------------------------------------------------------------|---|-----------------------------------------|--|
| Value of the contract (as defined in the <b>Preference Schedule</b> ) ( <b>P*</b> ) | R | B-BBEE Status Level of Prime Contractor |  |
|-------------------------------------------------------------------------------------|---|-----------------------------------------|--|

| Name of Sub-contractor (list all) | B-BBEE Status Level of Sub-contractor <sup>1</sup> | Total value of Sub-contract (excl. VAT) <sup>1</sup> | Value of Sub-contract work to date (excl. VAT) <sup>1</sup> | Value of Sub-contract work to date (excl. VAT) <sup>1</sup> | Value of Sub-contract work to date (excl. VAT) <sup>1</sup> |
|-----------------------------------|----------------------------------------------------|------------------------------------------------------|-------------------------------------------------------------|-------------------------------------------------------------|-------------------------------------------------------------|
| Sub-contractor A                  |                                                    | R                                                    | R                                                           | R                                                           | R                                                           |
| Sub-contractor B                  |                                                    | R                                                    | R                                                           | R                                                           | R                                                           |
| Sub-contractor C                  |                                                    | R                                                    | R                                                           | R                                                           | R                                                           |
|                                   |                                                    |                                                      |                                                             |                                                             |                                                             |
|                                   |                                                    |                                                      |                                                             |                                                             |                                                             |

|                                                  |                                        |   |
|--------------------------------------------------|----------------------------------------|---|
| <sup>1</sup> Documentary evidence to be provided | Total:                                 | R |
|                                                  | Expressed as a percentage of <b>P*</b> | % |

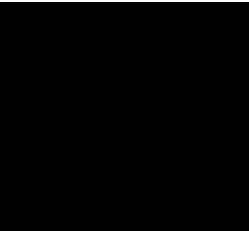
**Signatures**

Declared by Contractor to be true and correct: \_\_\_\_\_

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

Verified by Employer's Agent/  
Employer's Agent's Representative: \_\_\_\_\_

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



ANNEX 3

CITY OF CAPE TOWN

CONTRACT NO. AND NAME: \_\_\_\_\_

CONTRACTOR: \_\_\_\_\_

JOINT VENTURE EXPENDITURE REPORT BASED ON PAYMENT CERTIFICATE NO. ....

Value of the contract (as defined in the Preference Schedule) (P\*) R

B-BBEE Status Level of Joint Venture

| Name of Joint Venture partner (list all) | B-BBEE Status Level of each JV partner as at contract award | Percentage contribution of JV partner per JV Agreement <sup>1</sup><br>A | Total value of JV partner's contribution (excl. VAT) <sup>1</sup><br>B = A% x P* | Value of JV partner's contribution to date (excl. VAT) <sup>1</sup><br>C | Value of JV partner's contribution as a percentage of the work executed to date<br>D = C/P*x100 |
|------------------------------------------|-------------------------------------------------------------|--------------------------------------------------------------------------|----------------------------------------------------------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| JV Partner A                             |                                                             | %                                                                        | R                                                                                | R                                                                        | %                                                                                               |
| JV Partner B                             |                                                             | %                                                                        | R                                                                                | R                                                                        | %                                                                                               |
| JV Partner C                             |                                                             | %                                                                        | R                                                                                | R                                                                        | %                                                                                               |
|                                          |                                                             |                                                                          |                                                                                  |                                                                          |                                                                                                 |
|                                          |                                                             |                                                                          |                                                                                  |                                                                          |                                                                                                 |

<sup>1</sup>Documentary evidence to be provided

Signatures

Declared by Contractor to be true and correct: \_\_\_\_\_

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

Verified by Employer's Agent/ Employer's Agent's Representative: \_\_\_\_\_

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



## ANNEX 4

## CITY OF CAPE TOWN

CONTRACT NO. AND NAME: .....

CONTRACTOR: .....

### TARGETED LABOUR CONTRACT PARTICIPATION EXPENDITURE REPORT BASED ON CERTIFICATE NO. ....

Value of the contract (as defined in the **Preference Schedule**)  
(P\*)

R

Specified Targeted Labour Contract Participation Goal

%

| Name of Contractor/Sub-contractor<br>(list all) | Total previous expenditure on wages in<br>respect of targeted labour | Net Amount for this month <sup>1</sup> | Total expenditure on wages in respect of<br>targeted labour |
|-------------------------------------------------|----------------------------------------------------------------------|----------------------------------------|-------------------------------------------------------------|
| Contractor                                      | R                                                                    | R                                      | R                                                           |
| Sub-contractor A                                | R                                                                    | R                                      | R                                                           |
| Sub-contractor B                                | R                                                                    | R                                      | R                                                           |
|                                                 |                                                                      |                                        |                                                             |
|                                                 |                                                                      |                                        |                                                             |
|                                                 |                                                                      |                                        |                                                             |
| Total:                                          |                                                                      |                                        | R                                                           |
| Expressed as a<br>percentage of P*              |                                                                      |                                        | %                                                           |

<sup>1</sup>Documentary evidence to be provided

#### Signatures

Declared by Contractor  
to be true and correct: .....

Date .....

Verified by Employer's  
Agent/  
Employer's Agent's  
Representative: .....

Date .....



# ANNEX 5

# CITY OF CAPE TOWN

CONTRACT NO. AND NAME: \_\_\_\_\_

CONTRACTOR: \_\_\_\_\_

**TARGETED ENTERPRISES CONTRACT PARTICIPATION EXPENDITURE REPORT BASED ON CERTIFICATE NO. ....**

Value of the contract (as defined in the **Preference Schedule**)  
(P\*) R

Specified Targeted Enterprises Contract Participation Goal %

| Name of targeted enterprise<br>(list all)        | Total previous expenditure (excl. VAT) to<br>targeted enterprises | Net Amount for this month <sup>1</sup> | Total expenditure (excl. VAT) to targeted<br>enterprises |
|--------------------------------------------------|-------------------------------------------------------------------|----------------------------------------|----------------------------------------------------------|
| Targeted Enterprise A                            | R                                                                 | R                                      | R                                                        |
| Targeted Enterprise B                            | R                                                                 | R                                      | R                                                        |
| Targeted Enterprise C                            | R                                                                 | R                                      | R                                                        |
|                                                  |                                                                   |                                        |                                                          |
|                                                  |                                                                   |                                        |                                                          |
|                                                  |                                                                   |                                        |                                                          |
| <sup>1</sup> Documentary evidence to be provided |                                                                   |                                        | Total: R                                                 |
|                                                  |                                                                   |                                        | Expressed as a<br>percentage of P* %                     |

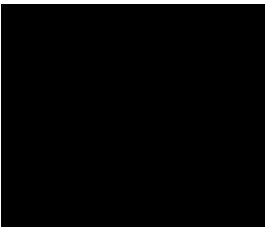
**Signatures**

Declared by Contractor  
to be true and correct: \_\_\_\_\_

Date \_\_\_\_\_

Verified by Employer's  
Agent/  
Employer's Agent's  
Representative: \_\_\_\_\_

Date \_\_\_\_\_



CITY OF CAPE TOWN

URBAN MOBILITY DIRECTORATE: TRANSPORT INFRASTRUCTURE IMPLEMENTATION

CONTRACT NO. 72Q/2025/26

UPGRADE OF VOORTREKKER ROAD, FROM 4TH AVENUE TO 12TH AVENUE, MAITLAND

## **C5.2 Returnable Schedules**

CITY OF CAPE TOWN

URBAN MOBILITY DIRECTORATE: TRANSPORT INFRASTRUCTURE IMPLEMENTATION

CONTRACT NO. 72Q/2025/26

UPGRADE OF VOORTREKKER ROAD, FROM 4TH AVENUE TO 12TH AVENUE, MAITLAND

**SCHEDULE 1: COMPULSORY ENTERPRISE QUESTIONNAIRE**

|                                                                                                                                                                             |                                                                                                                                   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| The following particulars must be furnished. In the case of a joint venture, separate enterprise questionnaires in respect of each partner must be completed and submitted. |                                                                                                                                   |
| Section 1: Name of enterprise: [REDACTED]                                                                                                                                   |                                                                                                                                   |
| Section 2: VAT registration number, if any: [REDACTED]                                                                                                                      |                                                                                                                                   |
| Section 2a: National Treasury Central Supplier Database registration number [REDACTED]                                                                                      |                                                                                                                                   |
| Section 2b: SARS Tax Compliance Status PIN : [REDACTED]                                                                                                                     |                                                                                                                                   |
| Section 3: cidb registration number, if any: [REDACTED]                                                                                                                     |                                                                                                                                   |
| Section 4: Particulars of sole proprietors and partners in partnerships                                                                                                     |                                                                                                                                   |
|                                                                                           |                                                                                                                                   |
| * Complete only if sole proprietor or partnership and attach separate page if more than 3 partners                                                                          |                                                                                                                                   |
| Section 5: Particulars of companies and close corporations                                                                                                                  |                                                                                                                                   |
| Company registration number [REDACTED]                                                                                                                                      |                                                                                                                                   |
| Close corporation number [REDACTED]                                                                                                                                         |                                                                                                                                   |
| Tax reference number [REDACTED]                                                                                                                                             |                                                                                                                                   |
| Section 6: Foreign Bidding Suppliers                                                                                                                                        |                                                                                                                                   |
| Is tenderer the accredited representative in South Africa for the Goods / Services / Works offered?                                                                         | <input type="checkbox"/> Yes <input type="checkbox"/> No<br>If yes, enclose proof                                                 |
| Is tenderer a foreign based supplier for the Goods / Services / Works offered?                                                                                              | <input type="checkbox"/> Yes <input type="checkbox"/> No<br>If yes, answer the Questionnaire to Bidding Foreign Suppliers (below) |
| Questionnaire to Bidding Foreign Suppliers                                                                                                                                  |                                                                                                                                   |
| a) Is the tenderer a resident of the Republic of South Africa or an entity registered in South Africa?                                                                      | <input type="checkbox"/> Yes <input type="checkbox"/> No                                                                          |
| b) Is the tenderer a resident of the Republic of South Africa or an entity registered in South Africa?                                                                      | <input type="checkbox"/> Yes <input type="checkbox"/> No                                                                          |
| c) Does the tenderer have a permanent establishment in the Republic of South Africa?                                                                                        | <input type="checkbox"/> Yes <input type="checkbox"/> No                                                                          |
| d) Does the tenderer have any source of income in the Republic of South Africa?                                                                                             | <input type="checkbox"/> Yes <input type="checkbox"/> No                                                                          |
| e) Is the tenderer liable in the Republic of South Africa for any form of taxation?                                                                                         | <input type="checkbox"/> Yes <input type="checkbox"/> No                                                                          |

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

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

Signed

Date

Name

Position

CEO

Enterprise  
name



CITY OF CAPE TOWN

URBAN MOBILITY DIRECTORATE: TRANSPORT INFRASTRUCTURE IMPLEMENTATION

CONTRACT NO. 72Q/2025/26

UPGRADE OF VOORTREKKER ROAD, FROM 4TH AVENUE TO 12TH AVENUE, MAITLAND

**SCHEDULE 14: SCHEDULE OF CONSTRUCTION EQUIPMENT**

The tenderer shall state below what construction equipment will be available for this Contract. The tenderer shall differentiate, if applicable, between construction equipment immediately available and construction equipment which will become available by virtue of outstanding orders, and indicate what further construction equipment will be acquired or hired for the work should he be awarded the Contract.

**CONSTRUCTION EQUIPMENT IMMEDIATELY AVAILABLE**

| DESCRIPTION, SIZE, CAPACITY                                                                                                              | NUMBER |
|------------------------------------------------------------------------------------------------------------------------------------------|--------|
| <p><b>SEE ATTACHED</b><br/><i>LIST OF PLANT</i></p>  |        |

**CONSTRUCTION EQUIPMENT ON ORDER**

(State details of arrangements made, with delivery dates)

| DESCRIPTION, SIZE, CAPACITY | NUMBER |
|-----------------------------|--------|
|                             |        |

**CONSTRUCTION EQUIPMENT THAT WILL BE ACQUIRED OR HIRED**

(State details of delivery arrangements)

| DESCRIPTION, SIZE, CAPACITY | NUMBER |
|-----------------------------|--------|
|                             |        |

Number of sheets appended by the tenderer to this Schedule 3 (If nil, enter NIL).

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

\_\_\_\_\_

100

# PLANT & ASSET LIST

| Category | Plant Type | Plant Number | Machine Description | Registration | Year | Power | Mass |
|----------|------------|--------------|---------------------|--------------|------|-------|------|
|----------|------------|--------------|---------------------|--------------|------|-------|------|

Chip Spreader

Diesel Truck

Digger Loader

Excavator

Flat Truck



# PLANT & ASSET LIST

| Category | Plant Type | Plant Number | Machine Description | Registration | Year | Power | Mass |
|----------|------------|--------------|---------------------|--------------|------|-------|------|
|----------|------------|--------------|---------------------|--------------|------|-------|------|

Roller - Static

Roller - Vibro

Tipper Truck

Water Truck

CITY OF CAPE TOWN

URBAN MOBILITY DIRECTORATE: TRANSPORT INFRASTRUCTURE IMPLEMENTATION

CONTRACT NO. 72Q/2025/26

UPGRADE OF VOORTREKKER ROAD, FROM 4TH AVENUE TO 12TH AVENUE, MAITLAND

**SCHEDULE 17: PROPOSED WORK PLAN**

The tenderer shall append their proposed work plan to this Schedule.

It should be noted that while a programme may form part of the required work plan, more than a programme is expected in response to this requirement. The work plan must indicate the approach and methodology that the tenderer intends following in order to reach the required outcomes. The work plan must show that the tenderer has appreciated the Scope of Work, and has good insight as to what actions or activities are required in order to comply with the Employer's objectives.

**SEE ATTACHED  
WORK PLAN**

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

646

Contract  
Part C5: Returnable Documents  
Contract No. 72Q/2025/26

C5.2  
Returnable Schedules

|                       |                                                                                                    |
|-----------------------|----------------------------------------------------------------------------------------------------|
| <b>DOCUMENT:</b>      | <b>PROPOSED WORK PLAN</b>                                                                          |
| <b>CONTRACT NAME:</b> | <b>Upgrade of Voortrekker Road, from 4<sup>th</sup> Avenue to 12<sup>th</sup> Avenue, Maitland</b> |
| <b>CONTRACT NO.</b>   | <b>72Q/2025/2026</b>                                                                               |
|                       |                                                                                                    |

## 1. PURPOSE & SCOPE

The purpose of this construction methodology statement is to outline the proposed methods to be implemented on site for the construction activities, including temporary and permanent works as well as the services required to complete the construction works to achieve the objectives of the assignment and the Employer's stated and implied requirements.

This Work Plan was prepared considering the design requirements, technical specifications, contract data, tender drawings and the health, safety, and environmental requirements provided by the Employer, the contractual and legal requirements, construction constraints, construction regulations, risks, and opportunities.

## 2. SITE LOCATION

The project is in the suburb of Maitland between 4<sup>th</sup> avenue and 13<sup>th</sup> Avenue on Voortrekker Road.

## 3. SCOPE OF WORKS

The scope of the works includes the following:

- Establishment
- Preparation and planning of the works in accordance with the agreed programme.
- Protection & relocation of existing telecommunication ducts
- Watermain protection & relocation in Main Road
- Stormwater
- Clear and Grub
- Earthworks: Cut to stockpile/spoil or fill
- Demolition and build of cemetery wall with 6 different types of wall to be constructed.
- Mill out existing surface
- Road widening
- Layer works & stabilisation
- Sidewalks
- Asphalt surfacing & overlay
- New kerbs
- Electrical works & streetlighting
- Traffic signals upgrade
- Ancillary works
- Landscaping
- As-built survey, Completion and Handover

## 4. PROJECT INITIATION

### 4.1. Pre-construction

Contracts Manager and Construction Manager will make arrangements for compilation of the pre-start documentation required by the Employer to permit the issue of the instruction to commence work on site and will include a Project Quality Plan, Construction Programme; Method statements; Quality Control Plans,

Insurances, sureties and performance guarantee; Health & Safety Plan; Risk Assessments; Construction Phase Methodology; and Construction-phase Environmental Management procedures and inspections.

#### 4.2. Mobilisation

Following approval of the pre-start submissions and receipt of the instruction to commence on site, the following mobilisation activities will commence:

- Compilation of documentation to be submitted for approval, including security plan, mix designs, samples of materials intended for use in the construction, and other documents required under the contract;
- Establish a forum with SAPS, City Law Enforcement and local neighbourhood security groups and possible others as deemed necessary.
- Meet with the **Community Liaison Officer (CLO)**, identify local subcontractors required.
- Identify suppliers and place orders
- Samples of materials and the laboratory test reports will be submitted for approval;
- Site-specific health, safety, and environmental hazards will be identified by the Health & Safety Officer, the risks assessed and mitigation measures developed;
- Permits and wayleaves will be obtained, as required;
- Mobilisation of the labour, plant, equipment, materials, and supervision personnel to site to establish the site camp and start the contract works;
- Identify local labour with the CLO's assistance and engage them for work related opportunities.
- Arrangements for temporary services connections for the temporary construction compound.
- The locations of existing services will be confirmed during the initial period and where the services conflict with the works or may be at risk of damage because of construction operations they will be protected or diverted, as required by the asset owners. The necessary arrangements will be made to protect or replace these services during the construction phase of the contract.

#### 4.3. Establishment of the Site Camp

Preparatory works for the temporary site establishments.

Establishment of a site camp will include offices and welfare facilities for the Engineer, Employer, [REDACTED] staff, and subcontractors, with a store room, hazardous materials store, ablution facilities, vehicle parking area, waste management, and site signage.

#### 4.4. Plant & Equipment

The construction plant and equipment necessary to undertake the construction activities on site will be provided internally from the [REDACTED] plant fleet. Plant and equipment that is required but not available internally will be obtained from reputable local plant hire companies, alternatively, a targeted enterprise will be identified and awarded a contract for the hire of plant.

