

CONTRACT

C1.1: FORM OF OFFER AND ACCEPTANCE

C1: AGREEMENTS AND CONTRACT DATA

C1.1 FORM OF OFFER AND ACCEPTANCE

Offer

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

CONTRACT No.: ELM 01/2021

UPGRADE & REHABILITATION OF MATTHEWS PHOSA ROAD AND ADJACENT STREETS

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

By the representative of the Tenderer, deemed to be duly 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.

For the Tender:

.....
Signature

.....
Name

.....
Capacity

Name and address of organization:

.....

.....

Signature and name of witness:

.....
Name

.....
Signature

Date:

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Acceptance

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

The terms of the contract are contained in

- Part 1 Agreement and Contract Data, (which include this Agreement)
- Part 2 Pricing Data
- Part 3 Scope of Work
- Part 4 Site Information

and drawings and documents or parts thereof, which may be incorporated by reference into Parts 1 to 4 above.

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

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

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

For the Employer:

.....
Signature Name

.....
Capacity

Name and address of organization:

.....
.....

Signature and name of witness:

.....
Signature Name

.....
Date

C1.1: FORM OF OFFER AND ACCEPTANCE

Schedule of Deviations

Notes:

1. The extent of deviations from the tender documents issued by the Employer prior to the tender closing date is limited to those permitted in terms of the 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 becomes 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:**.....

Details:.....

2. **Subject**.....

Details:.....

3 **Subject:**.....

Details:.....

4 **Subject:**.....

Details:.....

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

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

C1.1: FORM OF OFFER AND ACCEPTANCE

For the Tenderer:

For the Employer:

.....	Signature
.....	Name
.....	Capacity

Name and address of organisation:

Name and address of organisation:

.....	
.....	
.....	
.....	Witness Signature
.....	Witness Name
.....	Date

CONFIRMATION OF RECEIPT

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

The (Day)

of (Month)

20..... (Year)

At (Place)

For the Contractor:

.....
Signature

.....
Name

.....
Capacity

Signature and name of witness:

.....
Signature

.....
Name

C1.2: CONTRACT DATA

UPGRADE & REHABILITATION OF MATTHEWS PHOSA ROAD AND ADJACENT STREETS

PART 1: DATA PROVIDED BY THE EMPLOYER

C1.2.1: CONDITIONS OF CONTRACT

The General Conditions of Contract for Construction Works, Third Edition 2015 (GCC 2015), published by the South African Institution of Civil Engineering, Private Bag X200, Halfway House 1685, is applicable to this Contract and is obtainable from www.saice.org.za.

The General Conditions of Contract for Construction Works makes 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.

Each item of data given below is cross-referenced to the clause in the General Conditions of Contract for Construction Works to which it mainly applies.

If for some reason that the General Conditions of Contract for Construction Works (2015) does not address, the COLTO General Conditions of Contract 1998 for Road and Bridge Works will be referred to.

C1.2.1.2 SPECIAL CONDITIONS OF CONTRACT

C1.2.1.2.1 GENERAL

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

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

C1.2.1.2.2 AMENDMENTS TO THE GCC 2015

SCC 6.8.2 Application of Contract Price Adjustment Factor

Add the following to the end of subclause 6.8.2:

"Referring to the "CONTRACT PRICE ADJUSTMENT SCHEDULE" on page 72 of the GCC 2015, delete the four consecutive paragraphs describing the symbols "L", "P", "M" and "F" respectively, and replace them with the following:

"L" is the "Labour Index" and shall be the Consumer Price Index for the province and applicable area as stated in the Contract Data as published in Table 14 of the "Additional tables" of the Statistical release P0141 of Statistics South Africa

"P" is the "Plant Index" and shall be the Producer Price Index for "Civil engineering plant" as published in Table 4 of the Statistical release P0151 of Statistics South Africa.

"M" is the "Materials Index" and shall be the Producer Price Index for the "Building and construction - Civil engineering" industry as published in Table 3 of the Statistical release P0151 of Statistics South Africa.

"F" is the "Fuel Index" and shall be the Producer Price Index for "Diesel fuel – Wholesale Total" as published in Table 4 of the Statistical release P0151 of Statistics South Africa."

C.1.2.2: CONTRACT SPECIFIC DATA

Each item of data given below is cross-reference to the clause in the Condition of Contract to which it applies.

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

1.1.1 Definitions

Add the following definition:

"1.1.1.35 "Schedule of Documents" means the document so designated in and forming part of the Tender Documents"

1.3.5 Contractor's Copyright

Add to Clause 1.3.5

"The Contract Specific Data, Specifications (other than Standardized Specifications), Bills of Quantities and Drawing are the copyright of Mafahleni Engineers & Project Managers"

4.1.2 Contractor's liability for own design errors

In Clause 4.1.2, line 3, amend "any drawing" to read "any design, drawings"

4.3.1 Compliance with applicable laws

Add to the end Clause 4.3.1:

"The Contractor shall, within the time stated in the Appendix to Part 1 of the Contract Data, deliver to the Employer, for his approval, a health and safety plan as required by Regulations 4 (2) and 5 (1) of the Construction Regulations, 2003 of the Occupational Health and Safety Act.

The Employer shall approve (or disapprove) the health and safety plan within the time stated in the Appendix to Part 1 of the Contract Data from the date of receipt of the submission.

The Contractor shall, within the time stated in the Appendix to Part 1 of the Contract Data, deliver to the Employer a Mandatory Form as envisaged by section 37 (2) of the Occupational Health and Safety Act. (See Pro Forma: Agreement in terms of the Occupational Health and Safety Act bound in the Tender Documents.)"

4.3.2 Proof of good standing

Add to Clause 4.3.2:

"With regard to the Compensation for Occupational Injuries and Diseases Act (Act No.130 of 1993), the Contractor shall, within such time as is stated in the Appendix to Part 1 of the Contractor Data for the production of insurance policies in terms of Clause 8.6.6, deliver to the Employer a letter, either

- (a) from his Insurance Company certifying that the Contractor has effected insurance with the Company for the full extent of his potential liability in respect of all workmen employed by him on the Contract and undertaking to notify the Employer of the expiry date of the policy at least one calendar month before such date, or
- (b) from the Compensation Commissioner certifying that the Contractor has complied with the requirements of the above-mentioned Act and is at present in good standing with the Compensation Fund".

5.4.2 Access not exclusive

The access and possession of Site shall not be exclusive to the Contractor but as set out in the Scope of Works

5.12.1 Extension of time for Practical Completion

Add to Clause 5.12.1

"Should the Contractor consider that he may, during the course of the Contract, wish to invoke "abnormal climatic conditions" as a circumstance entitling him to an extension of time for the completion of the Works, he shall, before commencing any of the Permanent Work, establish an approved weather recording station with an approved observer who shall record daily the weather conditions that the Contractor may wish to invoke. The Records shall be submitted weekly to the Engineer's Representative, together with a statement recording the Contractor's opinion of the effect on his programme of any weather condition that he may consider to be abnormal."

The claim for extension of time shall be the sum of all the positive monthly totals for the Contract Period. Negative monthly totals shall be disregarded. A day shall be considered as lost when the Engineer's Representative agrees that no work was done or was capable of being done on any item shown on the critical path of the current construction programme. Items which are not shown on the critical path and have been affected by rainfall will not be considered for extension of time.

MONTH	EXPECTED NUMBER OF WORKING DAYS LOST DUE TO NORMAL RAINFALL	MONTH	EXPECTED NUMBER OF WORKING DAYS LOST DUE TO NORMAL RAINFALL
January	4	July	1
February	2	August	1
March	2	September	1
April	1	October	3
May	1	November	3
June	1	December	4

5.12.2 Some reasons for extension of time*

Add to Clause 5.12.2.1:

"Extension of time in respect of rainfall conditions shall be calculated in accordance with the method and data given in the Scope of Work."

Add to Clause 5.12.2.2:

Time period specified as the time for completion includes allowance for days on which it is expected that work, on the critical path items of the works, would be prevented due to weather conditions such as wind, rain falling or the subsequent waterlogged condition.

6.6.1 Provisional Sums

In Clause 6.6.1.2.1, the first line, after word "sum" insert ", excluding VAT," and in Clause 6.6.1.2.2, the third line, after the word "amount" insert, "excluding VAT".

6.6.2 Prime Cost Sums

In Clause 6.6.2, line 3, after the word "price", insert, "excluding VAT,"

6.9.1 Vesting Plant and Materials

Add at the end of Clause 6.9.1:

The Contractor shall where practicable before delivery, and in any event not later than 24 hours after delivery to the Site, inform the Engineer of any materials which are not his sole property."

6.9.2 Definition of "materials"

In Clause 6.9.2, last line, amend "Works" to read "Permanent Works".

6.10.1 Interim Payments

In Clause 6.10.1.5, line 4 amend "documentary evidence" to read" a signed statement".

7.2.1 Quality of Plant, Workmanship and Materials

Add at the end of Clause 7.2.1:

Unless otherwise directed in writing by the Engineer, materials for the Permanent Works shall be new and unused.

7.8.1 Making good of defects in Defects Liability Period

In Clause 7.8.1, paragraph 2, line 2, after the words "Defects Liability Period", insert "within the period specified by the Engineer", and amend "thereafter" to read "after the Defects Liability Period"

8.3.1 Excepted risks

In Clause 8.3.1.9 insert at the beginning, "Excepted where the Contract specifically so provides,"

8.6.1 Insurances to be effected.

Add to Clause 8.6.1.3:

"The minimum amount of insurance required in terms of this Clause, as stated in the Appendix to Part 1 of the Contract Data, shall be per event, the number of events being unlimited."

Amend Clause 8.6.1.5 to read:

"All material stored off Site, and intended for incorporation in the Permanent Works, including their delivery to the Site and off-loading on Site, to the value of such materials for which payment is made in terms of Clause 6.10.1.1 hereof."

8.6.5 Employer to approve insurance policy

Add to Clause 8.6.5 "withheld"

"The Employer shall approved (or disapprove) the terms of the insurance within the time state in the Appendix to Part 1 of the Contract Data from the date of receipt of the policies provided in terms of Clause 8.6.5."

8.6.6 Contractor to produce proof of payment

Add to Clause 8.6.6:

"The policies and the proof of payment of premiums and continuity of the policies shall be produced within such time as is stated in the Appendix to Part 1 of the Contract Data."

8.6.8 Claims arising

Add new Clause 8.6.8:

"In the event of any claim arising under the policies held in terms of this Clause, the Contractor shall forthwith take all necessary steps to lodge his claim on the joint behalf of himself and the Employer, and to secure settlement of such claim, and the claim submitted by the Contractor shall cover the cost of repairing and making good as required by Clause 8.2.2.1 and 8.2.2.3."

ADDITIONAL CLAUSES

Form of Offer

The Form of Offer to be used shall be the Offer bound in this document, which is not necessarily the same as the attached to the published version of the General Conditions of Contract.

Form of Acceptance

The Form of Acceptance to be used shall be the Acceptance bound in this document, which is not necessarily the same as that attached to the published version of the General Conditions of Contract.

Pro forma- Performance Guarantee

The Performance Guarantee shall be in the form bound in this document, which is not necessarily the same as that attached to the published version of the General Conditions of Contract.

A. DATA TO BE PROVIDED BY THE EMPLOYER

REF. CLAUSE No DATA BY EMPLOYER

C.1.2.3.1 Compulsory Data

Clause 1.1.1.13:	Defects Liability Period is 12 months measured from the date of the completion certificate.
Clause 1.1.1.14:	The time for achieving Practical Completion is 11 months from the Commencement Date, including non-working days and special non-working days.
Clause 1.1.1.15:	Name of Employer: Emalahleni Municipality
Clause 1.1.1.26:	The Pricing Strategy is Re-measurement Contract.
Clause 1.2.1.2:	Address of Employer: Physical: Mandela street Emalahleni 1035 Telephone No: (013) 690 6911 Fax No: (013) 690 6207 Postal: P O Box 3 Emalahleni 1035
Clause 1.1.1.16:	Name of Employers Agent 'Employers Agent' means any Director, Associate or Professional Employers Agent appointed by the Director of Mafahleni Engineers and Project Managers to fulfill the functions of the Employers Agent in terms of the Contract Data
Clause 1.2.1.2	Address of Employers Agent: Physical: 49 Ferreira St Mbombela 1200 Telephone No: 013 752 2937 Fax No: 013 752 2915 Postal: P O Box 4147 Mbombela 1200
Clause 5.3.1:	The documentation required before commencement with Works execution are: <ul style="list-style-type: none"> • Health and Safety Plan (Refer to Clause 4.3) • Initial programme (Refer to Clause 5.6) • Security (Refer to Clause 6.2) • Insurance (Refer to Clause 8.6) • Construction permit (as per Occupational Health & Safety Act 1993: Construction regulations 2014)
Clause 5.3.2:	The time to submit the documentation required before commencement with Works execution is 14 days.
Clause 5.8.1:	The non-working days are: Sundays The special non- working days are: <ol style="list-style-type: none"> 1) All statutory holidays as declared by National/ Regional Government. 2) The year-end break commencing on 17th December 2021 and ending on 07th January 2022
Clause 5.13.1:	The penalty for failing to complete the Works is 0.075% of the bid sum per calendar day
Clause 5.16.3:	The latent defect period is 10 years for civil engineering works
Clause 6.8.2:	The value of the certificates issued shall be adjusted in accordance with the Contract Price Adjustment Schedule with the following values:

The values of the coefficients for calculating the Contract Price Adjustment Factor are:

$$a = 0.20 \quad b = 0.35 \quad c = 0.35 \quad d = 0.10$$

The "Consumer Price Index" will be as for the province of Mpumalanga for the area of Province.

The base month is the month prior to the month in which the closing date for the tender falls.

- Clause 6.8.3: Price adjustments for variations in the costs of special materials are allowed.
- Clause 6.10.1.5: The percentage advance on materials not yet built into the Permanent Works is 80%
- Clause 6.10.3: The limit of retention money is 10% of the contract value. A retention money guarantee is not permitted.
- 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 R 500 000.00.
- Clause 8.6.1.3: The limit of indemnity for liability insurance is R 2 000 000.00

B: DATA TO BE PROVIDED BY CONTRACTOR

**REF. CLAUSE No DATA BY
CONTRACTOR**

Clause 1.1.1.9: **Name of Contractor:**

Clause 1.2.1.2: **Address of Contractor:**

Physical:

Postal:

.....

.....

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.....

.....

E-mail:

Telephone No: Fax No:.....

Clause 6.8.3: The variations in cost of special materials* will be based on the following:

Special Material	Unit	Rate or Price

**The quoted price is the ruling price on the month prior to the close of bid.*

C1.3: FORM OF GUARANTEE

C1.3.1: PERFORMANCE GUARANTEE

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

GUARANTOR DETAILS AND DEFINITIONS

"Guarantor" means:

Physical address:

"Employer" means: **Emalahleni Municipality**

"Contractor" means:

"Employers Agent" means: **Mafahleni Engineers & Project Managers**

"Works" means: **Rehabilitation & Upgrade of Matthews Phosa road and Adjacent Streets**

"Site" means: **Kwaguqa**

"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:

CONTRACT DETAILS

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

1. VARIABLE PERFORMANCE GUARANTEE

1.1 Where a Variable Performance Guarantee has been selected, the Guarantors liability shall be limited during the following periods to diminishing amounts of the Guaranteed sum as follows:

1.1.1 from and including the date of signing the Performance Guarantee up to and including the date of the interim payment certificate certifying for the first time more than 50% of the contract sum:

R..... (Amount in words)

1.1.2 from the day following the date of the said interim payment certificate up to and including the Expiry Date, or the date of issue by the Employers Agent of the Certificate of Completion of Works, whichever occurs first:

R.....(Amount in words).....

1.2 The Employers Agent and/or the Employer shall advise the Guarantor in writing of the date on which the interim payment certificate certifying for the first time, more than 50% of the contract Sum, has been issued and the date on which the certificate of completion of the works has been issued.

2. FIXED PERFORMANCE GUARANTEE

2.1 Where a Fixed Performance Guarantee has been selected, the Guarantors liability shall be limited to the amount of Guaranteed Sum.

2.2 The Guarantors period of liability shall be from and including the date on which the Performance Guarantee is signed up to and including the Expiry Date, or the date of issue by the Employers Agent of the Certificate of Completion of the works, or the date of payment in full of the Guaranteed Sum, whichever occurs first

2.3 The Employers Agent and/or the Employer shall advise the Guarantor in writing of the date on which the Certificate of the Works has been issued.

3. CONDITIONS APPLICABLE TO VARIABLE AND FIXED PERFORMANCE GUARANTEES

3.1 The Guarantor hereby acknowledge that:

3.1.1 Any reference in this Performance Guarantee to the Contract is made for the purpose of convenience and shall not be constructed as any intention whatsoever to create an accessory obligation or any intention whatsoever to create a suretyship.

3.1.2 Its obligation under this Performance Guarantee is restricted to the payment of money.

3.2 Subject to the Guarantors maximum liability referred to in 1.1 or 2.1, the Guarantor hereby undertakes to pay the Employer the sum certified upon receipt of the documents identified in 3.2.1 to 3.2.3.

3.2.1 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 as payment within seven(7) calendar days , the Employer intends to call upon the Guarantor to make payment in terms of 3.3.2;

- 3.2.2 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 3.2.1 and sum certified has still not been paid;
- 3.2.3 A copy of the aforesaid payment certificate which entitles the Employer to receive payment in terms of the sum certified in 3.2
- 3.3 Subject to the Guarantor's maximum liability referred to in 1.1 or 2.1, the Guarantor undertakes to pay to the Employer the Guarantor undertakes first written demand from the Employer to the Guarantor's physical address calling up this Performance Guarantee, such demand stating that;
 - 3.3.1 the Contract has been terminated due to the Contractor's default and that this Performance Guarantee and that this Performance Guarantee is called up in terms of 3.3; or
 - 3.3.2 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 3.3; and
 - 3.3.3 the aforesaid written demand is accompanied by a copy of the notice termination and/or the provisional /final sequestration and/or the provisional liquidation court order.
- 3.4 It is recorded that the aggregate amount of payments required to be made by the Guarantor in terms of 3.2 and 3.3 shall not exceed the Guarantor's maximum liability in terms of 1.1 or 2.1.
- 3.5 Where the Guarantor has made payment in terms of 3.3, 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 Employer's bank compounded monthly and calculated from the date payment was made by the Guarantor to the Employer until the date of refund.
- 3.6 Payment by the Guarantor in terms of 3.2 or 3.3 shall be made within seven (7) calendar days upon receipt of the first written demand to the Guarantor.
- 3.7 Payment by the Guarantor in terms of 3.3 will only be made against the return of the original Performance Guarantee by the Employer.
- 3.8 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.
- 3.9 The Guarantor chooses the physical address as stated above for the service of all notices for all purposes in connection herewith.
- 3.10 This Performance Guarantee is neither negotiable nor transferable and shall expired in terms of 1.1.2 or 2.2, 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

3.11 This Performance Guarantee, with the required demand notices in terms of 3.2 or 3.3, shall be regarded as liquid document for the purposes of obtaining a court order.

3.12 Where this Performance Guarantee is issued in the Republic of South African 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).....

C1.4: ADJUDICATOR'S CONTRACT

C1.4.1: DISCLOSURE STATEMENT

Contract : _____
Contractor : _____
Employer : _____
Engineer : _____

Dear Sirs

I am willing and available to serve as (*ad-hoc/standing*) Adjudication Board Member in the above- mentioned Contract.

In accordance with the General Conditions of Contract for Construction Works Adjudication Board Rules relating to disclosure statements by selected or nominated persons to the adjudication, I hereby state that:

- I shall act with complete impartiality and know of nothing at this time, which could affect my impartiality.
- I have had no previous involvement with this project.
- I do not have any financial interest in this project.
- I am not currently employed by the contractor, Employer or Engineer.
- I do not have any financial connections with the Contractor, Employer or Engineer.
- I do not have or have not had a personal relationship with any authoritative, member of the Contractor, Employer or the Engineer which could affect my impartiality.
- I undertake to immediately disclose to the parties any changes in the above position which could affect my impartiality or be perceived to affect same.

Should there be any deviation from foregoing statements, details shall be given.

I further declare that I am experienced in the work which is carried out under the Contract and in interpreting contract documentation.

Name in full: _____

Signature: _____

C1.4.2: ADJUDICATION BOARD MEMBER AGREEMENT

This Agreement is entered into between:

Adjudication Board Member:

Contractor:

Employer

The contractor and the Employer will hereinafter be collectively referred to as the Parties.

The parties entered into a contract for which provides that a dispute under or in connection with the General Condition of Contract for Construction Works, Third Edition 2015, must be referred to

The undersigned natural person has been appointed to serve as Adjudication Board Member and together with the undersigned Parties agree as follows:

1. The Adjudication Board Member accepts to perform his duties in accordance with the terms of the Contract, the General Condition of Contract for Construction Works Adjudication Board Rules and Agreement.
2. The adjudicator undertakes to remain independent and impartial of the Contractor, Employer and Engineer for the duration of the Adjudication board proceedings.
3. The Adjudication Board Member agrees to serve for the duration of the Adjudication Board proceedings.
4. The parties may at any time, without cause and with immediate effect, jointly terminate this Agreement.
5. Unless the Parties agree, the Adjudication Board Member shall not act as arbitrator or representative of either Party in any subsequent proceedings between the Parties under the contract. No Party may call the Adjudication Board Members as a witness in any such subsequent proceedings.
6. The standing Adjudication Board's duties shall end upon the Adjudication Board Member(s) receiving notice from the Parties of their joint decision to disband the Adjudication Board.
7. The Adjudication Board Member shall be paid in respect of time spent upon or in connection with the Adjudication including time spent travelling:
 - a. A monthly retainer of for of months, and / or
 - b. A daily fee of based on a hour day, and/or
 - c. A hourly fee ofand/or
 - d. A non – recurrent appointment fee of which shall be accounted for in the final sums payable
8. The Adjudication Board Member's expenses incurred in adjudication work shall be reimbursed at cost

Upon submission of an invoice for fees and expenses to the Parties, the shall pay the full amount within 28 days of receipt of the invoice and he shall be reimbursed by the other party by half the amount so that the fees and expenses are borne equally by the Parties. Late payment of such invoice shall attract interest at prime plus 3% points compounded monthly at the prime rate charged by the Adjudication Board Member's bank.

This Agreement is entered into by:

Contractor's signature:

Contractor's name:

Place:

Date:

Employer's signature:

Employer's name:.....

Place:

Date:

Adjudication Board Member's signature:

Adjudication Board Member's name:.....

Place:

Date:

**Delete the inapplicable party*

C1.5: AGREEMENT IN TERMS OF SECTION 37(2) OF THE OCCUPATIONAL HEALTH AND SAFETY ACT No 85 OF 1993

THIS AGREEMENT is made between

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

(hereinafter called the EMPLOYER) of the one part, herein represented by:

.....
.....

in his capacity as:

AND:

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

.....
.....

in his capacity as:

duly authorized to sign on behalf of the Contractor.

WHEREAS the CONTRACTOR is the Mandatory of the EMPLOYER in consequence of an agreement between the CONTRACTOR and the EMPLOYER in respect of

CONTRACT No.: ELM 01/2021

UPGRADE & REHABILITATION OF MATTHEWS PHOSA ROAD for the construction, completion and maintenance of the works;

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

NOW THEREFORE the parties agree as follows:

1. The CONTRACTOR undertakes to acquaint the appropriate officials and employees of the CONTRACTOR with all relevant provisions of the ACT and the regulations promulgated in terms thereof.
2. The CONTRACTOR undertakes to fully comply with all relevant duties, obligations and prohibitions imposed in terms of the ACT and Regulations: Provided that should the EMPLOYER have prescribed certain arrangements and procedures that same shall be observed and adhered to by the CONTRACTOR, his officials and employees. The CONTRACTOR shall bear the onus of acquainting himself/herself/itself with such arrangements and procedures.
3. The CONTRACTOR hereby accepts sole liability for such due compliance with the relevant duties, obligations, prohibitions, arrangements and procedures, if any, imposed by the ACT and Regulations, and the CONTRACTOR expressly absolves the EMPLOYER and the Employer's CONSULTING ENGINEERS from being obliged to comply with any of the aforesaid duties, obligations, prohibitions, arrangements and procedures in respect of the work included in the contract.
4. The CONTRACTOR agrees that any duly authorized officials of the EMPLOYER shall be entitled, although not obliged, to

take such steps- as may be necessary to ensure that the CONTRACTOR has complied with his undertakings as more fully set out in paragraphs 1 and 2 above, which steps- may include, but shall not be limited to, the right to inspect any appropriate site or premises occupied by the CONTRACTOR, or to take such steps- it may deem necessary to remedy the default of the CONTRACTOR at the cost of the CONTRACTOR.

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

Thus signed at for and on behalf of the **CONTRACTOR** on this the day of 20.....

SIGNATURE:.....

NAME AND SURNAME:.....

CAPACITY:.....

WITNESSES: 1.....

2.....

Thus signed at for and on behalf of the **EMPLOYER** on this the day of 20.....

SIGNATURE:.....

NAME AND SURNAME:.....

CAPACITY:.....

WITNESSES: 1.....

2.....

C2: PRICING DATA

C2.1 PRICING INSTRUCTIONS

1. GENERAL

The Bill of Quantities forms part of the Contract Documents and must be read and priced in conjunction with all the other documents comprising the Contract Documents, which include the Conditions of Tender, Conditions of Contract, the Specifications (including the Project Specification) and the Drawings.

2. DESCRIPTION OF ITEMS IN THE SCHEDULE

The Bill of Quantities has been drawn up generally in accordance with Civil Engineering Quantities 1990 issued by the SA Institution of Civil Engineers.

The short descriptions of the items in the Bill of Quantities are for identification purposes only and the measurement and payment clause of the Standardized Specifications and the Particular Specifications, read together with the relevant clauses of the Project Specification and directives on the drawings, set out what ancillary or associated work and activities are included in the rates for the operations specified.

3. QUANTITIES REFLECTED IN THE SCHEDULE

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

The Works as finally completed in accordance with the Contract shall be measured and paid for as specified in the Bill of Quantities and in accordance with the General and Special Conditions of Contract, the Specifications and Project Specifications and the Drawings. Unless otherwise stated, items are measured net in accordance with the Drawings, and no allowance has been made for waste.

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

4. PROVISIONAL SUMS

Where Provisional sums or Prime Cost sums are provided for items in the Bill of Quantities, payment for the work done under such items will be made in accordance with Clause 6.6 of the General Conditions of Contract Third Edition 2015. The Employer reserves the right, during the execution of the works, to adjust the stated amounts upwards or downwards according to the work actually done under the item, or the item may be omitted altogether, without affecting the validity of the Contract.

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

5. PRICING OF THE BILL OF QUANTITIES

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

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

If the Contractor omits to price any items in the Bill of Quantities, then these items will be considered to have a nil rate or price.

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

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

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

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

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

6. CORRECTION OF ENTRIES

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

7. ARITHMETICAL ERRORS

Arithmetical errors found in the Bill of Quantities as a result of faulty multiplication or addition, will be corrected by the Engineer at the tender evaluation stage, as set out in the Tender Data.

8. MONTHLY PAYMENTS

Unless otherwise specified in the Specifications and Project Specifications, progress payments in Interim Certificates, referred to in Clause 6.10 of the General Conditions of Contract Third Edition 2015, in respect of "sum" items in the Bill of Quantities shall be by means of interim progress installments assessed by the Engineer and based on the measure in which the work actually carried out relates to the extent of the work to be done by the Contractor.

9. UNITS OF MEASUREMENT

The units of measurement described in the Bill of Quantities are metric units for which the standard international abbreviations are used. Non-standard abbreviations which may appear in the Bill of Quantities are as follows:

No.	=	number
%	=	percent
Sum	=	Lump sum
PC sum	=	Prime cost sum
Prov sum	=	Provisional sum

EMALAHLENI MUNICIPALITY
BID No.: ELM 01/2021
PROPOSED UPGRADE OF MATTHEWS PHOSA ROAD AND ADJACENT STREETS
BILL OF QUANTITIES

Number	Item Description	Unit	Quantity	Rate	Amount
	SECTION 1200				
1200	GENERAL REQUIREMENTS AND PROVISIONS				
B12.01	Community Liaison Officers (3 CLOs for a period of 11 months)				
	(a) Remuneration of community liaison officers cost	Prov Sum	1,00	R 252 000,00	R 252 000,00
	(b) Handling costs and profit in respect of subitem on B12.01(a)	%	252000,00		
B12.02	Contractor's general obligations in respect of compliance with the Environmental Management Plan				
	(a) Fixed obligations	Lump Sum	1,00		
	(b) Remuneration of Environmental Control Officer	month	11,00		
B12.03	Contractor's general obligations in respect of Occupational Health and Safety Act and Construction Regulations				
	(a) Fixed obligations	Lump Sum	1,00		
	(b) Time related obligations	month	11,00		
	(c) HIV AIDS awareness obligations	Lump Sum	1,00		
B12.04	Protection and/or Relocation of Eskom				
	(a) Payment to Eskom to relocate, or lower their services	Prov. Sum	1,00	R 1 500 000,00	R 1 500 000,00
	(b) Handling costs and profit in respect of sub item B12.04(a)	%	1500000,00		
B12.05	Exposing of existing services by hand in all classes of material	m3	120,00		
B12.06	Payment for Protection and/or Relocation of other Emalahleni Municipality Services	Prov. Sum	1,00	R 2 000 000,00	R 2 000 000,00
	(b) Handling costs and profit in respect of sub item B12.06	%	2000000,00		
B12.07	Protection and/or Relocation of Telkom, and related service provider services				
	(a) Payment to Telkom or other related service provider to relocate, or lower their services	Prov. Sum	1,00	R 1 500 000,00	R 1 500 000,00
	(b) Handling costs and profit in respect of sub item B12.07(a)	%	1500000,00		
B12.09	Provision of contract name board (2m high x 3m wide)	No	2,00		
B12.10	Remove and relocate of traffic signals				
	a) Remove and relocate	No	2,00		
	b) Remove and take to stores	No	4,00		
Total Carried Forward					

Number	Item Description	Unit	Quantity	Rate	Amount
Total Brought Forward					
B12.12	Compulsory Training				
	a) Labour	PC Sum	1.00	R 150 000.00	R 150 000.00
	b) QSE'S and EME's	PC Sum	1.00	R 100 000.00	R 100 000.00
	c) Handling costs and profit in respect of sub item B12.04 (a) and (b)	%	250000,00		
B12.13	Services for Engineer				
	a) Allow Sum for Geotechnical investigation	PC Sum	1,00	R 205 000,00	R 205 000,00
	(i) Handling costs and profit in respect of sub item B12.11(a)	%	205000,00		
	b) Allow sum for Social Facilitation services	PC Sum	1,00	R 750 000,00	R 750 000,00
	(i) Handling costs and profit in respect of sub item B12.11(b)	%	750000,00		
	c) Allow sum for Payment to Engineer approved OHS Practitioner	PC Sum	1,00	R 207 000,00	R 207 000,00
	(i) Handling costs and profit in respect of sub item B12.11(c)	%	207000,00		
	d) Allows sum for Engineer approved Environmental Practitioner	PC Sum	1,00	R 140 000,00	R 140 000,00
	(i) Handling costs and profit in respect of sub item B12.11(d)	%	140000,00		
	(e) Allow sum for Engineer appointed Surveyor for survey work	PC Sum	1,00	R 172 500,00	R 172 500,00
	(i) Handling costs and profit in respect of sub item B12.11(e)	%	172500,00		
	f) Allow sum for Engineers supervision for duration of contract	PC Sum	1,00	1 345 500,00	R 1 345 500,00
	(i) Handling costs and profit in respect of sub item B12.11(f)	%	1345500,00		
	g) Allow sum for Electrical Engineers supervision for duration of contract	PC Sum	1,00	R 635 000,00	R 635 000,00
	(i) Handling costs and profit in respect of sub item B12.11(g)	%	635000,00		
	h) Allow sum for Engineers remuneration for Traffic studies conducted	PC Sum	1,00	R 180 000,00	R 180 000,00
	(i) Handling costs and profit in respect of sub item B12.11(h)	%	180000,00		
Total Carried Forward To Summary					

Number	Item Description	Unit	Quantity	Rate	Amount
	SECTION 1300				
1300	CONTRACTOR'S ESTABLISHMENT ON SITE AND GENERAL OBLIGATIONS				
B13.01	Contractor's general obligations				
	(a) Fixed obligations	Lump Sum	1,00		
	(b) Value-related obligations	Lump Sum	1,00		
	(c) Time-related obligations	month	11,00		
Total Carried Forward To Summary					

Number	Item Description	Unit	Quantity	Rate	Amount
14.00	SECTION 1400				
	HOUSING, OFFICES AND LABORATORY FOR THE ENGINEER'S SITE PERSONNEL				
B14.01	Office and laboratory accommodation				
	(a) Offices (interior floor space only)	m ²	36,00		
	(b) Open concrete working floors, 150 mm thick	m ²	20,00		
	(d) Roofs over open concrete working floors	m ²	20,00		
	(e) Ablution units	m ²	10,00		
14.02	Office and laboratory furniture				
	(a) Chairs	No	15,00		
	(b) Desks, complete with drawers and locks	No	2,00		
	(f) Conference tables	No	1,00		
14.03	Office Installations and equipment				
	(a) Items measured by number				
	(i) 220/250 volt power points	No	5,00		
	(ii) 400/231 volt 3-phase power points	No	2,00		
	(iii) Double 80 watt fluorescent light fittings complete with ballast and tubes	No	5,00		
	(iv) Double 55 watt fluorescent light fittings complete with ballast and tubes	No	3,00		
	(v) Hand wash basins complete with taps and drains	No	1,00		
	(x) Fire extinguishers, 9,0 kg, all-purpose dry powder type, complete, mounted on wall with brackets	No	2,00		
	(xi) Air conditioning units with 2,2 kW minimum capacity, mounted and with own power connection	No	2,00		
	(xii) Heater, space-heating type, minimum capacity 1,5kW	No	2,00		
	(xiv) General-purpose steel cupboard with shelves	No	2,00		
	(xv) Steel filing cabinet with drawers	No	1,00		
	(xvi) Refrigerators	No	1,00		
	(xviii) Voltage stabilizers	No	1,00		
	(xix) Plan rack holders	No	2,00		
	(xxi) Provision of personal computers, printers and accessories, plus all necessary software as specified, including internet connection and email	Prov Sum	1,00	R 20 000,00	R 20 000,00
	(xxii) Handling costs and profit in respect of sub item 14.03(a)(21)(c) above	%	20000,00		
Total Carried Forward					