Plant to be utilised during the construction phase of the contract includes but not limited to the following:

Tipper Trucks, Excavator, TLB, Water Truck, Recycler, Steel Drum Roller, Vibratory Rollers, Milling Machine, Asphalt Paver, Hand Tack Cart, Pneumatic Tyre Rollers (PTR) Wackers / Rammers, Pokers, Generators and Other Hand Tools.

#### 4.5. Personnel

The project will be staffed with competent experienced personnel. A Contracts Manager and Construction Manager will provide the overall management of the project and will be supported by a Professionally registered Health & Safety Officer; Environmental Officer (DEO) and Quality Controller.

The following teams will operate; Asphalt team, roadworks team, electrical team, stormwater team, clean-up team, and subcontractors as described below. The work teams will be controlled by a supervisor and the supervisors will report to the Construction Manager. Subcontractors will be managed by the Foreman on site.

In addition to the above, the site operations team will be supported by the [REDACTED] head office staff.



## **4.6. Procurement**

### **4.7.1. Materials**

Material supply will be confirmed prior to construction of the project and will include purchasing materials, equipment, and consumables from local suppliers. All materials sourced will conform to the requirements of the specifications.

## **5. CONSTRUCTION EXECUTION**

After the establishment of the site camp and offices the Contractor will commence with the execution of works once the Notification to the Department of Labour is in place. The Contractor will start by identifying, locating, and protecting existing services as indicated on the Wayleaves.

The Contractor will then establish all plant required for the construction works. During this phase the Contractor will execute the works as per the Contract Drawings within the timeframe indicated by the programme. The main activities during this phase comprises of the following:

- Establishment
- Locating, protecting, and dealing with existing services
- Clear and Grub
- Earthworks
- Relocation of existing services: Electrical and water.
- Mill & fill
- Layer works
- Kerbing
- Asphalt surfacing
- Retaining wall
- Streetlighting
- Ancillary works
- Landscaping
- Finishing

## **6. TRAFFIC ACCOMMODATION**

Temporary road signage conforming to SARTSM will be installed in terms of SADC chapter 13. This will involve the construction of site access and egress points.

## **7. QUALITY MANAGEMENT**

### **7.1. Documentation & Processes**

7.1.1. The quality management requirements of the project will be set out in the project Quality Plan (PQP) and address in the quality requirements of the scope of works and includes method statements, Quality Control Plans (QCP) and project-specific quality management processes.

7.1.2. An approved Laboratory will be appointed to undertake the required testing processes throughout the duration of the contract.

7.1.3. Samples of the materials will be submitted to the Engineer and these will be kept on site and referenced as the submission sample. The test results and reports provided by the laboratory for the various materials will be submitted to the Engineer for approval of the materials.

### **7.2. Process Control & Acceptance**

7.2.1. Process controls will be implemented to ensure that the completed works comply with the specifications. Requests for Inspection (RI) of completed work will be submitted to the Engineer for acceptance in advance of the date of inspection and testing to ensure sufficient time for sampling and testing to be arranged and performed.

7.2.2. Acceptance control is the responsibility of the Employer's Agent and will include all testing to be executed during the Works to determine the acceptability of the materials and workmanship executed by Civils 2000.

### **7.3. Testing & Inspection Documentation**

7.3.1. Records of materials testing, testing completed work for acceptance, and off-site testing and certification such as laboratory tests, factory tests, materials received inspections, manufacturer certifications, and equipment calibrations will be kept for each location/item/element and the reports submitted to the Engineer.

7.3.2. QCPs will be developed before construction commences and will be submitted to the Engineer for acceptance. For each item there will be an inspection or measurement record and attached to the record will be the site measurements and/or test reports/data and engineer acceptance sheets.

### **7.4. Laboratory and Field Testing**

7.4.1. All testing will be carried out and interpreted in accordance with the methods specified in the relevant standard, and laboratory testing will be undertaken only by testing laboratories of the South African National Standards, CSIR, and the Portland Cement Institute, and other SANAS accredited laboratories as approved by the Engineer. Pre-start tests on materials for approval will be undertaken.

7.4.2. Sufficient inspections and tests will be undertaken prior to requests for acceptance to ensure conformance with the specifications. Work not conforming with the specifications will be remedied by application of the Nonconformance Management Procedure.

7.4.3. Laboratory tests will be performed according to applicable test procedures following the guidelines set out in the QCP. The supervisor is responsible for monitoring the performance of the laboratory and verifying compliance with the specifications of this QMP. The Construction Manager will verify that the laboratory is SANAS-approved and that they perform the standard tests in accordance with the requirements of the specifications and applicable standards.

## **8. HEALTH AND SAFETY**

The works will be conducted in terms of the Occupational Health & Safety Act and Construction Regulations and in compliance with the contract Health & Safety specification as contained in the contract-specific Health & Safety Plan.

## **9. ENVIRONMENTAL**

All works will be performed strictly in accordance with the requirements of the environmental specification, which is part of the Environment Authorization and under the control of the Designated Environmental Officer (DEO).

## **10. COMPLETION AND DE-ESTABLISHMENT**

Minor defects and omissions will be rectified and all items on the snag list provided by the Engineer will be discharged. After remedial work and completion of the snags and obtaining practical completion, the construction manager will plan the de-establishment from site to allow smooth transitioning of the site to handover. This will include dismantling and removal of equipment, disconnection of temporary services, removal of temporary containers, stores and associated areas, general cleaning and reinstatement of services that may be required.

All as-built drawings, documentation and other finalisation requirements will be attended to and provided to the Employer prior to completion.

CITY OF CAPE TOWN

URBAN MOBILITY DIRECTORATE: TRANSPORT INFRASTRUCTURE IMPLEMENTATION

CONTRACT NO. 72Q/2025/26

UPGRADE OF VOORTREKKER ROAD, FROM 4TH AVENUE TO 12TH AVENUE, MAITLAND

**SCHEDULE 18: SCHEDULE OF ESTIMATED MONTHLY EXPENDITURE**

The tenderer shall state his estimated expenditure indicating the value of work done and materials not yet built into the Permanent Works for each month of the Contract period which he estimates will arise based on his preliminary programme and tendered rates, as set out in the table below. The total of the monthly amounts shall be equal to the tender sum.

| MONTH | VALUE |
|-------|-------|
| 1.    |       |
| 2.    |       |
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| 38.                 |                       |  |
| 39.                 |                       |  |
| 40.                 |                       |  |
| 41.                 |                       |  |
| 42.                 |                       |  |
| SUBTOTAL            |                       |  |
| CONTINGENCIES (10%) |                       |  |
| SUBTOTAL            |                       |  |
| VAT (15%)           |                       |  |
| TOTAL               |                       |  |
|                     | (INCLUDING VAT @ 15%) |  |

SIGNED ON BEHALF OF TENDERER: .....



CITY OF CAPE TOWN

URBAN MOBILITY DIRECTORATE: TRANSPORT INFRASTRUCTURE IMPLEMENTATION

CONTRACT NO. 72Q/2025/26

UPGRADE OF VOORTREKKER ROAD, FROM 4TH AVENUE TO 12TH AVENUE, MAITLAND

**SCHEDULE 19: SCHEDULE OF SUB-CONTRACTORS**

We notify you that it is our intention to employ the following sub-contractors for work (excluding work covered by provisional sums and contingencies) in this contract.

Acceptance of this tender shall not be construed as approval of all or any of the listed sub-contractors. Should any of the sub-contractors not be approved subsequent to acceptance of the tender, this shall in no way invalidate the contract, and the tendered unit rates for the various items making up the work activities shall remain final and binding.

| SUB-CONTRACTORS                                                                     |                                                        |                                |
|-------------------------------------------------------------------------------------|--------------------------------------------------------|--------------------------------|
| Sub-contractor's name                                                               | Work activities to be undertaken by the Sub-contractor | Estimated value of work (Rand) |
|  |                                                        |                                |
|                                                                                     |                                                        |                                |
|                                                                                     |                                                        |                                |

Number of sheets appended by the tenderer to this Schedule ..... NIL ..... (If nil, enter NIL).

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

CITY OF CAPE TOWN

URBAN MOBILITY DIRECTORATE: TRANSPORT INFRASTRUCTURE IMPLEMENTATION

CONTRACT NO. 72Q/2025/26

UPGRADE OF VOORTREKKER ROAD, FROM 4TH AVENUE TO 12TH AVENUE, MAITLAND

**SCHEDULE 20: HEALTH AND SAFETY PLAN**

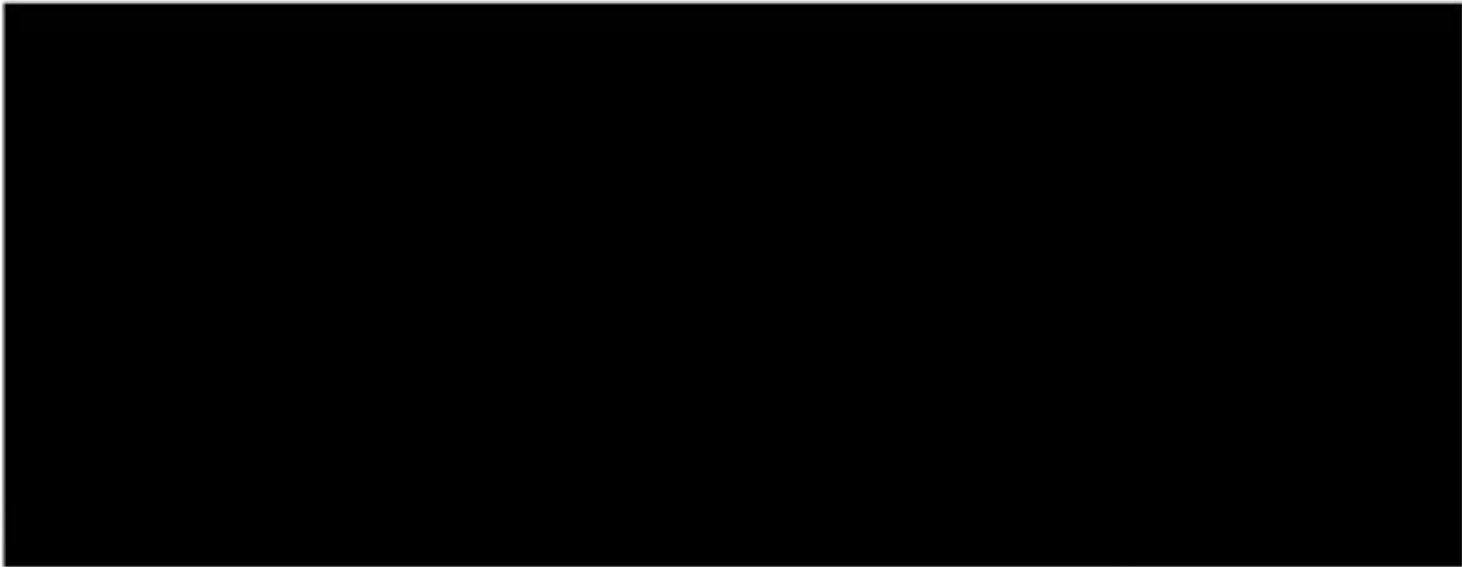
Tenderers are referred to the requirements of Clause C.2.18.4 in Part T1.2 Tender Data and shall append the required draft Health and Safety Plan to this Schedule.

Number of sheets appended by the tenderer to this Schedule ..... **50** ..... (If nil, enter NIL).

**SEE ATTACHED**

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





## **SAFETY, HEALTH, AND ENVIRONMENTAL MANAGEMENT PLAN**

### **FOR**

**Upgrade of Voortrekker Road, from 4<sup>th</sup> to 12<sup>th</sup> Avenue, Maitland**

| Developed & reviewed by: | Approved by:                  | Approved by:                     |
|--------------------------|-------------------------------|----------------------------------|
| SHE Officer<br>CR8.5     | Construction Manager<br>CR8.1 | Project Manager OHS Sect<br>16.2 |
| NAME                     | NAME                          | NAME                             |
| SIGNATURE                | SIGNATURE                     | SIGNATURE                        |
| DATE                     | DATE                          | DATE                             |



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## 1 DOCUMENT REVIEW

| Ref | Change Description          | Date |
|-----|-----------------------------|------|
| 00  | Draft for Tender Submission |      |
|     |                             |      |
|     |                             |      |
|     |                             |      |

## 2 PROJECT DIRECTORY

| ORGANISATION                       | CONTACTS DETAILS | CONTACT PERSON OR REPRESENTATIVE |
|------------------------------------|------------------|----------------------------------|
| EMPLOYER                           |                  |                                  |
|                                    |                  |                                  |
| EMPLOYER AGENT                     |                  |                                  |
|                                    |                  |                                  |
| DEPARTMENT OF LABOUR               |                  |                                  |
| Department of Employment and Labor |                  |                                  |
| PRINCIPAL CONTRACTOR               |                  |                                  |
|                                    |                  |                                  |
|                                    |                  |                                  |
|                                    |                  |                                  |
|                                    |                  |                                  |

## 3 INTRODUCTION

### 3.1 Purpose

The purpose of this document is to establish a plan for implementing the Civils 2000's safety program during construction. The plan is intended to minimize loss, meet regulatory compliance requirements and implement site safety regulations.



[REDACTED]

This health and safety plan describes the procedure upon which [REDACTED] shall comply with the requirements as set out in the clients Health and Safety Specifications.

This document defines the Management system that is implemented by [REDACTED] for the Management of Health and Safety on the project.

The aim of this document is to present the safety aspects that will be controlled and managed on the project.

### 3.2 Project:

Client: [REDACTED]

Client Safety Representative [REDACTED]

## 4 REFERENCES AND GUIDELINES

- Occupational Health and Safety Act 1993 and Regulations
- Construction Regulations 2014
- Compensation for Occupational Injuries and Diseases Act 1993
- Electrical Machinery Regulations
- Client Project Health and Safety Specifications
- Basic Conditions of Employment Act
- Labour Relations Act

## 5 ABBREVIATIONS AND DEFINITIONS

### 5.1 Abbreviations

|                |                                                     |
|----------------|-----------------------------------------------------|
| <b>AIA</b>     | Approved Inspection Authority                       |
| <b>COIDA</b>   | Compensation for Occupational Injuries and Diseases |
| <b>COC</b>     | Certificate of Compliance                           |
| <b>CR</b>      | Construction Regulation                             |
| <b>DOL</b>     | Department of Labor                                 |
| <b>EIA</b>     | Environmental Impact Assessment                     |
| <b>LDV</b>     | Light Delivery Vehicle                              |
| <b>SDS</b>     | Safety Data Sheets                                  |
| <b>OHS Act</b> | Occupational Health and Safety Act and Regulations  |
| <b>PPE</b>     | Personal Protective Equipment                       |
| <b>RA</b>      | Risk Assessment                                     |
| <b>RC</b>      | Recordable Injury                                   |
| <b>SHE</b>     | Safety, Health and Environment                      |



## 5.2 Definitions

|                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Competent person</b>        | Any person having the knowledge, training, experience and qualification specific to work or task being performed.<br><br>as defined in the Occupational Health and Safety Act, 85 of 1993 as amended, who can demonstrate an appropriate level of competence with the hazards, risks, and tasks of that workplace, may also be appointed.                                                                                                                                                                                                                                                                   |
| <b>Construction site</b>       | Any area as defined, where a service provider will be executing the tasks as described in the scope of work.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Construction work means</b> | Any work in connection with erection, maintenance, alteration, renovation, repair, demolition or dismantling of or addition to a building or any similar structure or installation.<br>Installation, erection, dismantling, or maintenance of a fixed plant where such work includes the risk of a person falling.<br>Construction, maintenance, demolition or dismantling of any bridge dam, canal, road, railway, runway, sewer, or water reticulation system or any similar civil engineering structure.<br>Moving of earth, clearing of land, making an excavation, piling or any similar type of work. |
| <b>Hazard</b>                  | A source of or exposure to danger (source which may cause injury or damage to persons or property)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Installation work</b>       | The installation, extension, modification, or repair of an electrical installation, including the connection of machinery at the supply terminals of such machinery                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>OHS Act</b>                 | The aim of the OHS Act is to provide for the safety and health of persons at work and in connection with the use of plant and machinery. It further provides for the protection of people other than people at work from hazards arising out of or in connection with the activities from people at work.                                                                                                                                                                                                                                                                                                   |
| <b>Plant</b>                   | Includes fixtures, fittings, implements, equipment, tools, and appliances, and anything which is used for any purpose in connection with such plant                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Risk</b>                    | The probability or likelihood that exposure to a hazard can result in injury or damage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Scope of work (SOW):</b>    | Document drawn up by the person who requires work to be done, indicating:<br>The work or services to be provided by a service provider on clients / affiliates premises.<br>Area where such work or services will be executed.<br>Risks attached to tasks to be executed.<br>Risks attached to neighbouring plants<br>Chemicals that will be encountered during the execution of the tasks in the specific work area.<br>Special personal protective equipment that might be necessary.                                                                                                                     |
| <b>SHE plan</b>                | SHE documented plan which includes the means and ways to manage hazards identified and indicates measures, procedures and systems for compliance to the SHE specification.<br>Means a documented plan which addresses hazards identified and includes safe work procedures to mitigate, reduce or control the hazards identified.                                                                                                                                                                                                                                                                           |