Number	Item Description	Unit	Quantity	Rate	Amount
Total Brought Forward					
	(b) Prime Cost items and items paid for lump sum				
	(1) Provision of telephone services, including cost of calls in connection to the contract administration staff and telephone rental	PC sum	1,00	R 25 000,00	R 25 000,00
	(2) Handling costs and profit in respect of sub item 14.03(b)(1) above	%	25000,00		
	(c) Items measured by area				
	(1) Shelving as specified, complete with brackets	m ²	15,00		
	(6) Roller blinds, opaque type	m ²	6,00		
	(8) Notice boards as specified (White boards)	m ²	5,00		
14.04	Car ports				
	(a) Car ports, as specified, at offices and laboratory buildings	No	2,00		
B14.07	Rented hotel and other accommodation				
	(a) Provisional sum for providing rented housing, hotel or other accommodation, fully furnished including services.	Prov Sum	1,00	R 132 000,00	R 132 000,00
	(b) Handling costs and profit in respect of sub item B14.07(a)	%	132000,00		
14,08	Services				
	(a) Services at office and laboratories:				
	(i) Fixed costs	Lump Sum	1,00		
	(ii) Running costs	Month	11,00		
B14.10	Provision of photostat facilities (500 Copies per month)	month	11,00		
B14.11	Provision of Surveying Services for use by the Engineer				
	(a) Wages, salaries and allowances	Prov Sum	1,00	R 30 000,00	R 30 000,00
	(b) Handling costs and profit in respect of subitem B14.11(a) above	%	30000,00		
Total Carried Forward To Summary					

Number	Item Description	Unit	Quantity	Rate	Amount
15.00	SECTION 1500				
	ACCOMMODATION OF TRAFFIC				
B15.01	Accommodating traffic and maintaining temporary deviations	km	5,00		
B15.03	Temporary traffic-control facilities				
	(a) Flagmen	man-day	1188,00		
	(b) Portable STOP and GO-RY signs	No	3,00		
	(c) Temporary traffic-control signals as specified or as shown on the drawings	No	2,00		
	(d) Amber flicker lights	No	4,00		
	(e) Road signs, R- and TR-series, (1200 mm)	No	30,00		
	(f) Road signs, TW-series, (1200mm)	No	30,00		
	(g) Road signs, STW-, DTG-, TGS- AND TG-series (excluding delineators and barricades)	m²	20,00		
	(h) Delineators (DTG50J) (250 x 1000):				
	(1) Single	No	150,00		
	(2) Mounted back to back	No	270,00		
	(i) Moveable barricade/road sign combination (TW 410 Chevron 3600 x 600)	No	4,00		
	(l) Movable barriers (Plastic New Jersey Type)	m	60,00		
	(m) Two-way communication devices	No	10,00		
15.04	Relocation of traffic-control facilities	Lump Sum	1,00		
15.08	Repairs, alterations and/or additions to existing roads used as temporary deviations	Prov sum	1,00	R 400 000,00	R 400 000,00
15.09	Maintenance of the bituminous surfacing and pavement of temporary deviations with bituminous surfacing and existing roads with bituminous surfacing used as temporary deviations	Prov sum	1,00	R 400 000,00	R 400 000,00
15.10	Accommodation of traffic where the road is constructed in half-widths	km	10,00		
B15.11	Provision of Traffic Safety Officer (including safety vehicle)	month	11		
Total Carried Forward To Summary					

Number	Item Description	Unit	Quantity	Rate	Amount
	SECTION 1600				
16.00	OVERHAUL				
B16.02	Overhaul on material hauled in excess of 1,0 km (ordinary overhaul)	m³-km	27000,00		
Total Carried Forward To Summary					

Number	Item Description	Unit	Quantity	Rate	Amount
	SECTION 1700				
17.00	CLEARING AND GRUBBING				
17.01	Clearing & grubbing	ha	1,00		
17.02	Removal and grubbing of large trees and tree stumps				
	(a) Girth exceeding 1m up to and including 2m	No	4,00		
	(b) Girth exceeding 2m up to and including 3m	No	4,00		
17.03	Re-clearing of surfaces (on the written instructions of the Engineer only)	ha	1,00		
17.04	Clearing and grubbing at inlets and outlets of hydraulic structures	m ²	800,00		
17.05	Cleaning out of hydraulic structures				
	(a) Pipes with an internal diameter up to and including 750 mm	m ³	100,00		
	(b) Pipes with an internal diameter exceeding 750 mm	m ³	100,00		
	(c) Box culverts up to and including 1,5 m vertical dimension	m ³	30,00		
	(d) Box culverts exceeding 1,5 m vertical dimension	m ³	30,00		
	(e) Grid inlets or side inlets not exceeding 1,5 m longitudinal dimensions	m ³	50,00		
Total Carried Forward To Summary					

Number	Item Description	Unit	Quantity	Rate	Amount
	SECTION 1800				
18,00	DAYWORKS				
B18.01	Personnel				
	(a) Unskilled labour	h	300,00		
	(b) Semi-skilled labour (Charge hand)	h	100,00		
	(c) Skilled labour (Artisan)	h	100,00		
	(d) Foreman	h	30,00		
	(e) Surveyor	h	30,00		
B18.02	Plant				
	(a) Trucks				
	(ii) Tip truck 10m³	h	50,00		
	(b) TLB tractor fitted with backactor and loader				
	(i) Model 55 - 70Kw power approximate mass 7 tonne	h	40,00		
	(c) Vibratory roller (self-propelled)				
	(i) Model mass 2t width 0.9m	h	20,00		
	(ii) Model mass 10t width 2.2m	h	20,00		
	(d) Air compressor complete with all tools, drills, jackhammers, etc. (10m³/min)	h	20,00		
	(e) Grader Cat 140H, or equivalent	h	20,00		
	(f) Water truck (9000litre)	h	20,00		
B18.03	Material				
	(a) Materials	PC sum	1,00	15 000,00	R 15 000,00
	(b) Percentage on net cost of materials	%	15000,00		
Total Carried Forward To Summary					

Number	Item Description	Unit	Quantity		Amount
21.00	SECTION 2100 DRAINS				
B21.01	Excavation for open drains: (a) Excavating soft material situated within the following depth ranges below the surface level: (1) 0 m up to 1,5 m	m ³	100,00		
	(b) Extra over subitem 21.01(a) for excavation in hard material, irrespective of depth	m ³	150,00		
21.02	Clearing and shaping existing open drains	m ³	100,00		
21.03	Excavation for subsoil drainage systems: (a) Excavating soft material situated within the following depth ranges below the surface level: (1) 0 m up to 1,5 m	m ³	120,00		
	(b) Extra over subitem 21.03(a) for excavation in hard material irrespective of depth	m ³	30,00		
21.04	Impermeable backfilling to subsoil drainage systems	m ³	100,00		
21.06	Natural permeable material in subsoil drainage systems (crushed stone): (a) Crushed stone obtained from commercial sources (i) Coarse-Grade (19 mm nominal size aggregate)	m ³	125,00		
21.07	Natural permeable material in subsoil drainage systems (sand): (b) Sand obtained from commercial sources (i) Coarse grade 4,75 mm nominal particle size	m ³	75,00		
21.08	Pipes in subsoil drainage systems: (b) Unplasticized PVC pipes and fittings, normal duty complete with couplings: (i) 100 mm internal diameter, perforated or slotted	m	750,00		
21.10	Synthetic-fibre filter fabric (non-woven, Grade 2)	m ²	1350,00		
21.12	Concrete outlet structures, manhole boxes, junction boxes and cleaning eyes for subsoil drainage systems: (a) Outlet structures (d) Cleaning eyes	No No	5,00 5,00		
21.13	Concrete caps for subsoil drain pipes	No	5,00		
21.17	Test flushing of pipe subsoil drains	No	5,00		
Total Carried Forward To Summary					

Number	Item Description	Unit	Quantity	Rate	Amount
22.00	SECTION 2200				
22.01	PREFABRICATED CULVERTS				
	Excavation:				
	(a) Excavating soft material situated within the following depth ranges below the surface level:				
	(i) 0 m up to 1,5 m	m³	6500,00		
	(ii) Exceeding 1.5m up to 3.0m	m³	200,00		
	(b) Extra over subitem 22.01(a) and (b) for excavation in hard material, irrespective of depth.	m³	150,00		
22.02	Backfilling:				
	(a) Using the excavated material	m³	3900,00		
	(b) Using imported selected material from commercial sources (unrestricted free haul)	m³	1000,00		
	(c) Extra over subitems 22.02(a) and (b) for soilcrete cement backfilling (with 3% cement)	m³	100,00		
22.03	Concrete pipe culverts:				
	(a) On class C bedding:				
	(i) 450mm Ø Type IJ class 100D	m	100,00		
	(ii) 600mm Ø Type IJ class 100D	m	3500,00		
	(iii) 900mm Ø Type IJ class 100D	m	200,00		
22.05	Portal and rectangular Culverts				
	(b) Without prefabricated floor slabs:				
	(1) 1800mm x 1200mm, Class 150S	m	100,00		Rate Only
	(2) 2100mm x 2100mm, Class 75S	m	50,00		Rate Only
	(3) 3600mm x 2400mm, Class 75S	m	50,00		Rate Only
22.07	Cast in-situ concrete and formwork				
	(b) In floor slabs for portal or rectangular culverts, including formwork and class U2 surface finish, Class 25/19 concrete	m³	15,00		
	(c) In inlet and outlet structures, skewed ends, catchpits, manholes, kerb inlets, thrust and anchor blocks, excluding formwork but including Class U2 surface finish, Class 20/19 concrete	m³	20,00		
	(d) Formwork of concrete under subitem 22.07 (c) above				
	1) Vertical formwork for F3 surface finish	m²	50,00		
22.10	Steel reinforcement				
	a) Mild-steel bars	t	2,00		
Total Carried Forward					

Number	Item Description	Unit	Quantity	Rate	Amount
Total Brought Forward					
22.12	b) High-tensile steel bars	t	4,00		
	c) Welded steel mesh (Ref 193)	kg	1500,00		
	Removing of existing concrete				
22.17	a) Plain concrete	m³	280,00		
	b) Reinforced concrete	m³	100,00		
	Manholes, catchpits, precast inlet and outlet structure complete as per Drawing No.....DET 02-05				
22.23	a) Manholes				
	1) Brick manholes for drainage constructed on all pipes up to 750mm Ø completed with 1.0 pre-cast manhole ring above the ground level. (Standard depth 1.50m)	No	15,00		
	(b) Catchpits, See Typical standard details drawing No.....DET 02				
	(i) Type A1 (1.50m deep)	No	20,00		
	(ii) Type A1 (1.5m to 2.0m deep)	No	8,00		
	(iii) Type A2 (1.50m deep)	No	6,00		
	(iv) Type A2 (1.5m to 2.0m deep)	No	2,00		
	Accessories				
	(a) Manholes covers including frames	No	10,00		
	(b) Inlet grids including frames (Type 80)	No	10,00		
	Service ducts:				
	(a) Ordinary pipes:				
22.24	(i) 110mm Ø , Class 16uPVC	m	400,00		
	(ii) 160mmØ, Class 16uPVC	m	100,00		
	Duct marker blocks as per SD 1002/C	No	15,00		
Total Carried Forward To Summary					

Number	Item Description	Unit	Quantity	Rate	Amount
	SECTION 2300				
23.00	CONCRETE KERBING, CONCRETE CHANNELLING, CHUTES AND DOWNPIPES, AND CONCRETE LININGS FOR OPEN DRAINS				
B23.02	Concrete kerbing-channelling combination (a) Precast kerb to SANS 927 and cast in situ 300mm concrete channel (concrete class 20/19) as shown on standard details drawing No.XS -T - 01				
	(1) Figure 7 Semi-Barrier Kerb	m	11500,00		
	(2) Figure 8(c) Mountable Kerb	m	11200,00		
	(3) Figure 3 Barrier Kerb	m	8400,00		
	(4) T&G (edge restraint -sidewalk)	m	8400,00		
23.03	Concrete chutes (typical designs): (a) Precast concrete chute	m3	150,00		
23.05	Inlet, outlet, transition and similar structures (typical designs): (a) Prefabricated inlet structures for chutes as shown on drawing	No	10,00		
23,07	Trimming of excavations for concrete-lined open drains (a) In soft material (b) In hard material	m ² m ²	2000,00 500,00		
23.08	Concrete lining for open drains: (a) Cast in situ concrete lining class 20/19 (i) For Standard v-side drain as per drawing (b) Class U2 surface finish to cast in-situ concrete lined open drains:	m ³ m ²	200,00 1500,00		
23.09	Formwork to cast in situ concrete lining for open drains (Class F2 surface finish) (a) To sides with formwork on the internal face only (c) To ends of slabs	m ² m ²	300,00 375,00		
23.10	Sealed joints in concrete linings of open drains (c) Silicone-based sealant	m	750,00		
23.12	Steel reinforcement (a) Mild steel bars (c) Welded steel fabric (Mesh Ref 193)	t kg	1,50 13000,00		
23.13	Polyethylene sheeting (0,15 mm thick) for concrete-lined open drains	m ²	1500,00		
23,14	Cutting bituminous surfacing and pavement layers for concrete kerbing, channelling or concrete-lined drains	m	4000,00		
Total Carried Forward To Summary					

Number	Item Description	Unit	Quantity	Rate	Amount
3300	SECTION 3300				
B33.01	MASS EARTHWORKS				
	Cut and borrow to fill, including free- haul up to 1.0 km				
	(a) Gravel material in compacted layer thickness of 150mm and less:	m ³	1000,00		
	(b) Rock fill (as specified in subclause 3209(c))	m ³	100,00		
	(c) Cut and borrow to fill from commercial sources (unrestricted haul)	m ³	50,00		
33.03	Extra over item 33.01 for excavating and breaking down material in:				
	(a) Intermediate excavation	m ³	100,00		
	(b) Hard excavation	m ³	10,00		
	(c) Boulder excavation class A	m ³	10,00		
33.04	Cut to spoil, including free-haul up to 0.5 km. Material obtained from:				
	(a) Soft excavation	m ³	15000,00		
	(b) Intermediate excavation	m ³	1000,00		
	(c) Hard excavation	m ³	150,00		
33.06	Variations in the number of roller passes (applicable to sub items B33.01(a)(iii) and 33.01(b)(iii) and item 33.11):				
	(a) Vibratory rollers	m ² -pass	10,00		
	(c) Heavy grid rollers	m ² -pass	10,00		
33,07	Removal of unsuitable material (including free-haul up to 1.0 km):				
	(a) In layer thicknesses of 200 mm and less:				
	(i) Stable material	m ³	4000,00		
	(b) In layer thicknesses exceeding 200 mm:				
	(i) Stable material	m ³	1000,00		
33.10	Roadbed preparation and the compaction of material				
	(a) Compaction to 93% of Mod AASHTO density	m ³	8000,00		
33.11	Three-roller-passes compaction				
	(a) Vibratory roller	m ²	2000,00		
	(c) Heavy grid rollers	m ²	2000,00		
	(f) Pneumatic-tyred roller	m ²	2000,00		
Total Carried Forward To Summary					

Number	Item Description	Unit	Quantity	Rate	Amount
34.00	SECTION 3400 PAVEMENT LAYERS OF GRAVEL MATERIAL				
34.01	Pavement layers constructed from gravel taken from cut or borrow, including free-haul up to 1.0 km: (a) Gravel selected layer compacted to: (i) 93% of modified AASHTO density (150 mm compacted layer thickness of G9 quality material) (ii) 95% of modified AASHTO density (150 mm compacted layer thickness of G7 quality material) (c) Gravel subbase (un-stabilised gravel) compacted to: (ii) 97% of modified AASHTO density 150mm compacted G5 material (for adjacent streets) (d) Gravel subbase (chemically stabilised material) compacted to: (i) 97% of modified AASHTO density (200mm C4 compacted layer of G6 quality material)	m³	7500,00		
		m³	7500,00		
		m³	4200,00		
		m³	9000,00		
34.02	Extra over item 34.01 for excavation of material in (b) Hard excavation	m³	250,00		
34.03	Pavement layers constructed from gravel obtained from existing pavement layers: (e) Gravel selected layer compacted to 97% of modified AASHTO density, using: (i) 200mm non cemented material.	m³	1000,00		
34.04	In situ reconstruction of existing pavement layers as: (f) Gravel subbase (chemically stabilised layer) compacted to 96% of modified ASSHTO density using: (i) Non cemented material (200mm C4 compacted layer) (ii) Cemented material (200mm C4 compacted layer)	m³	1000,00		Rate Only
		m³	2080,00		
B34.14	Pavement layers constructed from gravel taken from commercial sources (unrestricted free haul) (b) Gravel subbase (chemically stabilised layer) compacted to: (i) 97% of modified AASHTO density (200mm C4 compacted layer) (ii) 97% of modified AASHTO density (200mm C4 compacted layer) Milling 200mm thick	m³	600,00		
		m³	600,00		
Total Carried Forward To Summary					
Number	Item Description	Unit	Quantity	Rate	Amount

35.00	STABILIZATION				
35.01	Chemical stabilization extra over un-stabilized compacted layers				
	(i) 200 mm layer thickness G6 subbase - C4	m³	14000,00		
35.02	Chemical stabilizing agent:				
	(g) CEM II (B-M) 32.5N	t	540,00		
35.04	Provision and application of water for curing	kl	3000,00		
35.05	Curing by covering with the subsequent layer	m²	12000,00		
35.13	Extra over item 35.01 for trial section	m³	150,00		
Total Carried Forward To Summary					

Number	Item Description	Unit	Quantity	Rate	Amount
36.00	CRUSHED STONE BASE				
36.01	Crushed-stone base				
	(c) Constructed from type G2 material obtained from commercial sources and compacted to 85% of apparent relative density (150mm Thick)				
	(1) 37mm nominal maximum size stone	m ³	15600,00		
36.03	Crushed-stone base trial section, 150mm thick, constructed in accordance with the provisions of clause 3603	m ²	600,00		
36.04	Crushed Stone base constructed with material from existing pavement layer 150mm thick.				
	(b) (iii) G2 material compacted to 85% of apparent relative density 150mm thick using milled-out material	m ³	3600,00		Rate Only
36.07	Crusher fines or sand for improving the grading of recovered crushed stone:				
	(b) Material from commercial sources	m ³	540,00		
36.12	Water for compacting the pavement excavation floor	kl	500,00		
Total Carried Forward To Summary					

Total Carried Forward To Summary

Number	Item Description	Unit	Quantity	Rate	Amount
	SECTION 4100				
41.00	PRIME COAT				
41.01	Prime coat:				
	(c) MC-30 cut-back bitumen	litre	54000,00		
	(e) Invert bitumen emulsion (SABS 1260)	litre	4000,00		
41.02	Aggregate for blinding (6.7mm)	m²	5000,00		
41.03	Extra over item 41.01 for applying the prime coat in areas accessible only to hand held equipment	litre	750,00		
Total Carried Forward To Summary					

Number	Item Description	Unit	Quantity	Rate	Amount
	SECTION 4200				
42.00	ASPHALT BASE AND SURFACING				
42.02	Asphalt surfacing (50/70 penetration-grade bitumen)				
	(a) Continuously graded (medium grade)				
	(i) 30 mm thick, 50/70 Penetration grade bitumen and maximum size of 14.0mm aggregate	m²	91400,00		
	(ii) Asphalt surfacing 30mm thickness (using homogeneous A-E2 polymer modified bituminous binder, continuously graded medium grading)	t	50,00		
42.03	Rolled in chippings in surfacing				
	(a) 14 mm nominal size	t	10000,00		Rate Only
42.04	Tack coat of 30% stable-grade emulsion	litre	91400,00		
42.05	Binder variations				
	(a) 50/70 Penetration grade bitumen	t	10,00		
42.06	Variations in active filler content:				
	(b) Lime	t	1,00		
42.07	Trial sections (27mm nominal thickness)				
	(b) 30 mm surfacing	m²	1000,00		
42.08	100mm Cores in asphalt paving (Normal drilling of cores included as part of acceptance control testing)	No	150,00		
42.09	Asphalt surfacing on bridge decks (Nominal 40mm thick using 50/70 penetration-grade bitumen)				
	(a) Continuously graded (medium grade)	t	40,00		
	Total Carried Forward To Summary				

Number	Item Description	Unit	Quantity	Rate	Amount
	SECTION 5200				
52.00	GABIONS				
52.01	Foundation trench excavation and backfilling				
	(b) In all classes of material	m ³	400,00		
52.02	Surface preparation for bedding the gabions	m ²	200,00		
52.03	Gabions:				
	(a) Galvanized gabion boxes				
	(i) Length 1m, depth 1m width 2m and nominal diameter of mesh wire 2.7mm, mesh size 80mm x 100mm	m ³	45,00		
	(ii) Length 2m, depth 2m width 1m and nominal diameter of mesh wire 2.7mm, mesh size 80mm x 100mm	m ³	80,00		
	(b) PVC-coated gabion boxes				
	(i) Length 1m, depth 1m width 2m and nominal diameter of mesh wire 2.7mm, mesh size 80mm x 100mm	m ³	40,00		
	(ii) Length 2m, depth 2m width 1m and nominal diameter of mesh wire 2.7mm, mesh size 80mm x 100mm	m ³	40,00		
	(c) Galvanized gabion mattresses				
	(i) Length 6m, depth 0.30mm, width 2m, length 2m mesh size 80 x 100mm nominal diameter of mesh size 2,2mm, and 1m diaphragm spacing	m ³	20,00		
52.05	Filter fabric				
	Filter fabric (Kaytech grade A4 or similar)	m ²	250,00		
Total Carried Forward To Summary					

Number	Item Description	Unit	Quantity	Rate	Amount
	SECTION 5400				
5400	GUARDRAILS				
54.01	Guardrails on timber posts:				
	(a) Galvanised	m	1000,00		
54.03	Extra over items 54.01 for horizontally curved guardrails factory bent to a radius less than 45m	m	600,00		
54.04	End Treatments:				
	(a) End wings.	No	10,00		
	(d) End treatments in accordance with the drawings where single guardrail sections are used	No	10,00		
54.05	Additional guardrail posts:				
	Timber	No	300,00		
54.06	Reflective plates	No	400,00		
54.07	Removing existing guardrails	m	400,00		
54.09	Re-erection of guardrails with recovered and/or new material	m	400,00		
Total Carried Forward To Summary					

Number	Item Description	Unit	Quantity	Rate	Amount
56.00	ROAD SIGNS				
56.01	Road sign boards with painted or coloured semi-matt background. Symbols, lettering and borders in semi-matt black or in Class 1 retro-reflective material, where the sign board is constructed from: (c) Prepainted galvanized steel plate (chromadek 1,6 mm thick or approved equivalent): (1) Area not exceeding 2 m ²	m ²	120,00		
	(d) Prepainted galvanized steel profiles (200 mm high chromadek or approved equivalent): (2) Area exceeding 2 m ² but not 10 m ²	m ²	120,00		
56.02	Extra over item 56.01 for using: (a) Background of retro-reflective material of: (1) Class 1	m ²	170,00		
	(b) Lettering, symbols, numbers, arrows, emblems and borders of retro-reflective material: (1) Class 11	m ²	60,00		
56.03	Road sign supports (overhead road sign structures excluded): (c) Timber (2) 150 mm dia.	m	300,00		
56.05	Excavation and backfilling for road sign supports (not applicable to kilometre posts)	m ³	75,00		
56.06	Extra over item 56.05 for cement-treated soil backfill	m ³	20,00		
56.07	Extra over item 56.05 for rock excavation	m ³	5,00		
56.08	Dismantling, storing and re-erecting road signs with a surface area of: (a) Up to 2 m ² (c) Exceeding 10 m ²	No No	20,00 10,00		
Total Carried Forward To Summary					

Number	Item Description	Unit	Quantity	Rate	Amount
57.00	SECTION 5700				
57.02	ROAD MARKINGS				
	Retro-reflective road marking paint:				
	(a) White lines (broken or unbroken)				
	(1) 100 mm wide	km	20,00		
	(2) 150 mm wide	km	1,00		
	(3) 200 mm wide	km	0,50		Rate Only
	(4) 500 mm wide	km	0,50		Rate Only
	(b) Yellow lines (broken or unbroken)				
	(1) 100 mm wide	km	10,00		
	(2) 150 mm wide	km	2,00		
	(d) White lettering and symbols	m ²	100,00		
	(e) Yellow lettering and symbols	m ²	100,00		
	(f) Transverse lines, painted island and arrestor bed markings (any colour)	m ²	250,00		
57.04	Variations in rate of application:				
	(a) White paint	litre	50,00		
	(b) Yellow paint	litre	50,00		
57.05	Road studs				
	(b) Bi-directional				
	(1) Stimsonite or similar	No	1500,00		
57.06	Setting out and pre-marking the lines (Excluding traffic-island markings, lettering and symbols)	km	30,00		
57.07	Re-establishing the painting unit at the end of the maintenance period	L/sum	1,00		
57.08	Removal of existing, temporary or permanent road markings by:				
	(a) Sandblasting	m ²	250,00		
	(b) Overpainting as temporary measure	m ²	250,00		
Total Carried Forward To Summary					

Number	Item Description	Unit	Quantity	Rate	Amount
	SECTION 5900				
59.00	FINISHING THE ROAD AND ROAD RESERVE AND TREATING OLD ROADS				
59.01	Finishing the road and road reserve:				
	(b) Single carriageway road	km	10,00		
Total Carried Forward To Summary					

Number	Item Description	Unit	Quantity	Rate	Amount
73.00	CONCRETE BLOCK PAVING (FOR ROADS SIDE WALKS & BUS BAYS)				
73.01	(i) Concrete block paving (S-A Block Type, 25 MPa, 60 mm thick laid in herringbone pattern) on 35mm bedding sand for sidewalk	m ²	16000,00		
73.01	(ii) Concrete block paving (S-A Block Type, 25 Mpa, 80 mm thick laid in herringbone pattern) on 35mm bedding sand for bus bays	m ²	2400,00		
73.02	Cast in situ concrete edge and intermediate beams	m ³	50,00		
73.03	Provision of approved herbicide and ant poison				
	(a) Provision of materials	PC sum	1,00	200 000,00	R 200 000,00
	(b) Contractor's charges and profit added to the prime cost sum	%	20000,00		
B 73.04	Installation of Precast bus shelter (Drawing No..... DET -19)	No	10		
Total Carried Forward To Summary					

Number	Item Description	Unit	Quantity	Rate	Amount
	SECTION 8100				
81.00	TESTING MATERIALS AND WORKMANSHIP				
81.02	Other special tests requested by the engineer				
	(a) Cost of testing	PC Sum	1,00	R 70 000,00	R 70 000,00
	(b) Handling costs in respect of sub item 81.02 (a) above	%	70000,00		
Total Carried Forward To Summary					

**SCHEDULE B
 STREET LIGHTS**

Number	Item Description	Unit	Quantity	Rate	Amount
	PRELIMINARY & GENERAL OBLIGATIONS				
1	GENERAL REQUIREMENTS				
1.1.1	Liaison with Local Council (eMalahleni municipality), Submission of ECA registration & Regional Services Contribution Certificate	Lump sum	1,00		
1.2	DOCUMENTATION				
1.2.1	Certificates of compliance for complete installation	Lump sum	1,00		
1.3	TESTING and COMMISSIONING				
1.3.1	Testing and commissioning of the entire electrical work contained in this Bill.	Lump sum	1,00		
1.4	Contractor's Contract Insurance for the works	Lump sum	1,00		
1.5	Allocation for Safety Compliance	Lump sum	1,00		
1.6	Contractor's provision for Fixed and Time related preliminary and general costs for the duration of the contract.	Lump sum	1,00		
Total Carried Forward To Electrical Summary					

Number	Item Description	Unit	Quantity	Rate	Amount
2	EXCAVATION OF STREET LIGHTING RETICULATION				
2.1	REMOVAL OF EXISTING EQUIPMENT				
2.1.1	Removal of existing LV cables	m	2600,00		
2.1.1	Removal of existing street light poles and luminaires	No	52,00		
2.1.2	Transport and handing over of existing street light poles and luminaires to Municipal nearest Depot	No	52,00		
2.2	EXCAVATION & BACKFILLING				
	Excavation for street lighting poles in soft material situated within the following depth range below the surface level as detailed in the technical specification:				
2.2.1	0m up to 1.60m	m ³	320,00		
2.2.2	Extra over item 2.2.1 for excavation in hard material irrespective of depth	m ³	50,00		
	Backfilling to excavation in layers not exceeding 200mm thick compacted to 95% Mod AASHTO density utilising				
2.2.3	(a) Using the excavated material	m ³	200,00		
2.2.4	(b) Using imported selected material from commercial sources (unrestricted free haul)	m ³	50,00		
2.2.5	(c) Extra over subitems 2.2.3 (a) and 2.2.4 (b) for soil-crete cement backfilling (with 3% cement)	m ³	60,00		
Total Carried Forward To Electrical Summary					

Number	Item Description	Unit	Quantity	Rate	Amount
	DBs & CABLING				
3.1	SUPPLY, SERVICE DISTRIBUTION BOXES & CONNECTIONS				
3.1.1	Supply and install Emalahleni municipality Type 2 (3 phase) pole mounted service distribution box complete with HRC fuses, conductors, circuit breakers etc, internal wiring as required in the General Technical Specification. Labelling earthing etc and all other accessories	No	4,00		
3.1.2	Supply and install the photoelectric control unit in accordance with the General Technical Specifications and to eMalahleni specifications, complete include all necessary wiring from the SDB etc.	No	4,00		
3.2	CABLES AND TERMINATION				
	ABC overhead cable shall be in accordance with clause 6 of the Technical with the requirements of SABS 1418. Aluminum alloy cables 600/1000V ABC shall be used, including clamping supports, etc. as follows:				
	Supply and installation of:				
3.2.1	ABC 25 square mm, 3 core cable, 1 x 54.6mm ² neutral / earth supporting conductor (aluminum alloy & insulated)	m	5000,00		
3.4	Cable Terminations including drilling, bolting, lugs, number tags, core markers, pole labelling, gland, shroud, line taps, etc.				
3.4.1	ABC 25 square mm, 3 core cable with 54.6mm ² neutral / earth supporting conductor	No	1100,00		
	Supply and installation of:				
3.4.3	16 square mm, 4 core cable	m	3500,00		
Total Carried Forward To Electrical Summary					

C2.1: PRICING INSTRUCTION

Number	Item Description	Unit	Quantity	Rate	Amount
4.1	LIGHTING				
	STEEL POLES				
	Source, take delivery, provide safe storage, transport in accordance with clause 4 of the General Technical Specification				
4.1.1	11.5m galvanised steel pole - Town Council Power's Standard Type A6 pole, without outreach but with spigot only, as detailed in the specifications and including poles and all other accessories with two fuses, internal wiring.	No	91,00		
4.1.2	Single spigot 250mm arm outreach	No	15,00		
4.1.3	Double spigot 250mm arm outreach	No.	72,00		
4.1.4	3-way spigot 250mm arm outreach	No	4,00		
4.2	LUMINAIRES				
4.2.1	Source, take delivery unpack, assembly, provide safe storage, transport to site, install and connect the 162W LED street light fittings in accordance with clause 5 of the General Technical Specification	No	190,00		
	SUNDRIES				
4.2.3	Rubber insulators, connectors, distribution board locks etc.	Lump sum	1,00		
Total Carried Forward To Electrical Summary					

Number	Item Description	Unit	Quantity	Rate	Amount
5	POWER TRANSFORMERS				
5.1	Source, Take Delivery, transport to site, install the following transformers in accordance with clause 8 of the General Technical Specification.				
5.1.1	(i) Supply and deliver complete 4 No.16KVA Transformers	Prov sum	1,00	600 000,00	R 600 000,00
	(ii) Application for power from Eskom	Prov sum	1,00	55 000,00	R 55 000,00
5.1.2	Handling costs and profit in respect of sub items 5.1.1 (i) & (ii)	%	655000,00		
5.1.3	Supply and Deliver, install wooden structure transformer mounting poles complete with cross bars, and glands	No	12,00		
5.1.4	Supply, Deliver and install eMalahleni municipality Type 2 (3 phase) pole mounted service distribution box complete with HRC fuses, conductor, circuit breakers etc, internal wiring in accordance with the General Technical Specification. Labelling earthing etc and all other accessories	No	4,00		
5.2	Emalahleni MV Lines				
5.2.1	MV lines	Prov sum	1,00	60 000,00	R 60 000,00
5.2.2	Handling costs and profit in respect of item 5.2.1	%	60000,00		
5.3	Commissioning & Planning				
5.3.1	(i) Commissioning and testing of all the parts of each of the transformer installation.		1,00	20 000,00	R 20 000,00
	(ii) Eskom Survey and ENS Documentation	Prov sum	1,00	30 000,00	R 30 000,00
	Handling costs and profit in respect of sub items 5.3.1 (i) & (ii)	%	50000,00		
Total Carried Forward To Electrical Summary					

SUMMARY OF ROAD WORKS - SCHEDULE A

SECTION	DESCRIPTION	AMOUNT
1200	GENERAL REQUIREMENTS AND PROVISIONS	
1300	CONTRACTOR'S ESTABLISHMENT ON SITE AND GENERAL OBLIGATIONS	
1400	HOUSING, OFFICES AND LABORATORY FOR THE ENGINEER'S SITE PERSONNEL	
1500	ACCOMMODATION OF TRAFFIC	
1600	OVERHAUL	
1700	CLEARING AND GRUBBING	
1800	DAYWORKS	
2100	DRAINS	
2200	PREFABRICATED CULVERTS	
2300	CONCRETE KERBING, CONCRETE CHANNELLING, CHUTES AND DOWNPIPES, AND CONCRETE LININGS FOR OPEN DRAINS	
3300	MASS EARTHWORKS	
3400	PAVEMENT LAYERS OF GRAVEL MATERIAL	
3500	STABILIZATION	
3600	CRUSHED STONE BASE	
3800	BREAKING UP EXISTING PAVEMENT LAYERS	
4100	PRIME COAT	
4200	ASPHALT BASE AND SURFACING	
5200	GABIONS	
5400	GUARDRAILS	
5600	ROAD SIGNS	
5700	ROAD MARKINGS	
5900	FINISHING THE ROAD AND ROAD RESERVE AND TREATING OLD ROADS	
7300	CONCRETE BLOCK PAVING	
8100	TESTING MATERIALS AND WORKMANSHIP	
	Total Carried Forward to Summary of Schedules	

SECTION	DESCRIPTION	AMOUNT
1	PRELIMINARY & GENERALS	
2	EXCAVATION	
3	DBs & CABLING	
4	LIGHTING	
5	POWER TRANSFORMERS	
Total Carried Forward to Summary of Schedules		

1	ROADWORKS	
2	ELECTRICAL STREET LIGHTING	
3	SUBTOTAL 1	
4	ADD: Contingencies 10% of SUBTOTAL 1	
5	SUBTOTAL 2	
6	ADD: Contract Price Adjustment 5% of SUBTOTAL 2	
7	SUBTOTAL 3	
8	ADD: 15% VAT of SUBTOTAL 3	
	TOTAL CARRIED FORWARD TO FORM OF OFFER	

C3: SCOPE OF WORK

C3.1 DESCRIPTION OF THE WORKS

C3.1.1 Employer's Objectives

Emalahleni Municipality intends to upgrade & rehabilitate Matthews Phosa Road leading to Kwaguqa township. The total length of upgrade is 4.6km. In addition Emalahleni intends to rehabilitate the adjacent streets abutting the main Matthews Phosa road.