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>SHE specification</b>        | Documented specification of all SHE requirements pertaining to the associated work on a construction site, so as to ensure the health and safety of persons and the care of the environment.<br>Means, a documented specification of all health and safety requirements, pertaining to the associated works on a construction site, so as to ensure the health and safety of persons.                                                                     |
| <b>Task specific SHE file</b>   | Task specific SHE file compiled by the Service Provider for all tasks to be carried out within a specific area, addressing all the risks of the area as per SOW or PDA, as provided by the requester / client, and contains the information as indicated in the task specific SHE file checklist.                                                                                                                                                         |
| <b>Method statement:</b>        | Means, a document detailing the key activities to be performed in order to reduce as reasonably as practicable the hazards identified in any risk assessment                                                                                                                                                                                                                                                                                              |
| <b>Principal contractor:</b>    | Means an employer, as defined in section 1 of the Act, who performs construction work and is appointed by the client to be in overall control and management of a part of or the whole of a construction site.                                                                                                                                                                                                                                            |
| <b>An Incident</b>              | is an unplanned, undesired event that resulted in or could have resulted in injury, illness, damage, and product loss, interruption of work or has a detrimental impact on the environment.                                                                                                                                                                                                                                                               |
| <b>First Aid Injury</b>         | is a case for which the treatment required is from the First Aid box or clinic only.                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Medical Injury</b>           | is a case where injuries which must be referred for treatment by a medical practitioner or external clinic.                                                                                                                                                                                                                                                                                                                                               |
| <b>Lost Time Injury</b>         | When an injured person cannot return to work next shift and is booked off by a medical practitioner                                                                                                                                                                                                                                                                                                                                                       |
| <b>A Reportable Injury Case</b> | is a case where the injury sustained warrants Medical Treatment by a Registered Medical Practitioner or is hospitalized and serious enough to result in time off work for 14 days or more. An incident where a person becomes unconscious, suffers the loss of a limb or a part of a limb, dies and is reportable to the Divisional Inspector, or Department of Labour in terms of the Provisions of Section 24 of the Occupational Health and Safety Act |
| <b>Occupational Disease</b>     | is a disease diagnosed by a registered medical practitioner as having arisen out of the course of employment of the diagnosed employee.                                                                                                                                                                                                                                                                                                                   |
| <b>Injury on Duty</b>           | Compensation for Occupational Injuries may be claimed where an employee has suffered any injury on duty and requires medical treatment then the form that needs to be completed is WCL 2: Notice of Accident and Claim for Compensation.                                                                                                                                                                                                                  |

## 6 SCOPE OF WORK

### 6.1 Description Of Works Includes but Not Limited To:

- Site establishment
- Traffic accommodation
- Protection, relocation and upgrading of existing services (incl up to DN750 steel)
- Water mains and HV & MV cables.
- New traffic signals (for 9 intersections)
- Railway bridge widening

- Relocation of existing cemetery sandstone wall and fencing
- Streetlighting, signage, landscaping, IS&T, ducting, road markings
- etc

## **7 HEALTH AND SAFETY POLICY**

Civils 2000 is committed to providing a safe and healthy environment for all personnel, and visitors to the site. We will strive to continually improve the effectiveness of the health and safety system through the setting and measurement of health and safety objectives and by conforming to current, applicable occupational health and safety legislation. Refer to Annexure A

## **8 STARC INITIATIVE**

### **Policy Statement for STARC (Stop, Think and Make the Right Choice)**

#### **8.1 Policy Statement for STARC (Stop, Think and Make the Right Choice)**

##### **Preventing accidents; injuries and reworks:**

- Reduce the risk of accidents and injuries through increased awareness and deliberate actions.
- Prevent failures / reworks through "doing it right the first time" and lessons learnt.

##### **Promoting safety and quality awareness:**

- Foster a culture where safety is ingrained in every aspect of our work.
- Adopt a culture of high standard in the work we produce.

##### **Enhancing Decision-Making:**

- Equip employees with the tools and mindset to make safe and informed decisions.

##### **Ensuring Compliance:**

- Adhere to all applicable regulations; standards and codes

#### **8.2 STARC Life Saving Rules**

1. Personal Protective Equipment
2. Zero Alcohol and Drugs
3. Man-Machine Interface
4. Traffic Management
5. Excavations
6. Working at Heights
7. Lifting Operations
8. Working in Confined Spaces
9. Hazardous Chemical Substances
10. Environmental Management



## 9 SITE ORANOGRAM

Refer to Annexure B

### 9.1 Appointments

In terms of the Regulations, and before carrying out any construction work, the following appointments will be made, in writing as required:

- a. Appoint each contractor in writing for the part thereof of the project on a construction site (in terms of Regulation 7(1)(c))
- b. Appointment of employees to fulfill the following duties:
  - Construction Manager - with the duty of managing the management and performance of the construction work, in terms of Regulation 8(1);
  - Alternative/Assistant Construction Manager - in terms of Regulation 8(2);
  - Construction Health & Safety Officer - to assist in the control of all safety related aspects on the site, in terms of Regulation 8(5);
  - First Aider - for the construction work and available on site during working hours, in terms of General Safety Regulations;
  - Construction Supervisors – to supervise construction work, excavation work, temporary work operations, demolition work and scaffolding operations, in terms of Regulations 13 (1), 12(1), 14(1) and 16(1);
  - Operators – competent to operate mobile plant and equipment for the construction work, in term of Regulation 23 (4)(d);
  - Electrical Inspector - competent to control, supervise and monitor all electrical installations, both temporary and permanent, for the construction period (in terms of Regulations 24(c))
  - Stacking & Storage Responsible Person - competent to supervise all stacking and storage of materials or consumables for the duration of the construction work (Regulation 28 (a))

| Description                              | Appointed Person | Document |
|------------------------------------------|------------------|----------|
| Appointment of CEO                       | Chris Botha      | TBC      |
| Appointment of Contracts Manager         | TBC              |          |
| Appointment of Construction Manager      | TBC              |          |
| Appointment of Site Manager              | TBC              |          |
| Appointment of Assistant Site Manager    | TBC              |          |
| Appointment of Construction Supervisor   | TBC              |          |
| Appointment of Health and Safety Officer | TBC              |          |
| Appointment of Traffic Safety Officer    | TBC              |          |
| Appointment of Risk Assessor             | TBC              |          |

|                                                       |     |  |
|-------------------------------------------------------|-----|--|
| Appointment of Fall Protection Planner                | TBC |  |
| Appointment of Incident Investigator                  | TBC |  |
| Appointment of Emergency Fire Coordinator             | TBC |  |
| Appointment of Temporary Works Designer               | TBC |  |
| Appointment of Demolition Supervisor/Inspector        | TBC |  |
| Appointment of Excavation Work Supervisor             | TBC |  |
| Appointment of a Temporary Works Supervisor/Inspector | TBC |  |
| Appointment of Scaffold inspector/Supervisor          | TBC |  |

## 10 SITE CAMP AND WELFARE FACILITIES

A suitable site camp area will be agreed with the Engineer prior to the commencement of work.

Existing roads provide access to certain points along the works; Access will be maintained to all affected properties. Site Camp will be cordoned off with appropriate fence panels and all visitors and/or professional's will be required to sign in at the site office entrance. Work area's will be demarcated with netting to secure work areas from unauthorized entry.

No unauthorised entry, Civils 2000 (Pty) Ltd Site office and emergency numbers will be displayed at the site camp entrance. Site specific signs will be placed strategically to notify members of the public of construction work (Danger Open Excavations, Construction site keep out, visitors report to site office). An assessment will be conducted if additional signage may be required.

There will be a minimum of 1 toilet for every 20 employees and one for each sex (Male & Female). Toilets will be hired from an external supplier and serviced a minimum of once a week or as required. All toilets will be cleaned weekly and provided with toilet paper. The toilets will be stayed to prevent them from falling in extreme weather conditions.

## 11 RESTRICTIONS

Employees will only be allowed to work within the boundaries of the site area.

## 12 RESPONSIBILITIES & SUPERVISION

An organisation chart detailing the management structure for the project shall be compiled for the site. The organisation chart may be updated as the project progresses. Site appointments detailing specific responsibilities as required meeting regulatory compliance shall be completed and maintained, within the SHEQ Management System.

[REDACTED]

Supervision: Management shall be responsible for the planning of any supervision required on site. If, however an unforeseen situation arises on site which requires supervision, it is the responsibility of the "construction manager" to ensure supervisory requirements are complied with. If this is not possible with the relevant personnel on site, then he/she will make the necessary arrangements prior to the work commencing.

- [REDACTED]
- Is responsible for the safety and health of all persons within his/her working area as allocated in the contract with the client.
  - shall provide adequate numbers of suitably trained, experienced, and competent management, supervision, and workforce to ensure that work proceed safely and without risks to health, safety, and environment.
  - shall ensure that their managers and supervisors give clear and unambiguous instructions for the work on hand to the personnel for whom they are responsible for.

The instructions shall normally include, but not necessarily be limited to, a description of the task, sequence of work, foreseeable hazards, and precautionary / preventative measures that shall be taken, and the permit to work requirements as issued at the relevant workplace.

## 12.1 The Construction Manager (CR8.1 & CR8.2)

[REDACTED] shall, prior to commencing the Works on Site, appoint a full-time competent person as the construction manager, with the duty of managing all construction work on a single site, including the duty of ensuring occupational health and safety compliance. In the absence of the construction manager an alternative will be appointed by [REDACTED] to oversee all the duties and responsibilities of the construction manager.

[REDACTED] may, having considered the size of the project, appoint, in writing, one or more assistant construction managers for different sections thereof.

No construction manager may manage any construction work on or in any construction site other than the Site in respect of which he/ she has been appointed.

The appointed CR8.1 or CR8.2 will have overall responsibility for all occupational health and safety activities on the site and will have the authority to stop any employee from working on site in an unsafe manner.

The Construction Manager will be responsible for managing all construction work, including the duty to ensure compliance to health and safety requirements on the site.

[REDACTED]



Key obligations in this regard include: Compliance to the principal contractor's SHE Management Plan; ensuring the effective use and implementation of hazard identification and risk management documentation and ensuring task performance by a competent workforce.

The Construction Manager must ensure but not limited to:

- ensure implementation of Safety, Health and Environmental planning, leadership, and control.
- ensure supervision and control on each shift; and workplace inspections.
- Communicating the Safety and Environmental Policy to all employees.
- Ensuring that all applicable legal and project health and safety requirements are identified and complied with.
- Ensuring that effective hazard identification and risk management processes are established and implemented for all work to be carried out.
- Participating in (and approving) all (Issue) Task-Based Risk Assessments conducted for the work to be carried out.
- Driving the achievement of agreed health and safety objectives and targets that all work is adequately and competently supervised.
- as far as is reasonably practicable that each employee and sub-contractor employee is competent to perform his/her role and has received appropriate workplace health and safety training and instruction.
- Managing all appointed sub-contractors regarding health and safety performance
- Establishing and maintaining effective communication and consultative processes to ensure that all employees and sub-contractor employees are kept up to date regarding health and safety information (e.g., incidents and lessons learnt, leading practices, hazards, risks and control measures, etc.) and that feedback is provided promptly regarding issues and / or concerns raised.
- Participating in the project's Visible Felt Leadership (VFL) Targets & Objectives and Toolbox Talks
- Chairs and/or attends the monthly Health, Safety and Environmental Meetings
- Implementing the Health, Safety and Environmental Management Plan and associated Safe Work Procedures
- Implementing, testing, and maintaining an effective Emergency Response Plan for all employees and sub-contractor activities, and ensuring that the plan is adequately resourced.
- Ensuring that workplace exposure of [REDACTED] and sub-contractor employees to hazardous substances or agents is measured and monitored to determine the effectiveness of controls and compliance with legal (and project) requirements.
- Ensuring that all incidents are reported without delay and are investigations thoroughly conducted.
- Providing the necessary resources for regular health safety and environmental audits and inspections to be conducted and supporting the auditing process.
- Participating in health, safety, and environmental audits, and carrying out workplace inspections

- Ensuring that corrective actions (arising from incident investigations, audits, inspections, etc.) are implemented, and that adequate resources are provided for this purpose.

## 12.2 The Construction Supervisor (CR8.7 & CR8.8)

As required, the construction manager shall appoint a competent employee(s) in writing as the construction supervisor(s) for the Site, who will be responsible for construction activities and ensuring occupational health and safety compliance on the construction site. [REDACTED] may, having considered the size of the project, appoint, in writing, one or more competent employees to assist the appointed construction supervisor(s).

Each supervisor will be appointed as per construction regulation 8.7 by the construction manager, clearly defining the functional and legislative reporting line for the supervisor as per the legal framework.

No work will be carried out without an appointed supervisor being physically present in the work area.

The supervisor must ensure that:

- All employees and contractor employees understand the requirements for all SHE related matters
- all work carried out under his/her supervision is done so in accordance with the requirements of all applicable legislation, rules, standards, specifications, plans, and procedures.
- Participating in Baseline and (Issue) Task-Based Risk Assessments
- all employees Understands the hazards and risks involved in the task being undertaken and are made aware of the hazards, risk scenarios and control measures identified in relevant risk assessments.
- the control measures stipulated in all relevant risk assessments are in place and are implemented fully for all work carried out under his/her supervision.
- the necessary written appointments are in place for each employee under his/her supervision (e.g., first aider, mobile crane operator, etc.)
- No employee carries out any work that he/she is not competent to perform or has not been appointed to perform.
- Conducting a weekly Toolbox Talk with his/her team.
- Leading, discussion and ensuring full team participation in the DSTI with his/her team.
- Ensuring that all Safe Work Procedures applicable to the work carried out under his/her supervision are adhered to and are fully implemented.
- Carrying out Planned Task Observations
- emergency response procedures are understood by all employees under his/her supervision and that these procedures are followed in the event of an emergency
- Reporting all incidents immediately, participating in incident investigations, communicating the lessons learnt to all employees under his/her supervision, and implementing corrective actions where required.



- Carrying out workplace health and safety inspections.

### 12.3 Construction Health and Safety Officer (CR8.5)

Civils 2000 shall appoint a full - time / part time SHE practitioner who is registered with SACPCMP according to the following criteria:

- Considering the size of the contract.
- The degree of risk.
- Accumulation of hazards.

Should the need arise; the client may instruct the principal contractor at any time to appoint an additional full-time / part-time health and safety practitioner (s).

Where a principal contractor deploys up to 100 employees (directly or through contractors), at least one full time Health and Safety Officer must be appointed, with an additional Health and Safety Officer appointed for every 100 thereafter.

The Construction Health and Safety officer (CHSO) or manager (CHSM) must be registered with the SACPCMP in the appropriate category.

The SHE Officer must ensure:

- Review and approve all Contractors SHE Files prior to work commencing.
- all incidents are reported immediately to Client and HO SHEQ Department
- all incidents / SHE related matters are communicated to all employees and contractors.
- Provide and communicate the SHE Plan with all employees and contractors.
- the applicable Safety Data Sheets (SDS) is available and communicated
- Conduct SHE site specific inductions
- Conduct Monthly SHE Audits on all subcontractors
- Assist with reports, investigations and close-out environmental incidents and/or complaints.
- Assist project management team in conducting section audits throughout the project.
- Attend all SHE Site meetings and report on SHE Matters
- Maintain all SHE documented information as per the project requirements
- Assist, attend and conduct incident investigations.
- Maintain register of all employees and contractors on site with the following details:
  - Full Name
  - Contact Details
  - Next of Kin

- o Certificate of Fitness validity
- o Induction
- o Legal Appointments including valid Certificates.

Report on the following but not limited to:

- any threat or potential threat to the safety or health of any employee to the construction / Project manager immediately
- Project SHE Statistics as per Client Requirement weekly / monthly
- Compile, verify and submit all SHE reports to SHEQ HO monthly as per requirement
- Keep a record of all employees, including date of induction, relevant skills, and licenses.

**Operational:**

Inspect work areas which includes but not limited to:

- Verify and approve the DSTI information is correctly recorded, communicated and all employees and contractors have acknowledged communication thereof.
- All reasonable safety and health measures have been taken in respect of the use or handling of machinery and the performance of other work;
- Safety equipment is maintained in good condition and properly utilised;
- The applicable requirements relating to the safety and health of employees have been or are being complied with; and
- All employees have been properly trained or possess the necessary qualifications for the safe execution of their work.

## 12.4 Health And Safety Representatives

Where 20 or more people are working on a project, a Health and Safety Representative must be elected and appointed. Taking into consideration the number of people employed, the geographical area in which the work is taking place, the different work disciplines, and the shift pattern (if applicable), the contractor must ensure that an adequate number of Health and Safety Representatives (at a minimum ratio of one Health and Safety Representative per 50 employees) are elected and appointed to effectively represent all site personnel.

The contractor must ensure that a documented process for the nomination or election and period of office is developed and implemented.

Each Health and Safety Representative is required to attend an accredited training course for health and safety representatives. The contractor must make the necessary allowances for the Health and Safety

Representatives to carry out their duties as specified in the applicable legislation. The contractor must ensure that an appropriate method of identification for Health and Safety Representatives is implemented.

Employees will be encouraged to submit suggestions to enhance health and safety management on site.

A process must be in place for documenting, evaluating, implementing (as appropriate), archiving, and recognising improvement ideas

## **12.5 First Aiders**

The contractor must ensure that an appropriate number of First Aiders are trained and appointed. First aid training must be done through an accredited training institution. The contractor must ensure that an appropriate method of identification for First Aiders is implemented.

# **13 COMMUNICATION**

## **13.1 Internal Communications**

### **Project Meetings:**

Progress meetings will be held with site management. During these meetings safety health and environmental issues relating to the site operations will be discussed and as required, suitable actions will be identified and implemented.

## **13.2 Site Communication:**

The entire workforce will be encouraged to speak directly to any supervisory staff member regarding any hazard they have seen, or to make suggestions that will make conditions safer.

Any such contribution will be raised during the progress and SHE committee meetings or earlier if appropriate.

The result of these meetings will be communicated back to the work force by their Construction supervisor / SHE representatives.

## **13.3 Client Progress Meetings**

Progress meetings will be held with the Client as agreed upon by both parties. During these meetings SHE related issues relating to the site operations will be discussed and as required, suitable actions identified and taken.

## **13.4 DSTI and Toolbox talks**



A Daily Safe Task Instruction (DSTI) is a pre-start discussion amongst the members of a work team, led by the appointed supervisor, aimed at anticipating potential hazards associated with the day's activities and ensuring that the necessary controls are in place to prevent harm.

Toolbox talks will be held by supervisory staff on a Weekly basis with all employees and contractor employees, this will address the application of safety, health & environmental incidents; hazards identified through trend analysis including rules and procedures to the hazards of current work.