C3.1.2 Overview of the Works

The works involve road upgrade to dual lanes with median for the entire road from the N4 offramp (KG Mall) to Hlalanikahle intersection. The other works will involve the installation of pedestrian sidewalks either side of the road, bus-stops, storm water improvement and installation of streetlights.

In addition the municipality intends to upgrade the adjacent streets as follows:

- Cindi Street 500m
- Joe Tholo 500m
- Shadrack Maelane Avenue 1,8km
- KD Ndlovu 2,5km
- PV Mbatha 800m
- Matthews Phosa Vosman 1,5km
- Shadrack Maelane Drive 2,5km

C3.1.3 Extent of the Works

C3.1.3.1 Scope of Works

The works include the following aspects:

- Upgrade of 4.5km of Matthews Phosa road into a double divided carriageway with median as follows:

CH	Existing Condition	Proposed Work
CH 0 - CH 1800	Undivided dual carriageway with 3.25m wide lane section with mountable kerbs/v-drain	Widen to a double divided carriageway with 3.5m wide lane width, 1.2m median, 0.6m shoulder and walkways on both sides as well as street lights.
CH 1800- 4500	Single carriageway with 3.5m wide lanes	Widen to a double divided carriageway with 3.2m wide lane width, 1.2m median, 0.6m shoulder and walkways on both sides as well as street lights.

The pavement structure will be as follows:

Proposed Pavement Structure Matthews Phosa	
Existing sections	Widening
40mm Asphalt (Continuously Graded-Medium)	40mm Asphalt (Continuously Graded-Medium)
150 mm G2 Base Course compacted to 85% apparent relative density (imported)	150 mm G2 Base Course compacted to 85% apparent relative density
200mm C4 compacted to 97% MOD AASHTO density	200mm C4 Subbase compacted to 97% MOD AASHTO density
150mm In-Situ Subgrade	150mm G7 material compacted to 95% MOD AASHTO density
	150mm G7 compacted to 93% MOD AASHTO density
	150mm In-Situ Subgrade

- Construction of sidewalks 2m wide both sides of road
- Installation of LED streetlights in median 25m-30m apart

- Rehabilitation & installation of storm-water pipes, manholes and associated infrastructure
- Improvement and construction of 5 No. traffic circles, 1 x intersections to meet standards
- Construction of 10 No. bus bays

Adjacent Streets

- Rehabilitation of adjacent streets namely Cindi, Joe Tholo, Shadrack Maelane, KD Ndlovu, PV Mbatha, Matthews Phosa Vosman, Shadrack Maelane Drive

Proposed Pavement Structure Adjacent Streets	
Existing sections	Widening
40mm Asphalt (Continuously Graded-Medium)	40mm Asphalt (Continuously Graded-Medium)
150 mm G2 Base Course compacted to 100% MOD AASHTO density (imported)	150 mm G2 Base Course compacted to 100% MOD AASHTO density
150mm G5 compacted to 97% MOD AASHTO density	150mm G5 Subbase compacted to 97% MOD AASHTO density
150mm In-Situ Subgrade	150mm G7 material compacted to 95% MOD AASHTO density

C3.1.3.2 Features Requiring Special Attention

C3.1.3.2.1 Labour Intensive Construction Methods

C3.1.3.2.1.1 General

The Contractor's attention is specifically drawn to the fact that certain aspects of the Works which can be executed using labour intensive methods, and semi-skilled labour, shall be carried out as such. The Employer's purpose in using labour intensive construction methods is to provide employment for as many of the unemployed people in the area as possible.

A Social Facilitator has been engaged for the project to facilitate the formation of a Project Steering Committee and convene periodic meetings for conflict resolution.

A list of local labour including their names and abilities (or trades if any) will be made available to the Contractor by the Social Facilitator via the Community Liaison Officer(s) (CLO). The CLO will be responsible for assisting the Contractor in sourcing local labour. As such, the Contractor will be required to submit labour requirements to the CLO for his swift action. The CLO shall ensure that the labour required by the Contractor is available within 24 hours.

The Contractor will only be allowed to use his own personnel in respect of specialized activities. Equipment such as picks and spades shall be supplied by the Contractor on a "lease-lend" basis to each "subcontractor". All manufactured materials shall be purchased by the Contractor and supplied to the "subcontractors" as necessary. The Contractor is at liberty to employ specific "subcontractors" for specific tasks, or to employ such "subcontractors" for a variety of tasks.

The method of payment and any other necessary agreement between the Contractor and his "subcontractors" shall be drawn up by the Contractor himself. The Contractor is expected to declare the payment rates to the local labour prior to engagement and the dates for payment as well as the duration of employment. Any local labour disputes will be brought to the attention of the CLO. The Project Steering Committee will be required to assist the CLO on matters which cannot be resolved by him and which do not need the interference of the Engineer. However, such shall be reported during monthly site meetings.

C3.1.3.2.1.2 Documentation

Every month the Contractor shall submit to the Engineer a schedule listing all the local labour employed on the project and giving the wages earned, sex, age and disability status. No Payment Certificates will be processed without proof of employed labour which proof must accompany the certificate.

C3.1.3.2.1.3 Drawings and Quantities are Provisional

All drawings and quantities issued with this document are preliminary. Prior to commencement of the construction, all levels and dimensions shall be carefully checked with the Engineer and be revised if necessary.

The quantities in the Schedule are provisional only and do not necessarily present the actual and final amount of work to be done. Unless otherwise stated, items will be measured nett in accordance with the drawings and actually installed and no allowance will be allowed for waste.

The contract amount for the complete contract shall be computed from the actual measured quantities of authorized work done to the satisfaction of the Engineer, valued at prices tendered against the respective items in the Schedule of Quantities.

C3.1.3.2.1.4 Safety Regulations

Both the "Factories, Machinery and Building Work Act (Act 22 of 1941)" and the "Machinery and Occupational Safety Act (Act 6 of 1983)" must, wherever they appear in the SABS1200 (Edition 1998) standardized specifications, be replaced by the "Occupational Health and Safety Act (Act 85 of 1993)".

C3.1.4 Location of the Works

The site is located in Kwaguqa township of Emalahleni off the N4 route (Pretoria to Witbank) i.e. road R104 commencing from the N4 on ramp (KG Mall/Kwaguqa/Matthews Phosa road) expected to terminating at the Hlalanikahle/Philip Ndimande intersection.

The co-ordinates of the site are as follows:

Estimated Location	Latitude	Longitude
Start	25°52'21.90"S	29° 08'04.75"E
End	25°50'16.20"S	29° 6'16.49"E

C3.1.5 Temporary Works

No temporary works are envisaged

C.3.2. ENGINEERING

C.3.2.1. Design

WORKS DESIGNED	RESPONSIBILITY
Concept, feasibility and overall process	Engineer
Basic engineering and detail layouts to tender stage	Engineer
Final design to approved for construction stage	Engineer
Temporary works	N/A
Preparation of as-built drawing	Contractor

C.3.2.2. Employer's Design

The brief description of the work is indicative rather than absolute and shall not limit the work to be executed by the Contractor under this contract. Approximate quantities of the various types of work to be carried out in accordance with the contract documents are listed in the schedule of quantities.

C.3.2.3. Detailed description of the project

The works to be constructed are as shown on the drawings which are included in the contract and as outlined in the project specifications. The work consists of the following:

The following are pavement designs appropriate to this project:

(a) Pavement Design for the widening

Layers	Description	Thickness (mm)
Surfacing	AC: continuously graded Asphalt (medium grade)	40
Base	150 mm G2 Base Course – Dense graded stone. PI<6, max stone size of 37.5mm compacted to 100% Mod AASHTO density.	150
Subbase	C4 – Min. Lab. UCS of 750kPa @ 97% Mod AASHTO Density, min. ITS of 200kN, Min.GM of 1.2, Max. PI of 6.	200
Upper Selected Layer	G6 - CBR≥45 @ 95% Mod AASHTO Density	150
Lower Selected Layer	In-situ material: G7 – CBR ≥20 @ 93% Mod AASHTO Density	150

(b) Pavement Design for Existing road sections

Layers	Description	Thickness (mm)
Surfacing	AC: continuously graded Asphalt (medium grade)	40
Base	150 mm G2 Base Course – Dense graded stone. PI<6, max stone size of 37.5mm compacted to 100% Mod AASHTO density.	150
Subbase	C4 – Min. Lab. UCS of 750kPa @ 97% Mod AASHTO Density, min. ITS of 200kN, Min.GM of 1.2, Max. PI of 6.	200
Upper Selected Layer	G6 - CBR≥45 @ 95% Mod AASHTO Density	150

(c) Pavement Design for Walkway

Layers	Description	Thickness (mm)
Surfacing	Interlocking concrete paving blocks (Type S-A)	60
Bedding	Bedding sand	25
Subbase	G7 - CBR≥20 @ 93% Mod AASHTO Density	150
Subgrade	G9 - CBR≥7 @ 93% Mod AASHTO Density	150

(d) Pavement Design for Bus Bays

Layers	Description	Thickness (mm)
Surfacing	Paving Blocks (Type S-A)	80
Bedding Sand	Bedding sand	20
Subbase Layer	C4– 1000 kPa @ 97% Mod AASHTO Density	150
Subgrade	G7 – CBR ≥15 @ 95% Mod AASHTO Density	150
Roadbed	G9 – CBR ≥7 @ 93% Mod AASHTO Density	150

(e) Pavement Design for Adjacent streets

Layers	Description	Thickness (mm)
Surfacing	AC: continuously graded Asphalt (medium grade)	40
Base	150 mm G2 Base Course – Dense graded stone. PI<6, max stone size of 37.5mm compacted to 100% Mod AASHTO density.	150
Subbase	150mm G5 subbase – 53mm max size stone or natural gravel compacted to 95% Mod AASHTO Density, Max. PI of 10.	150
Upper Selected Layer	G7 - CBR≥45 @ 93% Mod AASHTO Density	150

- **Road Signs and Markings:** there will be painting of road markings and installation of traffic signs as indicated on the drawings.
- **Maintenance:** The contractor shall be responsible for the maintenance of the existing road surface and the deviations to ensure a safe trafficable surface at all times for the duration of the contract. There may be a fine if the contractor fails to maintain existing road and deviations.
- **Structures:** Major structure are included in this project and some of the existing culvert structures shall be cleaned to effect unhindered flow of surface water.
- **Street Lights:** Installation of streetlights as per standards adopted by the Employer. Street lights will be installed throughout the road and must be in the median for the majority of the proposed upgrade except the entry section and where not possible due to geometrics
- **In-situ Materials:** Existing layer-works material will be stockpiled and used for lower selected layer. Material deemed surplus to requirements shall be taken to the nearest licensed landfill site.

C.3.2.3.1. Borrow Materials

No borrow pits were cited for this project as all available possible borrow pits in close proximity are exhausted. Materials for base, subbase and upper selected layer will be sourced from a commercial quarries within the municipality.

Water for road construction can be obtained from the local rivers but only after acceptance testing at the time of usage. Water for concrete can be obtained from Municipal supply.

C.3.2.3.2. Contractor's Design

Where the Contractor is to supply the design of designated parts of the permanent Works or temporary works, he shall supply full working drawings supported by a professional engineer's design certificate.

C.3.2.3.3. Drawings

The Contractor will be supplied with three (3) prints of each of the drawings. These prints are issued free of charge and the Contractor shall make any additional prints he may require at his own cost.

Any information in the possession of the Contractor which is necessary for the Engineer's Representative for completing his as-built drawings shall be supplied to the Engineer's Representative before a certificate of completion will be issued.

Only figured dimensions shall be used and drawings shall not be scaled unless so directed by the Engineer. The Engineer will supply any figured dimensions which may have been omitted from the drawings.

All designs and modifications thereto shall be communicated in writing and the Contractor and the Engineer shall maintain master lists to record and track all deviations.

The drawings for the design of the permanent Works are bound in reduced drawing book of drawings Volume 2 or as supplied during the contract. The Contractor and the Engineer shall maintain master lists indicating the supply and revision of such documents.

C.3.3. PROCUREMENT, LOCAL LABOUR AND TRAINING

C.3.3.1. Procurement

C.3.3.1.1. Minimum Preferential Procurement Requirements

All Subcontractors must be registered with the CIDB, and be approved by the Employer.

(a) Minimum Employment Creation Requirements

It is required that at least 30% of the Contract Value excluding VAT and contingencies be spent on worker's salaries and wages, local subcontractors, local suppliers and service providers, of this 30%, at least one third must be Local Labour.

The proportions of Workers must be at least:

For all workers:

- i) 40% to be for Female workers
- ii) 55% to be Youth workers
- iii) 2% to be Disabled workers

For local labour:

- iv) 40% to be for Female workers
- v) 55% to be Youth workers
- vi) 2% to be Disabled workers

C.3.3.1.2. Definitions

Percentages stated in clause C3.3.1.1 (a)

Percentages of the Contract Value (Excluding VAT) are calculated from the agreed financial values of the work performed by the various types of Subcontractors excluding VAT, based on the appropriate quantities in the Contractor's approved statements of payment (in terms of clause 6.10 of the General Conditions of Contract), including the applicable proportional values of general costs derived from sections 1200, 1300, 1400 and 1500 of the Bill of Quantities. In the event that agreement cannot be reached, the Engineer's ruling shall prevail.

B-BBEE Status Level

The certified status level in-terms of the Preferential Procurement Regulations promulgated on 6 June 2011.

Qualifying Small Enterprises (QSE's) or Exempted Micro Enterprises (EME's)

The QSE and EME's certified status in terms of the B-BBEE Code of Good Practice and the Preferential Procurement Policy Framework Act, 05 of 2000 and Regulations of 2011.

EME's are deemed to have the status of a level 4 contributor and in instances where black ownership is greater than 50%, the status of a level 3 contributor.

Average weighted equivalent B-BBEE Status level

The Average Weighted B-BBEE Status level =

$$\left(\frac{\sum (s \times v)}{\sum (v)} \right)$$

Σ = The sum of the values in parenthesis ()

s = status level of each individual, QSE or EME sub-Contractor

v = Value of the work performed, including the proportion of General costs incurred, by each individual QSE or EME Sub-Contractor.

Female Owned

Female owned enterprises are enterprises that can provide proof of more than 50% female ownership, in the form of written certification by a registered professional auditor.

Worker

As defined in Part D of the project specifications.

Salaries and Wages

The total gross remuneration of the workforce, (as defined in Part D of the Project Specification) as reported regularly to the Engineer in an acceptable format.

The gross remuneration shall exclude the proportions of salaries and wages of labourers when such workers are not performing work directly related to the contract.

The gross remuneration shall only include the remuneration or proportional remuneration of:

- Key Personnel*
- The Workforce*
- Local Labour*
- Subcontractors
- The Community Liaison Officer*
- Other labour specifically approved by the Engineer.

* As defined in Part D of the Project Specifications

The local labour rates are as per the gazetted Bargaining Council for the Civil Engineering Industry as follows:

<i>Occupational group/Job Title</i>	<i>Hourly rates from 1 September 2020 – 31 August 2021</i>
<i>General Worker/Watchman</i>	<i>R 39,81/hr</i>

The hourly labour rates are subject to increase on 01 September 2021 and tenderers must consult with the Bargaining Council for the Civil Engineering Industry for future labour rates adjustments.

The Engineer may require certification by a registered professional auditor of the values reported.

Local Labour

“Local labour” are workers as defined in Part D of the Project Specifications.

Youths

Youths are Local Labour between the ages of 15 and 35.

C.3.3.1.3.QSE and EME Subcontractor work

The Contractor is expected to demonstrate to what extent he can meet the minimum requirements (See C3.3.1.5 hereafter).

In order to further assist the Contractor to attain and exceed the minimum requirements stated in Clause C3.3.1.1 (a) above, the CLO and the Employers Social facilitator (as defined in Part D of the Project Specifications) will provide the Contractor with a list of local QSEs and ESEs.

The Contractor is under no obligation to appoint any QSE's of ESE's thus identified.

Examples of some of the construction activities included in the works which are considered suitable to be undertaken by QSE and EME Subcontractors include:

- Supply of construction materials,
- Provision of traffic control facilities,
- Construction of street lights
- Management of traffic control facilities and traffic safety as part of the accommodation of traffic,
- Erection and maintenance of the Contractor's camp site,
- Removal of trees,
- Construction of concrete paving, kerbs and channels,
- Manufacture of pre-cast concrete elements,
- Construction of cycle ways/pedestrian walkways,
- Finishing of cut and fill slopes,
- Construction of minor concrete drainage elements such as side drains, catch pits, manholes, etc.
- Construction of side drains,
- Installation of stormwater pipes,
- Patching,
- Relocation/protection of services,
- Installation of subsoil drains,
- Cartage of materials,
- Cleaning out of pipe culvert inlet and outlet structures,
- Erection of temporary and permanent road signs,
- Erection of guardrails,
- Finishing of the road and road reserve,
- Road markings,
- Construction of service roads.
- Stone pitching
- Landscaping

The Contractor is encouraged to innovate and add additional activities.

C.3.3.1.4.Examples of Employment Creation

Key objectives of this contract are:

- Those Local Labourers that are employed during the course of the contract (as specified in Part D of the Project Specification), be permanently employed (i.e. for at least 230 person days).
- That work on the project be performed in a way which will maximise employment through the utilisation of labour intensive instead of mechanical intensive construction methods.

The following activities included in the works are examples of work considered as suitable for labour enhanced construction:

- Site establishment
- Clearing and grubbing in areas without trees
- Accommodation of Traffic
- Mixing of concrete/soilcrete for minor concrete works
- Laying of concrete block paving, kerbs and channels
- Excavations for minor concrete drainage structures and kerbing
- Construction of variable depth side drains (normal side drains are part of bulk earthworks)
- Excavation and backfilling of pipes and culverts
- Finishing of the road and road reserve
- Construction of subsoil drains
- Excavations for road signs
- Patching
- Clearing the fence line and erection of fencing
- Brooming of slush on crushed stone bases
- Spreading of topsoil and application of fertilizers on areas for grassing
- Grass sodding.

The Contractor is encouraged to innovate and add additional activities.

Labour enhanced construction activities, shall be clearly identified by the Contractor and approved by the Engineer.

No variation in payment shall be made for labour enhanced work identified by the Contractor.

C.3.3.1.5. Demonstrating how the minimum Preferential Procurement requirements are to be achieved.

The Contractor shall take cognisance of the minimum criteria and their contribution to the utilisation of employment creation when, at tender stage, he sets out his intentions, on form T2.1H on how he proposes to achieve the minimum requirements in Clause C3.3.1 (a) and (b) above.

C.3.3.1.6. Failure to comply with the minimum requirements of Clause 3.3

Failure or refusal on the part of the Contractor to take the necessary steps to ensure that the required Minimum Empowerment of Subcontractors and Females (MESF) is achieved, shall be sufficient cause for the Engineer to

deduct penalties as follows:

MESF Penalty = Tender sum (excluding CPA & VAT) x (required MESF% -actual MESF %)

Failure, or refusal on the part of the Contractor to take the necessary steps to ensure that the required percentages of Minimum Employment Creation (MEC) are met, shall be sufficient cause for the Engineer to deduct penalties as follows:

MEC Penalty = Tender sum (excluding CPA & VAT) x (required MEC % - actual MEC %)

The penalty amounts shall be agreed between the Contractor and the Engineer. In the event that agreement of the penalties' amounts cannot be reached, the Engineer's ruling shall prevail.

The Contractor agrees that the penalty amounts may be deducted from the Contractor's payment certificates.

No additional payment (negative discounts) will be applicable if the Contractor exceeds the minimum requirements.

C.3.3.2. Compulsory training

Compulsory training shall be implemented for local Labour, QSE's and EME's by the Contractor as specified in Part E of the Project Specifications.

Prime cost sums are included in Section 1200 of the Bill of Quantities for accredited training providers. This sum will be spent at the sole discretion of the Engineer in consultation with the Employer.

The Contractor will, inter alia be responsible for

- Arranging Construction Education and Training Authority (CETA) approved courses (Payment being by way of the Prime Cost allowances in the Bill of Quantities).
- Provision of training facilities and, if required, transport to the training, venue; (Payment to the Contractor being included in the Contractor's General obligations as specified in section 1200 of the Project Specifications).

The attendance and completion of each course by selected individuals must be CETA certified and copies of such certificates must be submitted to the Engineer.

C.3.4. CONSTRUCTION

C.3.4.1. Standard Specifications

C.3.4.1.1. General

- (a) The following specifications shall apply for the construction of the Works:
 - (i) The COLTO Supplementary Conditions of Contract for Road and Bridge Works for State Road Authorities in respect of The Employment of Emerging Contractors and Labour Intensive Projects (2000).
 - (ii) The COLTO Standard Specifications for Road and Bridge Works for State Road Authorities (1998).
 - (iii) The COLTO Supplementary Notes to Tenderers and Supplementary Specifications and Supplementary Forms for Road and Bridge Works for State Road Authorities in respect of The Employment of Emerging Contractors and Labour Intensive Projects (2000).

The Contractor may purchase copies of Item (ii) from the South African Institution of Civil Engineers (SAICE)

Waterfall Park
Howick Gardens
Vorna Valley
Becker Street
Midrand
Tel: (011) 805-5947

Postnet Suite 81
Private Bag X65
Halfwayhouse
1685
Fax: (011) 805-5971

(b) SABS or BS Specifications and Codes of Practice

Wherever any reference is made to the South African Bureau of Standards (SABS) and the British Standards Specification (BSS) in either these Bill of Quantities or the Specification of Materials and Methods to be Used (OOG-001E), this reference shall be deemed to read "SANS or equivalent standard" and BS or equivalent standard" respectively.

(b) Various other specifications specified in the COLTO Standard Specifications or the Project Specifications

C.3.4.1.2. Interpretation

(a) Project specific variations and amendments

(i) Miscellaneous

The project specifications form an integral part of the contract documents and supplement the standard specifications.

In the event of any discrepancy with a part or parts of the standard specifications, the schedule of quantities or the plans, the project specifications shall take precedence.

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 contract.

(ii) Restrictions on Construction

- (a) Pedestrian and vehicle access shall be maintained at all times to the satisfaction of the Engineer. All works shall be properly barricaded complete with the necessary signs. The Contractor shall take due account of the requirements for the accommodation of public traffic on existing roads affected by the works.

The Contractor's tendered rates for the relevant items in the schedule of quantities shall include full compensation for all possible additional costs which may arise from the above and no claims for extra payment due to inconvenience as a result of the modus operandi will be considered.

- (b) The travelling public shall have the right of way on public roads/ temporary access 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.
- (c) Failure to maintain road signs, warning signs or flicker lights, etc., in a good condition shall constitute ample reason for the Engineer to bring the works to a stop until road signs, etc., have been repaired to his satisfaction.
- (d) The Contractor may not commence constructional activities before adequate provision has been made to accommodate traffic in accordance with the requirements of his document, the contract documents, the contract plans and the latest edition of the South African Road Traffic Signs Manual.
- (e) The Contractor shall submit proposals in connection with directional signs to the Engineer for approval.

(iii) Construction in confined areas

It may be necessary for the Contractor to work in confined areas, but no additional payment will be made for work in "restricted areas" as described in section 6100 of the standard specifications. In certain areas the width of the fill material and pavement layers may reduce to zero and the working space may be confined. The method of construction in these confined areas depends on the Contractor's construction plant. However, the Contractor must note that measurement and payment will be in accordance with the specified cross-sections and dimensions, and that the rates and amounts tendered will be deemed to include full compensation of any special equipment or construction methods or for any difficulty encountered in working in confined areas and narrow widths, and at or around obstructions, and that no extra payment will be made nor will any claim for payment be considered or account for these difficulties, unless specific payment items are included in the schedule of quantities for such work.

(iv) Existing Services

The proposed cycle way/pedestrian walkway forming part of this contract are public roads falling within the proclaimed road reserves. According to available drawings some of the existing services may be affected by the proposed works (especially cycle way/pedestrian walkway) and necessary measures shall be taken for the protection and or relocation of these services. If however, other services are encountered which interfere with construction work, these services shall be located, exposed and if necessary, be moved or protected as instructed by the Engineer.

(v) Construction Materials

Gravel required for pavement construction work shall be obtained from commercial sources. All borrow pits within the area are exhausted. Crushed stone required for the base-course, small concrete structures and as well as asphalt products must be obtained from commercial sources.

C.3.4.2. PROJECT SPECIFICATIONS RELATING TO STANDARD SPECIFICATIONS

C.3.4.2.1. General Conditions of Contract Referred to in the Standard Specifications

The references to the General Conditions of Contract appearing in the COLTO Standard Specifications refer to the COLTO General Conditions of Contract which is superseded in this contract by the General Conditions of Contract for Construction Works 2015 (3rd Edition). The corresponding clause in the latter document pertaining to the reference in the COLTO Standard Specifications is listed in the table below.

COLTO Standard Specification		COLTO General Conditions of Contract 1998 (GCC)		GCC2015 General Conditions of Contract for Construction Works, 2015	
Clause No	Page No	Cl. No	Description or Reference	Cl No	Description or Reference
1115	1100-2		Definition of applicable GCC and special conditions of contract		GCC 2015 together with project documents
1204	1200-2	15	Construction programme	5.6.1	Construction programme
1204	1200-2	14	General reference to GCC		GCC 2015, as applicable
1206	1200-3		Setting out of works	5.4	Access to the Site
1209(a)	1200-4		General references to GCC		GCC 2015, as applicable
1209(e)	1200-5	52(2)	Valuation of material brought onto site	6.10.2	Valuation of material brought onto site
1210	1200-5	54	Certificate of practical completion	5.14.4	Certificate of practical completion
1212(1)		1200-7		49(2)	Cost of checking alternative designs
1215	1200-9	45	Extension of time for completion due to abnormal rainfall.	5.12	Extension of time for Practical Completion
1217	1200-10	35	Care of the works	8.2	Care of the works
1303(ii)	1300-1		General reference to GCC		GCC 2015, as applicable
1303(iii)	1300-1	49	Price adjustment Item 13.01 (a)	6.11	Variations exceeding 15%
1303 (iii)	1300-2	49	Price adjustment Item 13.01 (b)	6.11	Variations exceeding 15%
1303 (iii)	1300-1	53	Variations exceeding 20%	6.11	Variations exceeding 15%
1303 (iii)	1300-2	53	Variations exceeding 20%		Variations exceeding 15%
1303	1300-2	12	Payment Item 13.01 (c)	6.1.1	Payment to Contractor
1303	1300-2	49	Payment of Item 13.01 (c) Time Related Obligations	6.11	Variations exceeding 15%
1403c) (ii)	1400-4	40	Variation for rented accommodation	6.4	Valuations of Variations
1505	1500-3	40	Payment for damage caused by temporary drainage	6.4	Valuations of Variations
Item 15.08	1500-8	48	Payment of Provisional Sum	6.6	Provisional and Prime Cost Sums
Item 15.09	1500/8	48	Payment of Provisional Sum	6.6	Provisional and Prime Cost Sums
Item 15.11	1500-8	48	Payment of Provisional Sum	6.6	Provisional and Prime Cost Sums
Note (2)	3100-4	40	Payment for prospecting for materials	6.4	Valuations of Variations
3204(b) (iii)	3200-2	40	Determining Compensation for varied methods and equipment	6.4	Valuations of Variations
Item 44.06	4400-3		General reference to GCC, PC Sums	6.6	Provisional and Prime Cost Sums
Item 45.06	4500-3		General reference to GCC, PC Sums	6.6	Provisional and Prime Cost Sums
5803 (c)	5800-3	40	Variation, for landscaping	6.4	Valuations of Variations
5805 (d)	5800-4	40	Variation, for grassing	6.4	Valuations of Variations
Item 58.10	5800-10	48	Payment for Extra Work	6.6	Provisional and Prime Cost Sums
8103 (c)	8100-1	40	Testing materials	6.9	Vesting of Plant and materials
			Valuation of Variations	6.4	Valuations of Variations
Item 81.02	8100-26		General reference to GCC, Provisional Sums	6.6	Provisional and Prime Cost Sums
Item 81.03	8100-26	22	Removal of Test Equipment and Clearance of Site on Completion	5.15	Clearance of Site

C.3.4.2.2. Amendments to the Standard Specifications

There are no amendments to the Standard Specifications as issued by the Committee of Land Transport Officials (COLTO).

C.3.4.2.3. Project Specifications Relating to Standard Specifications

This part of the project specifications deals with matters relating to the standard specifications. Where reference is made in the standard specifications to the project specifications this part shall also contain the relevant information e.g. the requirements where a choice of materials or construction methods are provide for in the standard specifications.

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 and amendments of the standard 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 B 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 new payment item, which does not form part of a clause or a payment item in the standard specifications and is included here, is also prefixed by B 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 number of a new clause or a new payment item, which does not form part of a clause or a payment item in the standard specifications and is included here, may be prefixed by a D (Project Specifications for Employment of Local Labour as EPWP Beneficiaries) or a E (Project Specifications for the Provision of Compulsory Training) or an F (Project Specifications for Health & Safety) or a G (Project Specifications for HIV/AIDS) 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.

C3.5: PROJECT SPECIFICATIONS

PART B: MATTERS RELATING TO THE STANDARD SPECIFICATIONS SECTION 1100: DEFINITIONS AND TERMS

B1115 GENERAL CONDITIONS OF CONTRACT

Replace Clause 1115 with the following:

The General Conditions applicable to this Contract are the General Conditions of Contract for Construction Works, 2015, Second Edition, (GCC 2015).

Accordingly, all reference in the Standard Specifications to any other General Conditions of Contract (GCC) has to be amended. The Standard Specifications have been scrutinised and clauses, which refer to another GCC, identified. These are tabulated below together with the relevant equivalent clause in the GCC 2015 Conditions of Contract. The context of the reference to the GCC is also noted.

Whereas every effort has been made to include all of the affected clauses in the table, there may be some omissions. In every case, however, the GCC 2015 Conditions of Contract for Construction, as amended by the Special Conditions of Contract in Section C1.2 of this Volume, shall apply and the Contractor shall be responsible for interpretation of the equivalent clause.