## 14 PUBLIC AWARENESS

Civils 2000 Project management will ensure that community and visitors affected by the construction work are made aware of the risk exposure likely to arise from construction work:

Posters and /or notices shall be posted at key locations around the site to maintain safety awareness on each Site where practicable possible

## 15 SITE RULES AND INDUCTION

In terms of the Regulations, only suitably trained and competent persons may be employed on a construction site. The Contractor, any other contractor and/or visitors on a construction site must provide written proof of general safety induction training and of task specific training.

The following rules will apply on site:

- All personnel shall attend induction conducted by the SHE Officer and/or a designated person.
- All personnel shall wear or use the applicable items of personal protective equipment required by the site rules and as identified within risk assessments.
- No smoking in areas identified by symbolic 'No Smoking' signs.

### 15.1 Site Access

Access to the site shall be via working hours:

Mon – Fri: 07h00 – 17h00 (overtime will be worked on request and within limits)

Sat: 07h00 – 14h00 (overtime will be worked on request and within limits)

Sun: Nil (any work conducted on Sunday and holidays will be communicated with the client)

Working on site outside the above hours is prohibited unless arrangements have been made with the Site Manager for competent supervision and the correct equipment will be on site.

## 15.2 Working Hours

- All work conducted on the site shall fall within the legal requirements in accordance with the Basic Conditions of Employment Act.
- Permissions to exceed these hours are granted under exceptional circumstances by the DOL or MEIBC and should be supported by the different labour unions.
- Application for exemption must be sent to the provincial offices at least two months in advance to ensure feedback is received before any work is started.
- If no exemption is granted or received before work commences, no work will commence in excess of legal requirements.

## 16 TRAINING

All employees, management personnel and visitors shall undergo induction training prior to working on site.

All inductions shall be recorded and maintained on site for the duration of the project.

### 16.1 Training And Competencies

██████████ will ensure that all employees (including contractor employees) are trained and competent, and they understand the risks and controls associated with the work to be executed

██████████ and contractors

- shall ensure that all their employees are adequately trained and competent to perform tasks with the necessary supervision at all times to maintain safe work practices and standards.
- shall identify all training needs and incorporate the applicable specific training into a training plan
- develop and maintained a training plan indicating training that has been completed, and which training is still outstanding.

### 16.2 Induction

#### a) Site Specific Induction

- ██████████ shall ensure that before any employee commences work on site, the Site-specific safety induction training has been completed.
- All visitors must undergo a visitor induction briefing entering the site. Visitors must be always accompanied by an appropriately senior employee who has been fully inducted.
- Proof of this training shall be available in the SHE files with proof of completion of such training.

Induction to include but not limited to:

- Basic site rules & PPE
- Site specific rules, e.g. Working @ Heights
- Vehicle & personnel movement
- Emergency Management
- Evacuation Plan
- Rescue Plan where applicable

**b) Job Specific Induction Carried Out by The Supervisor on The Site**

- Project management shall ensure that before any employee commences work on site, the supervisor in control with responsibility for his/her employees, has informed the employee of their scope of authority and any hazards associated with the tasks / activities to be performed.
- Project management shall ensure that the supervisor is satisfied that the employee is conversant with all hazards associated with any work that will be performed by conducting task observation

## **17 FIRST AID**

A first aid box will be provided and allocated to a trained, certified first aider. Every injury occurring on site will be treated and reported. Should an injury require professional medical treatment, the supervisor in charge will complete an appropriate accident report.

## **18 FIRE PREVENTION**

Project will appoint a trained, certified firefighting person/s as per CR29. A fire extinguisher will be provided and placed as required at various locations on site. All operations conducted on site shall be conducted in a manner to prevent the risk of fire. Flammable materials shall be stored in a suitable location and adequate firefighting equipment installed in suitable locations around the store. Smoking and open flames are not permitted in any areas, which contain flammable materials, or any 'No Smoking' area indicated by no smoking signs.

## **19 MONITORING HIGH RISK CONTRACTS AND TASKS**

Civils 2000 will appoint a Risk Assessor (CR9) who will work with the applicable management team to develop and issue the applicable High-Risk Assessments required for the work being conducted.

It is the responsibility of the Project management team including but not limited to supervisory staff to ensure the monitoring of all risk work at all times.



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Reporting as per Incident Management Procedure

All incidents will be reported immediately to the responsible supervisor and SHE Officer on site.

The Project Manager / SHE Officer will notify the Client of all incidents immediately

All incidents will be reported including but not limited to:

- Near Miss
- High Potential Incidents (HPI)
- First Aid
- Medical Treatment
- LTI
- Fatalities

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- Reporting of an incident within [REDACTED] Group will occur immediately by means of short message service (WhatsApp) and or telephonic notification to the SHEQ Manager. Failure to report any incident and report accurate/truthful information, may lead to disciplinary action.
- Sub-Contractors are required to report all incidents to the appointed SHE Officer and Construction Manager without delay. All reported incidents by sub-contractors will be recorded and shall be investigated as deemed necessary.
- The appointed SHE Officers are responsible for ensuring that non-conformances/incidents are reported to the Project / Construction Manager and that corrective and improvement action is taken to eliminate or minimise the impact of reported incidents.

### 20.1 In The Event of a Significant Incident (SI):

- Investigation shall commence within seven (7) days of the occurrence.
- Project / Construction Managers must ensure that action taken is in line with the potential hazard/risk of identified incidents.
- All incidents shall be reported and investigated as prescribed in the Incident Procedure

## Incident Investigation

- All significant incidents shall be investigated and the RCAT methodology can be used as a guideline to determine the root causes of such incident and or non-conformance if required.
- a) Any construction incident and / or accident involving vehicles shall be reported to the Traffic/police Department.
- b) The company's responsible person shall ensure that the lessons learned of all investigations are communicated to the employees engaged through incident recall and prescribed meetings.

To ensure compliance with the requirements of the Act and regulations, the Contractor shall:

- Implement and maintain a register of all incidents and accidents that occur as a result of the construction work; and
- Provide a monthly report on all accidents and incidents that occur and
- Notify the Client within 24 hours of a reportable injury or major incident occurring; and
- Appoint a competent person to provide first aid assistance on site
- Investigate and report in writing on all incidents and accidents that may occur because of the construction work. If it is not clear whether the incident is because of the construction work, an investigation will be carried out in any case to identify and document the responsibility

## 21 REGISTERS

All required registers will be maintained and kept up to date as required by legislation by the Responsible Person.

## 22 HEALTH AND SAFETY FILE

A Health & Safety File shall be maintained on site by the Construction SHE Officer. At the end of the contract, the Construction SHE Officer and Construction Manager shall review the consolidated SHE File to ensure the completeness and hand the file to the client.

SHE File Index will include but not limited to:

- 1) Permit/Notification of Construction Work to Department of Employment Labour
- 2) COIDA Letter of Good standing
- 3) Health and Safety Policy
- 4) Health and Safety Plan



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- 5) Risk Assessments
  - 6) Method Statement and Safe Work Procedure
  - 7) Fall Protection Plan (if required)
  - 8) Section 37.2 Mandatory Agreement
  - 9) Contractor Appointment
  - 10) Appointment Letters & Competency Letters
  - 11) Emergency Procedures (in line with the premises)
  - 12) Incident & Accident Procedure
  - 13) Inspection Registers
  - 14) Training

Induction

Toolbox Talk

## 23 MANAGEMENT PRINCIPLES

- All levels of line management are accountable for Health, Safety, Environment and Quality.
  - It is expected that all employees and service providers accept, without reservation their responsibility for Health, Safety, and Environment and Quality issues.
  - Health, Safety, and environmental matters have equal priority with all other business objectives, and the contribution of every employee and service provider is essential to the continual success of our business.
  - Promote and maintain open and constructive dialogue and good working relations with all shareholders, with a view to increasing awareness, knowledge and enhancing mutual understanding and respect in matters of mutual concern.
  - Foster creativity and innovation in the management and performance of our company, that complement and enhance each other's unique abilities and services offered.
  - Ensure workforce competence, responsibility, and accountability at all levels through proper training and awareness in all aspects of our products, health, safety, environment, and quality.
  - Identify and prioritise significant hazards and risks, set appropriate targets, ensure compliance with all applicable legislation, apply best practice, review SHEQ management systems for appropriateness and maintain records.
- 

### 23.1 Measurable Objectives

- Set measurable performance targets and monitor progress against these targets for Health, Safety, Environmental and Quality aspects of the business.
- Prevent or minimize work related Health and Safety incidents with a goal of all employees and service providers being healthy, and the workplace incident and injury free.
- Wherever practical, reduce, recycle, conserve energy and water resources and take measures to prevent pollution and minimize the impact of the company's activities on the environment.
- Maintain a quality service/ product throughout, that result in us being the leaders in their fields

## 24 SUB-CONTRACTORS MANAGEMENT

The principal contractor will ensure that processes are in place to ensure that the health and safety risks associated with the procurement of materials, equipment, services, and labour is effectively managed. A process will be in place for the assessment and selection of all contractors, to ensure suitability prior to the awarding of any contract or purchase order. The activities / performance of all contractors and service providers will be managed throughout the contract period; and before work commences on the contract, all contractor / service provider personnel will receive induction training in the same way that a direct employee of the principal contractor would receive orientation and induction training.

[REDACTED] shall ensure that all sub-contractors are given a SHE specification, and that they comply to that specification. No sub-contractor shall work on site without a legal appointed supervisor present at all times.

No sub-contractor shall be allowed on site, unless all site rules have been complied to, site induction completed, and all legislative requirements complied to.

All contractors will be appointed as per the requirements of construction regulation 7.

## 25 LIQUOR AND DRUGS

- Liquor and drugs are not permitted on site nor will anyone under the influence of either be permitted on site.
- Random testing of people is performed, and any person found to be under the influence or in the possession of alcohol or drugs will be handed over to the Security Department and the incident will be reported to the HR Department for appropriate disciplinary action.
- Any person/s who are under medical treatment must report it to their management immediately. Should such medical treatment cause the person to be a risk to him/herself or his/her fellow employees, he/she will be sent home.

## 26 SUPPLIERS AND VISITOR'S ACCESS CONTROL

- a) Suppliers to comply to the same rules as sub-contractors.
- b) Visitors Register is to be kept on site to include the following:
  - Name of Visitor company,
  - Name of Visitor contact person,
  - Contact number of Visitor and

## 27 RISK ASSESSMENTS AND HAZARD REPORTING

### 27.1 Baseline Risk Assessment

- In legal terms (section 8 of the OHS Act) an employer has the obligation to ensure that all employees can perform their tasks safely (providing suitable / safe conditions and relevant procedures).
- A formal risk assessment shall be done by a multi-disciplinary team to identify all risks and systematically reduce the risk to an acceptable level. To deliver on this obligation, the following specifications will be followed:
  - The company will make a list of all equipment used and tasks executed by employees on site from the time they enter the premises, until the time they leave the premises.
  - A risk rating after control measures should give an indication of how effective control measures are in mitigating the risks.
  - Proof of communication of the baseline risk assessment to all employees, on site will be provided in the SHE File.
  - All high-risk tasks or equipment will require a task risk assessment and safe working procedure to be developed.

### 27.2 Task Risk Assessments

- Task risk assessments are to be conducted on all activities involved with the task.
- The task risk assessment should focus on only one task / equipment used at a time.
- The steps of the task should be set out step by step, and each step be assessed for the hazards.
- Each hazard should have its own risk rating to determine which part of the task execution contains the highest potential for injury.
- Control measures specified will be practical aspects that are to be executed by the person executing the task or his immediate supervisor.
- Proof of communication of the task risk assessments to all employees will be provided in the task specific SHE file.
- The task risk assessment shall address all the risks as indicated in the scope of work, PDA and SDS's



### 27.3 Review Of Risk Assessments

The Principal Contractor shall review the hazard identification, risk assessments and standard safeworking procedures:

- prior to any work activity commencement,
- where changes are affected to the design and construction that result in a change to the risk profile when an incident has occurred, or at least quarterly.

The Principal Contractor shall provide the Employer, sub-contractors, and all other concerned parties with copies of any changes, alterations or amendments as contemplated above.

Activities carried out without conducting a risk assessment or found to be non-compliant with the risk assessment, will be stopped until such time a risk assessment is compiled, and work is carried out according to the risk assessment.

Risk assessments must be fully communicated to all relevant personnel and must be considered when establishing training, awareness, and competency requirements. Records of risk assessment communications must be kept for inspection purposes.

## 28 STANDARD OPERATING PROCEDURES

### 28.1 Structures

Project management will ensure that

- all safety measures as per CR11 is adhered to.
- Only skilled employees are allowed to erect structures and that the skills of these employees are being verified at regular intervals.
- Steps are taken to ensure that no structure becomes unstable or collapses due to construction work being performed on it or in the vicinity of it.
- No structure is overloaded to the extent where it becomes unsafe.
- All inspections records, technical details are kept on record for verification purposes.
- Legally appointed person to receive from the designer the following information:
  - Information on known or anticipated hazards relating to the construction work and the relevant information required for the safe execution of the construction work.
  - A geo-scientific report (where applicable).
  - The load the structure is designed to bear.
  - The methods and sequence of the construction process etc.

### 28.2 Scaffolding And Ladders

The requirements of SANS 10085 must be complied with.

#### **28.2.1 Training, Competency and Supervision**

Scaffolding may only be erected, maintained, altered, or dismantled under the strict personal supervision of a competent Scaffolding Supervisor (or Scaffolding Inspector) appointed in writing. It is the Scaffolding Supervisor's responsibility to ensure that all employees carrying out such work are suitably trained and experienced.

#### **28.2.2 Erection and Dismantling of Scaffolding**

Only approved scaffolding components may be used to erect a scaffold. Scaffolding must be erected, modified, and used in accordance with the manufacturer's guidelines /recommendations, and in strict compliance with all applicable legislation and standards. Base width to scaffold height ratios prescribed by regulation or by the manufacturer of the components must be adhered to.

A green tag (displaying the words, "Scaffold Safe to Use") or a red tag (displaying the words, "Scaffold Unsafe to Use") must be prominently displayed on each scaffold at all times. The tag must be positioned close to the base of the ladder / staircase provided for safe access. The wording on the tags must be in English and any other language commonly used on site.

#### **28.2.3 Inspection Of Scaffolding**

Every scaffold structure must be inspected by a competent Scaffolding Supervisor: Prior to use and after erection, and at least weekly thereafter; After inclement weather (heavy rain, strong winds, etc.); After any incident resulting in jarring, tilting, or overloading; After any alteration is made; and before being dismantled.

On completion of an inspection, the Scaffolding Supervisor must update the information on the scaffold tag. A record of each inspection (date and time of inspection, location of scaffolding, findings, etc.) must be captured in a register. The register(s) must be maintained by the Scaffolding Supervisor(s) carrying out the inspections.

#### **28.2.4 Ladders**

All ladders used on site must be of sound construction and adequate strength. Wooden or makeshift ladders is forbidden. All ladders will be numbered, listed in a register, and inspected by a competent person monthly (the results of each inspection must be recorded in the register). Before using a ladder, the user must be inspected for damage. Ladders with missing, broken, cracked or loose rungs, split stiles, missing or broken spreaders (stepladders) or any other form of damage or defect may not be used.

Project management shall ensure that every ladder is constructed of sound material and is fitted with non-skid devices at the bottoms ends. They will make sure all the ladders are in impeccable working order for all to use.

### **28.3 Machinery, Tools, and Equipment**

- Project Management shall ensure that machinery; tools and equipment are identified, registered, inspected daily or every time before use, and declared safe.
- All electrical tools will be inspected and verified before being used on site.
- All machinery and equipment shall be used and maintained in good condition.
- No machinery, tool or equipment will be allowed onto the site that is of a sub-standard quality or poses a threat to the health and safety of persons and as such may be checked (cranes and vehicles) and signed off as inspected by a representative before being brought onto the premises.
- All driven machines shall be adequately guarded, and it is the responsibility of the service provider to ensure that all guards for rotating parts on equipment and machinery are inspected, identified, and adequate for use.
- All machinery, tools, and equipment shall be listed on an inventory list
- Service providers are to bear in mind that where a piece of machinery, tools or equipment has been numbered and registered it will be regarded as separate entity and will be inspected as such.
- Equipment numbers will appear on the physical inspection list or register where the inspection has been carried out.
- All machinery, tools, and equipment shall have the necessary test documentation where applicable on site. A copy of these certificates will be kept in the SHE File.

#### **28.3.1 Tools And Equipment Maintenance**

**Project Management shall:**

- Ensure that all equipment is maintained at intervals that are sufficient to ensure the safe functioning of the equipment.
- Arrange for regular operational maintenance and preventive maintenance to be performed in accordance with the manufacturer's recommendations.
- Ensure that steps are immediately taken when a defect is found in equipment to protect the health and safety of any worker who may be at risk.
- Assign qualified personnel to correct defective equipment as soon as is practicable.
- Monitor the preventive maintenance program and make revisions when required.
- Maintain detailed maintenance records.



#### **Supervisors Shall:**

- Maintain a written inventory of all tools, equipment, or machinery that are used in his or her work area, including documentation of maintenance and/or safety checks performed on the equipment.
- Maintain equipment in safe working order in accordance with the manufacturer's instructions.
- Ensure that all tools, equipment, and machinery are monitored and checked for safety on a regular basis.
- Ensure that all tools and equipment are in good repair before assigning them to a worker.
- Ensure that repair requisitions are completed describing the work done, when, and by whom.
- Ensure that all tools and equipment that need repair are taken out of service until they have been repaired or replaced.
- Ensure that all workers use the appropriate tools, equipment, or machinery in a safe manner and as intended.
- Ensure that workers receive appropriate training to use tools, equipment, or machinery required as part of his or her job.

#### **Worker Shall:**

- Use all tools, vehicles, equipment, and/or machinery assigned or designed to prevent or minimise injuries to workers as required.
- Prior to using, inspect all tools, equipment, and/or machinery required to complete the task(s).
- Follow operating and maintenance procedures for specific equipment.
- Stay alert when using equipment and/or tools.
- Do not use equipment, power tools, or hand tools for other than their specific purpose.
- Follow the manufacturer's operating instructions for use.
- Do not create hazards by:
  - Careless use of extension cords.
  - Causing excessive noise or dust; or
  - Moving equipment without first making sure the way is clear.
- Keep tools, vehicles, and equipment well maintained.
- Store equipment and tools in a designated storage when not in use in order to eliminate accidents, guard against abuse, and prevent deterioration.