COLTO Standard Specification		COLTO General Conditions of Contract 1998 (GCC)		GCC2015 General Conditions of Contract for Construction Works, 2015	
Clause No	Page No	Cl. No	Description or Reference	Cl No	Description or Reference
1115	1100-2		Definition of applicable GCC and special conditions of contract		GCC2015 together with project documents
1204	1200-2	15	Construction programme	5.6.1	Construction programme
1204	1200-2		General reference to GCC		GCC 2015, as applicable
1206	1200-3	14	Setting out of works	5.4	
1209(a)	1200-4		General references to GCC		GCC 2015, as applicable
1209(e)	1200-5	52(2)	Valuation of material brought onto site	6.10.2	Valuation of material brought onto site
1210	1200-5	54	Certificate of practical completion	5.14.4	Certificate of practical completion
1212(1)	1200-7	49(2)			Cost of checking alternative designs
1215	1200-9	45	Extension of time for completion due to abnormal rainfall.	5.12	Extension of time for completion
1217	1200-10	35	Care of the works	8.2	Care of the works
1303(ii)	1300-1		General reference to GCC		GCC 2015, as applicable
1303(iii)	1300-1	49	Price adjustment Item 13.01 (a)	6.11	Variations exceeding 15%
1303 (iii)	1300-2	49	Price adjustment Item 13.01 (b)	6.11	Variations exceeding 15%
1303	1300-2	12	Payment Item 13.01 (c)	1.5.2	Commencement Date
1303	1300-2	49	Payment of Item 13.01 (c) Time Related Obligations	6.11	Variations exceeding 15%
1403(c) (ii)	1400-4	40	Variation for rented accommodation	6.4	Valuations of Variations

C3.5: PROJECT SPECIFICATIONS

1505	1500-3	40	Payment for damage caused by temporary drainage	6.4	Valuations of Variations
Item 15.08	1500-8	48	Payment of Provisional Sum	6.6	Provisional and Prime Cost Sums
Item 15.09	1500/8	48	Payment of Provisional Sum	6.6	Provisional and Prime Cost Sums
Item 15.11	1500-8	48	Payment of Provisional Sum	6.6	Provisional and Prime Cost Sums
Note (2)	3100-4	40	Payment for prospecting for materials	6.4	Valuations of Variations
3204(b) (iii)	3200-2	40	Determining Compensation for varied methods and equipment	6.4	Valuations of Variations
3303(b)	3300-2	2	Employer's Agent's decisions, with reference to materials classification	3	Employer's Agent and Employer's Agent's Representative
Item 44.06	4400-3		General reference to GCC, PC Sums	6.6	Provisional and Prime Cost Sums
Item 45.06	4500-3		General reference to GCC, PC Sums	6.6	Provisional and Prime Cost Sums
5803 (c)	5800-3	40	Variation, for landscaping	6.4	Valuations of Variations
5805 (d)	5800-4	40	Variation, for grassing	6.4	Valuations of Variations
Item 58.10	5800-10	48	Payment for Extra Work	6.6	Provisional and Prime Cost Sums
8103 (c)	8100-1	40	Testing materials Valuation of Variations	6.9 6.4	Materials, Workmanship and Construction Equipment Valuations of Variations
Item 81.02	8100-26		General reference to GCC, Provisional Sums	6.6	Provisional and Prime Cost Sums
Item 81.03	8100-26	22	Removal of Test Equipment and Clearance of Site on Completion	5.15	Clearance of Site
8209	8200-11		Process Control by Contractor (Table 8206/3 amended)		GCC 2015, as applicable

Add the following clauses:

B1156 LABOUR-INTENSIVE CONSTRUCTION

The cost effective employment of as great a portion of labour as is practically and technically feasible to produce a standard of construction as required by the specifications, thus the economic substitution of plant and mechanical equipment in favour of available labour using hand tools.

Hand tools, equipment and plant may be supplemented with the use of the following equipment:

- generators for electricity supply;
- angle grinders and/or similar hand-held equipment;
- concrete mixers;

- self-propelled pedestrian rollers or hand-held impact equipment (whacker) for compaction purposes;
- chain saws;
- tractor and trailer.

B1157 PROCESS CONTROL

Process control means all testing required to be carried out by the Contractor, at his own cost, in order to ensure that the completed permanent works comply with the specifications and drawings. All such testing will be subject to inspection and approval by the Engineer.

B1158 ACCEPTANCE CONTROL

Acceptance control means whatever testing the Engineer carries out over and above the process control testing already carried out in order to decide on the acceptability of any work submitted by the Contractor. Such testing will be carried out at the cost of the Employer."

SECTION 1200: GENERAL REQUIREMENTS AND PROVISIONS

B1202 SERVICES

Amend the 1st paragraph to read:

"This contract may include certain work relating to the moving and reinstating of existing services, monuments and memorials that may be affected by the construction of the works."

Add the following to the second paragraph:

"All known services inside the limits of the works are indicated on the drawings or shall be advised during the clarification meeting. The Contractor shall, however, immediately inform the Engineer of any underground service which it is not shown on the drawing and which he discovers during the execution of the contract."

Insert the following paragraph after the fifth paragraph:

"All services which exist or are presumed to exist by the Contractor or the Engineer must be searched for and exposed by the Contractor so that the Engineer can make a final decision about possible protection or shifting."

It is also the condition of this contract that the Contractor notifies the Engineer in writing at least one week in advance of the intention to search and expose any existing services. During this period the Contractor must assist the Engineer in gathering information about these services."

The Contractor shall supply adequate supervision for labourers when excavating to expose services. Any damage caused by the Contractor shall be repaired at his expense to the satisfaction of the owner of the service and the Engineer.

B1204: PROGRAMME OF WORK

(a) General requirements

Insert the following before the first paragraph:

"A network-based programme in accordance with the precedence method shall be provided, showing the various activities in such detail as the Engineer may require. The programme shall be updated monthly in accordance with the progress made by the Contractor."

Failure to comply with these requirements entitles the Engineer to use a programme based on his own assumptions to evaluate claims for extension of time for completion of the works, or for additional compensation."

Add the following as a continuation of the first paragraph:

"In drawing up the programme the Contractor shall make allowance for the following:

- (i) All special non-working days defined in C1.4 Contract Data.
- (ii) The expected delays defined in B1215: Extension of time resulting from inclement weather.
- (iii) The construction sequences and accommodation of traffic as directed

Add the following sub-clause:

“(c) Programme revisions

The programme will be reviewed at the scheduled site meetings at which the Contractor shall provide sufficient detail that will allow the comparison of completed work per activity against the original approved programme. The Contractor shall indicate what resources and programme changes he intends to implement in order to remedy any activity that may have fallen behind. The Engineer may request from the Contractor a major revision of the programme. Such a revision shall be submitted for approval within fourteen (14) days of the request.”

B1205: WORKMANSHIP AND QUALITY CONTROL

Add the following after the title:

“The Contractor shall implement a quality assurance system in accordance with ISO 9002 and appoint a quality manager who shall ensure that members of the Contractor’s staff comply with the requirements of the quality system. The quality system and the methods used to implement it shall be described in a quality plan produced by the Contractor.

The quality manager shall be resident on site full time. No construction activities shall take place on site before the Engineer approves the quality plan”.

Delete the second, third and fourth paragraphs and replace with the following:

“The Contractor shall submit the quality assurance system he proposes using to the Engineer, for his approval, within two weeks of the site handover. Once accepted by the Engineer the Contractor shall not deviate from it unless written notification of proposed changes have similarly been submitted and approved. The system shall record the lines and levels of responsibility and indicate the method by which testing procedures will be conducted.”

B1206 THE SETTING-OUT OF WORK AND PROTECTION OF BEACONS

Delete the first portion of the first paragraph up to the words of "..., and he". The paragraph shall start "The Contractor shall comply with all legal...."

Delete "and of clause 14 of the general conditions of contract" in the sixth paragraph

Add the following after the third paragraph of clause 1206:

Permanent beacons and reference pegs will be provided.

The Contractor shall provide, free of charge, sufficient, labour to the Engineer or his representative for measuring, levelling, testing or other work of short duration which may be necessary during the course of the contract. At least one literate employee shall be available on request.

Add the following paragraphs:

"The Contractor shall take care that property beacons, trigonometrical survey beacons or setting-out beacons are not displaced or destroyed without the consent of the Engineer. Property beacons and trigonometrical survey beacons that have been displaced or destroyed shall be replaced by a registered land surveyor, who shall certify such replacement.

The cost of replacing all beacons displaced or destroyed during the course of the contract without the consent of the Engineer shall be the Contractor's responsibility and included in the tender rates".

"The Contractor shall use appropriate methods for setting out the works to be constructed by labour-based methods. This may include the use of special templates and sight rails and other suitable implements, which will assist the labourers in constructing the works to the required lines, levels and standards. The cost of these implements and additional setting-out procedures shall be included in the rates for the works items and no separate payment will be made for them."

B1208 MEASUREMENTS

(a) Measurement of Completed Work

Add the following:

“(v) The actual authorised quantities of application or mix proportion of materials such as bituminous binders, aggregates, mineral fillers, paint, etc., shall be measured and paid for irrespective of allowed variations from nominal mix proportions or prescribed, portions. Any unauthorised increase in rates of application or mix proportions above those specified, shall however not be paid for.

The Engineer may also reject any work outright where the actual rate of application of the aforementioned is not within the specified limits and this work shall be rectified or reconstructed at the Contractor's expense.”

B1209 PAYMENT

(e) Materials on the site

Add the following:

“The Engineer may at his sole discretion allow payments under "Materials on the site" in respect of any construction materials, if stored off-site, providing that:

- the site selected for this purpose is approved by the Engineer;
- such land is physically separated from any production plant or operation;
- only materials for use under this contract are stockpiled on such land, and
- the Contractor has provided proof of an agreement with the owner of such land that the owner has no objection to using the land for these purposes and has no claim whatsoever on any materials stockpiled on such land.”

Add the following sub-clause:

“(g) Value Added Tax (VAT)

No value added tax shall be included in the Contractor's tendered rates or amounts.”

Add the following sub-clause:

“(h) Payment certificates

With reference to the General Conditions of Contract, the Engineer's certificate will be issued only after receipt by him of a draft certificate prepared by the Contractor at his own expense in the form prescribed by the Engineer. The cost of duplicating and delivering copies of the certificate to the Contractor, the Engineer and the Employer shall be borne by the Contractor. The Engineer and the Employer shall require four (4) sets of A4- sized paper copies of the approved certificate in total.”

Add the following sub-clause:

(i) Work in confined areas

No extra payment shall be made nor shall any claim for additional payment considered for construction in confined areas. The omission of standard pay items from the schedule of quantities shall be taken to be deliberate and any additional costs incurred shall be included in the bulk rate.

B1210 CERTIFICATE OF PRACTICAL COMPLETION OF THE WORKS

Add the following paragraph:

"In addition to the listed specified items of work and regardless of the degree of beneficial occupation by the Employer, no sections of the works, individually or collectively, shall be considered for practical completion unless the following criteria have also been met:

- (i) In the case of partial completion, the estimated cost to complete the outstanding work shall be less than 2% of the estimated cost to construct the whole section or sections, excluding CPA, Contingencies and VAT.
- (ii) In the case of the whole works, the estimated cost to complete the outstanding work shall be less than 2% of the tendered value of work plus the cost of any variation or extra work orders, but excluding CPA, Contingencies and VAT.
- (iii) It must be possible for the Contractor to complete the written list of outstanding items of work within 28 days from the date on which the list is issued to the Contractor."

B1214 CONTRACTOR'S ACTIVITIES IN RESPECT OF PROPERTY OUTSIDE THE ROAD RESERVE AND OF SERVICES MOVED, DAMAGED OR ALTERED

Add the following to the last paragraph of sub-clause (d):

"These written statements shall be handed to the Engineer before the final certificate will be issued. Failing to obtain these written statements from all landowners and authorities concerned, the period of maintenance will be extended including all conditions related to such an extension, until such time that all these statements are obtained.

The obtaining of any such written statements will not relieve the Contractor of the execution of any of his obligations to the satisfaction of the landowner or authority concerned, and to the approval of the Engineer."

B1215 EXTENSION OF TIME RESULTING FROM ABNORMAL RAINFALL

Add the following:

"Extension of time resulting from abnormal rainfall or other forms of inclement weather shall be calculated according to the requirements of Method II (critical-path method). The value of "n" as specified in this clause shall be taken as listed in Table B1 below:

Table B1: Number of Possible Delays in a calendar Month due to Inclement Weather

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
No. of Days ("n")	4	2	2	1	1	1	1	1	1	3	3	4

If no abnormal rainfall or other inclement weather periods occur during a specific calendar month (or months), the n-value of these days, as allowed for in the programme of works shall not be taken as accumulating over the contract period.

Items of work in the critical path of the programme of work and which are subjected to weather limitations shall only be considered for extension of time if such items of work are halted by e.g. cold weather, high winds or other inclement weather conditions. In this regard, reference shall be made to weather limitations specified for the application of various bituminous products.

The n-value for standing time shall also be applicable to each of these subsections of the works for which separate completion times are specified and standing time shall only be recorded during the period of the time the specific subsection as indicated by the Contractor in his official programme of work, is under construction. Extension of time for each subsection, if applicable, shall therefore be calculated separately. Time related changes in this regard shall be calculated as specified under section 1300 of these specifications."

B1216 INFORMATION FURNISHED BY THE EMPLOYER

Add the following after the second paragraph:

"Drawings and quantities regarding the distribution and extent of work items were compiled and calculated to the best of the Engineer's knowledge and available information at the time of the design and could be subject to variations at the construction stage. Such variations shall, however, not form grounds for a claim by the Contractor in terms of sub-clause 6.3: Variations of the General Conditions of Contract."

B1217 PROTECTION OF THE WORKS AND REQUIREMENTS TO BE MET BEFORE CONSTRUCTION OF NEW WORK ON TOP OF COMPLETED WORK IS COMMENCED

Add the following:

- "(h) Prior to the start of any excavation on any part of the works, the Contractor shall submit to the Engineer for approval a method statement for the execution of that part of the work. The Contractor is responsible for the protection of the underlying pavement layers and the drying out and/or keeping dry of such excavations. The Contractor's programme shall make provision for the speedy backfilling of the excavations and the drainage thereof if inundation cannot be prevented.

The Contractor shall, at his own cost, be responsible for the repair of pavement layers which have been damaged due to his own works or his neglect to submit his planning to the Engineer for approval or to adhere to approved precautionary measures."

B1222 USE OF EXPLOSIVES

Add the following:

- "(i) No blasting shall be carried out without prior written permission from the Engineer, and the necessary written approval or clearance being obtained from the relevant authority and the concern of all parties."

B1224 THE HANDING-OVER OF THE ROAD RESERVE

Add the following:

"The total length of the road reserve will be handed over to the Contractor at the start of the contract period." From the handing over of the road reserve up to the issue of a completion certificate, the road reserve shall be maintained by the Contractor as specified in section 1700.

All work shall be carried out within the road reserve"

B1229: SABS CEMENT SPECIFICATION

Add the following:

"Where reference is made in this specification or the standard specifications to the cement specifications, it shall be replaced with the new specification of SANS 50197-1:

2000: Part 1: Composition, specifications and conformity criteria for common cements.

Common cement types are intended for use in concrete and the following types shall normally apply

Table B2: Common Cements

DESCRIPTION	TYPE AND NOTATION	MAIN EXTENDERS TO PURE CEMENT CLINKER
Portland cement	CEM I	No extenders (pure cement)
Portland slag cement	CEM II/A-S	6- 20% blast-furnace slag
	CEM II/AB-S	21-35% blast-furnace slag
Portland silica fume cement	CEM II/A-D	6-10% silica fume
Portland fly ash cement	CEM II/A-V	6-20% siliceous fly ash
	CEM II/B-V	21-35% siliceous fly ash
	CEM II/A-W	6-20% siliceous fly ash

	CEM II/B-W	6-20% calcareous fly ash
Portland limestone cement	CEM II/A-L	6-20% limestone
	CEM II/B-L	21-35% limestone
Portland composite cement	CEM II/A-M	6-20% composite
	CEM II/B-M	21-36% composite
Blast-furnace cement	CEM III/A	36-65% blast-furnace slag
	CEM III/B	66-80% blast-furnace slag
	CEM III/C	81-95% blast-furnace slag
Pozzollanic cement	CEM IV/A	11-35% silica fume and fly ash
	CEM IV/B	36-55% silica fume and fly ash
Composite cement	CEM V/A	36-60% slag and fly ash
	CEM V/B	61-80% slag and fly ash

The following strength classes for cement are specified:

Table B3: Mechanical and physical requirements of common cements

STRENGTH CLASS	COMPRESSIVE STRENGTH (MPa)			
	EARLY STRENGTH		STANDARD STRENGTH	
	2 DAYS	7 DAYS	28 DAYS	
32,5	-	-	≥32,5	≥52,5
32,5R	≥10.0	-		
42,5	≥10.0	-	≥42,5	≥62,5
42,5R	≥20.0	-		
52,5	≥20.0	-	≥52,5	-
52,5R	≥30.0	-		

The following amendments shall apply to COLTO Volume 2A

B1232 LABOUR-INTENSIVE CONSTRUCTION METHODS

Compulsory training shall be provided to Local labour and selected QSE's and EME's in accordance with the provisions set out in clause C3.3 and Part F of the Project Specifications. All training courses must be offered through approved accredited training organisations and shall commence within one month of the commencement date and shall be complete before the end of the Contract Period.

The Contractor shall provide the following for the training as part of his General Obligations:

- (a) A venue with sufficient lighting, electric power points and furniture;
- (b) All necessary stationary, consumables and study material;
- (c) Transport to and from the training venue if the training is not delivered on Site;
- (d) Wages for candidates attending training during working hours;
- (e) **A PC sum has been allowed in the Bill of Quantities for payment to approved training organisations for the provision of training to Local Labour and QSEs and EMEs**

B1234 MEASUREMENT AND PAYMENT

Item

Unit

B12.01 Community Liaison:

- (a) Community Liaison Officer Prov. sum
- (b) Contractors charge to allow for handling costs and profit in respect of Sub-item B12.01 (a) Percentage (%)

Payment under the full project duration provided sub-item B12.01 (a) is to cover the employment, remuneration for 3 No. allowable Community Liaison Officer(s) and R 300.00 per month cell phone allowance each per month included in this remuneration package. The CLOs must be selected from the affected wards and be given by the Project Steering Committee on commencement of the Works.

The tender percentage in sub-item B12.01 (b) is the percentage of the amount actually spent under item B12.01 (a) that will be paid to the Contractor in full compensation for the Contractor's handling costs and profit in respect of the employment and remuneration of the Community Liaison Officer.

Item

Unit

B12.02 Contractor's general obligations in respect to Environmental Management Plan (EMP)

- | | | |
|----|---|----------|
| a) | Fixed obligations | Lump Sum |
| b) | Remuneration of Environmental Control Officer | Month |

The tendered rate for sub item (a) shall include full compensation for the fixed part of contractor's environmental management. Under no circumstances will the contractor be paid monthly obligations under this item and payment will be a once off instalment.

The rate tendered in sub-item B12.02 (b) shall include full compensation for all costs resulting from the recruitment and employment of a designated full time Environmental Officer (DEO), This shall include all expenses related to the employment of the Environmental officer, including the provision of transport, any equipment and facilities, etc. required by Environmental officer to carry out his/her duties.

Item	Unit
-------------	-------------

B12.03 Contractor's general obligations in respect of the Occupational Health and Safety Act and Construction Regulations

- | | | |
|-----|--------------------------------|----------|
| (a) | Fixed obligations | Lump Sum |
| (b) | Time related obligations | Month |
| (c) | HIV/AIDS awareness obligations | Lump Sum |

The full amount will be paid in one instalment only once:-

- (a) The Contractor has notified the Provincial Director of the Department of Labour in writing of the project.
- (b) The Contractor has made the required initial appointments of employees and sub-Contractors.
- (c) The Client has approved the Contractor's Health and Safety Plan.
- (d) The Contractor has set up his Health and Safety File.

The tendered monthly amount shall represent full compensation for that part of the Contractor's general obligations in terms of the Occupational Health and Safety Act and the Construction Regulations which are mainly a function of time. This includes inter alia payment of all costs for the appointment of all staff contemplated in the construction regulations and the transport of employees on site. Payment will be monthly only after payment for Item B12.03 (a) has been made.

The tendered lump sum shall represent full compensation for the Contractor meeting all his obligations in respect of the Occupational Health and Safety Act and the Construction Regulations and for the preparation and submission of his Health and Safety File complete as envisaged on this specification to the Client's satisfaction.

This amount will be paid only once the Contractor has met all his obligations in respect of the Occupational Health and Safety Act and the Construction Regulations and has submitted his Health and Safety File complete as envisaged on this specification to the Client's satisfaction.

The total tendered sum for items B12.03 (a) and (b) shall not be more than 1% of the total tendered sum exclusive of VAT.

The combined total amount of Payment Items B12.2 (a) to (b); B12.03 (a) to (c) and 13.01 (a) to (c) shall not exceed 16% of the total tendered sum excluding VAT.

Item	Unit
B12.04, B12.06, B12.07 Protection and/or Relocation of Services	
(a) Provisional Sum for relocation of services	
(i) Eskom	Provisional Sum
(ii) Telkom	Provisional Sum
(iii) District Pipes	Provisional Sum
(iv) Emalahleni Municipality Water Pipes	Provisional Sum
(v) Emalahleni Municipality Sewer Pipes	Provisional Sum
(vi) Other service providers	Provisional Sum
(b) Contractor's handling costs and other charges on item B12.05 (a)	Percentage (%)

Expenditure under Item B12.05 (a) shall be made in accordance with the General Conditions of Contract.

The tendered percentage under Item B12.05 (b) shall be made on the actual amount expended under Sub-Item B12.05(a) and shall provide full compensation for the Contractor's handling cost and all other charges to compensate for service relocations.'

Item	Unit
B12.05 Exposing existing services by hand in all classes of material	Cubic metre (m ³)

The unit of measurement shall be the cubic metre of material excavated within the lengths and widths authorised by the Engineer and the depth required to expose the service. Excavation in excess of the authorised dimensions shall not be measured for payment.

The Bid rates shall include full compensation for all excavation, backfilling, compacting to 90% of modified AASHTO density, disposing of surplus excavated material, keeping the excavations safe, dealing with any surface or subsurface water, taking special care to ensure that services are not damaged in any way and any other operation necessary for completing the work.

No distinction will be made between hard and soft material nor will distinction be made between the various types of services to be exposed or the depths to which excavations are taken.

NOTE:

The Contractor shall supply adequate supervision for the labourers when excavating to expose services. Any damage to a service caused by the Contractor shall be repaired at his expense to the satisfaction of the owner of the service and the Engineer.

Item

Unit

B12.09 Supply and erection of contract sign boards

Number (No.)

The unit of measurement shall be the number of sign boards supplied and erected on the site. Each sign shall be 2m high and 3m wide with prominent letterings as per the specifications from the Employer

The tendered rate shall include full compensation for furnishing and erection of the sign boards as detailed on the drawings, complete with supports and the dismantling and removal thereof on completion of the contract.'

Item

Unit

B12.10 Remove and relocate traffic signals

Number (No.)

The unit of measurement shall be the number of traffic signals removed.

- a) The tendered site shall include for removing the signals to its temporary position, maintaining the traffic signals, during construction phase and relocating the traffic signals to its final position on completion of the construction works and incidental cables up to 20m length.
- b) The tendered rate shall include for removing the signals to the municipal stores where such signal is no longer needed in that position.

Item

Unit

B12.12 Training Requirements

- | | | |
|-----|--|----------|
| (a) | Local labour | P.C. Sum |
| (b) | QSE'S and EME's | P.C. Sum |
| (c) | Contractor's handling costs, profit and all other charges in respect of Sub-items B12.12 (a) and (b) | (%) |

Payment under Sub item B12.12 (a) and (b), shall be the amounts actually paid to the training institutions and shall be made in accordance with the provisions of the General Conditions of Contract.

The percentages tendered for Sub item B12.12(c) shall be the percentages of the amounts actually reimbursed to the Contractor under Sub items B12.12(a) and (b), and shall be in full and final compensation in respect of the Contractor's handling costs, profit, mentoring, record keeping, reporting and all other charges in connection with providing the

services.

Item	Unit
B12.13 Services for the Engineer	PC Sum
PC Sum for services in relation to engineers costs and compensation for services expended in relation to the project which services have been paid by the Engineer.	
(a) Geotechnical investigation	PC Sum
(b) Social Facilitation Services	PC Sum
(c) OHS Practitioner	PC Sum
(d) Environmental Practitioner	PC Sum
(e) Survey works	PC Sum
(f) Engineers supervision of the works	PC Sum
(g) Electrical Engineers supervision	PC Sum
(h) Traffic studies	PC Sum

The tendered percentage under each item B12.12 (a) shall be made on the actual amount expended under each Sub-Item and shall provide full compensation for the Contractor's handling cost and all other charges to compensate for handling costs.'

Add the following clauses:

B1238 SUBCONTRACTORS

In addition to the provision of clause 6 of the General Conditions of Contract regarding subcontracting of the works, it is a requirement of this contract that an approved Sub-contractor shall not further subcontract work contracted to him by the main Contractor, to another Sub-contractor without the consent and approval of the Engineer. Subcontracting shall in all cases be critically considered by the Engineer. The Engineer reserves the right to limit the extent and volume of work subcontracted by the Contractor, should it be deemed necessary in terms of progress and quality of workmanship.

B1239 WORKER'S COMPENSATION ACT

All labour employed on the site shall be covered by the Workmen's Compensation Act. The Contractor shall pay in full, including the payment of the necessary levies, such amounts, as are due in terms of the act. The Contractor, at the commencement of the contract, shall resolve the manner in which Workmen's Compensation will be handled. Amounts paid by the Contractor shall not be included in the wage rate but shall be an extra payment allowed for by the Contractor.

B1240 SECURITY

Security of Contractor's plant and personnel:

The tenderer shall note that, notwithstanding the insurances effected by the Contractor, the Contractor shall be responsible for the effecting of safety and security of plant and personnel on and around the site of the works, and that no claims in this regard will be entertained by the Employer.

Contractors are expected to use common sense and good judgment in assessing their security requirements. Under no circumstances will additional payment be made for items such as security fencing, e.g. razor coil wire, mobile radios, control of persons entering the site camp(s), day and night watchmen, armed guards on pay days, control on

stockpiles of materials and fuel, or any other measures normally associated with the provision and maintenance of security on site.

Security arrangements will be deemed to be included in the amount tendered for in Items 13.01(a) and 13.01(c).

B1241 DRAWINGS

The drawings shall remain in the sole custody of the Engineer, but one electronic copy shall be furnished to the Contractor free of charge. The Contractor shall, at his own expense, produce there from all further prints required for the Construction of the Works. At the completion of the Contract, the Contractor shall return to the Engineer all prints provided and produced during the Contract period.

One full size set of prints of the drawings shall be kept by the Contractor on the Site and these shall at all reasonable times be available for inspection and use by the Engineer and his representative, or by any other persons so authorised by the Engineer in writing.

The drawings shall not be used by the Contractor for any purpose other than the execution of the works.

All information in the possession of the Contractor which is required by the Engineer's representative for the completion of "as-built" drawings shall be submitted to the Engineer's representative before a completion certificate is issued.

Only figured dimensions on the drawings shall be used, and drawings shall not be scaled. The Engineer shall supply and figured dimensions which have been omitted from the drawings.

Additional drawings may be issued as necessary to the Contractor by the Engineer from time to time during the progress of the works. The Contractor shall timeously notify the Engineer of the priority in which drawings and details are required."

SECTION 1300: CONTRACTOR'S ESTABLISHMENT ON SITE AND GENERAL OBLIGATIONS

B1301 SCOPE

Add the following at the end of the last sentence (replace the full stop with a comma):

"including application of the Workmen's Compensation Act."

B1302 GENERAL REQUIREMENTS

(a) Camps, construction plant and testing facilities

Add the following to this clause:

The Drawings shall remain in the sole custody of the Engineer, but shall be supplied with three (3) prints of each drawings and shall make additional prints at his own costs. The contractor shall make his own arrangements regarding the establishment of a camp site and housing for his construction personnel. No personnel will be allowed to reside on the site. Only night-watchmen may be on the site after hours.

The Contractor shall be responsible for the security of his personnel, construction plant on and around the site of the works, and of his camp. The cost of this will be deemed to be included in item 13.01.

The Contractor's offices, laboratory and stores shall, unless otherwise agreed, be erected in close proximity to the Engineer's offices and laboratory. The entire area shall be fenced with a minimum of 1,8m height razor taped mesh. The Contractor's offices, laboratory and stores and Engineer's offices and laboratory shall be provided with sufficient perimeter lighting.

The Contractor shall provide an acceptable training venue in the form of an air conditioned room with sufficient space to comfortably provide training as specified in above and in Part F of the project specifications. The training venue shall have seating and tables so that such trainees have space to make notes.

The Contractor shall provide security guards from a reputable security company for protection of the Engineer's offices and laboratory. The security guards must be provided with a two way radio and be in constant contact with the control room of the security company and an armed response unit. The security guards must be armed and accompanied by trained guard dogs. Payment for the above shall be included in item 13.01.

The Contractor shall provide at each work site at least one portable chemical latrine unit per 10 workers for use by construction workers employed on the project. The latrine units shall be serviced daily and kept in a hygienic and orderly state to the satisfaction of the Engineer. The Contractor shall move them to the required positions, and finally remove them, on completion of the works, all to the satisfaction of the Health Department of the relevant authority. Toilets must be screened from public view and their use shall be enforced. No separate payment shall be made for this requirement and payment shall be deemed to be included in the rates tendered for the Contractor's time-related obligations.

The Contractor shall supply and erect contract sign boards, manufactured with steel sheeting with a matt legend on a matt background, which shall be suitably erected on an approved steel support structure, with the bottom edge

2,5m above natural ground level, at positions pointed out by the Engineer. The contract signboards shall be erected within 30 days of the commencement date. Details of the sign face and legend will be provided on request. The Contractor shall maintain the contract sign boards and their support structures for the duration of the contract and remove them within 10 days of the receipt of a Certificate of Completion.

SECTION 1400: HOUSING, OFFICES AND LABORATORIES FOR THE ENGINEER'S SITE PERSONEL

B14.01 (a) Office and Laboratory accommodation

Add the following:

"It is a requirement of the contract that the offices for the engineer's supervisory staff shall be supplied with approved burglar proofing, the cost of which shall be included in the relevant tendered rates.

Add the following new paragraph at the end of this clause:

'The offices, laboratory and stores shall, unless otherwise agreed, be erected in close proximity to the contractor's offices and laboratory, and the entire area shall be fenced with security fencing and provided with a gate. The contractor shall take all reasonable precautions to prevent unauthorized entry to the offices and laboratories and to ensure the general security of the offices and laboratories.'

B14.03 Offices installations and equipment

Replace sub-sub-clause (xii) with the following:

"Cellphones will be the form of telephone communication and a 3G data card and modem shall be provided by the contractor. The Cellphone shall have a minimum of 5 megapixel camera and shall have a geo-tagged feature for taking photographs. The cost of cellphone calls and data are included in the prime cost sum for the provision of the telephone service".

Add the following:

(xviii) Steel plan cabinets which are able to accommodate AO plans hung from the narrow side.

(xix) Microwave oven with a minimum capacity of 30 litres

(xx) Computers and printers The computers shall be laptops and shall meet the following minimum requirements:

- (1) IntelCorei5processor
- (2) 4GBRAM
- (3) 250 GB hard disk
- (4) 15' inch colour monitor
- (5) CD/DVD disk drive
- (6) 1GB graphic card
- (7) Wireless mouse with mouse pad
- (8) Windows 7 Home Premium and MS Project 2010
- (9) Microsoft Office 2010 (that has Word, Excel, PowerPoint and Outlook)
- (10) Bluetooth, Wi-fi and 3G connection
- (11) The printers shall be a highspeed colour printer.'

(c) Laboratories

In the second paragraph, second line substitute “drawings” with “figures included in the project document”

Delete (xvi) and replace with:

“Uninterrupted power supply (UPS) units shall be supplied for all electronic equipment.”

(g) Ablution units

Add the following:

“Two separate ablution units are required on site. Each unit shall contain at least a wash-hand basin, flush toilet, urinal, shower unit and the necessary accessories. Both ablution units shall be provided with hot and cold water. The towels shall be replaced with clean towels every second day and soap and other toiletries supplied as necessary.

One of the units shall contain a lockable clothing cupboard for at least six employees. The other unit shall contain a lockable clothing cupboard for at least two employees. The ablution units shall each have an interior floor area of at least 10m² and a 1,5m wide veranda on one side with a 100mm concrete floor.

The tendered rate under Item B14.01 (e) shall include full compensation for the supply, erection and maintenance of the complete units as specified.”

Add the following sub-clauses:

“(i) Kitchen units

The contractor shall provide a kitchen unit, for the use of the engineer, with minimum interior floor area of 12m², a 1,5m wide veranda on one side with a 100 mm thick concrete floor in the vicinity of the offices.

The unit shall contain at least two opening windows, a lockable door, a three-plate electrical stove with oven, a steel framed formica topped table (0, 6 m x 1, 2 m), four steel framed bar or kitchen stools, a lockable refrigerator of one hundred and fifty litres capacity, a kitchen sink supplied with clean hot and cold potable water, a drain board coupled to a suitable drainage system and a lockable steel grocery cupboard.

B1403 HOUSING

(c) Rented accommodation

Add the following:

“The engineer will arrange for the obtaining of rented accommodation for his supervisory personnel on site. Payment of rent shall be made under the Provisional Sum in sub-item 14.07(a) and shall be expended on a monthly basis as ordered by the engineer.”

B1404 SERVICES

(b) Water, electricity and gas

Add the following:

The power supply shall be regulated by suitable UPS units in order to maintain a constant current and voltage level at all times to prevent damage to the office and laboratory equipment and related electronic equipment during power

surges. In the event of damage to the office and laboratory equipment and related electronic equipment because of a faulty voltage, the contractor shall be liable for payment of all repair or replacement costs of such damaged items.

(d) Cooking facilities

Add the following:

The contractor shall have access to tea lady who will make tea for the engineer and his subordinates when required to do so.

Add the following sub-clause:

(f) Survey equipment

The Contractor shall provide the following survey equipment on the site when called on to do so:

- 1 x Theodolite (direct 20" reading) with tripod
- 1 x Automatic level with tripod
- 1 x 25m Stylon tape
- 1 x 100m steeltape
- 2 x 5 m levelling staffs (1cm graduations) with bubbles
- 6 x One-piece 2m fibreglass ranging rods
- 1 x Optical square
- 1 x 14lb survey hammer
- Steel and wooden pegs as required.

A tachymeter may be shared by arrangement between the contractor and the engineer's representative, but the remaining instruments shall be provided for the exclusive use of the engineer's representative. The contractor shall keep the equipment insured against any loss, damage, or breakage, and he shall indemnify the engineer and the employer against any claims in this regard.

The contractor shall maintain the equipment in good working order and keep it clean.

"(f) Survey assistants

The contractor shall make available two survey labourers to the engineer. He shall upon request make a further two labourers available to assist the engineer's staff in taking and transporting samples."

B1406 MEASUREMENT AND PAYMENT

Add the following sub-item to item 14.01:

"B14.01(g) Kitchen units

Number (No.)

The unit of measurement and payment shall be the authorized number of units erected, complete and in accordance with the specifications and together with all items as specified in Clause B1402.

The tendered rate shall include full compensation for the supply and erection of units, accessories, furniture, etc. as specified and for the proper maintenance, cleaning and provision of daily requirements."

B14.03 Office and laboratory fittings, installations and equipment

(a) Items measured by number

Add the following new sub-items:

'Item	Unit
(xix) Steel plan cabinets	Number(No)
(xx) Microwave oven 30 litre	Number (No)
(xxi) Supply of computer	
(1) Computer	Number(No)
(2) Printer	Number (No)
(xxii) Flood lights complete with poles and 500watt minimum globes	Number (No)
(xxiii) Uninterrupted power supply unit	Number (No)

The tendered rate shall be full compensation for providing all the equipment specified and all maintenance repairs to ensure that the equipment is maintained in fully serviceable condition.'

SECTION PRIME-COST ITEMS AND ITEMS PAID FOR IN A LUMP SUM

Add to (b) (i) the following:

"Included, is the payment of calls made by cell phone by the Engineer's staff and if required by the Engineer, for the provision of suitable cell phones."

Add the following new items:

Item	Unit
B14.10 Provision of Photostat facilities	month

The photocopier to be supplied by the contractor shall be a 4 in 1 machine (i.e. photocopy, fax, scan and print).

Add the following new items:

Item	Unit
B14.11 Services for the Engineer	
(a) Provision of survey equipment	month
(b) Provision of survey assistants	month

The tendered amount for sub-item (a) shall include full compensation for the supply and maintenance of the service during the months requested by the engineer and the tendered amount for sub-item (b) shall include full compensation for the supply of the assistants including accommodation and transport.

B1500: GENERAL REQUIREMENTS

(a) Safety

Add the following:

"The travelling public shall at all times 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."

(i) Traffic safety Officer

Add the following to the second paragraph:

"Before the appointment of the Traffic Safety Officer, The Contractor shall submit a CV of the candidate of to the Engineer for approval. The appointed person shall receive direct instructions from the resident Engineer. He shall be available at all times during working hours."

Add the following paragraph after the second paragraph:

"The responsible person shall have under his control a permanent daily patrol unit to ensure traffic arrangements and road signs to be satisfactory and in good state at all times. Payment for the daily patrol unit shall be measured under item B15.03(n)."

Add the following sub-clause (ii):

"Neat and dimensioned sketches of traffic accommodation at each location, showing all signs, barricades, delineators, cones, amber flicker lights, flagmen, guardrails and permanent or temporary road markings, adequately referenced to identifiable permanent features located along the site of the works, shall be submitted to the Engineer for his comments and recommendation. These records shall be amended whenever changes are made."

Add the following sub-clauses"

- "(ix) have a direct line of communication at all times with the police and traffic officer responsible for the area where the contract is located.
- (x) ensure that all obstructions related to the Contractor's civilities be removed before nightfall where applicable and as instructed by the Engineer and that the roads are safe for the night traffic."

(j) Handing over the site

Add the following to the second paragraph:

The entire site will be handed over to the Contractor at the beginning of the contract. The Contractor shall be responsible for maintaining the road surfaces over the entire site in a safe and trafficable condition for the duration of the contract.

(k) Public traffic

The Contractor must plan and conduct his activities so as to bring about the least possible disruption of the traffic on the existing roads within the area. Before starting work on any part of the site or at any location, the Contractor shall submit to the Engineer his method statement and programme for accommodating traffic as approved by all affected parties on that section of the works for the Engineer's information and comments.

Traffic shall be accommodated according to the contract plans and the South African Road Traffic Signs Manual (SARTSM), Volume 2, Chapter 13. The latest edition of this publication is available from the Government printer in Pretoria and a copy must be kept by the Contractor on site.

It is the responsibility of the Contractor that all sections of the road used to accommodate public traffic are safe and that the easiest possible passage is at all times provided.

Failure and/or refusal on the part of the Contractor to take the necessary steps to ensure the safety and convenience of the public traffic in accordance with these specifications or as required by the statutory authorities or the Engineer, shall be sufficient cause for the shutdown of all works under this contract until all provisions prescribed have been complied with to the satisfaction of the Engineer.

(l) Bypasses

It is the condition of this contract that the Contractor shall accommodate public traffic through the site of the works. Temporary bypasses shall be constructed where required and to the standards approved by the Engineer, and shall be maintained in a safe, trafficable condition to the satisfaction of the Engineer.

(m) Overnight parking of plant

During non-working hours, all plant traffic hazards shall be removed from the road and all signs no longer applicable to the situation shall be removed or effectively covered. No plant shall be parked adjacent to the road overnight. Plant which is impractical to be parked at the Contractor's camp may be parked on construction site, provided that it is parked at least 10m away from the edge of the road surface.

(n) Failure to comply with 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 Engineer, shall be sufficient cause for the Engineer to deduct penalties as follows:

A fixed penalty of R20 000.00 per occurrence shall be deducted for each and every occurrence of non-compliance with any of the requirements for section 1500 of the standard specifications and section B1500 of the project specifications.

In addition a time related penalty of R 1500.00 per hour 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 Engineer.

The Engineer's instruction shall state the allowable time, which shall be in time hours for reinstatement of defects. Should the Contractor fail to adhere to this instruction, the time-related penalty shall be applied from the time the instruction was given."

SECTION B1503: TEMPORARY TRAFFIC CONTROL FACILITIES

(a) Traffic control devices

Add the following:

"The Contractor must ensure that all traffic-control devices be cleaned on regularly basis with special attention given to retro-reflective road signs.

It shall be the Contractor's responsibility to ensure that temporary devices are positioned in such a way as to minimise restrictions in particular existing intersections."

(b) Road signs and barricades

Add the following:

"All temporary road signs are to be mounted on portable supports to facilitate the moving of the signs. Only sandbags will be permitted for the ballasting of the sign supports. The sandbags shall consist of durable material and have adequate mass to prevent signs from being blown over by wind. The cost of the sand bag shall be included in the tendered rates for the various types of temporary road signs.

Temporary road signs and channelization devices shall be manufactured in accordance with the latest edition of the Road Traffic Signs Manual (Southern African development Community) and arranged along the road as shown on the plans and/or in Volume 2, Chapter 13 of the Road Traffic Signs Manual. Delineator plates shall be mounted on a post and a base section.

Temporary road traffic signs and barricades employed in the accommodation of traffic shall be removed from the site of works as soon as such signs are or barricades are no longer applicable to the situation.

The Contractor shall be responsible for the protection and maintenance of all signs and shall at his own cost replace any signs that have been damaged, lost or stolen.

The temporary covering of permanent road signs, if applicable, shall be done by utilising a hessian bag which shall be pulled over the sign in the form of a hood and fastened to the sign post. The plastic bag or other materials fastened by means of adhesive tape shall not be permitted. The cost of covering permanent road signs shall be deemed to be included in the tendered rates for item B15.01."

The Contractor shall indemnify the Employer against all proceeding, claims, actions, damages and costs which may arise from, or be related to the absence or improper functioning or placement of road-traffic signs, barricades, traffic-control facilities, channelization devices and warning devices.

(e) Warning devices

Add the following:

"All construction vehicles utilised on site shall be equipped with visible rotating amber warning lights and these lights shall be operational at all times when travelling on site or when vehicles are stationary in construction areas. All construction vehicles shall clearly display an identification sign(s) with the legend "CONSTRUCTION VEHICLES" visible from the front and back of the vehicles. No separate payment shall be made for the provision of warning lights and identification of signs for construction vehicles.

Where night-time closures are necessary and approved by the Engineer, warning lights shall be placed at strategic places such as barricades, obstructions, etc. as directed by the Engineer. The warning lights shall be flashing amber lights of an approved type. It may be necessary to construct a special unit to house the flashing light and power source in such a manner that it is vandal and theft proof.

The Contractor shall supply the Engineer's site personnel with a set of warning lights and vehicle identification signs for their vehicles (Britax or similar approved rotating flashing lights) as measured under the item B15.14, as well as with high visibility safety jackets as measured under item B15.15."

(f) Road markings

Add the following:

Where existing road markings are no longer visible due to the application of fog spray, repair work or resurfacing, temporary road markings shall be provided as directed by the Engineer and as soon as practically possible after the existing markings have been covered up by the pre-treatment and/or resurfacing operations. Allowance is made under this section of the schedule of quantities for the application of temporary road markings."

Add the following

MEASUREMENT & PAYMENT

'Item	Unit
B15.14 Services of a Traffic Safety Officer	month
Monthly compensation shall be made for the services of a Traffic Safety Officer in the employ of the contractor once conditions of item 1500 (i) and the particular specifications above are fulfilled.	

SECTION 1600 : OVERHAUL

B16.02: DEFINITIONS

(b) Overhaul

Add the following:

"Overhaul shall not be paid on materials transported from commercial sources"

(c) Haul distance

Add the following:

"The overhaul distance on the materials hauled shall be calculated by taking the total distance travelled by haulage vehicles from the point of loading to the point of delivery and back to the point of loading, divided by two, minus the specified free haul distance. The shortest practical haul route shall in all cases be confirmed with the Engineer prior to the commencement of haulage of materials from source to the relevant construction areas."

SECTION 1700: CLEARING AND GRUBBING

B1701: SCOPE

Add the following:

"This section also covers the keeping clean and maintenance of the existing road reserve for the duration of the contract, as would normally be done as part of the routine road maintenance."

B1703: EXECUTION OF WORKS

SECTION DISPOSAL OF MATERIALS

Add the following:

All the material resulting from the clearing, grubbing and maintenance of the road reserve and the drainage system shall be disposed of at approved dumping sites provided by the Contractor in accordance with the Engineer's instruction and in accordance with the requirement of the Local Authorities, particularly with respect to any restrictions against burning. The Contractor shall be responsible for finding suitable places near the construction site where the material can be disposed of to the satisfaction of the Engineer. Any charges payable for the dumping of material shall also be to the Contractor's account."

B1704: MEASUREMENT AND PAYMENT

Add the following payment items:

Item	Unit
B17.01 Clearing and grubbing	hectare (ha)

Add the following to the second payment paragraph:

The tendered rates shall also include full compensation for the removal of redundant sign posts or any post of a similar nature, cutting trees with single or multiple trunks each with a girth of less than a metre, cutting trunks and branches into transportable lengths, backfilling cavities, trenches and dongas and removing, transporting and disposing of materials thus cleared, grubbed, cut and demolished."

Add the following payment items:

Item	Unit
<p>B17.09 Removal of builder's rubble not included under item B17.08 above for free haul of 1km (haulage beyond 1km and dumping charges paid under items 17/16.02 and B17.11) cubic metre (m³)</p> <p>The unit for measurement shall be the cubic metre of builder's rubble, broken up, removed and disposed of as shown on the plans or as instructed by the Engineer.</p> <p>The tendered rate shall include full compensation for all work necessary to break up, and for removing, transporting and disposing of rubble at approved dumping areas for a free haul of 1km.</p>	
Item	Unit
<p>B17.10 Remove existing kerb and channel (haulage beyond 1km and dumping charges paid under items 17/16.02 and B17.11)</p>	cubic metre (m ³)
<p>The unit for measurement shall be the cubic metre of concrete kerbing, irrespective of type, broken up, removed and disposed of as shown on the plans or as instructed by the Engineer.</p> <p>The tendered rate shall include full compensation for all work necessary to break up existing kerbing (if necessary), and for removing, transporting and disposing of concrete kerbing, debris, etc. at approved dumping areas.</p>	
Item	Unit
<p>B17.11 Dumping charges:</p> <p>(a) Dumping charges at dump site</p> <p>(b) Handling costs and profit</p>	<p>Provisional Sum</p> <p>Percentage (%)</p>
<p>On written instruction only may the Contractor dispose of spoil material at an approved dump site.</p> <p>Expenditure under this item shall be made in accordance with the General Conditions of Contract.</p>	

SECTION B1800: DAYWORKS AND HIRE OF CONSTRUCTION EQUIPMENT

Add the following section to the standard specifications:

SECTION 1800: DAYWORKS AND HIRE OF CONSTRUCTION EQUIPMENT

Contents

B1801 SCOPE

B1802 GENERAL REQUIREMENTS

B1803 MEASUREMENT AND PAYMENT

B1801 *Scope*

This section covers the listing of day work items in accordance with the general conditions of contract clause 6.5, for the use in determining payment for work which cannot be quantified in specific units in the schedule of quantities, or work ordered by the engineer during the construction period which was not foreseen at tender stage and for which no applicable rate exists in the schedule of quantities.

B1802 *GENERAL REQUIREMENTS*

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

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

The Contractor and the Engineer will agree on the method of recording the working hours prior to the commencement of the work. Any long period of idling at any one time which in the opinion of the Engineer or his representative is beyond that required for normal operating conditions will not be paid for as working time. Non-working hours for any reason shall not be measured for payment.

B1803 MEASUREMENT AND PAYMENT

	Item	Unit
(i)	B18.01 Personnel during project working hours	
	(a) Unskilled labour	hour (hr)
	(b) Semi-skilled labour (Charge hand)	hour (hr)
	(c) Skilled labour (Artisan)	hour (hr)
	(d) Foreman	hour (hr)
	(e) Surveyor	hour (hr)
(ii)	B18.02 Plant	
	(a) Trucks	
	(i) Tip Truck 6m ³	hour (hr)
	(ii) Tip Truck 10m ³	hour (hr)
	(b) TLB tractor fitted with back-actor and loader	
	(i) Model 55Kw power	hour (hr)
	(ii) Model 70Kw power	hour (hr)
	(c) Vibratory roller (self-propelled)	
	(i) Model mass 2t width 0.9m	hour (hr)
	(ii) Model mass 10t width 2.2m	hour (hr)
	(c) Air compressor complete with all tools, drills, Jackhammers, etc. (10m ³ /min)	hour (hr)
	(e) Grader Cat 140G or equivalent	hour (hr)
	(f) Water truck (9 000litre)	hour (hr)

The unit of measurement for items B18.01 and B18.02 shall be the hour for the item of plant or personnel. Non-working hours for transport breakdown, lack of operator of any other reason shall not be measured. The time shall be taken from the time that the personnel and/or plant depart until return

Prior to the commencement of any work by the labourers described under items B18.01, the contractor must obtain written consent from the engineer regarding the classification of all labourers in terms of "unskilled", semi-skilled" and "skilled" labourers.

The tendered rates for labour for items B18.01 shall include full compensation to cover overhead charges and profit, leave pay, bonuses, subsistence, allowances, employer's contributions, additional payment for overtime where applicable, insurances, housing, site supervision, use of small hand tools and appliances, non -mechanical plant and equipment and consumable stores, for all administrative, supervisory, operative and contingent costs, relating to the supply of personnel

The tendered rates for plant for item B18.02 shall be an all-inclusive hire charge for the use of the vehicle and driver or plant/equipment and operator and shall apply only to vehicles plant and equipment nominated in writing by the engineer, for all administrative, supervisory operative and contingent cost, and profit, relating to the running of the plant

The above-mentioned tendered rates shall be full compensation for the various items as specified and no further profit shall be paid

The rates shall be for the working hours of this contract.

Item

Unit

B18.03 Materials

(a) Materials

Provisional Sum

(b) Percentage on net cost of materials

percentage (%)

The prices for materials (excluding VAT) shall be based on the documented proof submitted to the Engineer in accordance with the General Conditions of Contract. The prices shall not be subject to the Contract Price Adjustment factor.

The tendered percentage as an on-cost on the net cost price of materials shall include full compensation for handling, overheads, profit, liabilities, obligations, risks, incidentals, wastage and other on-cost for the supply, delivery and distribution of materials for day works."

SECTION 2100: DRAINS

Amend the first paragraph to read:

"This section covers all work both rehabilitative and new work in connection with the excavation and construction of open drains, subsoil drainage and banks and dykes at the locations and to the sizes, shapes, grades and dimensions as shown on the drawings or as directed by the engineers, and the test flushing of subsoil drains."

B2102 OPEN DRAINS

Sub-clause 2102(b)

Add before the second paragraph:

'All side drains, table drains and concrete-lined drains shall form part of the road prism, and their excavation shall be measured and paid for under Section 3300.'

Delete the word 'back actors' in the third from last line of the second paragraph. Sub-clause 2102(c)

Add the following :

'Concrete-lined side drains shall be finished within 5mm of the lines and grades shown on the drawings.'

The table drain side drain shall be finished to plus or minus 15mm of the lines and grades shown on the drawing.'

B2104 SUBSOIL DRAINAGE

(a) Materials

(i) Pipes

Amend this sub-clause by adding the following to the end of the third paragraph:

"(category-heavy duty) or SABS 1601 (stiffness class 350)"

The pipes to be used shall be either slotted u PVC pipes or perforated HDP pressure pipes, 100 mm ID"

(ii) Natural permeable material

Add the following to the 3rd paragraph:

"The crushed stone shall be coarse (19mm nominal) and shall be washed clean of all fines"

(iii) Synthetic-fibre filter fabric

Under item (4) Selection, of this sub-clause, replace the 1st paragraph with the following:-

"The filter-fabric used for subsoil drains shall be grade 2 and shall satisfy the criteria for a grade 2 geotextile as given in Table 2104/2"

(b) Construction of subsoil drainage systems

Add the following sub-clause:

"(v) Proving of pipes in sub-soil drainage systems

On completion of the pipe laying and prior to backfilling, all pipe joints shall be surveyed as proof of their installation to line and level. After backfilling the pipes shall be proved by pulling through a cylindrical

cleaning brush followed by a wooden mandrill \pm 400mm long and 5mm in dia less than the bore of the pipe.

Proving of pipes shall not be paid for separately and the cost thereof shall be deemed to be included in the rate tendered for laying the pipe."

B2107 MEASUREMENT AND PAYMENT

B21.01 Excavation for open drains

Add the following to the penultimate paragraph:

"The tendered rate shall also include full compensation for trimming the open drains"

Item	Unit
B21.01 (c) Excavating soft material by hand for open drains	cubic metre (m ³)

The unit of measurement shall be the cubic metre of material excavated within the lengths and widths and depths authorised by the Engineer. Excavation in excess of the authorised dimensions shall not be measured for payment.

The rates shall include full compensation for all excavation, backfilling where necessary, compacting to 90% of modified AASHTO density, disposing of surplus excavated material, keeping the excavations safe, dealing with any surface or subsurface water, taking special care to ensure that services are not damaged in any way and any other operation necessary for completing the work.

No distinction will be made between hard and soft material nor will distinction be made between the various types of services to be exposed or the depths to which excavations are taken.

B21.12 Concrete outlet structures, manhole boxes, Junction boxes, and cleaning eyes for subsoil drainage systems:

Add the following:

"The tendered rate shall also include full compensation for procuring and finishing the galvanised woven wire mesh, cutting, waste, installing the wire mesh at outlets and keeping the wire mesh in the pipe openings clean for the duration of the contract period."

SECTION 2300 : CONCRETE KERBING, CONCRETE CHANNELLING, CHUTES AND DOWNPIPES, AND CONCRETE LINING FOR OPEN DRAINS

B2301 SCOPE

Add the following to this clause

"This section also covers the replacement of damaged concrete kerbing, channelling and lining."

B2302 MATERIALS

- (b) Kerbing and Channelling

Replace the first sentence with this clause

"Prefabricated kerbing and channelling shall comply with the requirements of SANS 927:2007."

B2304 CONSTRUCTION

- (b) Prefabricated concrete kerbing and channelling

Add the following

'Kerbing of radius 1m and less shall be cast in situ in accordance with sub-clause 2304(e) and as shown on the drawings.

All precast kerbs shall be provided with continuous in situ concrete backing (haunching), the cost of which shall be included in the tendered rate. Dimensions of the triangular-shaped (in cross-section) haunching shall be: if the difference in levels between the top of the kerb and the subbase on which the kerb is laid is h, then the height of the haunch is $\frac{2}{3}h$ and the width of the haunch is h.

- (e) Cast in situ kerbs and channels

Add the following

'Where new kerbing and channelling have to be laid in an existing surface, the surface shall be neatly cut to a straight line with an angle grinder or similar approved means along the edge of the channel. The existing road foundation shall then be removed over the width and depth required to construct the new kerb and channel.

During the construction of the in situ channel, the contractor shall take care not to stain or damage the existing road surface.

Refer to Clause B2215 for duct markers ground into precast kerbs' faces.'

Add the following sub-clauses:

"(l) Shrinkage joints for cast in situ concrete work

Unless shown otherwise on the drawings, cast in situ channels shall be provided with shrinkage joints spaced a maximum of 2m apart. Shrinkage joints shall be constructed so that shrinkage cracks are generated at the joints. Sections of channel which have cracked between shrinkage joints shall be removed and replaced by the contractor at his own cost.'

“(m) Removal of existing kerb and channel

Where shown on the drawings and/or indicated by the engineer, the existing kerb and channel shall be removed and transported to spoil as directed.”

B2307 MEASUREMENT AND PAYMENT

Edit pay Item B23.02 as follows:

Item	Unit
“B23.02 Concrete kerbing-channelling combination	
(c) Concrete channels, cast in-situ concrete class 25/19 (m³)	cubic metre

The measurement and payment for item B23.02 (b) shall be as for item 23.04 (a) and shall also include the provision of shrinkage joints in cast in situ concrete work, as shown on the drawings.”

SECTION 3400: PAVEMENT LAYERS OF GRAVEL MATERIAL

B3402 MATERIALS

(a) General

Add the following at the end of the second paragraph:

"For chemically stabilised layers the material shall conform to the requirements in table B3402/5."

Add the following after the second paragraph:

"Distinction shall be made between crushed and natural G4, G5 and G6 materials. Where the crushing and/or screening of these materials has been specified, the combined grading shall conform to the grading limits specified for G4 class material in Table 3402/1."

Replace Table 3402/5 with:

"Table B3402/5

Requirements for Chemically Stabilized Layers

Table B4: Requirements for Chemically Stabilized Layers

Classification	C1	C2	C3	C4
Material before treatment	At least G2 quality	At least G4 quality	At least G5 quality	At least G6 quality
PI after treatment	Non-plastic	Non-plastic	6 max. see note *(1)	6 max. see note *(1)
UCS (MPa) *(2)	6 min.	4 min. 6 max.	1,5 min	0,75 min.
ITS (kPa) *(3)	-	-	250 min.	200 min.
WDD (% loss)	5 max.	10 max.	20 max.	30 max.

Note:

*(1) For materials derived from the basic crystalline rock group, the Plasticity Index after stabilization shall be non-plastic.

*(2) Unconfined Compressive Strength @ 100% Mod. AASHTO density

*(3) Indirect Tensile Strength @ 100% Mod. AASHTO density

*(4) Wet/Dry Durability (WDD) according to Method B 8110"

(b) Compaction requirements

Add the following to this sub-clause:

The compaction requirements for the layers to be constructed under this contract are:

Upper Subbase	97% of mod AASHTO density
Upper Selected layer	95% of mod AASHTO density
Lower Selected layer	93% of mod AASHTO density
Gravel Shoulder	93% of MOD AASHTO density

Gravel Access road

93% of mod AASHTO density

Add the following sub-clause::

“(d) Excavations

Excavations in the pavement shall be kept dry. In the event of water penetrating the underlying layers, construction of the consecutive layers shall be postponed until the underlying layers are dry enough to accommodate the construction plant without any deformation or distress.”

B3406 QUALITY OF MATERIALS AND WORKMANSHIP*Add the following:*

“For the purposes of this contract, the test results and measurements will be assessed in accordance with **Section 8200.**”

B3407 MEASUREMENT AND PAYMENT

Item	Unit
B34.14 Pavement layers constructed from gravel obtained from commercial sources (including all haul):	
(a) Gravel selected layer (G5 or G6 material quality) compacted to:	
(i) 93% of modified AASHTO density (specify compacted layer thickness)	(m ³)
(ii) 95% of modified AASHTO density (specify compacted layer thickness)	(m ³)
(b) Gravel subbase (Chemically stabilised material, for C3 or C4) compacted to:	
(i) 95% of modified AASHTO density (specify compacted layer thickness)	(m ³)
(ii) 97% of modified AASHTO density (specify compacted layer thickness)	(m ³)
(g) Gravel shoulders (G6 material quality) compacted to:	
(i) 93% of modified AASHTO density (specify compacted layer thickness)	(m ³)
(h) Gravel wearing course (G6 material quality) compacted to:	
(i) 93% of modified AASHTO density (specify compacted layer thickness)	(m ³)

The unit of measurement shall be the cubic metre of compacted pavement layer, and the quantity shall be calculated from the authorized dimensions of the completed layer.

The tendered rates shall include full compensation for procuring, furnishing and transporting approved material from commercial suppliers, including the cost of transporting and all haulage of the material to the required location on the site, placing and compacting the material, and the protection and maintenance of the layer and the conducting of control tests, all as specified. No additional payment shall be made for the removal or disposal of oversize material, regardless of the volume of oversize material.”

SECTION 3500: STABILISATION

B3502: MATERIALS

(a) Chemical stabilizing agents

Add the following:

"Cement types shall comply with the requirements of SANS ENV 197-1 (also refer to the section 1200, clause B1229).
The use of strength classes greater than 32,5MPa shall not be permitted.

Where necessary the Engineer may instruct the Contractor to alter the type or percentage of stabilizing agent after tests on the site during construction."

B3503: CHEMICAL STABILISATION

(d) Mixing in the stabilisation agent

Add the following:

"Notwithstanding anything to the contrary in the provisions of any part of these specifications, the Contractor shall, without any extra payment and for each type of material, prepare a trial section where he shall demonstrate his proposed mixing process before commencing with any extensive mixing.

After approval has been obtained, the mixing process and equipment shall remain unaltered unless otherwise instructed by the Engineer.

The fact that the Engineer has approved the mixing process shall not relieve the Contractor of any of his obligations in respect of mixing as specified elsewhere in the specifications. It will only serve as a guideline to ensure that the specified mixing requirements can actually be met.

(e) Compaction

Add the following:

"If chemical stabilization by means of road lime is required to modify certain physical properties of gravel material and not for cementation purposes, the following procedure shall be followed:

The stabilization agent shall be applied, mixed and the mixture shall be watered according to the requirements of as specified in sub-clauses 3503(d) and 3503(e), after which the layer shall be compacted by two passes using a heavy pneumatic roller.

After a period of twenty four (24) hours, the layer shall be loosened over its full surface and depth by ploughing. The

shaping, compacting and final finishing shall be completed according to the relevant specifications.”

(i) Construction limitations

Replace Table 3503/1 with:

Table B5: Total stabilization processing time

Type of stabilizer	Maximum time* (hours)
Common cements	
Strength class 42.5 cement	2
Strength class 32.5 cement	4
Cement and slag or flyash blended on site	4
Lime and slag or flyash blended on site	8
Lime (Modification)	24-48
Lime (Cementation)	6 – 8 (depending on setting rate)
Maximum time* for completion after stabilizer has made contact with material on the road. If material temperatures remain below 30°C during construction, the suggested time limits when using cement may be extended by 50 per cent.	

Add the following:

“No stabilization shall be carried out during falling temperatures when the ambient air temperature falls below 7°C or during rising temperatures when the ambient air temperature is below 3°C.

The surface temperature of a compacted stabilized layer shall not be allowed to fall below 1°C during the first three (3) days after stabilization. The Contractor shall be responsible for taking all the measures necessary in this connection, and especially to refrain from stabilization when such night temperatures become probable.

Where a sudden unforeseen drop in temperature occurs to a level below this limit, the stabilized layer shall be covered with material required for the next layer to be constructed.

Moisture content tests shall not be undertaken more than one day in advance of in-situ Stabilisation operations. Care shall be taken to ensure that samples are representative of the in-situ material. Checks shall be conducted when wet weather occurs between initial testing and work commencing on any section

All stabilized layers which have been damaged by frost or by the formation of ice in the layer shall be removed and replaced by the Contractor at his own expense. The Contractor shall make allowance of these requirements in his construction programme, and no claims in this regard will be considered.”

B3506: TOLERANCES

(b) Uniformity of mix (chemical stabilization)

Add the following:

'Stabilizer content shall be determined by THM 1 test method A 15(d). The coefficient of variation (CoV) for each lot shall not exceed the following:

Coefficient of variation = X_n / S_n and

CoV = 30 % for in place mixing or

CoV = 20 % for plant mixing

Where S_n = Standard deviation and X_n = Sample mean

B3509: QUALITY OF MATERIALS AND WORKMANSHIP

Replace the second paragraph with the following:

"The test results and measurements shall be assessed in accordance with the provisions of section 8300."

Add the following:

"The Engineer shall be informed in good time to enable him to conduct tests.

When stabilizing agent is to be spread by hand, the bags of stabilizing agent shall be placed on the layer at regular intervals. However, spreading shall not commence before the Engineer is satisfied that the correct quantity of stabilising agent of stabilizing has been placed on the layer and has given his permission that the stabilizing agent can be spread."

B3510: MEASUREMENT AND PAYMENT

Item	Unit
B35.01 Chemical stabilization extra over un-stabilised Compacted layers	(m ³)

Add the following to the second payment paragraph:

"The tendered rate shall also include full compensation for working in restricted areas on top of and alongside culverts where necessary."

SECTION 3600: CRUSHED-STONE BASE

B3600: CRUSHED-STONE BASE

B3602: MATERIALS

(a) Requirements for crushed aggregate

After the first sentence delete the remainder of the paragraph and replace with the following:

"The aggregate shall not contain more than 0,1% by mass of unwanted material such as wood, coal or similar organic material.

Aggregates containing mica, such as granite, gneiss, mica schist, pegmatite, sandstone shall not contain more than 2% by mass of free mica, especially muscovite, when assessed by visually separating the particles, or more than 4% by volume when assessed by means of microscopic slides. Aggregate containing easily detectable quantities (more than 1%) of olivine, serpentine and sulphide minerals such as pyrites and marcasite, must be considered with caution, and may warrant additional evaluation to the satisfaction of the engineer

Soft or weathered particles shall be controlled by the Durability Mill Index values specified in B3602 (e) Durability.

Provision has been made in clause (B)8108(b)(iii), calculation, for the determination and calculation of the Apparent Density for aggregates with a total water absorption greater than 1,5%, when total water absorption is determined according to TMH1 methods B14 and B15."

(c) Grading requirements

Replace entire clause with the following:

"The target grading, after compaction, shall be as near as possible to the mean of the specified grading envelope listed in table 3602/1 and shall be continuous with no marked gaps or excessive quantities of any particular size. The mean grading of each lot (minimum of 4 but preferably 6 test points per lot) shall conform to the approved target grading plus or minus the tolerances specified in table 3602/4."

Add the following sub-clause:

"(e) Durability

The durability property of aggregates derived from the basic crystalline group shall be assessed by means of the Ethylene Glycol Durability Index. When tested in accordance with the method prescribed in B 8105 (g) the Durability Index shall not exceed four. In addition, the 10% FACT value obtained after soaking in ethylene glycol for four days

shall not be less than 70% of that obtained on the un-soaked sample. Where any values are obtained that fall outside the above requirements, a detailed assessment of the quarry shall be undertaken together with a specialist mineralogical evaluation of both the coarse as well as fine fractions in order to assess the long-term durability properties of the material.

For Basic crystalline rocks, Arenaceous rocks, Argillaceous rocks and Diamictites the Durability Mill Index (DMI) shall be less than 125. For all other rock types the Durability Mill Index (DMI) shall not be more than 420, subject to the % passing the 0,425mm sieve not increasing by more than 8 percentage points during the Durability Mill test."

Table 3602/1

In table 3602/1 delete 85% of bulk relative density and replace with:

"88% of Apparent Density"

B3604: CONSTRUCTION

c) Surface preparation of the base

(i) Continuous process

Add the following after the first paragraph:

"The Contractor must make provision in his rates for the supply and use of pneumatic-tyred roller for the construction and slushing process, should it be required by the Engineer."

B3607: QUALITY OF MATERIALS AND WORKMANSHIP

Replace the second paragraph with the following:

"Test results and measurements shall be assessed in accordance with the provisions of section 8300."

SECTION 4100 : PRIME COAT

B4102: MATERIALS

B4102 MATERIALS

- (b) Aggregate for blinding

Add the following sentence:

"Blinding of the primed surface with aggregate shall only be permitted to facilitate vehicular access to adjoining properties"

B4104 WEATHER AND OTHER LIMITATIONS

Replace paragraph (g) with the following:

"(g) When the moisture content of the upper 50mm of the layer is higher than 50% of the optimum moisture content determined according to TMH 1, Method A7"

B4106 APPLICATION OF THE PRIME COAT

Add the following to paragraph (c)

"The nominal application rate of the prime shall be 0.8 l/m² for Colprime E and 0, 7 l/m² for other types unless test results onsite show otherwise. Unless directed otherwise by the engineer or indicated on the drawings, the edges of the primed surface shall be 150mm wider than the edges of the surfacing."

Add the following to paragraph (d)

"The minimum curing period of six (6) hours is recommended for Colprime E."

Add the following subclause

"(j) Application in areas treated by reworking and construction of a new base shall be primed using a mechanical distributor complying with subclause 4103(a). The edges of the previously constructed or existing surfacing shall be adequately protected by approved means to ensure that an overlap of prime not exceeding 50mm is sprayed onto the previously constructed or existing surfacing."