#### **Defective Equipment**

- Immediately report to his or her supervisor any tool, equipment, or machinery that is not in good working order, not functioning properly, or poses a hazard to his or her health or safety.

- Immediately remove from service tools that are worn, malfunction, or require replacement or repair.
- Hand over to the Technical Coordinator/Sec16.2, who shall in turn ensure a Non-Conformance report is completed and managed until item repaired.
- Send the equipment/tool for repairs if authorized to do so.
- Once equipment/tools are repaired, close off and sign-off the non-conformance, and hand the repaired equipment/tool over to the relevant supervisor.

## **28.4 Housekeeping**

An area dedicated for rubbish dumping will be established. Storage areas will be established and identified on the site layout plan. Storage of all materials will be confined to these areas. Rubbish bins will be provided at the site office and will be emptied on an ongoing basis.

- Project Management shall keep the site tidy and free of any debris, waste and other superfluous material.
- Adequate care shall be taken by the Project management to ensure that stacking and storage is done correctly and safely.
- On completion, the contractor is responsible for clearing the site of all materials, scrap, temporary buildings and building bases to the satisfaction of the client.

## **28.5 Vehicle And Passenger Transport Rules & Maintenance**

### **28.5.1 Safe Transportation of People**

- Vehicles for transportation of personnel shall meet the technical requirements as specified in SANS 1207.
- No passengers may sit at the back of a vehicle that has not been specifically designed and licensed as a passenger vehicle, and then it may only carry the number of passengers it has been licensed to carry.
- All permanent and temporary staff, shall be transported to and from site in a licensed passenger vehicle, transporting only the number of persons it is licensed to transport.
- No equipment, tools, materials, or items may be transported in a passenger transport vehicle.
- All passengers to wear seatbelts at all time, while vehicle is mobile.
- Cellular phones are prohibited whilst driving
- All passengers to comply to all local and national laws & regulations.
- Forward facing seating with three-point seat belts is the preferred configuration. If this is not practical approval needs to be obtained for other alternatives (e.g. bench seating).
- If new vehicles are purchased with the sole intention of transporting people, it should be a minibus meeting all the legislative requirements. In the case of an LDV, which will be necessary on certain



terrains, the vehicle will be fitted with a canopy and all other requirements as specified in the technical requirements of the SANS 1207.

- Where people are transported at the back of a vehicle that was subjected to the preferred configuration, the speed limit should be a maximum of 30km per hour or less if the terrain requires it.
- No person shall be transported while standing on the back of a vehicle.
- The responsibility for the safety of passengers in all vehicles is placed on the driver.
- Only one passenger may sit next to the driver of the vehicle in the cab, except where more than two safety belts are available.
- It is the responsibility of the contractor to ensure that the drivers of such vehicles have the proper authorisation, driving permits and as required by the road traffic ordinance.

#### **28.5.2 Transport And Vehicles**

- All motor vehicles operated by service providers within operational units, shall in all aspects, comply with the road traffic ordinance. Drivers of such vehicles shall be in the possession of a valid driver's license and be verified yearly by the service provider.
- No passengers are allowed to be transported on forklift trucks, mobi - lift, and earth moving machinery or any other construction vehicle unless proper seating is provided.
- Persons and material shall not be transported together.
- Provision shall be made to separate people and material, equipment, and tools. The separation will be of sound construction.
- All drivers must be physically fit to operate such construction vehicles by being in possession of a medical certificate of fitness.
- Drivers are responsible for the safe transport of loads. Loads will be properly tied down when material is transported.
- Abnormal loads shall be transported on a suitable vehicle with authorisation from Road Management Department.
- All servicing and repairs of any vehicle will be performed in a designated area.
- Adequate fire prevention must be provided on industrial vehicles.
- All waste from vehicle servicing areas shall be disposed of in accordance with the environmental waste management program.
- Industrial vehicles must have a reverse alarm. This includes all trucks, cranes, fork lifts, and loaders.
- Earth moving machinery shall have headlights switched on while in operation.

#### **28.5.3 Vehicle Rules**

- Drivers to ensure that the vehicle is fit for the purpose for which they are being used.

- All loads, equipment & material must be secured, tied down, and not overlap the loading area where at all possible. If overlapping is unavoidable, overlapping may not exceed the legal limits at any time.
- Where reasonable practical loads should be evenly distributed over the entire loading area.
- No loads may at any time exceed the maximum loading capacity as per manufacturer's specifications.

#### **28.5.4 Driver Rules**

All drivers must

- perform daily pre-use vehicle checks, prior to commencing work in the mornings.
- only drive vehicles that they are authorized and licensed to drive.
- Always Adhere to Traffic Regulations and client specific rules.
- Always be friendly and courteous to other road users.
- ensure they take rest breaks of 15 minutes for every 2-hour during continuous driving. (long distance)
- always wear regulatory seatbelts
- ensure all passengers wear the regulatory seatbelts prior to the vehicle moving.
- The use of Cellular handheld phones is prohibited while driving, irrespective of what communication style is being used (e.g. talking, texting, etc.). Only hands-free telephonic systems may be used.

#### **28.5.5 Maintenance Rules**

- All vehicle and trailers to be inspected and documented daily
- All deviations; hazards; faults to be reported immediately on discovery to the coordinator for a decision
- regarding repairs.
- All vehicles to be serviced every 15,000Km

### **28.6 Checklists And Inspections**

- Project management will monitor all activities under the projects control and to conduct SHE inspections of all activities as required.
- All deviations found during such inspections shall be recorded and the corrective actions taken should be noted.
- Any deviation shall be rectified within seven days or as soon as reasonably practicable.
- If any serious health and safety risk exist, all activities shall be stopped immediately until the deviation is rectified.

- The client will conduct formal inspections once a month and any deviation found shall be rectified within the specified time frame.
- Records shall be kept of all inspections, calibrations, test certificates and any other legally required documents and tools. Inspection records shall be available on request.

## **28.7 Reporting of SHE Related Complaints.**

- All SHE related issues which, directly or indirectly, results from the operations of the company be reported to management and recorded on the Interested and Affected Parties (IAP) Register.

## **28.8 Fall Protection Plan**

For work that is to be carried out from an elevated position, a fall protection plan shall be developed and implemented, and will be maintained and amended as required. The FPP has include all risks relating to working from an elevated position, considering the nature of work undertaken and identifying the methods to be applied in order eliminate the risk. The Fall protection plan addresses the following:

- FPP developer appointment
- Pre task risk assessment
- Training management
- Medical evaluation
- Gear management
- Climbing equipment issue
- Equipment inspections
- Standard operation procedures
- Rescue
- Emergency

### **28.8.1 Rescue Plan (Summary, See Our "Rescue Plan" For More Detail)**

It is the company's policy to provide prompt medical treatment when a worker is injured on the jobsite. To do this, workers may have to perform a working at heights rescue to bring down a worker who has fallen or suspended in a safety harness.

This procedure applies to all managers, supervisors, employees, and visitors on the jobsite.



### 28.8.2 Purpose Of Working at Heights Rescues

When a worker falls, and is suspended in a harness, it's important to rescue him or her as quickly as possible because of the following reasons.

- The worker may have suffered injuries during the fall and may need medical attention.
- When workers are suspended in their safety harnesses for long periods, they may suffer from blood pooling in the lower body. This can lead to suspension trauma.
- Suspended workers may panic if they are not rescued quickly.
- The event that led to the fall may create additional risks that need to be addressed.

### 28.8.3 Emergency Planning

The four main parts of emergency planning are:

- 1) Training
- 2) Emergency Response plan
- 3) Rescue procedures.
- 4) Post-Rescue Procedure

### 28.8.4 Fall Protection & Rescue PPE

All personal fall protection & Rescue PPE issued, shall be signed for by the user on the Register. A pre-use inspection checklist shall be completed, signed and handed in before the equipment is allowed to leave the store property.

Thereafter, Civils 2000's "Pre-use inspection checklist" must be completed on a daily bases before the equipment is used, and handed in to the Sec 16.2 appointee, as soon as the user gets back to the office, but no later than the end of that week.

This PPE includes:

- Anchorage connectors
- Full body harnesses
- Lanyards
- Helmets with chin straps
- Hooks and connectors, if required
- Applicable safety glasses, if required
- Applicable safety gloves, if required
- Applicable safety shoes, if required

#### **28.8.5 Fall Protection Equipment Cleaning & Storage**

**All fall protection & Rescue equipment is to be cleaned in the following manner:**

Wipe off all surface dirt with a sponge dampened in plain water. Squeeze the sponge dry. Dip the sponge in a mild solution of water and mild detergent. Work up a thick lather, with a vigorous back and forth motion. Then wipe dry with a clean cloth.

Hang freely to dry, but away from excessive heat, steam, or long periods of sunlight.

#### **28.8.6 All Fall Protection & Rescue Equipment Is to Be Stored in The Following Manner:**

Storage areas should be clean, dry and free of exposure to fumes, heat, direct ultraviolet light, sunlight, and corrosive elements.

**Note:** Do not store harnesses next to batteries, chemical attack can occur if battery leaks.

### **28.9 Electrical Work**

Each electrical installation (temporary or permanent) installed or worked on by the contractor will be inspected by a nominated project management representative to ensure that the installation complies with all statutory requirements, codes, design criteria and safety standards applicable to the project. The Installation may not be left in an energised state on completion of commissioning if all relevant COC's have not been issued.

- [REDACTED] will only permit qualified electrician to carry any electrical work.
- Electrician shall have an assistant who is competent in the case of an emergency.
- Electrician should be careful so that she/he does not switch off other circuits.
- Be aware of your surroundings.
- Electricians will make sure that all power has been neutralised by starting with the proper equipment.
- Whenever work involves accessing energized parts, the qualified person in charge will conduct a job safety briefing with the personnel performing the work and apply lock out as applicable.

The job safety briefing will address, at a minimum—

- Hazards associated with the work.
- Procedures involved in the work.
- Any special precautions required to maintain electrical safety.
- Control of energy sources.

- PPE and clothing required for the work.
- Location of emergency and/or first aid equipment.
- Emergency call number and procedures.
- Voltage of circuits and equipment.
- Shock hazard boundaries.
- Arc flash energy.
- Arc flash protection boundary.
- Location and procedure for emergency power disconnect.

For routine work, a brief discussion will meet the requirement if the employee, due to training and experience, can reasonably be expected to recognize and avoid the hazards involved in the job. Additional job briefings will occur if any one of the following conditions exists:

- New and unfamiliar work.
- Performed infrequently.
- Outside of normal duties.
- Performed differently than in a documented procedure.
- Complicated work or incurs new electrical hazards.
- Workers cannot be expected to recognize and avoid the hazards involved in the job, this may apply to newly assigned personnel.

#### 28.9.1 Electrical & Underground Services

██████████ will only permit qualified electrician to carry any electrical work.

██████████ will provide PPE that is to be worn at all times.

Electrician shall have an assistant who is competent in the case of an emergency.

Electrician should be careful so that s/he does not switch off other circuits.

Be aware of your surroundings.

Electrification's will make sure that all power has been neutralised.

Whenever work involves accessing energised parts, the qualified person in charge will conduct a job safety briefing with the personnel performing the work.

The job safety briefing will address, at a minimum—

- Hazards associated with the work.
-

- Procedures involved in the work.
- Any special precautions required to maintain electrical safety.
- Control of energy sources.
- PPE and clothing required for the work.
- Location of emergency and/or first aid equipment.
- Emergency call number and procedures.
- Voltage of circuits and equipment.
- Shock hazard boundaries.
- Arc flash energy.
- Arc flash protection boundary.
- Location and procedure for emergency power disconnect.

For routine work, a brief discussion will meet the requirement if the employee, due to training and experience, can reasonably be expected to recognize and avoid the hazards involved in the job. Additional job briefings will occur if any one of the following conditions exists:

- New and unfamiliar work.
- Performed infrequently.
- Outside of normal duties.
- Performed differently than in a documented procedure.
- Complicated work or incurs new electrical hazards.
- Workers cannot be expected to recognize and avoid the hazards involved in the job in particular, this may apply to newly assigned personnel.

#### **28.10 Cable Locating Devices**

Before work begins, underground cables must be located, identified, and clearly marked. The position of the cable in or near the proposed work area should be pinpointed as accurately as possible by means of a locating device, using plans, and other information as a guide to the possible location of services and to help interpret the signal.

Locators should be used frequently and repeatedly during the course of the work. People who use the locator should be competent and have received thorough training in its use and limitations. Locating devices should always be used in accordance with the manufacturer's instructions, regularly checked and maintained in good working order.



## **28.11 Safe Digging Practices**

Excavation work should be carried out carefully and follow recognized safe digging practices. Once a locating device has been used to determine cable positions and routes, excavation may take place, with trial holes dug using suitable hand tools as necessary to confirm this.

Excavate alongside the service rather than directly above it. Final exposure of the service by horizontal digging is recommended, as the force applied to hand tools can be controlled more effectively.

Insulated tools and care shall be used when hand digging near electric cables.

## **28.12 Confine Spacing**

### **Ventilation**

The concentration of gas in a confined space will be tested by means of measuring equipment (Gas Monitor) prior to work commence and ventilation should be done for at least 15 minutes by blower to neutralize concentration of gas or any substances. If possible, locate the source of any such substances and isolate.

All open manholes must be barricaded and protected at all times.

Before signing off the permit the responsible person must confirm that all the employees are accounted for and ensure that all the manholes are properly closed, and barricading removed.

### **Entering a manhole**

Person entering the confine space or manhole will wear a safety harness, fully operational gas monitor. A lifeline will be attached to the safety harness and a person on the surface must be in continuous contact with the person in the manhole.

Depending on the condition on the confine space a rotational work practices may be introduced, and no person shall remain within a confined space or manhole for a longer period.

Should the alarm sound on the gas monitor, the employees will exit the confined space or manhole and the immediate area will be evacuated immediately. The area will be properly ventilated and re-tested before re-entering the confined space or manhole.

Employees will be provided with flameproof lighting when entering deep manholes or manholes with flammable gases. No hot work, smoking or unprotected electrical apparatus which may cause sparks shall be permitted in any manhole or confine space.



## **General**

All employees working in confined spaces or manholes will be issued with fully functioning gas monitoring equipment and safety harnesses as well as self-rescuers where applicable.

Where over-pumping between manholes is involved, only leak free pumping machines and conveyance tubes will be used.

## **Safety equipment**

All teams will be issued with fully functional gas monitoring equipment and safety harnesses and self-rescuers where applicable. All employees will be trained (including refresher training on a continuous basis) in the use thereof.

## **General records**

The following records will be implemented and maintained by project management:

- a. Confined space entry permits
- b. Confined space entry registers
- c. Safety harness registers

## **Training**

- a. Applicable will be provided as required.
- b. Awareness in terms of that must be discussed frequently with all employees.

## **28.13 Demolition Work**

Demolition work will only be carried out under the supervision of a competent person who has been appointed in writing.

- A detailed structural engineering survey of the structure to be demolished will be carried out and a method statement on the procedure to be followed in demolishing the structure shall be developed by a competent person, before any demolition may be commenced.
- As demolishing progresses the structural integrity of the structure shall be checked at intervals as determined in the method statement by the appointed competent person in order to prevent any premature collapse.
- Steps to be taken to ensure that where a structure is being demolished:
  - a. no floor, roof or any other part of the structure is overloaded with debris or material that would make it unsafe;

- b. precautions are taken to prevent the collapse of the structure when any frame or support is cut or removed;
- c. shoring or propping is applied where necessary;
- d. no employee is required or allowed to work under unsupported overhanging material; and
- the stability of an adjacent building, structure or road is maintained at all times.
- The location and nature of any existing services such as water, electricity, gas etcetera must be established before any demolition is commenced with and any service that may be affected by the demolition must be protected and made safe for employees and other persons.
- Every stairwell in a building being demolished must be adequately illuminated.
- Convenient and safe means of access will be provided.
- A catch platform or net shall be erected over every entrance to the building or structure being demolished where the likelihood exists of material or debris falling on employees and/or persons entering and leaving and every other area where the likelihood exists of material or debris falling on employees and/or persons must be fenced or barricaded

No material may be dropped on the outside of the building unless the area into which it is dropped is fenced off or barricaded.

#### **28.14 Excavation**

All applicable legislation concerning excavation work must be complied with.

Each contractor carrying out excavation work on the project site(s) will develop, document, and implement Safe Work Procedures (SWP) that are aligned with the requirements of this standard.

All excavation work will be properly planned. Site-specific conditions and hazards will be considered, including traffic, overhead and buried utilities / services, proximity to nearby structures, soil properties, presence of surface and / or ground water, position of the water table, and weather conditions.

A review of the on surface and above surface infrastructure (e.g., pipelines, conveyors, structures, overhead power lines, etc.) must be carried out to determine if mobile excavation equipment can be safely routed onto the work site and if there is sufficient working space at the site.

Excavation work may only be carried out under the personal supervision of a competent Excavation Supervisor who has been appointed in writing.

## **28.15 Asbestos Handling**

### **28.15.1 Notification Of Asbestos Work**

Before starting on asbestos-related work, regardless of the extent of the work, Project management will notify the relevant provincial director and describe the work to be done which Civils 2000 will comply with.

Such work could include manufacturing processes during which asbestos fibres are mixed with other materials and the fabrication, installation or removal of asbestos containing material.

### **28.15.2 Asbestos Work**

Project management will provide an asbestos work plan in full compliance with the OHS Act, 1993, as amended, the

Asbestos Abatement Regulations 2020 relating to demolition\* work (\*as defined in AR).

- 1) to be performed by a Registered Asbestos Contractor (RAC) and brief the RAC on the details contained therein

Notification of Asbestos Work given to the Department of Labour regarding the asbestos work as soon as the RAC is appointed. Monitor the activities of the RAC to ensure compliance with the Asbestos Regulations of the OHS Act, 1993, as amended, according to the following inspection schedule or as prescribed by the AIA. Conduct asbestos air monitoring, associated laboratory tests and submit test results and reports. The reports shall include for remedial work /action to be taken by the RAC, where applicable, and the AIA shall brief of the RAC accordingly, all according to the following schedule: Feedback of tests results, inspections, and respective reports to be available within at least 2(two) working days of the said test, inspection etc. Conduct a final inspection at the conclusion of the work and issue a site clearance certificate

### **28.15.3 Risk Of Working with Asbestos**

The inhalation of airborne asbestos fibre can cause serious lung diseases including asbestosis, cancer of the lungs and mesothelioma. These diseases usually become apparent only some years after exposure to asbestos and sometimes not until 40 or more years after the first exposure. Cigarette smokers who are occupationally exposed to asbestos exhibit a marked increase in the incidence of lung cancer when compared to non-smokers.



## 29 ERGONOMICS

It deals with the interaction between people and their total workplace environment – the relationship between man and machine and his/her working environment.

By applying ergonomics, a more effective work system can be achieved by controlling the health and safety risks associated with a job, by making the man-machine-environment interfaces as safe, efficient, and comfortable as possible.

It may be applied to improve working conditions when working with traditional tools and work methods e.g. introduction of computerized technology in a factory.

Productivity could be improved by:

- A reduction in incidents, error rates, absenteeism, labour turnover;
- A reduction in re-hiring and re-training costs;

Ergonomic can be studied under the following major groups:

- Anthropometry;
- Biomechanics;
- Physiology;
- Psychology;
- Occupational hygiene;
- Occupational safety.

## 30 ENVIRONMENTAL MANAGEMENT

### 30.1 GENERAL

The construction will be carried out according to the contract environmental management requirements.

All reasonable care will be taken to minimise the impact of establishment and construction activities on the environment.

### 30.2 ENVIRONMENTAL MEASURES

In addition to safeguarding the health and safety of its employees and visitors to site, Civils 2000 project management will develop and implement measures to safeguard the general public and environment from hazards that may arise as a result of the construction work. To ensure compliance with this aspect of the Regulations, project management shall (if required):

- a) Establish whether there is any potential cross-boundary nuisance that may arise on site as a result of construction operations, such as dust or noise nuisance, and if there is a potential for such nuisance, to implement measures to eradicate or minimise the impact;
- b) Develop an emergency plan in the event of a fire, explosion, spill, or any other incident that could impact on the environment or the general public;
- c) Notify, in writing, all local emergency services, traffic authorities and environmental agencies of the intended work programme before the commencement of the work and on completion (if necessary);
- d) Implement measures to ensure the safe accommodation of pedestrian and vehicular traffic across or along the area(s) of construction;
- e) Ensure that all Records of decision that may be required in terms of Environmental Legislation for the construction work are in place and available for inspection;
- f) Ensure that the location of all storage areas for flammable or hazardous materials is properly designed and constructed to prevent the contamination of any water source, including groundwater of the environment in general;
- g) In the event that the construction work includes tasks that involve the using of chemicals or materials that may give rise to vapours or particles that can be transported by the wind, the Contractor will endeavour to perform these tasks in a controlled environment. If this is not possible or practical, the Contractor will situate these tasks in an area where the prevailing wind direction will minimise the spread of the vapours or particles to local communities. If this is also not possible, the Contractor will modify his operations and implement procedures to reduce the risk of contamination. In all situations, however the Contractor shall implement measures to monitor the spread of such vapours or particles and shall present a written report on completion of the construction work.
- h) No Washing of Vehicles and Equipment on site, except for cleaning of equipment and flushing of Mixers, however the activities should not result in pollution of the surrounding environment.

### 30.3 WASTE MANAGEMENT

Waste may not be disposed of unless the disposal of that waste is authorized by law. The contractor must therefore ensure that all waste that is generated is handled, stored, transported, and disposed of in accordance with the requirements of the applicable legislation / local authority. No waste may be removed from the project site to a waste storage or disposal facility unless that facility has been approved for use by the nominated project management representative. The specific landfill site and waste procedure has been specified in the Environmental Management Plan and the Waste Management Plan as required.

An adequate number of waste bins and skips will be provided by the contractor and suitable arrangements will be made to ensure that these bins and skips are emptied regularly. Hazardous wastes must be kept separate from general wastes.

## **31 HAZARDOUS CHEMICAL SUBSTANCES (HCS)**

No chemical substance may be brought onto site unless it appears on the contractors HCS register. Every HCS will have available a SDS with the following information: Trade name / product name of substance; Manufacturer / supplier of substance; Maximum inventory; Storage requirements and precautions; fires, etc. (e.g. reagents to neutralize spillages, firefighting foam, etc.); and Approved disposal methods. SDS's will not be older than 5 years. Any chemical substance brought onto site without adherence to the requirements stipulated above shall be removed from site immediately. The contractor must ensure a file, or files, containing all of the SDS's must be maintained and must be readily available to all personnel on site (particularly first aiders) as well as other potentially affected parties (e.g. emergency services personnel, persons from the local community, etc.). The SDS's must be in the language(s) commonly used on site.

## **32 BRICKWORK AND PLASTERING**

The contractor will ensure that employees performing brickwork and plastering is competent to perform their specific activities, this will include working at height competence as required. No Brickwork or plastering may be performed from a ladder. All brickwork or plastering that is performed from a scaffold structure will comply to the requirements for scaffolding and working at heights. No bricks may be stacked higher than the kick plates fitted to the scaffold. Stacking of bricks on scaffolding must take the loadbearing for the scaffold into consideration and the contractor must be able to show the calculations for the maximum loadbearing of the temporary structure and the loadbearing that will be applied.

## **33 ROOF WORK**

The contractor will ensure that employees performing roofing activities or work on a roof will be competent to perform their specific activities, this will include working at height competence. No roof tiles or corrugated sheeting may be stacked on the roof in a position where it can be dislodged and fall to a lower level. All sheets will be secured to ensure they cannot be blown off the roof by wind. The contractor will ensure that the fall protection plan makes provision for the roof work as contemplated in the relevant section of the construction regulations.

## **34 PPE REQUIREMENTS**

All sites have been designated as "Hard Hat" sites for as long as there is a risk of head injury. The Construction Supervisor or Site Construction SHE Officer is responsible for assessing this risk. Other personal protective equipment, as identified in the applicable risk assessments and method statements, shall be worn.

Other basic rules include but not limited to:

- No person is allowed to enter any work site area without the required mandatory PPE.
- It is the responsibility of employees, clients & visitors to comply with this specification.



- Reflective strips to be fitted on all work overalls.
- It is compulsory for ladies or men wearing synthetic hair / hair extensions in the operational areas to wear the hair cap protector.
- Special protective equipment as required by the client to protect them from hazards on the site, other than applicable to the trade, may be required in certain areas for certain activities.
- When corrosive liquids are handled follow SDS instructions.
- The construction Manager shall make provision to issue visitors with the correct PPE when they visit the site area of under his/her responsibility.
- Loose clothing may not be worn where it may become caught in moving machinery or equipment.

#### **34.1 PPE Guideline**

Project management will ensure that all employees, contractors, and visitors only wear SANS Approved PPE at all times on site, the following is a guideline of PPE which may be issued, but not limited to.

- SANS approved Hard hats.
- SANS approved Protective footwear (Shoes)
- Overalls that ensure worker visibility.
- High Visibility Vests
- Safety Goggles (for dust, possible flying particles/debris etc.)
- Hearing protection.
- Respiratory protection (minimum of FF2 and or respirators), and
- Life jackets where applicable
- Any other necessary PPE identified from SDSs and/or risk assessments.

#### **34.2 Specialised PPE will include but not limited to:**

- Specialist Safety Goggles (specific to task requirement etc.)
- Task and trade specific Gloves (for manual handling of equipment/tools etc.)
- Earplugs (for noise areas etc.)
- Acoustic earmuffs (electronic and non-electronic)
- Dust masks (for dust, fumes, or vapours etc.)
- Task specific respirators
- Rain Suits

### 34.3 Task-Specific PPE

In addition to the standard PPE required for a project site (including a safety hard hat, safety glasses, safety shoes, and high visibility protective clothing), the following task-specific PPE must be used as a minimum by any person carrying out or assisting with such a task:

- **Arc Welding** – safety glasses and welding helmet (i.e., double eye protection), respiratory protection against the specific airborne contaminants being generated (fumes, gases, dusts, etc.), leather welding gloves, leather apron, leather spats, leather yoke (for work above shoulder height), and knee pads for welders in kneeling positions.
- **Gas Welding, Cutting or Brazing** – gas cutting or welding goggles with shade 4 filter lenses and full-face shield (i.e., double eye protection), respiratory protection against the specific airborne contaminants being generated (fumes, gases, dusts, etc.), leather gloves (long cuff for welding and cutting, short cuff may be used for brazing), leather apron, leather spats, and leather yoke (for work above shoulder height)
- **Grinding** – safety glasses or goggles and full-face shield (i.e., double eye protection), hearing protection, respiratory protection where dust or fumes may be generated, leather gloves, leather apron, and leather spats.

## 35 MEDICALS - OCCUPATIONAL HEALTH

- Medical examinations are required for all employees that work onsite.
- Civils 2000 will maintain medical records of the employees for the period as stipulated in the OHS Act.
- Any employee who is on site for more than one year will be required to have an annual medical assessment (periodic)
- Any employee who has been away from site for more than one year shall be required to attend pre-work fitness medical assessment .
- Hygiene facilities shall be provided by the service provider and maintained as per OHS Act and national building regulations requirements unless agreement has been reached with the client with regards to the use of existing facilities.
  - a. Above mentioned facilities shall always be kept in a clean, hygienic, safe condition, and in a good state of repair.
  - b. Provision shall be made for separate male and female facilities.
  - c. A pictogram indicating the gender of the persons, for whom the facility is intended, shall be clearly provided at the entrance of the facility.
  - d. No facilities or system shall be connected to any drinking water system without proper authorisation from the client.
- Project Management will be responsible for the health risk assessments and any other occupational hygiene surveys applicable such as physical stressor monitoring, hazardous chemical substance monitoring, etc.
- Project Management will maintain these records for the period as stipulated in the OHS Act.



## 36 EMERGENCY PREPAREDNESS AND RESPONSE

### Project management

- will establish a site-specific emergency procedure and implement an emergency plan based on the emergency procedure for the site
- shall ensure that emergency drills are conducted as prescribed in the Emergency Response Plan and all records will be retained.
- Specific requirements for first - aid and medical as well as fire and rescue should be addressed in the emergency plan.
- shall ensure that the necessary firefighting equipment is in place in the respective areas.
- Approval of flammable liquid storage areas shall be obtained from the client's management representative.
- Will allow for designated smoke areas as per regulation as required.

## 37 SITE MONITORING, SCHEDULED INSPECTIONS & AUDITS

### 37.1 Assessments

- a) Civils 2000 will be assessed (audited) on a regular basis as per risk ranking.
- b) The client / agent and the Project SHE officer shall review the data and provide suggestions to improve on the SHE performance.
- c) Project Management will review the SHE plans to accommodate action plans based on outcome of SHE performance.

### 37.2 Scheduled Site Inspection

- a) SHE Representatives will conduct weekly site inspections
- b) Project SHE Officers will conduct monthly SHE Inspections
- c) Ongoing and continuous daily inspections will be part of the appointed Sec 8.1 & Sec 8.7's

Daily responsibility and will form part of their weekly meeting report as required.

|    | Inspection Type                            | Designated Persons |
|----|--------------------------------------------|--------------------|
| 1  | SHE Representatives                        | Sec 17-SHE Reps    |
| 2  | SHE Officer                                | CR 8.5             |
| 3  | Site Supervisor inspections                | CR 8.1 OR CR 8.7   |
| 4  | Site Audits                                | CR 8.5             |
| 5  | Daily Barricading checklist                | CR 8.1 OR CR 8.7   |
| 6  | Daily Compressor Checklist                 | CR 8.1 OR CR 8.7   |
| 7  | Tool List                                  | CR 8.1 OR CR 8.7   |
| 8  | Daily Vehicle Pre-Ignition Checklist       | CR 8.1 OR CR 8.7   |
| 9  | Hand Tool and Splicing Equipment Checklist | CR 8.1 OR CR 8.7   |
| 10 | Incident Accident Register                 | CR 8.5             |

## SHE MANAGEMENT SYSTEM

### SHE Management Plan

|    |                                                     |                  |
|----|-----------------------------------------------------|------------------|
| 11 | First Aid Dressing Register                         | First Aider      |
| 12 | Environmental Checklist                             | CR 8.5           |
| 13 | Flammable and Combustible Materials Checklist       | CR 8.1 OR CR 8.7 |
| 14 | First Aid Inspection Form                           | First Aider      |
| 15 | Good Housekeeping Checklist                         | CR 8.1 OR CR 8.7 |
| 16 | Daily Excavation Checklist                          | CR 8.1 OR CR 8.7 |
| 17 | Portable Electrical Tools and Appliances Check List | CR 8.1 OR CR 8.7 |
| 17 | Electrical Hazards checklist                        | CR 8.1 OR CR 8.7 |
| 19 | Public Safety Check List                            | CR 8.1 OR CR 8.7 |
| 20 | PPE Issue Register                                  | CR 8.1 OR CR 8.7 |
| 21 | Site Visitors Register                              | CR 8.1 OR CR 8.7 |
| 22 | Weekly Fire Extinguisher Register                   | Fire Fighter     |
| 23 | Generator Inspection Checklist                      | CR 8.1 OR CR 8.7 |
| 24 | Concrete Mixer Check List                           | CR 8.1 OR CR 8.7 |
| 25 | Site File Inspections Checklist                     | CR 8.5           |
| 26 | FPE-Issue Register                                  | CR 8.5 OR CR 8.1 |

### 37.3 Scheduled Audits

- a) Monthly Site Audits will be conducted by the Appointed SHE Officer on all subcontractors
- b) Head Office SHE Audits will be conducted as per the Audit programme

|   | Audit Type                  | Audit Intervals   | Designated Persons      |
|---|-----------------------------|-------------------|-------------------------|
| 1 | Site Audits                 | Monthly, per site | CR 8.5                  |
| 2 | Company Internal H&S Audits | Biannually        | SHEQ / SHE / QA Manager |

## 38 Management review

A review of the SHEQ Management System will be completed annually to ensure that the system is efficient and effective in managing health and safety performance and meeting project requirements. A procedure will be in place for this process. The review will evaluate if there is any need for change and must identify actions to improve the system.

A record of each completed management review will be retained, and it must include all decisions and identified actions concerning alterations, modifications, or improvements to the management system that demonstrates a commitment to continuous improvement.

## Annexure A: SHE Policy

### OCCUPATIONAL HEALTH AND SAFETY POLICY

#### 1. SCOPE

This Policy outlines our commitment to maintaining a Safe and Healthy work Environment throughout the Civils2000 Group of Companies.

This demonstrates our commitment in providing safe and healthy working conditions for the prevention of work-related injuries and which are appropriate to reduce the OH&S risks to which specific operational activities expose our workers and the surrounding communities.

The Civils2000 Group of Companies is committed to providing a safe and healthy work environment for all employees, contractors, and visitors. We believe that every employee has the right to work in a safe and secure environment and has the responsibility to contribute to the overall safety of the workplace.

#### 2. ORGANISATION DESCRIPTION

#### 3. GUIDING PRINCIPLES

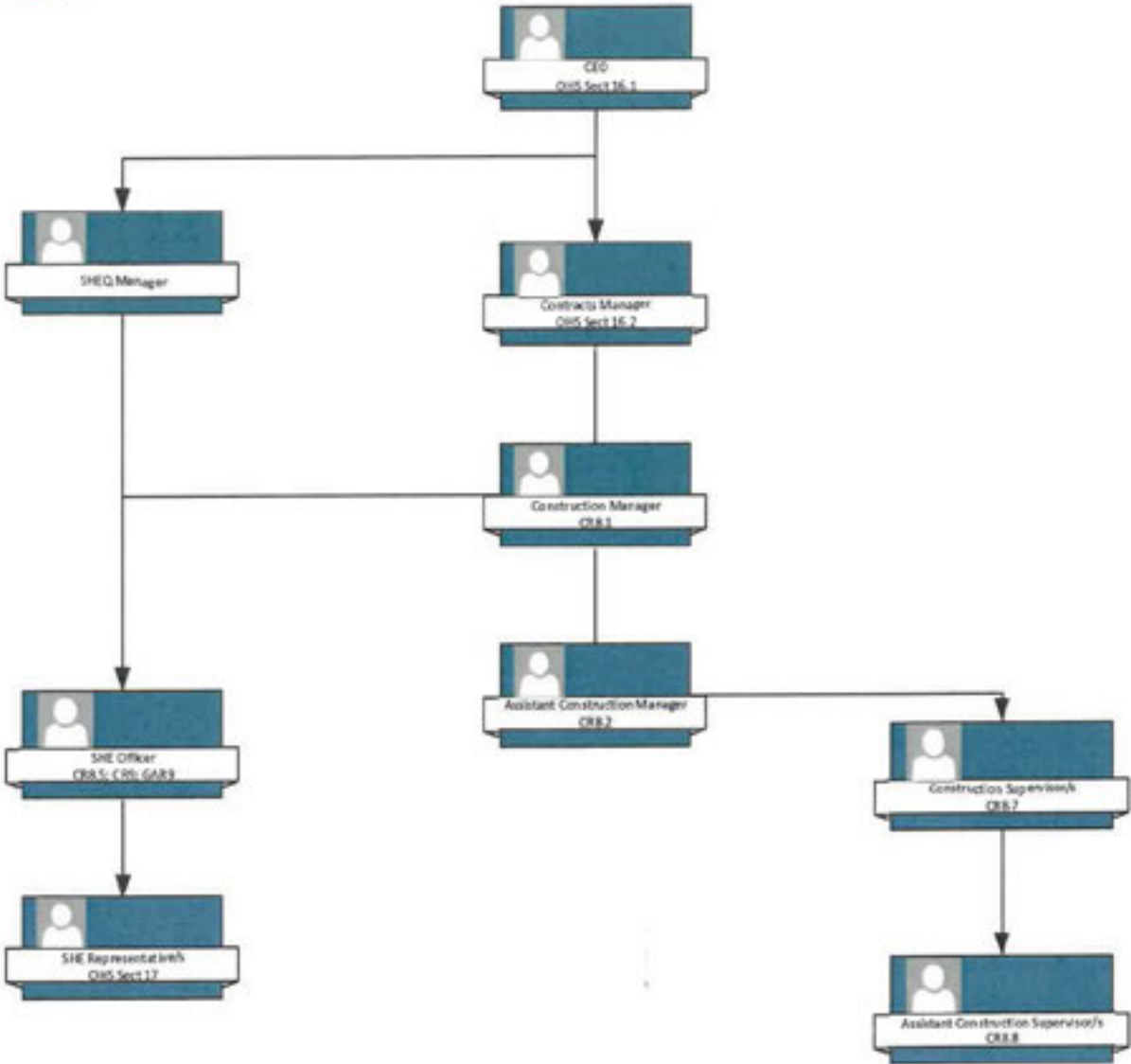
- ◆ To ensure consistency with the application and utilisation of this Policy Statement.
- ◆ To promote Occupational Health and Safety Initiatives in the Workplace.
- ◆ To minimise the risk to Employees, Stakeholders and the Public when exposed to our operations.
- ◆ This policy will apply to all Construction sites.