B4108 TOLERANCES

Replace the first paragraph with the following:

"The actual spray rates measured at spraying temperature shall not deviate by more than 8.0% from that ordered by the engineer. The engineer may, at his discretion, conditionally accept application rates falling outside this tolerance at reduced payment in accordance with Table B4108/1.

Table B4108/1

Payment Reduction Factors for Conditionally Accepted Prime Coat

Deviation specified spray rate at spraying temperature. (%)	Payment reduction factor (of tendered rate).
±8,0	1.00
±9,0	0.97
±10,0	0.95
±11,0	0.90
±12,0	0.85
±13,0	0.80

Any deviation outside these limits shall not be paid for, however, the engineer shall have the right to instruct the contractor to make up any deficiency, or blind excessive prime without additional payment. Where so instructed, the material for blinding shall consist of approved, but shall consist of screened 4,75mm nominal single size aggregate. The use of crusher dust for blinding shall not be permitted. If under-spraying occurs, and it is accepted by the engineer, only the actual quantities applied shall be paid for"

B4109 TESTING

Add the following

"No payment will be made if this condition is not adhered to. The contractor shall provide, at his cost, representative samples of every batch of prime delivered onto site."

B4110 MEASUREMENT AND PAYMENT

Item B41.01

Add the following sub-item:

"(f) Colprime E"

The unit of measurement shall be the litre of priming material measured at spraying temperature and sprayed as required.

The tendered rates shall include full compensation for supplying the priming material, cleaning and watering the layer to be primed, applying the priming material and maintaining the primed surface as specified.

4

SECTION 4200: ASPHALT BASE AND SURFACING

B4202: MATERIALS

(a) Bituminous binders

(i) Conventional binders

Add the following to the first paragraph:

“The latest amendments of the relevant SABS specifications shall be applicable.”

Add the following paragraph:

“The bitumen binder for the manufacturing of continuously grade asphalt surfacing shall be a 60/70 penetration grade bitumen. The bitumen binder for the manufacturing of asphalt base material shall be 40/50 penetration grade bitumen.”

ii) Homogeneous modified binders

Add the following:

“The bitumen binder to be used for the continuously graded asphalt surfacing with modified binder shall be modified with a styrene-butadiene co-polymer. The specific polymer as well as the percentage of modification is not prescribed, but the properties of the modified binder shall conform to the properties of an A-E2 binder class as shown in TABLE B4202/12.

The modification of the binder shall be as specified in the draft document “Guidelines on Modified Binders for use in Hot-mix Asphalt and Surfacing Seal Applications” which is obtainable from The Asphalt Academy.

The tenderer shall note that, notwithstanding conformance to SABS 307, some bitumen binders may prove to be incompatible with certain polymers.

TABLE B4202/2: PROPERTIES OF POLYMER MODIFIED BINDER FOR HOT-MIX ASPHALT

PROPERTY	UNIT	MIN/ MAX	TEST METHOD	BENDER CLASS A-E2
Softening Point	°C	Min.	MB-17	60
Dynamic Viscosity @165°C	Pa.s	Max.	MB-18	0.6
Ductility @ 15°C	cm	Min.	MB-19	50
Elastic Recovery at 15°C	%	Min.	MB-20	50
Storage Stab. (Diff. in R&B @ 160°C	°C	Max.	MB-6	5
Flash Point	°C	Min.	ASTM: D93-97	230
Properties after ageing (RFTOT)			MB-3	
Diff. in Softening Point	°C		MB-17	-2 to +8
Elastic Recovery @ 15°C	%	Min.	MB-20	40
Mass Change	%	Max.		1,0

The following tests shall be carried out on the polymer modified binder for “report only” purposes in order to develop a local data base for these properties:

PROPERTY	UNIT	MIN/MAX	TEST METHOD
Dynamic Viscosity @150°C	Pa.s	-	MB-18
Dynamic Viscosity @135°C	Pa.s	-	MB-18
Force Ductility		-	AASHTO: TP5
Complex Shear Modulus: $G^* \sin \zeta$ @ 10 rad/s		-	AASHTO: TP1
Creep Stiffness	MPa	-	
Torsional Recovery @ 25°C	%	-	MB-5

Samples of each delivery of bitumen to the site shall be made available to the Engineer for testing prior to the blending.”

(b) Aggregates

Add the following:

The aggregate for the continuously grade asphalt surfacing shall be as specified for a medium grade in table 4202/7 of the standard specifications. Special attention shall be given to the grading of the mixture specified to be used at intersections in order to increase the rut resistance of this mixture.”

(c) Fillers

Add the following:

“All asphalt mixtures specified for use in the works shall contain at least 1% by mass of the hydrated lime filter.”

B4203: COMPOSITION OF ASPHALT BASE AND SURFACING MIXTURES

Add the following paragraph:

“A specially designed continuously graded asphalt mixture with modified binder shall be used at intersections, where high turning movements occur, in order to increase the rut resistance of the asphalt surfacing. Special attention shall be given to the volumetric design optimization and effective compositional design of this mixture for which a separate payment item is provided in the bill of quantities. The extent of the areas where the intersection mixture shall be used are as shown on the drawings or instructed by the Engineer.”

Add the following to the last paragraph:

“The design of the asphalt mixtures shall be in accordance with the latest guidelines for the design of hot-mix asphalt in South Africa.

The normal testing requirements for the design of continuously graded asphalt base and surfacing layers shall be as shown in TABLE B4203/1, which replace the requirements for these mixtures as given in TABLE 4203/1 of the standard specifications.”

TABLE B4203/1: TESTING REQUIREMENTS FOR CONTINUOUSLY GRADED ASPHALT BASE AND SURFACING

DESCRIPTION	MINIMUM	MAXIMUM
Density (% of maximum theoretical density)	Clause B4210	96%
Marshall stability @ 60°C (kN)	8	15
Marshall flow (mm)	2	4
Stability/flow ratio (kN/mm)	2,5	-
Voids in mix (%)	3	6
Voids in mineral aggregate (%)	14	-
Filler/Bitumen ratio	1,0	1,5
Air permeability (cm ²)	-	1 X 10 ⁻⁸
Film thickness (µm)	5,5	-
Indirect tensile strength @ 25°C (kPa)	800	-
Dynamic creep modulus @ 40°C (MPa)	20	-
Static creep modulus @ 40°C (MPa)	100	-
Immersion index (%)	75	-

B4205: GENERAL LIMITATIONS AND REQUIREMENTS AND THE STORAGE OF MIXED MATERIAL

(c) Surface requirements

(iii) Tack coat

Add the following:

"The equipment to be used to apply the tack coat must consist of approved plant able to spray the required application of tack evenly over the entire area to be treated. The specified application rate shall be applied correctly in a transverse and longitudinal direction. A valid calibration certificate is required for the binder distributor."

B4206: PRODUCTION AND TRANSPORTING THE MIXTURE

(c) Transporting the mixture

Add the following:

"The Contractor shall ensure that trucks used to haul asphalt are not overloaded and the legal axle loads are not exceeded. Before any asphalt can be transported, the Contractor must provide the Engineer with the certified carrying capacity of each truck intended for the purpose of transporting the asphalt mixture. The Contractor shall provide a weighbridge ticket for each truck to the Engineer before discharging into the paver hopper.

ANY TRUCK that is overloaded shall not be allowed to discharge its load and shall return to the depot/batching plant for adjustment of the load. In addition, a penalty shall apply for the overload."

Add the following:

“(f) Approval of asphalt mixture

Before any asphalt is placed on the road, the Engineer shall approve the mix design. The approval process shall be as follows:

The Contractor shall prepare and submit a laboratory design mix with test results of four different bitumen contents. The design mix shall be submitted on the prescribed Form D3 of TMH 10: “Instruction for the Completion of As-Built materials Data Sheets” with all the necessary test results completed. In addition, the proposed asphalt mixture shall be subject to gyratory testing. All the expenses in preparing and submitting the laboratory design mix shall be to the Contractor's cost.

Samples of all aggregate and bitumen shall be submitted with the laboratory design mix to enable the Engineer to carry out checks. The laboratory asphalt mix design and aggregate shall be submitted to the Engineer at least six weeks before the Contractor intends to commence with any asphalt production.

After the laboratory mix is approved, the Engineer may require the Contractor to produce a plant mix to prove that the laboratory design mix can be produced successfully. If this is not required by the Engineer, permission shall be given for laying trial sections at varying binder contents in accordance with the requirements of section 4211 of the standard specifications. The Engineer may require that the mix be further assessed by means of Wheel Tracking Testing, the cost of which will be borne by the Employer. Mass production of asphalt shall only commence after the approval of the trial section, which should be given within a minimum of ten days.

The Engineer may instruct the Contractor at any time to halt his paving process and to review the whole or part of the above process, should a change of aggregate properties occur, the specified asphalt requirements not being met and/or a consistent asphalt mixture not be produced.”

B4208: JOINTS

Add the following:

“All joints between adjacent paved strips of asphalt must be under the final position of the solid or broken lines between traffic lanes. No joints shall be constructed in the traffic lanes or shoulders.

Whenever the paver stops for more than 30minutes and/or the asphalt mixture cools to below the rolling temperature required to obtain the specified density, joints shall be constructed as specified.”

B4210: COMPACTION

Add the following:

“Immediately after the asphalt has been spread and struck off, it shall be thoroughly and uniformly compacted by rolling.

The surfaces must be rolled immediately using two steel wheel rollers with minimum mass of 10 tons. Rolling procedures shall be adjusted as required to obtain the specified density. Rollers must move at a uniform speed not

exceeding 5km/h, with the driving wheel nearest to the paver. Roller must continue until all roller marks have been eliminated and the specified density obtained, but not after the mixture has cooled to 90°C or below. The Contractor shall monitor density during the compaction process by means of nuclear density gauges to ensure that the minimum required compaction is achieved.

To prevent adhesion of the mixture to the roller, it will be necessary to keep the wheels properly moistened with water mixed with very small quantities of detergent or other approved agent.

Once sufficient in-place density has been achieved, rolling operations shall be stopped immediately as over-rolling may cause migration of bitumen and filler to the surface of the compacted pavement. In addition to the minimum density requirements as specified in clause 4210 of the Standard Specifications, the maximum field density of the asphalt layer shall not exceed 96% of the maximum theoretical relative density as determined according to TMH 1 method C4.

Traffic must not be allowed on the newly compacted surface before it has cooled to at least 40°C, or within 3 hours after having been laid, whichever is attained first.

B4214: QUALITY OF MATERIALS AND WORKMANSHIP

(b) Coring of asphalt layers

Add the following:

"Cores may only be drilled when the road temperature is 20°C or below. Each core hole must be filled with hot-mix asphalt and properly compacted within 12 hours after the cores have been drilled.

Asphalt layers must be cored within 2 days and the density results must be submitted to the Engineer within two days after coring.

The Engineer reserves the right to withhold payment for asphalt work until all test results for the section of work concerned have been received and the work is fully approved."

(c) Routine inspection and tests

Add the following:

"Test results and measurements will be assessed in accordance with the provisions of section 8300: Quality Control (Scheme 2)."

SECTION 5200: GABIONS

52.05: MEASUREMENT AND PAYMENT

Add the following pay item:

Item	Unit
B52.05 Sand cement slurry slushed into Gabion units (6:1 sand cement)	Cubic meter (m ³)

The tendered rate for item B52.05 shall include for all materials and work necessary to slush sand cement mortar into the gabion units to full depth. The unit of measurement shall be the cubic metre of sand cement actually slushed into the gabions.

SECTION 5600 : ROAD SIGNS

B5601 SCOPE

After “South African Road Traffic Signs Manual” in the second paragraph add:

“and SADC Road Traffic Signs Manual”

B5603 MANUFACTURING OF ROAD SIGN BOARDS AND SUPPORTS

(a) Road signboards

Add the following:

“The contractor shall make every effort to ensure that signboards are correct in all respect and before dispatching the boards from the manufacturer’s factory shall provide the engineer with a 100mm x 150mm colour photograph of each sign face for approval of the correctness of the legend. Such approval will not imply final acceptance of the board. If the contractor is in any doubt as to the correctness of the sign detail, the sign designer shall be contacted for verification.”

(a) (ii) Steel profile road signboards

Add the following:

“Chromadek section shall be assembled in accordance with the details on the Standard Plans.

Where the letter or legends cross the horizontal joints of the sign panels, the letter shall be cut on the joint and both ends folded around the radius.

Retro-reflective material to adjoining Chromadek panels on a sign shall be practical visual match of the specified colour.”

B5604 ROAD SIGN FACES AND PAINTING

Add the following sub-clause:

“(e) Application of retro-reflective material

All sign faces shall be faced with retro-reflective material. Painted front sign faces shall not be used.

Where applied to Chromadek sections, retro-reflective material shall be applied as specified for aluminium section in Clause 5603(d) of the Standard Specification, and of Clause B5603 (a) (ii) of this project Specification.”

B5605 STORAGE AND HANDLING

Add the following:

“The following shall not be allowed on the sign face:

- Drilling of holes, except for the fastening of overlays
- Application of any form of adhesive
- Cleaning with any chemicals that are not specifically approved by the manufacturer of the retro-reflective material

Covering the sign face with an impermeable material that does not allow free circulation of air.”

B5606 ERECTING ROAD SIGNS

(c) Erection

Add the following:

“After erection the signboard shall be thoroughly cleaned with a cleaning agent approved by the retro-reflective material's manufacturer.

All vegetation obstructing the new or replaced sign board shall be removed and disposed of as instructed by the engineer.”

B5608 DISMANTLING, STORING AND RE-ERECTING EXISTING ROAD SIGNS

Add the following:

"Existing overhead and ground mounted road signs that are being replaced by new signs shall be dismantled and disposed of by the Contractor. Where possible the dismantling of the signs shall not be before the replacement sign is erected and displayed. Where dismantling of the 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 (within 72 hours).

Dismantling shall include sign panels and ground mounted sign supports.

Ground mounted sign supports shall be cut off just below ground level. Material excavated for removal of buried poles shall be replaced, and any depression made good using excess material from excavation for new signs.

Pay items are provided in the Pricing Schedule. Payment will differentiate between different types of sign panels."

B5609 MEASUREMENT AND PAYMENT

B56.01 Road sign boards 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:

Amend the last two lines of the second paragraph to read:

"completion, delivery, installation of the road sign board complete as specified, and the removal and disposal of all vegetation obstructing the motorists' view of the new or replaced sign board."

SECTION 5700: ROAD MARKINGS

B5701 SCOPE

Replace South African Road Traffic Signs Manual in the second paragraph with:

“SADC Road Traffic Signs Manual”

B5702 MATERIALS

Insert the following before sub-clause (a) Paint:

“The selection of appropriate road marking materials for permanent road markings to ensure conformance with the requirements of this specification rests with the Contractor. Road marking materials for temporary road markings as clarified in SANS 731-1 shall be equal to or more durable than road marking paint specified in sub-clause B5702(a)(i) and (ii), provided it meets the specified initial performance criteria.”

(a) Paint

(i) Road-marking paint

Add the following:

“The commercial product supplied by the contractor shall be subject to the approval by the engineer and the submission of a certificate of the SABS permitting the manufacturer to apply the SABS standardising mark to the supplied product.”

(ii) *Retro-reflective road-marking paint*

Replace “CKS192” in the first paragraph with “SABS EN 1423 for medium grading glass beads”.

When measured in accordance with SABS Method 1261-1998 within a period of two weeks (± 1 week) after application, the coefficient of retro-reflected luminance, RL , of temporary road markings shall be at least 150 mcd/m².lx for white markings and 100 mcd/m².lx for yellow markings.

The product supplied for permanent road markings shall be subject to the approval by the engineer, who may request the contractor to provide sufficient supporting evidence to compare the durability of the proposed product with that of hot-melt thermoplastic material.

B5704 MECHANICAL EQUIPMENT FOR PAINTING

Add the following:

"The machine shall always operate in the same direction of the traffic flow when applying lane markings."

B5705 SURFACE PREPARATION

Add the following at the end of the second paragraph:

"The onus is on the contractor to ensure that the surface on which the road markings are to be applied is sufficiently clean and dry to ensure that the quality of the road markings will not be adversely affected. The contractor is also responsible for protecting road studs from being painted over, and the subsequent cleaning thereof if such over-painting did occur. (The cleaning of the road studs shall be done in such a manner that the functionality of the road studs will not be detrimentally affected by the cleaning agent.)"

B5706 SETTING OUT THE ROAD MARKINGS

Add the following:

"Where road markings are to be replaced on seal, it is essential that all existing barrier lines and other road marking lines be accurately referenced before commencement. The position of barrier lines shall be re-assessed on site by the engineer before the contractor commences with the road marking. No separate payment will be made for referencing the existing road markings and full compensation shall be included in the rate tendered for item B57.06."

B5707 APPLYING THE PAINT

Replace the last paragraph with the following

The Contractor's establishment on site and general obligation shall be deemed to fully include the establishment of the road-marking team, irrespective of the number of times the road-marking team is required to be on site or is required to move within the site, other than those payments specifically allowed for in payment item B13.01(e)."

Replace the second last paragraph with the following:

"Road marking materials shall be applied at application rates which would suit the traffic conditions in such a way that the functional life of the temporary road markings would exceed six months, whilst the expected functional life of the permanent road markings should exceed 36 months."

B5714 MEASUREMENT AND PAYMENT

Item

B57.06 Setting out and pre-marking the lines (excluding traffic island markings, lettering and symbols) km

Add the following:

"Referencing of barrier lines and other road marking lines and other operations, shall be included in the tendered rate for setting out and pre-marking."

Add the following paragraph:

"Island markings shall specifically exclude the length of line which outlines or borders the extent of the diagonal or chevron bars forming the island marking. Island markings shall also exclude longitudinal lines of a continuous nature."

SECTION 5800: LANDSCAPING AND PLANTING PLANTS

B5801 SCOPE AND DEFINITION

(a) Scope

Delete this paragraph and replace with:

"This section includes all areas affected by construction activities. It includes landscaping, grassing, rehabilitation, erosion protections and planting trees and shrubs."

(b) Definition

WEEDS

Delete the following:

"(as listed in bulletin 413 issued by the Department of Agriculture, Directorate of Agricultural Information)" *and replace it with:*

"(as listed in the Conservation of Agricultural Resources Act)"

B5802: MATERIALS

(c) Grass seeds

Add the following:

"The seed mixture to be used for borrow pit areas and stockpile sites shall be as follows:

Eragrostis Curvula "Selected"	3kg/ha
Eragrostis Tef	2kg/ha
Chloris Gayana	9kg/ha
Cynodon Dactylon	5kg/ha
Pioneer seed	10kg/ha
	29kg/ha

The seed mixture to be used on cut and fill slopes shall be:

Eragrostis Curvula "Selected"	3kg/ha
Eragrostis Tef	2kg/ha
Chloris Gayana	5kg/ha
Cynodon Dactylon	7kg/ha
Cenchrus Ciliaris	5kg/ha
Digitaria Erianntha	4kg/ha
Pioneer seed	10kg/ha

The 10kg of pioneer seed specified shall consist of the following mixture of seeds:

Aristida Adscensionis	2kg/ha
Chloris Virgata	2kg/ha
Eleusine Coracana Subspecie Africana	2kg/ha
Melinis Repens Subspecie Repens	2kg/ha
Urochloa Panicoides	2kg/ha
	10kg/ha

The Contractor shall make his own arrangement to obtain the specified seed mixtures. Should specific species not be available, alternative seeds may be proposed by the Contractor for consideration by the Engineer."

B5802 Materials

(e) Grass sods

Delete "until they are placed" and add "once placed for planting."

(i) Nursery-grown sods

Add the following:

"The sods shall be free of weeds, weed seeds, insects and fungal diseases. "

(ii) Veld sods

Add the following:

"The sods shall be free of weeds, weed seeds, insects and fungal diseases."

(g) Topsoil

Add the following at the end of the first paragraph:

"The contractor shall be responsible for the control of any germination of weed seeds within topsoil used on site."

Add the following at the end of the second paragraph:

"Areas such as stockpiles, borrow pits and spoil sites shall be stripped of all topsoil before work may commence within the area. Should a larger site for any of the above be required during construction, the contractor shall refer to the DEO for best practice methods on ensuring the preservation of the additional stripped topsoil."

Add the following new paragraph:

"The topsoil shall be kept free of all foreign material generated during construction. This shall include all stone and bituminous products. Top soiling shall not be accepted should it contain any of the above material."

B5804 PREPARING THE AREAS FOR PLANTS

(b) Areas which do not require topsoil

Replace “50mm” with “20mm “ and “150mm” with “20mm”

Add the following:

“In areas with large natural rock, i.e. not blasted or excavated rock, these rocks may be placed so as to look like a natural part of the landscape”

Add the following sub-clause:

“g) Removal of undesirable vegetation

During the course of the Contract the engineer may instruct the contractor to physically remove undesirable vegetation from within the road reserve. Such an operation will take place before the flowering stage of the undesirable vegetation upon written instruction from the engineer, but shall not relieve the contractor of his obligation towards weeding sodded, grassed areas as described under 5806(a) and any area directly affected by any construction activity. Should the contractor fail to respond to the written instruction from the engineer for the removal of the aforementioned undesirable vegetation before flowering, the contractor shall be held contractually responsible for any growth or seeding of said vegetation for a period of not less than twenty four (24) months in the affected area.”

B5805 GRASSING

(a) Planting grass cuttings

In the 2nd paragraph remove “be covered with 30mm of approved soil” and replace with:

“have the root system of the grass cuttings thoroughly planted within the topsoil layer to ensure good growth. No part of the grass root system shall be left protruding from the topsoil”.

At the end of the 2nd paragraph removes:

“and, when sufficiently dry, shall be rolled with a light agricultural roller.”

(c) Hydroseeding

Add the following:

“The nominal seed mixture for hydroseeding shall comprise:

- Eragrostis Curvula
- Eragrostis Tef
- Chloris Gayana Katambora
- Cynodon Dactylon

-
- Cenchrus Ciliaris Molopo Medicago Trucatula Jemalong
 - Trifolium Subterranean

The latest and best seed mixture for hydroseeding must be established by the contractor in conjunction with and ordered from the Potchefstroom University, Private Bag X6001, Potchefstroom, 2520.'

(f) Sowing by hand

Delete the following:

"If approved by the Engineer,"

Replace the second sentence with:

"The top 20mm of prepared topsoil shall be raked away in sections, the seed shall then be spread uniformly within the prepared area. The top 20mm topsoil shall then be raked over the seedbed, ensuring an even thickness. This method is to be systematic, and where applicable, follow the contours of any slopes."

Add the following:

"The thickness of the topsoil layer shall be as specified by the engineer. The preparation of the soil of the soil for areas to be grassed is to include scarifying just before sowing the grass seed. Should erosion of any kind (by animal, wind or rain) have occurred before the contractor applies the grass seed, the slope shall be re-instated, at the contractor's cost, to its original, erosion free state before seeding.

The types and mixtures of seeds to be used shall be as specified in the project specifications. The contractor shall be solely responsible for establishing an acceptable grass cover, and any approval by the engineer of seed mixtures intended for use by the contractor shall not relieve him of his responsibility".

B5808 GENERAL

Insert the following sub-clause:

"(e) Weeding

The contractor shall maintain all areas affected by construction activities free of all undesirable plant species. They shall be removed before the flowering stage of each species. Should the contractor fail to remove the alien plant species before flowering he shall be held responsible for alien plant removal within the affected area, for an additional period of one year, over and above the contractual one year maintenance period.

The method for the removal of undesirable plant species shall be either by hand, which shall include the removal of the complete root system, or by chemical means, through the use of a registered selective herbicide. A registered, licensed pest control operator, licensed for the industrial application of herbicides, shall only administer the application of the herbicide."

Add sub-clause:

“(g) Establishment of vegetation within areas disturbed by construction activities

The engineer shall assess any area within the construction boundaries that has been disturbed by construction activities, but which is not scheduled for formal re-vegetation within the contract. The assessment shall include whether re-vegetation is required. These disturbed areas, none the less remain the contractor's responsibility for the removal of alien vegetation (see 5807 (e)).”

B5809 MEASUREMENT AND PAYMENT

Item	Unit
------	------

B58.03 Preparing the areas for grassing

(f) Stockpiling topsoil (free haul 1,0km) where the following applies:

Add the following sub-items:

“(i) Topsoil stored at a stockpile site agreed with by the engineer	Cubic metre (m ³)
“(ii) Topsoil pushed or bladed into heaps next to area from which it was taken	Cubic metre (m ³)”

(f) Stockpiling the topsoil (*Unit of measurement*)

Delete from the first paragraph, the last sentence: “Only material actually loaded..... approved area

SECTION 5900: FINISHING THE ROAD AND ROAD RESERVE AND TREATING OLD ROADS

B5901 SCOPE

In the first line of the second paragraph, insert the following after 'this section'

"...distinguishes between new construction and renewal construction. When construction is new, as in the case of new alignments for example, then this section...."

B5902 FINISHING THE ROAD AND ROAD RESERVE

Retain the existing paragraphs as new sub-clause-

"(a) New Construction"

Replace the sixth paragraph with:

"All materials resulting from the finishing operations shall be disposed of at approved spoil sites."

Add the following:

"(b) Renewal Construction

After completing construction work within the site, the contractor shall ensure that all construction generated or related material that may have been swept, windrowed, stockpiled, stored or spread beyond the road surface is removed. This shall be done before any other rehabilitation work is undertaken, including shaping, top soiling and grassing. Should, during the removal of construction generated or related material, existing vegetation or topsoil be disturbed or destroyed, the contractor shall, at his own cost, re-instate the road reserve to its original state. This shall include ripping, should the construction material have compacted the existing surface.

Culvert inlets and outlets, culvert barrels, and open drains shall be cleared of debris, soil, silt and other material generated from the construction activities.

The surfacing shall be cleared of all dirt, mud and foreign objects. Dragging, pushing or scraping material across the finished surfacing shall not be permitted.

All junctions, intersections, islands, kerbing and other elements making up the completed works shall be neatly finished off.

The contractor shall ensure that all undesirable plants have been removed from the road reserve and borrow pit areas.

All materials resulting from the finishing operations shall be disposed of at approved spoil sites."

SECTION B7300: CONCRETE BLOCK PAVING FOR ROADS

Add the following section to the standard specifications:

SECTION 7300: CONCRETE BLOCK PAVING FOR ROADS

Contents

B1801 SCOPE

B1802 GENERAL REQUIREMENTS

B1803 MEASUREMENT AND PAYMENT

"B7301 Scope

This section shall also include the installation of precast concrete bus shelters to be installed in bus bays so constructed to the project specifications.

B7302 MATERIALS

Prefabricated concrete bus shelters shall be installed according to the drawings and installed in bus bays as per the Engineers instructions.

B7304 MEASUREMENT & PAYMENT

Item	Unit
B73.04 Provision of precast concrete bus shelter	No.

7304 The rate shall include the provision of prefabricated concrete bus shelter as per the Drawing No EMAL-001-RDS-DET-19-T-A and installation to the positions as agreed with the Engineer.

SECTION 8100 : TESTING MATERIALS AND WORKMANSHIP

B8105 TESTING OF AGGREGATES

Add the following sub clause:

“(g) Determination of Ethylene Glycol Durability Index

The Ethylene Glycol Durability Index shall be determined as follows:

1) Apparatus

Suitable pans or basins Ethylene Glycol solution Stirring rod

2) Method

Obtain three or more representative samples from the source to be evaluated.

If not already crushed, crush the material in order to obtain sufficient minus 19mm plus 13mm sized aggregate in order to totally cover the bottom of the basin or pan with a single layer of stone. Add sufficient ethylene glycol to each basin ensuring that every aggregate particle is completely submerged.

After soaking for 24 hours, gently stir the aggregate and allow to settle. Observe and record the response of the aggregate to the ethylene glycol according to the criteria listed in (iii) below. Continue the above cycle at intervals of 24 hours for a further 4 days, in each case recording the observed response. After 5 days allow the samples to remain submerged in the solution and observe and record the disintegration response after a total period of 15, 30 and 60 days have elapsed.

3) Classification of response

After each cycle, classify and record the response of the aggregate as follows:

DISINTEGRATION CLASS

Class 1: No obvious effects, or only very minor spalling of sand sized particles or very small flakes.

Class 2: Splitting of rock, accompanied by any other disintegrative effects.

Class 3: Fracturing (spheroidal and/ or internal) without extensive spalling or distortion.

Class 4: Fracturing (spheroidal and / or internal) with extensive spalling or distortion.

Class 5: Complete disintegration.

TIME CLASS

The time factor in the above disintegrative process is classified according to the time taken for the most serious effect of the expansive stresses to occur i.e.

- Class 4:** 0 - 5 days
Class 3: 6 - 15 days
Class 2: 16 - 30 days
Class 1: 31 - 60 days
Class 0: Over 60 days

4) Determination of Glycol Durability Index

The Ethylene Durability Index is determined by adding the class number as assigned for the specific disintegrative response observed to the class number as assigned for the period for this response to occur. A durability index ranging from 1 (no response) to 9 (rapid and complete disintegration) is thus determined."

B8106 TESTING THE CONCRETE

Add the following new sub clause:

"(g) Testing for concrete durability

Durability predictions for durability concrete prefixed 'W' will be based on the following tests that shall be carried out by the contractor:

- (i) Oxygen permeability
- (ii) Water sorptivity
- (iii) Chloride conductivity
- (iv) Depth of concrete cover.

Notes-

The test methods shall be as described below.

Test No. (iii) may only be required for structures located in a very severe or extreme environment (as defined in table B6306/1), as directed by the engineer. This test will, nevertheless, be used as a concrete mix acceptance test at the start of the contract and repeated every time that the contractor makes significant changes to the mix during the project (including changes to the materials supply sources). Test No.(iv) shall be conducted using an approved calibrated electromagnetic cover meter.

A laboratory approved by the engineer shall carry out testing. For test no's (i) and (ii) (and (iii) when required), cores of 70 ± 2 mm diameter shall be extracted from the structure when the concrete reaches the age of at least 28 days and tested for the durability criteria set out in clause B6404 (h) of the project specifications. The frequency of the testing at the start of the contract shall be such that there is at least one test (consisting of 2 cores) per discrete concrete element, or 15m³ poured (whichever is the lesser), until such time that the engineer is confident that the specified criteria are

consistently achievable, whereupon the test shall be limited to a discrete concrete element or a maximum concrete pour of 40 m³ (whichever is the lesser), or as directed by the engineer. Depending on access requirements, the frequency and locations of the tests may be changed to suit site requirements as directed by the engineer. Note that for decks and walls, the cores shall be taken on the exposed faces of the concrete i.e. the soffit and sidewall face taking care not to cut the reinforcing bars. Where the cores do contain pieces of reinforcing steel, they shall not be used for the tests, particularly in the chloride conductivity test or where bleeding cavities may have formed. The cores shall be extracted through the cover concrete from the constructed concrete element and a slice (25 ±2mm thick) shall then be cut from the outer surface of this core such that the slice is representative of the middle layer of the cover concrete i.e. the middle layer being a 25mm thick slice of concrete, 5mm from the exposed outer surface extending in towards the reinforcement) and tested for all three tests. The engineer will indicate the positions at which the cores will be extracted.

Test no. (iv) (non-destructive) shall be conducted to confirm that the specified depth of concrete cover has been achieved. The cover meter tests shall cover at least 1m² for every 10m² exposed. The average cover of the 1 m² subjected to the test shall be used to determine the payment as per Table B8212/1 unless the contractor chooses to carry out additional tests as detailed in the final paragraph of clause B6414 (a). The cover meter must be calibrated for each project by drilling and measuring actual cover in at least 3 locations to validate the readings.

Elements critical for cover are parapets, deck edges including underside of cantilevers, lower portions of columns, abutments and walls. Should any of these areas show deficiencies, the engineer may order additional cover tests on other areas at the contractor's costs.

Filling of the holes left by the drilling of the cores shall be the responsibility of the contractor and shall be carried out using an approved proprietary non-shrink repair mortar so as to restore structural integrity and durability of the structural element tested. The cost of drilling and filling of the holes shall be included in the rate make-up of pay items B81.04 (a), (b) and (c).

The methodology and latest revision for the durability index tests are available at the University of Cape Town's web address at www.civil.uct.ac.za.

(iv) Depth of concrete cover

The procedure for testing for depth of reinforcement from concrete surface shall be in accordance with the manufacturer's requirements for the relevant electromagnetic cover meter. The number of readings taken of the layer of rebar closest to the concrete surface to each 1m² to be tested shall be such that an accurate average cover can be determined for the tested area. For purposes of calculation of the overall cover of a rebar layer those bars that have a cover 10mm or more greater than specified shall not be included."

B8108 DETERMINING THE TOTAL APPROXIMATE DRY BULK RELATIVE DENSITY AND THE APPARENT DENSITY

Add the following at the end of this clause:

"For materials where the total water absorption, when determined according to TMH1 Methods B14 and B15, is in excess of 1,5%, the Apparent Density shall be calculated in accordance to the following formula:

$$\frac{(b-a)}{(d-a) + \{(w-1.0) \times (b-a)\} - (b-c)} \times 100$$

This formula shall be used as an alternative to note (5) regarding soaking period, when so instructed by the engineer."

B8110 TESTS RELATING TO CHEMICAL STABILISATION

Add the following sub-clause:

"(d) The Wet-Dry Durability Test for cement and/or lime-treated materials using the hand-brush method (SANRAL METHOD)

1. Scope

This method covers the procedure for determining the soil-cement losses obtained by repeated wetting, drying and hand brushing of hardened soil-cement specimens (see 5.4).