#### 4. POLICY STATEMENT

We will:

- ◆ Establish appropriate management systems to address safety and occupational health to minimise risk and ensuring duty of care, performance monitoring and continuous improvement.
- ◆ Comply with all legislative and policy requirements and set standards to meet the objectives of this policy.
- ◆ Educate, train, motivate, and develop our employees in terms of occupational health and safety matters.
- ◆ Continually work towards a safe working environment for our employees, stakeholders, and the general public to protect individuals against the occupational health and safety risks associated with our construction activities
- ◆ Develop strong relationships with our clients and understand their requirements to meet and exceed their respective needs and expectations.

Annexure B: SITE Organogram





CITY OF CAPE TOWN

URBAN MOBILITY DIRECTORATE: TRANSPORT INFRASTRUCTURE IMPLEMENTATION

CONTRACT NO. 72Q/2025/26

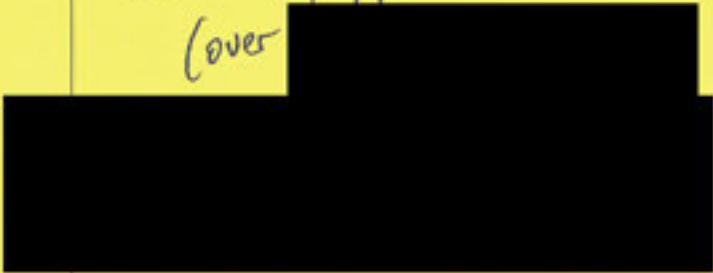
UPGRADE OF VOORTREKKER ROAD, FROM 4TH AVENUE TO 12TH AVENUE, MAITLAND

**SCHEDULE 21: DEVIATIONS AND QUALIFICATIONS BY TENDERER**

The Tenderer should record any deviations or qualifications he may wish to make to the tender documents in this Returnable Schedule. Alternatively, a tenderer may state such deviations and qualifications in a covering letter attached to his tender and reference such letter in this schedule. Any deviations or qualifications contained in a covering letter which is not referenced in this schedule will not be considered.

The Tenderer's attention is drawn to clause C.3.8 of the Standard Conditions of Tender referenced in the Tender Data regarding the Employer's handling of material deviations and qualifications.

If no deviations or qualifications are made, the schedule hereunder is to be marked NIL and signed by the Tenderer.

| PAGE | CLAUSE OR ITEM | PROPOSED DEVIATION OR QUALIFICATION                                                                                      |
|------|----------------|--------------------------------------------------------------------------------------------------------------------------|
|      |                | Refer to attached<br>Cover sheet<br> |

Number of sheets appended by the tenderer to this Schedule 2 (If nil, enter NIL).

**SIGNED ON BEHALF OF TENDERER:** 

**RE: TENDER 720/2025/26 – UPGRADE OF VOORTREKKER ROAD, FROM 4TH AVENUE TO 12TH AVENUE, MAITLAND**

Dear Sir / Madam,

We thank you for the opportunity to submit a bid for the above-mentioned project and are pleased to submit our duly completed tender in the amount of:

- **R200,502,500.00 Including VAT.** (Two-Hundred Million Five Hundred & Two Thousand, Five Hundred Rands only)

For clarity, we highlight the following aspects of our tender:

1. We claim a total of **5.5** points for specific goals, verifiable through the annexures in our submitted BBBEE certificate.
2. We claim a total of **70** points for functionality scoring.
3. Under item C1.2.8.2, we have allowed the following size plant, (b) – 7 ton, (c) – 12 ton, (f) – 5 ton, (g) 185 cfm.
4. Under items C6.2.1.2 & C6.2.4.2, priced for 200mm x 100mm x 50mm De Hoop paver as per Drawing [REDACTED]
5. Under item 1.1.1, excavations allowed at 1m deep as no depth categories provided and transport measured under 1.1.5.
6. Under item 1.1.3, excavations measured elsewhere.
7. Under item 4.3.1, priced HDPE ducting which is 450KN as per specification & NTT and is extensively used in City of Cape Town.
8. Under item 4.4, imported bedding is from elsewhere on site.
9. Under item 6.2 (a), priced to 1.5m deep.
10. Under item 6.3 (a), priced to 1.2m deep/Type A.
11. Under item L5.1, bends are CI 16 PVC to suit PVC as Cast-Iron are not available.
12. Under item L7.1, tee measured under L5.2.6
13. Under item L7.2, tee measured under L5.4.2
14. Under item 4.8, excavations are measured elsewhere.



Building a better tomorrow, **together.**



We trust our offer will be of interest to you and look forward to being of service.

We hold ourselves available for clarification at your earliest convenience.

Yours faithfully,





E: [REDACTED]

Email [REDACTED]

ATTENTION: [REDACTED]

TENDER NO: 72Q/2025/26

DESCRIPTION: UPGRADE OF VOORTREKKER ROAD, FROM 4<sup>TH</sup> AVENUE TO 12<sup>TH</sup> AVENUE, MAITLAND

The Bid Evaluation Committee is in the process of evaluating your tender offer for the above-mentioned tender. In terms of Clause C.3.10 of the Tender Data, we request that you provide further information or clarification on the following points:

1. The cover letter provided stipulating the following terms and conditions

The Bid Evaluation Committee reviewed each of the listed deviations as per the cover letter:

- 1.1. Under item C1.2.8.2, we have allowed the following size plant, (b) -7 ton, (j) -12 ton, (f)-5 ton, (g) 185 cfm  
BEC Response: Minor clarification by tenderer. These are industry standard size plant/machines. Acceptable.
- 1.2. Under items C6.2.1.2 & C6.2.4.2, priced for 200mm x 100mm x 50mm De Hoop paver as per Drawing HHO 7504/704/1108.  
BEC Response: The De Hoop paver will be acceptable as an equivalent if it is a Class PA (as per Drawing). Current tests show that (De Hoop) it is a Class PB and not a Class PA.
- 1.3. Under item 1.1.1, excavations allowed at 1m deep as no depth categories provided and transport measured under 1.1.5.  
BEC Response: The depths have been indicated on the typical cross sections and services drawings and can be measured, which vary between 1-2m, therefore the condition is determined to be immaterial.
- 1.4. Under item 1.1.3, excavations measured elsewhere.  
BEC Response: Yes, that's correct. Excavations measured under 1.1.1, therefore the condition is determined to be immaterial.
- 1.5. Under item 4.3.1, priced HDPE ducting which is 450KN as per specification & NTT and is extensively used in City of Cape Town.  
BEC Response: Yes, that's correct, therefore the condition is determined to be immaterial.
- 1.6. Under item 4.4, imported bedding is from elsewhere on site.  
BEC Response: Yes, that's correct, therefore the condition is determined to be immaterial.
- 1.7. Under item 6.2 (a), priced to 1.5m deep.  
BEC Response: Yes, that's correct, therefore the condition is determined to be immaterial.
- 1.8. Under item 6.3 (a), priced to 1.2m deep/Type A.  
BEC Response: Yes, that's correct, therefore the condition is determined to be immaterial.
- 1.9. Under item L5.1, bends are CI 16 PVC to suit PVC as Cast-Iron are not available.



**BEC Response:** Equivalent bends such as uPVC Class 16 can be used, for up to size DN250. Therefore the condition is determined to be immaterial.

1.10. Under item L7.1, fee measured under L5.2.6.

**BEC Response:** Yes, that's correct, therefore the condition is determined to be immaterial.

1.11. Under item L7.2, fee measured under L5.4.2 \*.

**BEC Response:** Yes, that's correct, therefore the condition is determined to be immaterial.

1.12. Under item 4.8, excavations are measured elsewhere.

**BEC Response:** Yes, that's correct, therefore the condition is determined to be immaterial.

In conclusion the Bid Evaluation Committee acknowledges the terms and conditions listed in the cover letter and concludes that none of the conditions are considered material. Accordingly, Civils 2000 Pty Ltd is requested to withdraw the deviations determined to be immaterial by the BEC.

Confirmation by

I, \_\_\_\_\_, the representative of \_\_\_\_\_ hereby confirm the withdrawal of the listed deviations (as referenced in the cover letter):

Please indicate with an X:

|                                     |                     |
|-------------------------------------|---------------------|
| <input checked="" type="checkbox"/> | Yes, withdrawing    |
| <input type="checkbox"/>            | No, not withdrawing |

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

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

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

Yours faithfully,

On behalf of Director: Supply Chain Management

CONTRACT NO. 72Q/2025/26 UPGRADE OF VOORTREKKER ROAD, FROM 4TH AVENUE TO 12TH AVENUE, MAITLAND

CITY OF CAPE TOWN

URBAN MOBILITY DIRECTORATE: TRANSPORT INFRASTRUCTURE IMPLEMENTATION

CONTRACT NO. 72Q/2025/26

UPGRADE OF VOORTREKKER ROAD, FROM 4TH AVENUE TO 12TH AVENUE, MAITLAND

**SCHEDULE 24: RECORD OF ADDENDA TO TENDER DOCUMENTS**

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

|     | Date        | Title or Details        |
|-----|-------------|-------------------------|
| 1.  | 3/11/2025 . | NTT NO: 1               |
| 2.  | 3/11/2025   | NTT NO: 2 EXT OF TIME . |
| 3.  | 11/11/2025  | NTT NO: 3.              |
| 4.  |             |                         |
| 5.  |             |                         |
| 6.  |             |                         |
| 7.  |             |                         |
| 8.  |             |                         |
| 9.  |             |                         |
| 10. |             |                         |

Attach additional pages if more space is required.

**SEE ATTACHED**

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







E :

**NOTICE TO TENDERERS NO. 3**  
**1 page of 8**

**NOTICE TO TENDERER**

**TENDER NO: 72Q/2025/26**

**BOX NO: 197**

**EXTENDED CLOSING DATE:**

**DESCRIPTION: UPGRADE OF VOORTREKKER ROAD, FROM 4<sup>TH</sup> AVENUE TO 12<sup>TH</sup> AVENUE, MAITLAND**

This Notice to Tenderers (NT1) is to be recorded on schedule 24: Record of addenda to Tender Documents issued to Tenderers and bound into the tender document.

This Notice to Tenderers advises the tenderers the following:

The following clarifications to questions raised at the Site Clarification Meeting are as follows:

- 1) Question: Does the 10 years project experience limitation apply to the tenderer's project experience, Contract Manager's experience and Site Agent's experience ?  
Answer: Yes, as per Schedule 10 and Schedule 13 we will only review completed project experience up to 10 years maximum.
- 2) Question: Previous project experience with a minimum water pipe size of DN350 is a requirement but is there a limitation on the project value or length of the pipeline?  
Answer: There is no limitation on the project value or length of the pipeline (minimum DN350) which can be used as project experience.
- 3) Question: Is there a priced item for dewatering when constructing the cemetery wall?  
Answer: Generally throughout the Bill it is assumed that all rates include for dewatering unless otherwise specified. However, we have made an allowance for items to cover the dewatering of the construction of excavations for the cemetery walls under items C13.1.6.3&4.
- 4) Question: For the accommodation of traffic during construction, how many lanes are required to be open?  
Answer: We have adjusted the original requirement for 3 lanes to be open, to 2 lanes to be open rather. It is practically impossible to have 3 lanes open for a majority of the route hence we have reduced it to 2 lanes (1 lane in each direction during construction).
- 5) Question: Is it possible to share the GPR scans of the existing services which require to be relocated?

**CIVIC CENTRE      IZIKO LOLUNTU      BURGERSENTRUM**

**Making progress possible. Together.**

Answer: See COTO Clause A1.5.7.11 e) – on site shift is 8hrs but including transport to/from site it is maximum 10hrs.

- 18) Question: COTO Clause 1.7 Haul - Please confirm that haul is not paid in this contract on any of the billed items.

Answer: It is the responsibility of the tenderer to check the particular specifications if haulage is included or not. In general, the specifications have been adjusted to include haulage.

- 19) Question: Item C3.1.11 – Please provide a specification for the Grade 2 geotextile.

Answer: A2 Bidim geofabric with minimum 12 kN tensile strength or equivalent

- 20) Question: Please provide extra-over items for each type and combination of kerbing listed in items C3.3.1 and C3.3.2.

Answer: Price for kerb and channel combination.

- 21) Question: Item C.4.1.13 - This item is for spoiling material back into a borrow pit, where is the borrow pit located?

Answer: As per the specification. This item is used to load, haul, spread the recycled (crushed) material back into the road construction area (designated site) for reuse, if there's an over production of crushed material (the crushing site is your borrow area). Any surplus material will be removed/spoiled by the Contractor at his own cost.

- 22) Question: Item C4.1.15.1 - This item is for rehabilitating a borrow pit stockpile area, where is the borrow pit located?

Answer: As per the specification. This item is also used for stockpile sites close to the works which might need to be rehabilitated to original state. There are no quarries to be used.

- 23) Question: Item PC4.2.13 - The heading description is on standard - must the rate include stockpiling? If so where is the stockpiling site?

Answer: The Item no. should be PC4.2.4, see page 272 for amended specification. Proposed stockpiling sites/site camps are indicated on page 222. Stockpiling of material is paid under PC4.1.12

- 24) Question: Item PC5.2.2 – Provide PC specification for item.

Answer: See specification on page 275.

- 25) Question: Item C9.1.3.2 / C9.1.3.3 – Must stable – grade 30 % net bitumen emulsion be priced in this item or 60%?

Answer: You may price 30% net bitumen emulsion.

- 26) Question: Item C11.6.1.8 / C11.6.1.10 / C11.6.1.12 - Why are temporary signs measured under permanent works? An allowance has already been made under C1.5. Please remove these items as they appear to be duplicated.

Answer: As per the COTO specifications for road signage, temporary and permanent signs are measured under section C11.6.1. Tenderer to price accordingly.

- 27) Question: Item 1.1.1 PSC 8.2.7 - Please confirm the old watermain is flanged and will not require cutting to remove it.

Answer: They are mostly welded spigot and socket bell joints and will need cutting.

- 28) Question: Item 1.1.3 / 8.2.7 - Please indicate the size of pipe to be dismantled/broken out.

Answer: They are a maximum size of 300mm diameter.



- 29) Question: Item 1.1.5 / 8.2.9 - The document has written out haulage, will this item be payable? If not please remove it.  
Answer: See clause 1200C 8.2.9. Haulage is payable under this item, dependant on the haulage distance and volume to be spoiled.
- 30) Question: Item 2.6.2 / 2.6.3 (e)- Please indicate the type of service inside this 160mm diam. duct (Fibre optic, etc)  
Answer: They are fibre optic and electrical cable services typically found in these ducts.
- 31) Question: Item 4.1 - Please provide the trench depth and width for each duct configuration.  
Answer: See clause 1200LC & DB for clearances. Typically side trench clearances are 300mm and duct internal spacing of 100mm (vert & hor), with a top of duct cover to road final level of 900mm. Also see drawing HHO-7504-704-2701.
- 32) Question: Item 4.2.2 / 4.2.3 (e) - Please indicate the type of service inside this 160mm diam. duct (Fibre optic, etc)  
Answer: They are fibre optic and electrical cable services typically found in these ducts.
- 33) Question: Item L3.1 / PSDB 8.3.2 c - Please provide the PS spec for this item.  
Answer: Standard 1200 DB 8.3.2 c specification applies.
- 34) Question: Item L5 / PSDB 8.3.2 b - Please provide the PS spec for this item.  
Answer: Standard 1200 DB 8.3.2 b specification applies
- 35) Question: Item L7 / PSDB 8.3.2 b - Please provide the PS spec for this item.  
Answer: Standard 1200 DB 8.3.2 b specification applies
- 36) Question: Item L10.5 / 11.5 (e) - Please indicate the type of service inside this 160mm diam. duct (Fibre optic, etc)  
Answer: They are fibre optic and electrical cable services typically found in these ducts.
- 37) Question: Item L6 to L9 - Please provide the PS spec for this items  
Answer: Standard 1200 L 8.2.3 a) specification applies
- 38) Question: Items L5.2.4 to L5.2.9/L5.3.1/L5.5.5 - Assumed this fitting is connected with flange adaptors and VJs measured elsewhere in the bill. Please confirm.  
Answer: See drawings [REDACTED]
- 39) Question: Item PC1.5 / PC11.4.3.2 - Please indicate where these barriers must be collected from - the PC spec does not state that the barriers are supplied from a commercial source. Please confirm these barriers are to be collected from a stockpile and not supplied by the Contractor.  
Answer: See the specification on page 248. Contractor to provide the NJ type barrier, then establish and de-establish the barriers at end of construction. Another item will be provided in the tender notice to cover the cost of re-establish/move barriers during the course of construction.
- 40) Question: Item L9.1 / 2.5.1 (shoring) - The specification PSDB 8.3.4 is not relevant to shoring. Please provide specification for shoring.  
Answer: Standard 1200DB 8.3.4 a) shall apply, makes allowance for shoring.
- 41) Question: Item 4.3.1 (ducts) - Ducts under this item appear to be specified as class 12, is this correct? Typically class 34 UPVC pipes are specified for ducts. Please advise.  
Answer: This is correct. The specifications requires a minimum of 450N crushing resistance for ducts.