2. Apparatus

- 2.1 A moisture curing room capable of maintaining a relative humidity of 95 to 100 percent and a temperature of 22 to 25 °C, or suitable plastic bags capable of holding specimens and carriers in an air tight condition in a water bath as described in 2.2 below.
- 2.2 A suitable water bath with thermostatic control capable of maintaining a temperature of 22 to 25 °C.
- 2.3 A balance to weigh up to 10 kg, accurate to 0.5 g.
- 2.4 A drying oven capable of maintaining temperatures of 71 ±3 °C and 110 ±5 °C.
- 2.5 A wire scratch brush made of 50mm by 1.6mm flat 26 gauge wire bristles assembled in 50 groups of 10 bristles and mounted to form five longitudinal rows and 10 transverse rows on a 200 by 65mm wooden block.

3. Method

3.1 Preparation of specimens

Prepare specimens in accordance with the procedure described in the Appendix to method A19 in the TMH 1 with the following exceptions:

Use the material passing the 37.5mm sieve and discard the material remaining on the sieve.

Use the apparatus and compaction method as described in TMH 1 method A7 (Modified AASHTO).

3.2 Curing of specimens

Rapid cure the specimens (see 5.6). Alternatively, and where instructed by the engineer, the specimens may be cured for seven days at a relative humidity of 95% to 100% and a temperature of 22°C to 25°C in a suitable curing room or in plastic bags and a suitable water bath.

3.3 Wetting, drying and brushing

After curing, remove the specimens from the curing room or plastic bags, allow to cool and submerge them in water at room temperature for a period of five hours. Remove the specimens from the water and place them in an oven at 71 °C for 42 hours.

Remove the specimens from the oven. Give each specimen two firm strokes over the full surface area with the wire scratch brush. The brush must be held parallel to the long axis of the specimen or parallel to the ends as required to cover all areas of the specimen. Apply these strokes to the full height and width of each specimen with a firm stroke corresponding to approximately 13.5 KN force (see note 5.5).

3.4 Determination of soil-cement losses

After 12 cycles, dry the specimens to constant mass at 100 °C and determine the oven dry mass of the specimens. The data collected will permit the calculation of the soil-cement losses of the specimens after the prescribed 12-cycle test.

4. Calculations

4.1 Calculate the soil-cement loss of the specimens as a percentage of the original oven-dry mass of the specimens as follows:

$$L = \frac{W - N}{W} \times 100$$

Where

L = soil-cement loss (%)

W = original calculated oven-dry mass (g) (calculated according to paragraph 3.5 in the Appendix to method A19 in the TMH 1).

N = final oven-dry mass (g).

- 4.2 The percentage loss shall be calculated and reported to the nearest 0.1 percent. The results are normally required for stabilisation design purposes and should be reported graphically against relevant cement contents.

5. Notes

- 5.1 Mass determinations of the specimens before and after brushing are usually made at the end of each cycle during research or special investigations.
- 5.2 Care is required when assessing results obtained on very coarse graded materials as "plucking" out of the aggregate pieces during the brushing process could result in very high losses of material, which may however not be truly indicative of its potential erosion resistance.
- 5.3 If it not possible to run the cycle continuously because of Sundays or holidays, or for any other reason, the specimens should be held in the oven during the layover period.
- 5.4 The test was originally developed to determine wet-dry durability of cement-treated material. It can, however, be used with equal success on material tested with other chemical stabilizers, for example lime, or mixes of lime and milled blast furnace slag, or cement and milled blast furnace slag.
- 5.5 The pressure of the brushing stroke is determined as follows:

Clamp a specimen in a vertical position on the edge of a platform scale and zero the scale. Apply vertical brushing strokes to the specimen and note the force necessary to register approximately 1.36 kg.

- 5.6 Rapid curing:

Seal each specimen airtight in a suitable container or plastic bag. Carefully place the briquettes on suitable holders or in pans and place in the oven at the relevant temperature and period given below:

Stabilizing agent	Temp (°C)	Time (Hours)
Cement	70 -75	24 ±0.5
PBFC	70 -75	24 ±0.5
Lime	60 ±2	45 ±1
Lime/FA	60 ±2	45 ±1
Lime/MBFS	60 ±2	45 ±1

B8117 FIELD BINDER TRANSVERSE DISTRIBUTION ("BAKKIE") TEST

1. SCOPE

This method sets out the procedure for the simple field determination of the transverse distribution of a binder distributor. Certain statistical criteria are applied to the results to determine conformance with requirements.

2. DEFINITION

The purpose of the test is to determine conformance of the transverse distribution of the spray bar, as measured by direct discharge from sets of 3 nozzles, using the project binder.

3. APPARATUS

3.1 Steel troughs

Steel troughs fitted with handles and manufactured from 3 mm mild steel plate, conforming to the following or similar dimensions:

Width	-	265 mm
Depth	-	405 mm
Height	-	300 mm

A total of 14 troughs are required for a 4, 2 m wide spray bar. Each trough must be clearly numbered on its side.

3.2 Balance

A balance capable of weighing up to 50 kg to an accuracy of 20 g.

3.3 Personal protective clothing

The appropriate safety gear must be worn when performing this test and should include a pair of asbestos gloves, face shield and approved overalls.

3.4 Cleaning fluid

Diesel or other suitable fluid.

4. PREPARATION OF THE BINDER DISTRIBUTOR

Ensure that all the binder strainers on the sprayer have been cleaned.

Preheat the binder in the distributor tank to within $\pm 5^{\circ}\text{C}$ of the required spray temperature.

Circulate the binder through the spray bar for at least 15 minutes.

4.1 Position the spray bar over a full-length drip tray. A short preliminary spray is made to ensure that all the nozzles are functioning and that the machine is in normal working condition. Suck back the binder from the drip tray into the distributor tank on completion of test spray.

4.2 If necessary, correct any malfunctioning of the spray bar.

5. METHOD

5.1 Ensure that all troughs are clean and free of any water or other materials.

5.2 Place the pre-weighed steel troughs described in 3.1 under the spray bar in such a manner that the discharge of each set of three nozzles are collected in one trough. Ensure that the troughs are placed in numerical order.

5.3 Adjust the spray bar height to ensure that the nozzles are below the sides of the trough.

5.4 Increase the bitumen pump speed to yield the desired triple spray overlap in accordance to the type of nozzles and type of binder being used. Typically this could vary between 12 and 20 litres per minute for conventional binders.

5.5 Open the nozzles and spray sufficient binder to fill the troughs without risking spillage during handling.

5.6 Weigh the troughs to determine the mass of binder sprayed.

5.7 On completion of the weighing and before the binder cools suck back the binder into the distributor tank.

5.8 Only clean the troughs with a suitable cleaning fluid once they have cooled down to room temperature.

5.9 Store used cleaning fluid in a suitable container for re-use.

6. CALCULATION AND REPORT

6.1 Determine the net mass of binder in each trough to the nearest 20 grams.

Net mass binder = $(M_1, M_2, M_3 \dots M_n)$.

6.2 Calculate the average mass of the binder collected in all the troughs.

$M_{ave} = \sum (M_1 \dots M_n) / n$ where n = number of troughs

6.3 Calculate the deviation from the average mass for every trough and express the value as a percentage.

$$\% \text{ Deviation} = (M_{ave} - M_i) / M_{ave} \times 100$$

- 6.4 If the transverse distribution is out of specification, make the necessary adjustments to the spray bar and repeat the test.
- 6.5 Report results on a suitable report sheet.
- 6.6 Update the 'bakkie' test record with the relevant information for the distributor.
7. ACCURACY

Due to the varying nature of the different types of binders, cognisance must be taken of the respective binder's viscosity at spray temperature when establishing achievable tolerances, namely:

Conventional binders	40 – 100 CPs
Polymer modified binders	120 –200 CPs
Bitumen rubber	2,000 – 3,000 CPs

B8200: QUALITY CONTROL (SCHEME 1)

B8206 JUDGEMENT PLAN B

Notes (Table 8206/3)

(1) Asphalt base or surfacing: Specification limits for-

Add to (a) Density, the following:

"L's = 96% of theoretical maximum density for surfacing at intersections of K15."

(c) Voids

Delete and replace the contents of this subitem with the following:

"L_s = specified values -1,0% points
L'_s = specified values +1,0% points"

Add the following clause:

"B8212 DETERMINING REDUCED PAYMENTS FOR 'W' CLASS CONCRETE

Payments for all durability concrete prefixed 'W' shall be based on the test results of the durability parameters and calculated according to Tables B8212/1 and B8212/2.

General note:

The overall percentage payment applied to a concrete member shall be based on the average of the percentage payments applied to each durability parameter, together with the percentage payment based on the strength requirements described in section 8200 of the standard specifications. The reduced payments shall apply to the relevant pay items of sections 6200 and 6400 for that element only.

Table B8212/1

TABLE OF REDUCED PAYMENTS FOR WATER SORPTIVITY AND OXYGEN PERMEABILITY INDEX - 'W' CLASS CONCRETE

DESCRIPTION OF TEST	COASTAL (≤ 5km from coast and up river valleys/estuaries up to 15km)	
	TEST RESULT	PERCENTAGE (%) PAYMENT

C3.5: PROJECT SPECIFICATIONS

Water sorptivity (mm//h)	< 10.0 $\geq 10.0 < 12.0$ $\geq 12.0 < 14.0$ ≥ 14.0	100 % 90 % 85 % rejection
Oxygen permeability index (log scale)	> 9.50 $> 9.13 \leq 9.50$ $> 8.75 \leq 9.13$ ≤ 8.75	100 % 90 % 85 % rejection

Table B8212/2

TABLE OF REDUCED PAYMENTS FOR CONCRETE COVER

CONCRETE COVER (mm)	TEST RESULT (Clause B8106 (g)(iv))		PERCENTAGE (%) PAYMENT
	Overall	Individual bar	
30 mm specified	≥ 40	≥ 45	Rejection
	$\geq 30 < 40$	$\geq 30 < 45$	100 %
	$\geq 20 < 30$	$\geq 15 < 30$	70 %
	< 20	< 15	rejection
	≥ 50		
40 mm specified	$\geq 40 < 50$	≥ 55	rejection
	$\geq 30 < 40$	$\geq 40 < 55$	100 %
	< 30	$\geq 25 < 30$	70 %
		< 25	rejection
50 mm specified	≥ 65		
	$\geq 50 < 65$	≥ 70	rejection
	$\geq 40 < 50$	$\geq 50 < 70$	100 %
	< 40	$\geq 30 < 50$	70 %
		< 30	rejection
60 mm specified	≥ 75		
	$\geq 60 < 75$	≥ 85	rejection
	$\geq 45 < 60$	$\geq 60 < 85$	100 %
	< 45	$\geq 40 < 60$	70 %
65 mm specified		< 40	rejection
	≥ 80		
	$\geq 65 < 80$	≥ 90	rejection
	$\geq 50 < 65$	$\geq 65 < 90$	100 %
	< 50	$\geq 40 < 65$	70 %
75 mm specified		< 40	rejection
	≥ 95		
	$\geq 75 < 95$	≥ 105	rejection
	$\geq 55 < 75$	$\geq 75 < 105$	100 %
80 mm specified	< 55	$\geq 47 < 75$	70 %
		< 47	rejection
	≥ 100		
	$\geq 80 < 100$	≥ 110	rejection
	$\geq 60 < 80$	$\geq 80 < 110$	100 %
	< 60	$\geq 50 < 80$	70 %
		< 50	rejection

The following notes shall apply to Table B8212/2:

1. For cantilevers, the cover shall in no instance be greater than 5mm of the specified cover.
2. Percentage payment for concrete cover shall be based on the average number of cover meter tests performed on a particular concrete element.

The time factor in the above disintegrative process is classified according to the time taken for the most serious effect of the expansive stresses to occur, i.e.

TIME CLASS

Class 4:	0 – 5 days
Class 3:	6 – 15 days
Class 2:	16 – 30 days
Class 1:	31 – 60 days
Class 0:	Over 60 days

4) Determination of Glycol Durability Index

The Ethylene Durability Index is determined by adding the class number as assigned for the specific disintegrative response observed to the class number as assigned for the period for this response to occur. A durability index ranging from 1 (no response) to 9 (rapid and complete disintegration) is thus determined.

C3.5.1 ELECTRICAL SPECIFICATION

C3.5.1.1 The works shall include the following:

- Supply, delivery and installation of 162W-250W led street light luminaries
- Supply, delivery and installation of 11.5m street lighting poles
- Supply, delivery and installation of all associated earthing
- Supply, delivery and installation of LV overhead cable
- Cable trenching
- Supply, delivery and installation of service distribution boxes (SDBs)
- Supply, delivery and installation of MV overhead line where applicable
- Supply, delivery and installation of MV/LV Transformers where applicable
- Safety management
- Testing and commissioning
- Handover data packs

C3.5.1.2 Specifications

The following SANS and legal specifications and standards are applicable to this project.

Specifications of List

Code	Description
	Occupational Health and Safety Act, 1993 (Act 85 of 1993)
SANS 141	Glass-reinforced polyester (GRP) laminates.
SANS 10225	The design and construction of lighting masts
SANS 1088	Luminaire entries and spigots
SANS 1749	Glass-reinforced polyester (GRP) poles
SANS 121	Hot dip galvanised coatings on fabricated iron and steel and steel articles – Specifications and test methods
SANS IEC 60947-4	Low Voltage Switchgear and Control gear: Part 4: Contactors and Motor Starters (Section One – Electromechanical contactors and motor starters)
SANS 1222	Enclosures for electrical equipment (Classified according to the degree of protection that the enclosure provides).
SANS 1277	Street lighting luminaires.
SANS 1777	Photoelectric Control Units for lighting (PECUs) – Preferred requirements for application in the Electricity Supply Industry.
SANS IEC 598	Luminaires. , LED.
ISO 4762	Hexagon socket head cap screws
SANS 60598-1	Luminaires – Part 1: General requirements and tests
SANS 60598-2-3	Luminaires – Part 2: Particular requirements – Section 3: Luminaires for road and street lighting
SANS 10098-1	Public lighting – Part 1: The lighting of public thoroughfares
SANS 529	Heat-resistant wiring cables
SANS 1091	National colour standards for paints
SANS 1507	Electric cables with extruded solid dielectric insulation for fixed installations (300/500 V to 1 900/3 300 V) Part 1 - General and Part 2 – Wiring cables.
SANS 60529	Degrees of protection provided by enclosures (IP Code)
SANS 121	Hot-dip galvanised coatings on fabricated iron and steel articles – Specifications and test methods
SANS 044-3	Welding – the fusion welding of steel. Part 3 – Tests for the approval of welding procedures and production welds.
SANS 10198	The selection, handling and installation of electric power cables of rating not exceeding 33 kV (All parts)
SANS 10225	The design and construction of lighting masts.
SANS 657-1	Steel tubes for scaffolding and for structural and general engineering purposes.
SANS 1063	Earth rods, couplers and clamps

SANS 1418-1	Aerial bundled conductor systems.
SANS 182-1	Conductors for overhead electrical transmission lines Part 1: Copper wires and stranded copper conductors (metric units)

C3.5.1.3 Poles Specification

Only galvanized steel poles shall be used for this project.

General Pole Requirements

- The steel tubes used shall comply fully with SANS657-1.
- The poles shall be manufactured of grade 300W steel, with a minimum yield stress of 300 MPa and a minimum tensile strength of 450 MPa, in accordance with SANS657-1.
- In addition, the poles shall be designed to support advertising signboards and the additional cantilever loading that will be imposed on these masts. The boards measure approximately 1225 mm (H) × 900 mm (B) and are mounted approximately 3,0 m from ground level (measured to the lower edge of the board) in most areas.
- In exceptional circumstances, mainly in CBD areas, they may be mounted at a height of up to
- 4,0 m in order to avoid being damaged by buses, etc.
- The steel poles shall be capable of withstanding a fluctuating wind load in accordance with the requirements of SABS 0225 at a wind velocity of 40ms⁻¹.
- In addition to the above, the poles are expected to carry low voltage aerial bundled conductor (ABC) in accordance with SABS 1418.
- The ABC will be in following configuration: 3 × 25 mm² phase conductors, 1 × 54.6 mm² neutral supporting conductor. The approximate mass per metre of the bundle is 1,51 kg and the design load (UTS /2,5) is approximately 8,0 kN.

Construction

- The steel tubes used shall comply fully with SANS 657-1.
- All poles shall be supplied as a unitary construction (i.e. in one piece).
- All poles shall have a curved outreach overhang of 3m. Preference will be given to designs incorporating increased safety i.e. that ensure that the arm remains attached to the pole in the event of a vehicle colliding with the pole.
- All changes in diameter shall be by means of swaging or continuous tapering. Under no circumstances will welded pieces (pipe reducers) inserted into the masts be accepted.
- All joints shall be bevelled prior to welding and shall present a symmetrical appearance after welding. In addition, all joints (other than those designed for later assembly) shall be designed and manufactured to ensure that there is no ingress of water into the interior of the mast.
- The poles shall be designed in accordance with SANS 10225 to support luminaires, the maximum number, mass and projected area.
- All poles shall be hot-dip galvanised in accordance with SANS 121. The minimum thickness of the zinc layer shall be 90 µm. The process used shall comply completely with the requirements of SANS 121.
- No material may be removed from the mast either mechanically or chemically after galvanising has been carried out.
- All items shall be protected against corrosion by either hot-dip galvanising as detailed above or by being manufactured of stainless steel. All possibility of galvanic action shall be avoided.
- All threaded articles shall use standard metric threads. External threads may not be undercut.
- All poles shall have an M10 nut welded to the pole at a height of 1,5 m from the top of the poles. This is to provide a point for earthing the pole.

Dimensions

- The overall length of the poles shall be 11,5 m, with a mounting height of 10,0 m.
- The poles shall have a cylindrical section at the bottom, with diameters at ground level of not less than 300 mm
- The poles shall be supplied complete with base plate and two M8 hook bolts and nuts, hot-dip galvanised to SANS 121 for heavy duty applications.
- The base plate shall have a minimum size of 300×300×1,6 mm. Closed base moulding together with a drainage hole will also be accepted.

Stay Pedestals

- The stay pedestals shall be manufactured in such a way that the top is completely closed and permanently sealed.
- The stay pedestals shall have a suitable facility near the top to attach one end of a stay wire, the other end being attached to a pole.
- At least every fifth pole shall be provided with a stay wire.

Spigots

- The spigot shall be manufactured from grade 304 stainless steel with a minimum wall thickness of 2 mm and shall be 250mm.

Strength

- The minimum mechanical strength of the pole shall be designed for a fluctuating wind pressure of velocity 40 ms^{-1} onto a wind surface area of $0,45 \text{ m}^2$ as well as the surface area of the pole under which a maximum deflection of 5% of the pole's height above ground level shall be permissible.
- To this end, in addition to the requirements of SANS 1749, the pole shall be designed for installation in an inland environment and of a required strength mid-way between an extrapolation for the design requirements of category 2 and category 3 terrain categories, as contemplated in SANS 10225.
- The poles should be "heavy duty" poles as it is envisaged that they may have to carry three or two luminaires, in different configurations (either double post-top, or single post-top and floodlight).

Pole Planting

- The poles shall be planted to a depth of 1,6m
- The poles shall be planted at least 150mm from the side walk paving.

C.3.5.1.4 Luminaries Specification

The luminaries shall consist of 162W LED lights.

- General Luminaries Requirements
- The luminaires shall comply with SANS 60598-1, SANS 60598-2-3 and/or SABS 1277.
- The luminaires shall be class 1 as per SANS 60598-1 and shall be of the totally enclosed type.
- The luminaires shall be designed for use under conditions of heavy atmospheric pollution and exposure to high levels of solar (including ultraviolet) radiation, at a mean altitude of 1 800 m, and be suitable for operation at ambient temperatures from -15°C to $+65^{\circ}\text{C}$. The luminaires will also be exposed to wind, rain, hail and sleet in service.
- The luminaires shall have a class protection rating of a minimum of IP 65 on the lamp compartment and a minimum of IP 54 on the control gear portion. These are minimum ratings and preference may be given to designs offering higher IP ratings, particularly on the control gear compartment, if it can be proven that such ratings will provide a material benefit to Emalahleni in terms of extended gear life, increased maintenance intervals, etc.
- All ratings must be certified by a test report confirming compliance with SANS 60598-1. The test report shall be issued by an accredited test authority acceptable to Engineer.
- All luminaires offered under this contract shall bear either both the SABS 1277 mark and the SANS 60598 mark, or the IEC 60598 mark.
- All luminaires shall be delivered completely assembled with control gear, lamp holder, reflectors, diffuser (bowl) and housing. Lamps are not required to be supplied.

Construction Luminaries

- The luminaires 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.

C.3.5.1.5 Cabling Specification

Underground Cabling

- Underground cabling will be applicable road crossings and traffic circles in this project.
- All cables shall be laid in accordance with the requirements of SABS 0198.
- Whenever cable is to be installed, only 16 mm² or 25mm² (4 core) copper cables shall be used.
- All cable trenches shall be a minimum of 400 mm wide and 600 mm in depth. Where sleeves are to be installed it shall be at a depth of 1 000 mm lower than ground level. Should it be required to excavate to a depth of greater than 1 000 mm, the width of such excavation shall be in accordance with the Occupational Health and Safety Act (Act 85 of 1993).
- Cable trenches shall be approved by a Emalahleni representative assigned to the project before any cables are installed and installation of the cables shall be approved before backfilling is commenced.
- Cables shall only be laid in trenches having a smooth flat bottom surface. Where these surfaces are irregular they shall be smoothed off before installing cables. Where cables are installed in trenches cut in rock, a 75mm layer of fine earth shall be placed at the bottom of the trench to serve as bedding for the cable. After cable has been installed it shall be covered with a 75mm layer of hand compacted fine earth, regardless of trench rock or not.
- Trenches shall be backfilled and compacted in 150mm layers after the cable have been covered. Rocks from excavations are not to be used for backfilling; suitable backfilling material shall be used.
- Wherever possible, street lighting cables shall be run in a common trench with other distribution cables. All cables shall be installed in straight lines as far as possible and excessive distortion or weaving in the cable length will not be accepted. Deviation from this policy shall be justified.
- Contractors shall be responsible for all earth works necessary to complete the electrical installation as specified. He or she shall familiarise him- or herself with the requirements as indicated in the Emalahleni Municipal Public Roads document and miscellaneous by-laws.
- All conditions stipulated in this standard are to apply irrespective of whether the excavations are in the road reserve or not. All persons shall ensure that the full context of these requirements is understood.
- At all road crossings, driveways and entrances to lanes, sleeve pipes shall be installed where they do not exist.
- Continuous lengths of cable marker tape shall be laid 200mm below natural ground level in all cable trenches.
- All excavations performed shall be barricaded at all times, in accordance with the OHS Act (Act 85 1993) and NOSA recommendations.
- Where cables have to be jointed Emalahleni's representative assigned to the project shall be notified prior to any jointing or termination of cables so that arrangements may be made for inspections to be carried out during these operations. Under no circumstances may a joint hole be backfilled until clearance is given by EMALAHLENI MUNICIPALITY representative assigned to the project.

Overhead Cabling

- All cables shall be laid in accordance with the requirements of SABS1418.
- 600/1000V ABC aluminium alloy cables shall be used.
- The cable shall consist of:
 - 3 x 25 mm² street lighting phase core (comprising an insulated aluminium alloy conductor) plus
 - 1 x 54,6 mm² neutral / earth supporting conductor (aluminium alloy & insulated)
- The cable shall have the following properties:

Type of conductor or core	Nominal cross section area mm	Number of Wires mm	Resistance at 20°C Ω / km Max	Diameter of conductor mm		Breaking force (kN)
				Min	Max	
Phase or auxiliary (Aluminium)	25	6	1.2	5.8	6.3	3300
Supporting aluminium	54.6 70	Number and Nominal diameter Of wires mm	0.63	9.2	9.6	16600
		7 * 3.15				

C.3.5.1.6 Photo Electric Control Unit (Photocell) Specification

General Photocell Requirements

- The photocell shall be designed for operation at ambient temperatures from -15°C to $+65^{\circ}\text{C}$.
- Category B photocells, which are designed to fail to the "OFF" position of the switch, are required to be supplied.
- The photocell shall conform to a negative switching differential. The switch-ON level shall be $60 \text{ lux} \pm 10\%$, and the switch-OFF level shall be $40 \text{ lux} \pm 10\%$. The switching levels shall be calibrated to a daylight colour temperature of 3 500 K.
- The photocell shall be sealed and capable of operating at up to 100% relative humidity and under conditions of heavy industrial pollution.
- The photo-sensor shall be omni-directional (i.e. the operation of the photocell shall be independent of the orientation of the photocell or its base).

Photocell Electrical Performance

- When the electrical supply is first applied to the photocell under daylight conditions, the electrical switching contacts shall remain closed for at least 15 seconds before operating. In addition, switching operations shall be delayed by at least 15 seconds to prevent spurious operation due to lightning flashes, vehicle headlights, etc.
- The electrical contact operation at the switching point shall be positive with no contact chattering. The contacts shall be suitably rated for a reactive load of 3000 VA. The relay shall be suitable for use with ten 162W to 250 W LED luminaires complying with SABS IEC 598 and SABS 1277.
- The photocell shall be capable of performing at least 8 000 switching operations. A single operation is defined as the transfer of the moving contacts from one operating position to another, or, in the case of electronic switching, a change from one state to another. Test reports on the switching cycles, provided by an independent authority, will suffice.
- The construction of the photocell shall provide double-insulation.
- The photocell shall be designed to operate with an AC supply of 240 V rms ($\pm 10\%$).
- The photocell shall be fitted with an integral surge suppression device (e.g. MOV) in order that it may withstand an induced lightning strike or other mains-borne disturbance.

Mechanical Performance

- The cover of the photocell shall be shaped and finished so as to facilitate maintenance and to minimize the accumulation of dust or dirt, and to discourage the perching of birds.
- The photocell shall be of adequate mechanical strength and so constructed as to withstand the stresses imposed during installation and normal use, including handling and vibration.
- The degree of protection provided to any part of a photocell which is open to the environment shall be at least IP 65, in accordance with SABS 1222. In addition, a means of sealing (i.e. gasket) shall be provided as part of the photocell to form a weatherproof seal between the photocell and its NEMA base
- All materials used in the manufacture of the photocell shall be ultra-violet stabilized, and shall not deteriorate as a result of solar radiation, heat, moisture, cold or compression. In addition, damage due to solar radiation should not cause the photometric performance of the photocell to deteriorate beyond the specified limits within a period of at least 10 years.

C.3.5.1.7 Transformer Specification

- 4 X new 11kV/400V 50kVA transformers shall be installed for LV power supply.

General Transformer Requirements

- All transformers shall comply with SANS 780 and this specification.
- In accordance with SANS 780, the following construction details shall be applicable:
 - Transformers shall be sealed;
 - Oil level indicators are not required;
 - Drain valves are not required;
 - Pole-mounting brackets are required
- All transformers shall be three phase with a Dyn 11 vector group.
- The MV nominal voltage shall be 11 kV or 22 kV. This is still to be verified on site.
- The rated voltage (U_m) of the transformer shall be 12 kV or 24 kV for the 11 kV and 22 kV systems respectively. The transformer shall be capable of operating continuously at U_m without loss of service due to over-fluxing of the core.
- All transformers shall be supplied filled with new insulating oil complying with SANS 555. The oil level must be at least 150 mm above any live part.
- All outdoor transformers shall be hot dip galvanised in accordance with SANS 121.
- All transformers shall be supplied with a self-adhesive temperature rise thermal indicator sticker which shall indicate any overloading which occurs.
- All neutral conductors within the transformer shall have the same cross-sectional area as the phase conductors and in addition shall be rated to carry the full phase current continuously.
- The final colour of the transformers shall be Avocado Green (C12 of SANS 1091).

No-load secondary voltage

- The transformers shall have a no-load secondary voltage of 415 V at the 11 kV or 22 kV principal tap.

Tapping connections

- The transformers shall have a tapping range of -6 %, -3 %, 0 %, +3 % and +6 %, achieved by an off-load (off-circuit) tapping switch.
- The operation of the off-load tapping switch shall be such that by turning the tap handle clockwise, the tap position number is increased.

Earthing terminals

- Each transformer earth terminal shall be a 30mm long boss, with an M12 thread throughout, welded to the transformer tank. The boss shall be fitted with a M12 × 25 mm setscrew, washer and spring washer. The boss and the set screw shall be stainless steel of grades 304 and 316 respectively.
- One earth terminal shall be located on the primary side of the tank, vertically below the centre bushing.
- One earth terminal shall be located on the secondary side of the transformer, between 250 mm and 300 mm below the neutral bushing. The design shall take into account that Emalahleni Local Municipality will mount a neutral surge arrester on the secondary earth terminal.

Surge arrester brackets

- A surge arrester bracket shall be provided adjacent to each primary bushing.
- The surge arrester bracket shall allow the mounting of a surge arrester spaced sufficiently away from the transformer tank to prevent the tank from interfering with the operation of the surge arrester.

Pole mounting brackets

- The transformers, are intended for single pole mounting, shall be equipped with single pole mounting brackets.
- In addition , two clamps and four threaded rods (M20 x 250 mm) shall be supplied. Each threaded rod shall be supplied with two nuts, two flat washers and one spring washer. The clamps, threaded rods, flat washers, spring washers and nuts shall be hot dip galvanised.

Bushings

- All bushings shall comply with the requirements of clause 4.9 of SANS 780.
- Only bushings made of porcelain or silicone rubber shall be acceptable.
- The minimum creepage distance of the bushings shall be 31 mm/kV.
- The MV bushing stem shall be copper with an M12 diameter and shall be threaded.
- The LV bushing stems shall be copper with an M18 diameter.
- The LV bushings shall be supplied with a flag suitable for the connection of up to two 95 mm² PVC insulated copper jumpers. The flag shall have two holes, each of which shall be fitted with an M12 x 40 mm set screw, flat washer and nut.
- The phase sequence of all bushings shall be clearly marked.

Tests

Type Tests

The following type tests shall be performed on each design and in accordance with SANS 780:

- Temperature rise test;
- Lightning impulse test (chopped on the tail) (primary and secondary windings);
- Tank stiffness test;
- Corrugated tank fatigue test (if applicable);
- Short circuit withstand test; and
- Pollution test.

Routine tests

The following routine tests shall be performed in accordance with SABS 780 on each transformer:

- Measurement of winding resistance;
- Measurement of voltage ratio and phase displacement;
- Measurement of short circuit impedance and load loss;
- Measurement of no-load loss and current;
- Separate source and voltage test;
- Induced over voltage test;
- Measurement of paint thickness; and
- Test for the effectiveness of the sealing

Marking and Packaging

- Each transformer shall bear the SANS 780 mark of approval.
- In addition to the requirements of the relevant clauses of SANS 780, each transformer rating plate shall have the following information:
- Year of manufacture;
- Order number; and
- The primary voltage, secondary voltage, transformer rating (in kVA), vector group and mass.

C3.5.1.8 Earthing Specification

- All LV earthing shall be in accordance with the Earthing System as described in the latest revision of the SABS 0292 standard.
- Under no circumstances shall any armour wires from the cables be cut off. The armour wires of all LV cables shall be glanded and the gland shall be connected to the neutral bar of the street light SDB (pillar box). New SDBs shall be supplied with a PEN (combined neutral and earth) bar.
- The neutral bar of the street light pillar box shall at all times be bonded to the earth bar of the street light SDB.
- All luminaires, metallic and non-metallic, shall be provided with earth terminals and earthed accordingly.

C3.5.1.9 Service Distribution Boxes Specification

General SDB Requirements

- Two Way SDBs shall be installed.
- The SDBs shall bear the SABS 141 mark.
- The SDB shall be glass reinforced polyester (G.R.P.). The G.R.P laminate shall be:
 - a) Type F: flame retardant, SABS 141.
 - b) Ultra – violet stabilised.

SDB Material

- Supply, Deliver and install ELM Type 2 (3 phase) pole mounted service distribution box complete with HRC fuses, contactor, circuit breakers etc, internal wiring as required in the General Technical Specification. Labelling earthing etc and all other accessories

The meter reading window shall be:

- a) Made from 5mm thick polycarbonate.
- b) Flame resistant,
- c) Ultra violet stable, and
- d) Impact resistant.

Busbar

- The bus bar shall be 5 mm thick tinned copper.
- The busbars shall be permanently marked by means of either a clearly visible, painted-on colour coded spot of diameter 5mm or colour-coded insulators. The following colours apply:
 - a) Live busbar – red, white or blue spot.
 - b) Neutral busbar – black spot.
 - c) Earth busbar – green spot.

Gland Plate

- The gland plate shall be constructed from 3 mm thick 3CR12 plate.
- The gland plate shall be provided with gland knock-outs as follows:
 - a) 2 x 50 mm diameter on the busbar side of the mounting panel.
 - b) 4 x 30 mm diameter on the meter side of the mounting panel.

- The gland plate(s) shall be connected to the earth bar and then to the neutral bar, as one circuit, by means of 70 mm² copper conductor.

Mounting panel details

- The mounting panel shall be manufactured from 6.4 mm² thick coated fibre board. The screws shall not protrude out the back of the panels.
- The panel shall be totally immersed in preservative after drilling of all holes and prior to assembly, in order to prevent the coated (tempered) fibre board panel from absorbing moisture.

Galvanizing

- All ferrous metal components shall be hot-dip galvanised after fabrication.
- External galvanised threads shall not be undercut.

Ventilation

- The covers of the SDB 2-way and 4-way shall have sufficient and adequate ventilation holes.
- The ventilation holes shall be IP 45, SABS 1222, backed by stainless steel gauze, for protection against water, dust and vermin.

Lock device

- The locking pin for the isolating pillars shall consist of a square flange welded to the pin, secured by means of a brass 7-sided nut.

C3.5.1.10 Earthing Specification

- All exposed metalwork through to the outside of the SDB shall be earthed.
- The gland plate shall be earthed to the main earth bar.