- 42) Question: Specification PSDB-5.1.5 - The PS spec states that shoring is included in the trenching rate. Does that mean the shoring rates in the bill will not be paid? Please advise.  
Answer: Incorrect – shoring is measured and paid separately.
- 43) Question: Item PC1.3.3 (i) to (iv) - Please provide an indicative duration for this Prov sum. Each contractor will make differing assumptions and some may make an under allowance in their programme placing the client at risk.  
Answer: Typically, it would take between 3-6 months in total for service providers to order material and relocate their services. Any time duration beyond 6months to relocate existing services would be considered unreasonable.
- 44) Question: No Provisional sum or PC sum has been provided for the ESKOM relocation. Please consider adding an item.  
Answer: Provision has been made to relocate existing electrical cables under schedule 9. The site does not fall under the Eskom supply area.
- 45) Question: Item 4.5 / PSLC 8.2.7 - The detail drawings for Type A, B and C are not included in the drawings issued. Can these drawings please be provided to us.  
Answer: See drawing [REDACTED] The type C chamber is a large combination duct chamber and the type B and C are single duct chambers.
- 46) Question: Item L5.2.4 - L5.2.9 - Please confirm if the gaskets/flanges should be Table D or Table 16. With reference to the gasket set, please specify the grade of stainless steel to which the bolts and nuts are required to comply.  
Answer: Flanges/gaskets to Table C (PN25) on page 323 or Iso 7005-1 Table 13. Grade of bolts/nuts to be 316 stainless steel.
- 47) Question: Item L7.1 to L7.2 - Please specify the pipe diameter on which the air valve should be installed, including what type of tee or saddle to be installed. Furthermore, please provide a drawing of the chamber.  
Answer: See drawings [REDACTED] for chamber/specials details.
- 48) Question: Drawing 504-2801 RevB, DN600 isolating valve and DN250 scour valve – Tenderer has technical query about the dismantling joint arrangement, taper reducer arrangement and how the scour tee will be connected.  
Answer: These questions are immaterial to the pricing of the particular tender items for the DN600 isolating valve and DN250 scour valve and subject to the tenderer's opinion. The drawings have been submitted to the CoCT for comment and approval. There is sufficient allowance within the contract to adjust details on site, if required.
- 49) Question: Item C1.6.4.1 / C1.6.4.2 (removal of buildings) - Please provide drawings indicating which building are being demolished. Additional detail is required in order to provide rates for these items especially since they are measured with the unit "lump sum"  
Answer: These properties are easily accessible on site and can be measured accordingly. Also, we have given overall dimensions of the structures as part of the item description, to be priced.
- 50) Question: Item 2.2 (mini-sub) – Is there a minisub which requires to be relocated?  
Answer: Yes, see drawing [REDACTED] which shows a minsubstation to be relocated opposite 7<sup>th</sup> Ave.



51) Question: Where are all the drawings for the electrical cable deviations and the electrical street lighting, and is there any other electrical drawings such as 1711, 1712 & 1712?

Answer: Drawings 1701 to 1703 are street lighting drawings and 1704 to 1705 are electrical duct drawings and [REDACTED] are the electrical cable deviation drawings. There are no 1711-1713 drawings available and are not required.

52) Question: Please provide detail/drawing W3 for air valves.

Answer: See attached drawing W3.

The following amendments to the Schedule and Specifications are as follows:

- **Schedule 1: General Requirements and Provisions**

- Items C1.2.1.1 / C1.2.1.2 / C1.2.2.5 / C1.2.2.6 / C1.2.4 / C1.2.5.2 quantity changed to "40"months which was previously 42 or 44 months.
- Item C1.2.8.3 (c) changed to "Tipper" truck.
- Item 3.5.7.02 amended to a Prime Cost item. Item (b) added for Contractor's overhead costs.
- Items C1.4.8.2 quantity changed to "40"months which was previously 42 months.

- **Schedule 2: Roadworks**

- Items C1.5.1.1 / C1.5.2 / C1.5.3 / C1.5.7.6 / C1.5.7.9 / C1.5.8 / C1.5.9 quantity changed to "40"months which was previously 44 months.
- Item C1.5.4 (w) & (p) thickness amended to "150mm thick"
- Item PC1.5/C11.4.3.2 a) amended and b) added
- Item C3.1.9 unit and quantity removed
- Item C3.1.11 specification for geotextile amended
- Item PC4.2.13 corrected to "PC4.2.4"
- Item C6.2.2 updated concrete description to "30MPa/20mm"
- Item C11.8.10 has been amended to include the Contractor's mark-up, b) added

- **Schedule 3: Services**

- Item 2.5.5 e) amended to add (ii) after (i) to accommodate volume of sewer to be disposed
- Item C1.5.4 (w) & (p) thickness amended to "150mm thick"

- **Schedule 6: Traffic Signals**

- Bill 1 item 15.1 has been amended to include the Contractor's mark-up, b) added
- Bill 2 item 15.1 has been amended to include the Contractor's mark-up, b) added
- Bill 3 item 14.1 has been amended to include the Contractor's mark-up, b) added

- **Clause 3.1.8: Programme, Method of Works and Accommodation of Traffic**

- 7<sup>th</sup> paragraph, bullet point (1) and (8) has been amended which now indicates an eight week start-up period and peak hours corrected for the AM and PM peak hours which is in agreement with Clause A1.5.3.2.

- **Specification C1.3.1 amended**

- Specifications for items 3.5.7.01 / 3.5.7.02 / 3.5.7.03 / 3.5.7.04 / 3.5.7.05 added. Additional page 241-1 added.

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- **Clause A1.5.3.2: General Requirements**

- Clause A1.5.3.2 (iv) has been amended and changed from a requirement of 3 lanes required to be open during construction to 2 lanes, one in each direction. All other unnecessary references have been removed.

- **Clause A1.5.7 amended**

- Clause A1.5.7.10 (iv) corrected to "Voortrekker Road"

- **Specification C1.5/PC11.4.3.2 amended**

- Specifications for items C1.5/PC11.4.3.2 (a) amended and (b) added to accommodate relocation of barriers

- **Specification PC5.2.5.8 added**

- Specifications for item PC5.2.5.8 was added.

- **Specifications PC6.2.1 / PC6.2.2 / PC6.2.3 / PC6.2.5 added**

- Specifications for items PC6.2.1 / PC6.2.2 / PC6.2.3 / PC6.2.5 added.

- **Specifications L2 / L2.2 / L4 / L4.1 / L4.2 / L5 / L6 (Clause PSL-8) added**

- Specifications for items L2, L2.2, L4.1, L4.2, L5 and L6 added.

- **Specifications L4 / L6 (Clause PSDB-8) added**

- Specifications for items L4 and L6 added (excavations).

- **COTO PC Specifications added for the Cemetery Wall and Water Box Chambers**

- Specifications for items PC2.1.2.6, PC2.1.2.7, PC3.2.16.4, PC3.2.17, PC11.1.4.2, PC11.5.1.12, PC11.5.1.13, PC13.1.6.3, PC13.1.6.4, PC13.4.15 added (cemetery wall).
- Specifications for items PC13.1.6.3, PC13.1.6.4 added (water box chambers).

Pages 79, 80, 82, 86, 88, 89, 90, 93, 94, 100, 110, 122, 129, 165, 169, 173, 220, 241, 244, 247, 248, 249, 275 and 332 have been replaced with amended pages 79A, 80A, 82A, 86A, 88A, 89A, 90A, 93A, 94A, 100A, 110A, 122A, 129A, 165A, 169A, 173A, 220A, 241A, 244A, 247A, 248A, 249A, 275A and 332A.

The following pages have been added to the tender document:

- Page 241-1 after Page 241
- Page 277-1 after Page 271, Page 277-2 added after Page 277-1
- Page 307-1 added after Page 307
- Page 332-1 added after Page 332
- Page 336-1 added after Page 336, Page 336-2 added after Page 336-1, Page 336-3 added after Page 336-2, Page 336-4 added after Page 336-3.

Answer: The tender drawings 1601 to 1707 indicate all existing services that will be impacted and required to be relocated. These drawings are based on the GPR scans and CoCT wayleave information. No further information will be shared.

- 6) Question: Is there a specific time allowance in the contract for services relocation?

Answer: We have not provided a time allowance for any service relocation except for the identification and proving of existing services which is one month prior to constructing within that specific area (Clause 3.1.12.1, page 222). Note that it is the tenderer's responsibility to programme the works and make reasonable time allowance for services relocations as per Clause 3.1.8 page 220, bullet (5).

- 7) Question: Does CPG spend on enterprises include suppliers as well?

Answer: Yes, but they must be a qualifying local enterprise.

- 8) Question: Will the Contractor be held liable for services not indicated on wayleaves?

Answer: Any unknown services not indicated on the wayleaves or construction drawings will be considered to be an unknown service and these relocation works covered by the Employer's contingency budget.

- 9) Question: Schedule 1 P&G's items indicate a duration of 44 months but elsewhere it is indicated as 42 months, which one is correct?

Answer: Contract duration will be 42 months which consists of 2 months mobilisation and 40 months construction period, exclusive of special working days. All relevant items for Schedule 1 and 2 will be corrected.

- 10) Question: Is it possible to extend the tender closing period due to the complexity of the tender?

Answer: The City of Cape Town is under tremendous pressure to implement this project as soon as possible. Under these circumstance, we cannot extend the tender Closing Date.

- 11) Question: Confirm that this project is not a EPWP project and BCCEI rates apply.

Answer: Yes, this project is not a EPWP project and BCCEI rates apply.

- 12) Question: Request to relax the requirement for a full time Contract Manager on site.

Answer: The Tender requires the Contract Manager to be fully employed by the Tenderer company but is not needed full time on site. Construction Manager must be full time on site.

- 13) Question: Please provide the specification for the Grade B geotextile

Answer: A4 Bidim geofabric or equivalent.

- 14) Question: Must this person (item C1.2.1.2, Dedicated enviro person) be onsite full time with no shared responsibilities? Annexure D of the Specification states that the Environmental Officer is appointed by the Client - does this mean we are not required to price this person?

Answer: Yes, as per the specification, it must be a dedicated person who will audit the site daily, appointed by the Contractor, who can be his own personnel.

- 15) Question: Please provide drawings for the bill in Section 3 1200LD (sewers)

Answer: See drawing [REDACTED] in the memory stick. Note that there is no major sewer works required except for any additional site works which might occur, if required.

- 16) Question: Item C1.5.4 / C9.1.5.1 - Given the restricted nature of the work could this asphalt please be paved by hand?

Answer: As per reference to C9.1.5.1 a suitable paver machine must be used. Minimum temporary bypass lane width would be 3m.

- 17) Question: Item C1.5.7.3 & C1.5.7.4 - Please confirm that a man-shift is 8 hrs?

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Yours Sincerely,

Abd 3.

On behalf of Director: Supply Chain Management

ACKNOWLEDGEMENT OF RECEIPT FOR AND ON BEHALF OF THE TENDERER: TENDER NO 72Q/2025/26

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E : [REDACTED]

3 NOVEMBER 2025

NOTICE TO TENDERERS NO. 2

1 page

NOTICE TO TENDERER

TENDER NO: 72Q/2025/26

BOX NO: 197

CLOSING DATE: [REDACTED]

EXTENDED CLOSING DATE: [REDACTED]

DESCRIPTION: UPGRADE OF VOORTREKKER ROAD, FROM 4<sup>TH</sup> AVENUE TO 12<sup>TH</sup> AVENUE, MAITLAND

This Notice to Tenderers (NT1) is to be recorded on schedule 24: Record of addenda to Tender Documents issued to Tenderers and bound into the tender document.

This Notice to Tenderers advises the tenderers the following:

Extended Closing Date to Tuesday, [REDACTED]

[REDACTED]  
On Behalf of Director: Supply Chain Management

ACKNOWLEDGEMENT OF RECEIPT FOR AND ON BEHALF OF THE TENDERER: TENDER NO 72Q/2025/26

At [REDACTED] on this [REDACTED] Day of [REDACTED]

Signature: [REDACTED]

Name of Signatory: [REDACTED]

[REDACTED] progress possible. Together, [REDACTED]





31 OCTOBER 2025

**NOTICE TO TENDERERS NO. 1**  
**1 Page of 15**

**NOTICE TO TENDERER**

TENDER NO: 72Q/2025/26

BOX NO: 197

CLOSING DATE: 5 NOVEMBER 2025

DESCRIPTION: UPGRADE OF VOORTREKKER ROAD, FROM 4<sup>TH</sup> AVENUE TO 12<sup>TH</sup> AVENUE, MAITLAND

This Notice to Tenderers (NT1) is to be recorded on schedule 24: Record of addenda to Tender Documents issued to Tenderers and bound into the tender document.

This Notice to Tenderers advises the tenderers the following:

The following clarifications to questions raised at the Site Clarification Meeting are as follows:

- 1) Question: Does the 10 years project experience limitation apply to the tenderer's project experience, Contract Manager's experience and Site Agent's experience?  
Answer: Yes, as per Schedule 10 and Schedule 13 we will only review completed project experience up to 10 years maximum.
- 2) Question: Previous project experience with a minimum water pipe size of DN350 is a requirement but is there a limitation on the project value or length of the pipeline?  
Answer: There is no limitation on the project value or length of the pipeline (minimum DN350) which can be used as project experience.
- 3) Question: Is there a priced item for dewatering when constructing the cemetery wall?  
Answer: Generally throughout the Bill it is assumed that all rates include for dewatering unless otherwise specified. However, we have made an allowance for items to cover the dewatering of the construction of excavations for the cemetery walls under items C13.1.6.3&4.
- 4) Question: For the accommodation of traffic during construction, how many lanes are required to be open?  
Answer: We have adjusted the original requirement for 3 lanes to be open, to 2 lanes to be open rather. It is practically impossible to have 3 lanes open for a majority of the route hence we have reduced it to 2 lanes (1 lane in each direction during construction).
- 5) Question: Is it possible to share the GPR scans of the existing services which require to be relocated?

**Answer:** The tender drawings 1601 to 1707 indicate all existing services that will be impacted and required to be relocated. These drawings are based on the GPR scans and CoCT wayleave information. No further information will be shared.

- 6) Question: Is there a specific time allowance in the contract for services relocation?

**Answer:** We have not provided a time allowance for any service relocation except for the identification and proving of existing services which is one month prior to constructing within that specific area (Clause 3.1.12.1, page 222). Note that it is the tenderer's responsibility to programme the works and make reasonable time allowance for services relocations as per Clause 3.1.8 page 220, bullet (5).

- 7) Question: Does CPG spend on enterprises include suppliers as well?

**Answer:** Yes, but they must be a qualifying local enterprise.

- 8) Question: Will the Contractor be held liable for services not indicated on wayleaves?

**Answer:** Any unknown services not indicated on the wayleaves or construction drawings will be considered to be an unknown service and these relocation works covered by the Employer's contingency budget.

- 9) Question: Schedule 1 P&G's items indicate a duration of 44 months but elsewhere it is indicated as 42 months, which one is correct?

**Answer:** Contract duration will be 42 months which consists of 2 months mobilisation and 40 months construction period, exclusive of special working days. All relevant items for Schedule 1 and 2 will be corrected.

- 10) Question: Is it possible to extend the tender closing period due to the complexity of the tender?

**Answer:** The City of Cape Town is under tremendous pressure to implement this project as soon as possible. Under these circumstance, we cannot extend the tender Closing Date.

The following amendments to the Schedule and Specifications are as follows:

**- Schedule 1: General Requirements and Provisions**

- Items C1.2.1.1 / C1.2.1.2 / C1.2.2.5 / C1.2.2.6 / C1.2.4 / C1.2.5.2 quantity changed to "40"months which was previously 42 or 44 months.
- Item 3.5.7.02 was amended from a per month item to a prime cost sum item, including a Contractor's overhead percentage charge item added.
- Items C1.4.8.2 quantity changed to "40"months which was previously 42 months.

**- Schedule 2: Roadworks**

- Items C1.5.1.1 / C1.5.2 / C1.5.3 / C1.5.7.6 / C1.5.7.9 / C1.5.8 / C1.5.9 quantity changed to "40"months which was previously 44 months.
- Item C1.8.10 has been amended to include the Contractor's mark-up, b) added

**- Schedule 6: Traffic Signals**

- Bill 1 item 15.1 has been amended to include the Contractor's mark-up, b) added
- Bill 2 item 15.1 has been amended to include the Contractor's mark-up, b) added
- Bill 3 item 14.1 has been amended to include the Contractor's mark-up, b) added

**- Clause 3.1.8: Programme, Method of Works and Accommodation of Traffic**

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- 7<sup>th</sup> paragraph, bullet point (1) and (8) has been amended which now indicates an eight week start-up period and peak hours corrected for the AM and PM peak hours which is in agreement with Clause A1.5.3.2.

- **Clause A1.5.3.2: General Requirements**

- Clause A1.5.3.2 (iv) has been amended and changed from a requirement of 3 lanes required to be open during construction to 2 lanes, one in each direction. All other unnecessary references have been removed.

Pages 79, 82, 86, 88, 89, 90, 122, 165, 169, 173, 220 and 244 have been replaced with amended pages 79A, 82A, 86A, 88A, 89A, 90A, 122A, 165A, 169A, 173A, 220A. + 244A

Yours Sincerely,

On behalf of Director: Supply Chain Management

**ACKNOWLEDGEMENT OF RECEIPT FOR AND ON BEHALF OF THE TENDERER: TENDER NO 72Q/2025/26**

At

2025

Signed

Noted as received

(Ink and Copy)

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