C3.5.1.11 Commissioning General

- The Supplier will appoint a Master Electrician to issue Certificates of Compliance for the installations.
- A Taking-Over Certificate in respect of the Works will be issued by the Contractor when successful Commissioning is achieved and signed off by the Engineer, and the Contractor has fulfilled all its obligations in terms of the Contract save for its obligations during the Defects Liability Period.

C3.5.1.12 Safety, Health and Environment

- The Supplier shall provide the necessary safety, health and environmental (SHE) management system in accordance with the South African Occupational Health and Safety Act.

C3.5.1.13 Data Packs

The following data packs and manuals to be supplied to the Contractor

Section	Description	Required (Yes or No)
Equipment Details Design (2 Sets Of Each)	Luminaries Data	Yes
	GA Drawings	Yes
	Detail Drawings	Yes
	BROCHURES	Yes
Quality Control	Quality Control Plan	Yes
	Manufacturing Program	Yes
Material Certificates	Material Test Certificates	Yes
Certificates Of Inspection	Cert. Of Conformance	Yes
MANUALS (5 SETS OF EACH)	Operating / Maintenance Manual	Yes
	Data Book	Yes

C3.6 MANAGEMENT

Unless otherwise stated or provided for separately, all management activities shall be deemed to be priced in the General Items or any other appropriate and relevant items.

C3.6.1 Management of the works

C3.6.1.1 Applicable SANS 1921 Standards

SANS 1921-1: 2004 - Part 1: General Engineering and Construction Works.

In the event that any conflict arises between these standards and the Scope of Works, the latter shall prevail.

C3.6.1.2 Particular/Generic Specifications

Construction Health and Safety Specifications
Environmental Management Plan
HIV/AIDS Specifications

C3.6.1.3 Planning and Programming

C3.6.1.3.1 Submitted Program

It is a requirement of the contract that a program in bar chart form be submitted within the time stated in the Contract Data. The program will indicate the time during which parts of the work will be done. Such a program shall be submitted on a monthly basis for the approval of the Engineer and shall take into account the applicable construction period.

During the site handover meeting, the Contractor shall submit an all-inclusive program which will, among others, show how he proposes to finish the Works.

In addition to the requirements of Sub-Clause 12.3 of the General Conditions of Contract, the Contractor's program shall show:

- a. the various activities, related to a time scale, for each element of the Works, including those of Subcontractors or other Contractors, in sufficient detail to be able to assess construction progress;
- b. critical path activities and their dependencies;
- c. key dates in respect of work to be carried out by others; and
- d. key dates in respect of information to be provided by the Engineer and/or others.

In addition to the requirements of Sub-Clause 12.2 of the General Conditions of Contract, the Contractor shall submit with his program, a copy of any network diagram used in producing the program. If any change to the critical path occurs, the Contractor shall as soon as practicable notify the Engineer in writing. The Contractor's program and method statement will not be accepted as the basis for claims for additional compensation without due reference to all relevant associated factors.

The Engineer may instruct the Contractor to put certain components of the Works at certain position in the program.

C3.6.1.3.2 General Allowances

When drawing up his program, the Contractor shall, take into consideration and make allowances for, inter alia:

- a. expected weather conditions and their effects,
- b. known physical conditions or artificial obstructions (e.g.; road crossings, fences, trees, pavements and existing lines and cables),
- c. dealing with existing services, and
- d. the accommodation and safeguarding of public access and traffic.

C3.6.1.3.3 Review of Progress

The Contractor shall review his progress fortnightly and should the progress be behind schedule by more than two weeks, he shall then submit a revised program and method statement of how he proposes to make up the lost time.

If, in the opinion of the Engineer, the revised program will not make up the lost time, the Engineer shall have the right to issue a reorganization order to the Contractor to ensure that an acceptable program is produced. All expenses as a result of the reorganization shall be at the Contractor's costs.

C3.5.1.4 Sequence of the Works

The Contractor will be responsible for planning and sequencing all activities towards executing the project.

C3.5.1.5 Software Application for Programming

The software to be used by the Contractor shall be MS Projects or any other equivalent software.

C3.5.1.6 Methods and Procedures

C3.6.1.6.1 Cleanliness of the Site

The Contractor shall take note that progressive and systematic finishing and tidying will form an essential part of this contract. On no account shall spoil, rubble, materials, equipment or unfinished operations be allowed to accumulate in such a manner as to unnecessarily be a hindrance to or impede the activities of others. In the event of this occurring, the Employer shall have the right to withhold payment for as long as may be necessary in respect of the relevant works in the area(s) concerned.

Unhygienic habits and other behavior that may cause contamination of any part of the Works or the surrounding areas are strictly prohibited. The Contractor shall ensure that good sanitary conditions prevail throughout the Site and that all his workmen are aware of, and comply with, this rule.

C3.6.1.6.2 Protection of Trees and Shrubs

The Contractor shall take all precautions to prevent:

- the erosion of soils and/or
- loss of or injury to domestic and other animals on any property used or occupied by the Contractor;
- refrain from destroying, removing or clearing trees, timber and scrub to any extent greater than is necessary for the execution of the Contract;
- take care to cause the minimum of disturbance to the fauna and flora;
- take precautions to keep the risk of fire to a minimum;
- arrange that timber for firewood be obtained only from such places as may be approved by the Engineer;
- take such measures as to ensure that his employees are aware of all laws and restrictions governing the hunting, disturbing, capturing or destroying of animals and birds in the vicinity of the camp or the Works or the taking of fish from any water; and
- prohibit all firearms from the site and temporary camps.

C3.6.1.6.3 Blasting Operations

No blasting will be permitted within 10 m of any structure, pipeline, or service unless the Contractor can satisfy the Engineer that his proposed blasting methods and controls are such that no damage will be caused to the adjoining structure, pipeline or service.

In any event the Engineer will require the Contractor to plan and execute each blast in such a manner as to ensure that no damage will be caused to any structure, pipeline or service. In addition, the Engineer will require vibro-recordings to be taken at no additional cost to the Employer. No blasting is to be carried out in Eskom servitudes or way leaves unless the Eskom authorities have been advised in writing three weeks prior to blasting. Where blasting is done adjacent to power lines, the Contractor shall arrange for a representative of Eskom to be present prior to and during any blasting.

C3.6.1.6.4 Borrow Pits and Disposal of Excess Materials

The Contractor will identify an appropriate borrow pit from where road construction materials will be sourced. The area where excess materials can be disposed of will be identified by the contractor. Both the borrow pit and the disposal site shall be finished to the satisfaction of the Engineer.

C3.6.1.6.5 Work on or Adjacent to Structures or Services

When work is being executed on or adjacent to structures and services, great care should be exercised not to cause any damage or failure to them. The Contractor may need to provide protection for the structure or service. At any rate, the Contractor shall keep handy all contact details of the owners or operators of the structures and services. In the event of damage, the responsible owner or operator shall be advised together with the Engineer in writing within 24 hours. This correspondence should be preceded by a telephone call which shall be made immediately the failure or damage is noticed.

C3.6.1.6.6 Management and Disposal of Water on the Site

The Contractor shall direct all water from whatever source away from the construction area but not to trafficked roads and residential sites. If open channels are not suitable for dealing with water, then water tanks shall be used to suck or pump the water and dispose of it at places or areas indicated by the Engineer.

Payment related to dealing with water is provided in the General Items.

C3.6.1.6.7 Access, Roads, Maintenance of Accesses and Walkways

The road to the borrow pit, disposal area and other sites supporting the construction works shall be maintained by the Contractor for his use. No separate payment shall be made for this item and it will be deemed that the overhaul rate includes for this activity.

C3.6.1.6.8 Cooperation with Others on the Site

The Contractor must take note that other Contractors may be on the same or adjacent sites. The Contractor shall, through the Engineer, liaise with these Contractors to ensure the smooth and uninterrupted operation of all contracts. If no specific item is included in the Preliminary and General Section, allowance for these operations shall be made in the tendered rates and no additional compensation or claims will be certified or evaluated for delays or costs that may result from work on the site by others.

If an item is included in the Schedule of Quantities, payment thereof will be made as a lump sum split over period of interaction between or among the contractor. Payment of this item will be deemed as full compensation for delays, disturbances, access etc and no other compensation or claim will be considered or certified.

C3.6.1.6.9 Existing Premises and Adjoining Properties

When excavating within sites with existing premises, the site owner shall be notified and under no circumstances shall a trench be left open overnight.

C3.6.1.6.10 Dealing with Underground and Other Existing Services, Cable and Pipe Trenches and Covers

Any service found underground shall be assumed live or operational and shall be cared for appropriately until proven otherwise. Before executing the works, the Contractor shall compile a list of authorities responsible for the expected services. Their contact details should be within reach for in case a damage occurs.

Any service found which does not reflect on the drawing for existing services shall be so noted in the drawing and the relevant authority advised as such.

C3.6.1.6.11 Dealing with Objects of Historical or Environmental Interest

Any historical or environmental objects of interest discovered during the project execution shall be safely kept and delivered to the Employer within 48 hours. Under no circumstances should existing graves be dug.

C3.6.1.6.12 Title to Materials from Excavation and Demolition

Any materials of interest found during excavation shall be safely kept and delivered to the Employer within 48 hours. This excludes demolition materials whose rights will vest with the Contractor.

C3.6.1.6.13 Site Records

All site records (site request book, visitor's book, daily activity book, etc.) shall be kept till the issue of Certificate of Completion.

C3.6.1.6.14 Hours of Work

The hours of work shall be those reflected in the Contract Data. Contractor employees and his sub-contractors shall conduct themselves in a good and constructive manner while on site.

C3.6.1.6.15 Noise, Dust, Water, Waste and Other Impediments

The Contractor shall exercise due care to reduce noise, dust, water, waste and other impediments. In addition, his actions should not encourage soil erosion and in the event that soil erosion occurs, the Contractor shall provide mitigating measures.

Dust should be controlled by spraying with water and waste shall be disposed of appropriately.

C3.6.1.6.16 Checking Work of Others

The Contractor will not be responsible for checking works of other contractors.

C3.6.1.6.17 Access for Other Contractors

The Contractor shall at all times not block access to other Contractors on site and shall advise the Engineer of any other contractor that needs to work close or adjacent to where the Contractor is working. Both contractors shall exchange contact details.

C3.6.1.6.18 Giving Notice of Work to Be Covered up

The Engineer shall be advised in writing and be given adequate notice for any intention by the Contractor to cover up work.

C3.6.1.6.19 Scaffolding and Temporary Works

Any scaffolding to be erected on site shall be erected by a properly qualified person.

The temporary river crossing shall be maintained such that it does not pose a problem to traffic. Signage warning road user of the temporary river crossing should be adequate.

C3.6.1.6.20 Care of the Works, Plant and Materials

The Contractor shall remain responsible for caring of the works, plant and materials installed until the commencement of the Defects Liability Period.

C3.6.1.6.21 Establishing and Removing Equipment from the Site

The Contractor, Engineer and the CLO shall decide where the Contractor should put his Camp. Upon removal of equipment from site, the Contractor shall reestablish vegetation in order to reduce the possibility of erosion.

C3.6.1.6.22 Samples and Mock Ups

At the start or any time during the project execution, the Engineer may with the Contractor, establish a test/quality section which would serve as a benchmark for the rest of the applicable work.

C3.6.1.6.23 Progress Photographs

The Contractor shall take and keep pictures to depict progress and keep records of site activities. In general, the photographs should be sufficient to give an idea of construction progress. The pictures taken shall be of e-mail quality and jpg format. The

frequency of picture shall be determined by the contractor but in general shall be taken every other day. Data to be reflected on the photographs includes date and time, if possible.

C3.6.1.6.24 Maintenance until Completion

The Contractor shall maintain all installed infrastructure until it gets handed over to the Employer after which the Defects Liability Period will be in effect.

C3.6.1.6.25 Plant Codification

Not applicable.

C3.6.1.6.26 Training of Operators

Not applicable.

C3.6.1.6.27 Materials Storage Facilities and Samples for Tests and Inspections to be provided

The Contractor shall arrange for all his storage facilities and any samples which are to be kept for use by the Engineer to be safely kept. The Contractor shall test for all specified compaction prior to requesting the Engineer to do his testing. All testing and sampling shall be in accordance with the Scope of Works.

C3.6.1.7 Quality Plans and Control

The Contractor shall test his works in accordance with the specifications and shall not conceal any failed product. There may be instances where the Engineer approves a test section which shall form a standard for all the site works. In that instance therefore, the Contractor would be assumed to have maintained the standard throughout the execution of the project.

No quality plan document is required of the Contractor but it will be expected of him to have a system of checking and confirming quality on site.

C3.6.1.8 Environment

The Contractor shall develop his own plan to minimize dust nuisance, erosion, quagmire conditions, noise level, pollution of streams and any other activity that may have a detrimental effect on the environment.

C3.6.1.9 Accommodation of Traffic on Public Roads Occupied by the Contractor

Any additional cost incurred by the Contractor due to the above will be deemed to be covered by the tendered rates.

C3.6.1.10 Other Contractors on Site

In the event that other Contractors are assigned through separate contracts to work within or close to the site, the Employer will, if at all possible, advise the Contractor of such contractors.

C3.6.1.11 Testing, Completion, Commissioning and Correction of Defects

The Contractor is required to carry out his own process control testing, but if he so wishes, and agrees to abide by the results of the Engineer's acceptance control tests, he may dispense with his own tests. However, should the Contractor wish to use the Engineer's testing facilities, he will be charged for the various tests at the rates ruling at the time.

Any additional tests requested by the Contractor, or any retests required due to failure of the initial tests, will be charged to the Contractor at the rate ruling at the time.

The Contractor shall carry out all testing as prescribed in the Scope of Works. He must first satisfy himself that the minimum test criteria has been attained before calling upon the Engineer to test or witness the test. No pipe testing and manhole leak testing for approval shall be performed in the absence of the Engineer.

The Contractor will be fully responsible for making corrections to the defects found on the Works prior to commissioning.

C3.6.1.12 Recording of Weather

On daily basis, i.e. Monday to Friday, the Contractor will take rain gauge measurements at 08h00. The rainfall data shall be kept in such a way that it is available for inspection by the Engineer and that the records are safe and written in black ink.

C3.6.1.13 Format of Communication

All communication shall be in writing and be transmitted through post, hand-delivery or by fax. An electronic communication must be followed by a posted, faxed or hand-delivered mail since no action will be taken on electronic mailed communication.

The pro formas for site instructions and site requests are attached in Annexes.

C3.6.1.14 Key Personnel

Requirements relating to key personnel are attached in the Schedule for Returnable Documents.

C3.6.1.15 Management Meetings

One of the key success factors for this project is continuous communication between the contractor and community representatives. Community participation must be allowed through the CLO. The Contractor will, therefore, be required to provide, as one of the permanent project staff, a project facilitator to liaise and communicate with the community and the labour force.

The CLO must be appointed and paid by the Contractor for the duration of the contract.

All management meetings shall be attended by the following institutions who will have delegated authority to represent their institutions:

1. Emalahleni Municipality
2. Mafahleni Engineers
3. CLO
4. Contractor

Monthly management meetings shall be arranged once the contractor is on site. Monthly technical meetings will only be attended by the Engineer and the Contractor.

Dates for all meetings will be publicized at project commencement.

C3.6.1.16 Forms for Contract Administration

The Contractor is expected to fill in the forms provided in the Annexure and will be discussed during monthly management meetings. These forms will assist to capture plant, rainfall readings, labour, etc. Further forms relating to labour returns will be provided to the successful tenderer.

C3.6.1.17 Electronic Payments

The Contractor will be expected to provide full banking details in order to assist the Employer in effecting electronic payments. The minimum information required is:

- (a) Account holder
- (b) Account number
- (c) Branch code
- (d) Branch name
- (e) Bank name

C3.6.1.18 Daily Records

The Contractor shall keep a daily record of the work force, plant and activity schedule (daily site diary) and such should be available for inspection by the Engineer or authorized individuals.

C3.6.1.19 Bonds and Guarantees

The guarantees and bonds shall be delivered to the Engineer at the address shown in the Contract Data.

C3.6.1.20 Payment Certificate

Measurements for use in preparing claims shall be done by both the Contractor and the Engineer during agreed days. The Contractor shall not submit payment claims of less than R100 000 excluding VAT since such will not be processed.

C3.6.1.21 Permits

No permits are required by the Contractor's staff members to gain entrance to site.

C3.6.1.22 Proof of Compliance with the law

It will be expected that the Contractor will, at all times comply with all applicable laws. However, the Employer may, at his discretion, request proof of compliance with specific laws related to the project.

C3.6.1.23 Insurance Provided by the Employer

The Employer shall effect insurance of the Works after the issue of the Completion Certificate. The insurance, however, will not absolve the Contractor from his responsibilities during the Defects Liability Period.

C3.5.2 Health and Safety

Both the "Factories, Machinery and Building Work Act (Act 22 of 1941)" and the "Machinery and Occupational Safety Act (Act 6 of 1983)" must, wherever they appear in the COLTO (1998 Edition) standardised specifications, be replaced by the "Occupational Health and Safety Act (Act 85 of 1993)".

C3.6.2.1 Health and Safety Requirements and Procedures

The Department of Labour must be informed of the intention to commence work by use of the form bound with the forms that are to be filled by the successful Contractor. In addition, the Contractor's Health and Safety Plan shall be submitted by the Contractor after acceptance of the offer. The Contractor's Health and Safety Declaration must also be completed.

C3.6.2.2 *Protection of the Public*

In areas where public access was prevented, the Contractor shall ensure that when the barriers are removed, safe public access is enhanced.

The Contractor shall erect danger tapes where necessary to identify, for the public, any danger zones. Danger zones will include, among others, dug holes and trenches not yet backfilled. The cost of the erection, maintenance and removal of danger tapes will be deemed to be covered by the rates for the establishment of facilities for the Contractor.

The Contractor shall at all times ensure that his operations do not endanger any member of the public.

The Contractor shall take special precautions to prevent public access to any danger areas caused by his work procedures.

C3.6.2.3 *Barricades and Lighting*

When the Contractor, after obtaining permission, has to work during night time, the proper lighting and barricading shall be done during the day such that it functions as expected at night.

All areas where excavation is not yet backfilled shall be barricaded by means of red danger tape as an absolute minimum. Barricading for extended periods of time will not be acceptable. The Contractor may have to consider backfilling.

If the natural light is inadequate for the type of work to be undertaken, the Contractor shall, at his own expense, provide adequate lighting.

C3.6.2.4 *Traffic Control on Roads*

All construction vehicles shall carry and operate warning lights. Where right of way is required by the construction vehicles, proper signage or control must be in place.

C3.6.2.5 *Measures Against Disease and Epidemic*

In order to prevent the spread of diseases and explosion of epidemics, sanitary conditions should prevail on site at all time. Quagmire conditions should be reduced and/or prevented. Appropriate protective clothing must be made available to site staff at all times.

C3.7 PARTICULAR SPECIFICATIONS

In addition to the Standardized and Project Specifications the following Particular Specifications shall apply to this contract and are bound in hereafter.

OHS 1993 SAFETY SPECIFICATION
PREFERENTIAL PROCUREMENT SPECIFICATION
ENVIRONMENTAL MANAGEMENT SPECIFICATION

PART E: OHSA 1993 HEALTH SAFETY SPECIFICATION

AGREEMENT FOR THE REGULATIONS OF OCCUPATIONAL SAFETY, HEALTH AND ENVIRONMENTAL RESPONSIBILITIES

Entered into by and between

.....
(The CLIENT)

And

.....
(The CONTRACTOR)

2. PARTIES

3. duly registered and incorporated according to the laws of the Republic of South Africa,
and hereinafter referred to as the CLIENT.

4. hereinafter referred to as the CONTRACTOR.

5. The COID Registration Number of the CONTRACTOR is:

2. DEFINITIONS AND INTERPATATION

2.1 An interpretation that is consistent with the intention of the PARTIES should be preferred over an interpretation that is inconsistent therewith.

2.2 In this AGREEMENT, unless inconsistent with, or otherwise indicated by the context, the following terms shall be interpreted under, and construed and implemented in accordance with, the laws of the Republic of South Africa.

2.3 In this AGREEMENT, unless inconsistent with, or otherwise indicated by the context, the following terms shall have the meanings assigned to them hereunder, namely:

2.3.1 The AGREEMENT: The contents of document and annexure(s), if any.

2.3.2 CONTRACT WORK: The work for which the CONTRACTOR was engaged by the CLIENT and all related activities.

2.3.3 The CONTRACT: As set out in paragraph 1.2 of this AGREEMENT.

2.3.4 The PARTIES: The PARTIES as set out in paragraph 1 of this AGREEMENT.

2.3.5 The CLIENT: As set out in paragraph 1.1 of this AGREEMENT.

2.3.6 SHE: Occupational Safety, Health and Environment.

PREAMBLE

- 3.1 The purpose of the AGREEMENT is to regulate the legal responsibilities and liabilities arising from the CONTRACT WORK regarding occupational safety, health and environmental management. This AGREEMENT does not purport to regulate all the contractual relations between the PARTIES, and does not replace any existing agreement(s) between the PARTIES, and does not replace any existing agreement(s) between the PARTIES relating to any other aspect that does not relate to SHE risks, responsibilities and liabilities.
- 3.2 It is the intention of the PARTIES that, subject to the, subject to the express provisions of this AGREEMENT, the CONTRACTOR shall be the main risk carrier for SHE regarding the CONTRACT WORK.
- 3.3 This AGREEMENT shall be deemed to be for the full extent of site presence and these rules will remain in force until such time as the CLIENT revokes the document in full or in part.
- 3.4 The onus is the CONTRACTOR to advise any sub-contractor that this document is an agreement under section 37(2) of the Occupational Health and Safety Act and similarly binds such sub-contractors.
- 3.5 If the Construction Regulations apply to the CONTRACT WORK, this AGREEMENT will also serve as the health and safety specifications envisaged by those regulations that the client must provide to the principal contractor. Refer also to Annexure A in this regard.

4. LEGAL COMPLIANCE

- 4.1 The CONTRACTOR undertakes to comply with all legal requirements for SHE during the executive of the CONTRACT WORK, including both legislative and common law provisions.
- 4.2 The legal requirements mentioned in 4.1 include, without limitation, the provisions of:
- 4.2.1 The Occupational Health and Safety Act 85 of 1993 and its regulations
 - 4.2.2 The Compensation for Occupational Injuries and Diseases Act 1993, (act no.130 of 1993 ;)
 - 4.2.3 The National Environment Management Act, 107 of 1998
 - 4.2.4 The Environment Conservation Act, 73 of 1989;
 - 4.2.5 The National Water Act, 36 of 1998;
 - 4.2.6 All relevant labour legislation;
 - 4.2.7 Any other applicable National Acts of Parliament, provincial legislation and local by laws and regulations, as well as common law provisions.
- 4.3 It is the responsibility of the CONTRACTOR to identify and comply with all applicable legal requirements applicable to its activities.

5. MINIMUM SHE STANDARDS

Without derogating from any legal requirement or any other aspect of this AGREEMENT, the CONTRACTOR undertakes to ensure that he and/or his sub-contractors and/or their respective employees will at all times comply with the following conditions:

- 5.1 All work performed on the CLIENT'S premises must be performed under the close supervision of people who are trained to understand

- all the SHE hazards associated with any work that the CONTRACTOR performs on the stated premises.
- 5.2 The CONTRACTOR assumes the responsibility in terms of section 16(1) of the Occupation Health and Safety Act, 85 of 1993, and this agreement is also an agreement as envisaged by section 37(2) of that Act.
- 5.3 The CONTRACTOR shall ensure that he familiarizes himself with the provisions of the Occupational Health and Safety Act, and that he, his employees and any sub-contractors comply with them. The CONTRACTOR shall further ensure that all work is carried out in compliance with CLIENT'S SHE Standards, where prescribed
- 5.4 The CONTRACTOR shall appoint competent employees who shall be trained on any SHE aspect pertinent to them or the work that is to be performed.
- 5.5 Discipline regarding SHE shall be strictly enforced by the CONTRACTOR.
- 5.6 The CONTRACTOR shall issue Personal Protective Equipment as required and ensure that it is worn at all material times.
- 5.7 The CONTRACTOR shall safe work practices and make employees conversant with contents of these practices.
- 5.8 No unsafe equipment/machinery and/or shall be used on the CLIENT'S premises.
- 5.9 The CONTRACTOR shall as soon as reasonably possible report all relevant incidents as required by law, including but not limited to those referred to in the Occupational Health and Safety Act; section 30 of the National Environmental Management Act, 107 of 1998; section 20 of the National Water Act, 36 of 1998, to the relevant authorities as well to the CLIENT.
- 5.9.1 The CLIENT hereby obtains an interest in a legal proceedings of whatsoever nature arising from any incident involving the CONTRACTOR and/or his sub-contractors regarding SHE due to the execution of the CONTRACT WORK.
- 5.10 No use shall be made of any of the CLIENT'S machinery/equipment/articles/substances without prior written approval.
- 5.12 Work for which the issuing of a permit is required shall not be performed prior to the obtaining of a fully completed and approved permit.
- 5.13 No alcohol or other intoxicating substances shall be allowed on the CLIENT'S premises. Anyone suspected to be under the influence of alcohol or other intoxicating substances shall not be allowed on the premises of the CLIENT. For the purpose of this provision, the CLIENT hereby acquires the right to test the CONTRACTOR his employees by means of breath analyzer at any time, and the CONTRACTOR or employee shall submit to the testing.
- 5.14 Full participation shall be given if and when the CLIENT'S employees or agents inquire into SHE issues.
- 5.15 The CONTRACTOR shall report any hazardous conditions, which he cannot rectify due to them being under the control of the CLIENT, without delay to the CLIENT and ensure that his employees and sub-contractors do the same.
- 5.16 During the execution of the CONTRACT WORK, the CLIENT'S SHE personnel may offer advice and conduct inspections to ensure that standards are met. They may issue instructions should standards not be met in order to rectify such situations. This provision shall not

detract from the CONTRACTOR'S other responsibilities in terms of law or this agreement.

- 5.17 The CONTRACTOR warrants that he shall not endanger the health and safety of the CLIENT'S employees in any way during the execution of the CONTRACT WORK.
- 5.18 The CONTRACTOR shall maintain a clean and tidy workplace,
- 5.19 The CONTRACTOR agrees to submit its vehicles to inspection by the PRINCIPAL or its agents or employees when entering and leaving the premises of the CLIENT.
- 5.20 Any additional rules, if applicable, will be added hereto as Annexure A.
- 6.1 The CONTRACTOR indemnifies and holds the CLIENT harmless against any loss in respect of claims, proceedings (of civil and criminal nature), damages, costs and expenses, regardless of negligence or not on behalf of the CLIENT, arising from:
- 6.1.1 Non-compliance by the CONTRACTOR with any provision of common law, Act of Parliament, regulation and by law of any local authority arising out of or due to the execution of the CONTRACT WORK or occupation of the site by the CONTRACTOR.
- 6.1.2 Claims from other parties, whether against the CLIENT or the CONTRACTOR, consequent upon death, bodily injury or illness of any person or physical loss or damage to any property arising out of or due to the execution of the CONTRACT WORK or occupation of the site by the CONTRACTOR.
- 6.1.3 Physical loss or damage to any plant, equipment or other property belonging to the CONTRACTOR or his subordinates or agents.
- 6.1.4 Any loss of whatsoever nature by the CONTRACTOR or his employees during the execution of the CONTRACT WORK.

7. INSURANCE AND REGRESS

- 7.1 The CONTRACTOR warrants that all his and his sub-contractors' employees are covered in terms of the Compensation for Occupational Injuries and Diseases Act, 130 of 1993 and that the cover is in force during the duration of the CONTRACT WORK.
- 7.2 In order to verify the cover mentioned in 7.1 the CLIENT shall be entitled to request at any time of the CONTRACTOR to furnish the CLIENT with written proof of registration and good standing with the Compensation Fund, which proof shall be delivered within 14(fourteen) days of such request.
- 7.3 Notwithstanding 7.2, the CONTRACTOR shall deliver to the CLIENT a certificate of good standing with Compensation Fund, or similar proof acceptable by the CLIENT, by no later than the end of April every year for the duration of the CONTRACT WORK.
- 7.4 The CONTRACTOR warrants that he is in possession of the following insurance cover which shall remain in force during the duration of the CONTRACT WORK:

(Delete, and initials items that are not required)

- 7.4.1 Public liability insurance cover;
 - 7.4.2 Insurance covering his liabilities to any of his and/or his sub-contractors' employees;
 - 7.4.3 Insurance covering any liabilities in respect of environmental pollution, damage or other loss relating to inadequate environmental management;
 - 7.4.4 Any other insurance cover that will adequately make provision for any possible losses and/ or claims arising from the indemnities provided for in this AGREEMENT.
- 7.5 In order to verify the cover mentioned in 7.4 the CLIENT shall be entitled to request of the CONTRACTOR to furnish the CLIENT with written proof of such cover, which proof shall be delivered within 14 (fourteen) days of such request.
- 7.6 Notwithstanding 7.5 the CONTRACTOR shall deliver to the CLIENT written proof of his public liability insurance, by no later than the end of April every year for the duration of the CONTRACT WORK.
- 7.7 Should any finding/order/penalty or similar conclusion be made by a court of law, arbitrator, national, provincial or local authority against the CLIENT due to something for which the CONTRACTOR is liable in terms of this AGREEMENT, then the CONTRACTOR shall, within 30 days after being so requested by the CLIENT, make good any and all loss suffered by the CLIENT as a result

8. BREACH

- 8.1 If any PARTY commits a breach of the terms of this AGREEMENT and fails to remedy such breach within 10(ten) days after receipt by him of a written notice from the PARTY aggrieved by such breach requiring him to remedy such breach, then and in that event the aggrieved PARTY may, without prejudice to any other rights or remedies he may have in terms of this AGREEMENT:
- 8.1.1 Cancel the CONTRACT WORK and claim and recover such damages as he have suffered as a result breach;
 - 8.1.2 Claim specific performance of the terms of this AGREEMENT; or
- 8.2 The CLIENT reserves the right to summarily expel any CONTRACTOR OR CONTRACTOR'S employee failing to comply with the SHE requirements.

9. COVENANT TO RENDER EFFECTUAL

The PARTIES undertake that they will do all such things and sign all such documents as may be required of them from time to time in order to carry into effect the terms of this AGREEMENT.

10. GENERAL

- 10.1 This AGREEMENT constitutes the whole and exclusive memorial of the agreement between the PARTIES in respect of the subject matter hereof and no warranties, representations or other terms and conditions of whatsoever nature not expressly recorded herein, shall be of any force or effect.
- 10.2 No variation of the terms and conditions of this AGREEMENT shall be of any force or effect unless reduced to writing and signed by the PARTIES or their duly authorized agents.
- 10.3 If any clause or term of this AGREEMENT should be invalid, unenforceable or illegal, then the remaining terms and provisions of this AGREEMENT shall be deemed to be severable there from and shall continue in full force and effect unless such invalidity, unenforceability or illegality goes to the root of this AGREEMENT.
- 10.4 The Parties declare that they have disclosed to each other all material facts and circumstances effecting the contents and purpose of this AGREEMENT.
- 10.5 No indulgence, lenience or extension of time which either PARTY ("the grantor") may grant or show to another PARTY ("the grantee") shall in any way constitute a waiver of any of the rights of the grantor, who shall not thereby be precluded from exercising any rights against the grantee which may have arisen in the past, or which might arise in future.

11. ADDRESS AND NOTICES

- 11.1 Each PARTY hereby chooses as his *domicilium citandi ET executandi* for all purpose under his AGREEMENT, the address set forth below and any party shall be entitled by notice to the other to change his *domicilium* aforesaid provided that the change shall only become effective 14 days after service of the notice in question.

11.1.1 The CLIENT:

11.1.2 The CONTRACTOR

- 11.2 Any notice to be sent to another PARTY may be sent by fax or delivered.

In the event of delivery by hand or transmission by fax it shall be deemed to have received by the addressee at noon on the second business day following the day of delivery or transmission.

EXECUTION

SIGNED at _____ on this _____ 2015

ON BEHALF OF THE CLIENT

NAME OF CAPACITY

ON BEHALF OF THE CONTRACTOR

NAME OF CAPACITY

WITNESS

ANNEXURE A

PRE-CONSTRUCTION HEALTH AND SAFETY SPECIFICATION

PROJECT: REHABILITATION & UPGRADE OF MATHEWS PHOSA ROAD

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2.6.2 Welfare Facilities

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3. **Annexure A**
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1. INTRODUCTION AND BACKGROUND

1.1 Background to the Pre-construction Health and Safety Specification

The Construction Regulations (2014) place the onus on the Client to prepare a pre-construction health & safety specification, highlighting all risks not successfully eliminated during design.

1.2 Purpose of the Pre-construction Health and Safety Specification

To assist in achieving compliance with the Occupational Health & Safety Act 85/1993 and the now promulgated Construction Regulations (2014) in order to reduce incidents and injuries. This pre-construction specification shall act as the basis for the drafting of the construction phase health & safety plan.

The pre-construction specification sets out the requirements to be followed by the Principal Contractor and other Contractors so that the health & safety of all persons potentially at risk may receive the same priority as other facets of the project e.g. cost, programme, environment, etc.

1.3 Implementation of the Pre-construction Health and Safety Specification

This specification forms an integral part of the contract, and the Contractor is required to use it at pre-tender phase when drawing up its project-specific construction phase health & safety plan. The Principal Contractor shall forward a copy of this specification to all Contractors at their bidding stage so that they can in turn prepare health & safety plans relating to their operations.

2. PRE-CONSTRUCTION HEALTH AND SAFETY SPECIFICATION

2.1 Scope

This Specification covers the requirements for eliminating and mitigating incidents and injuries on the particular 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.

This specification and the Contractor's own Health and Safety Plan as well as the Construction Regulations 2014, shall be displayed on site or made available for inspection by all workers, employees, inspectors and any other persons entering the site of works.

The following aspects of this project carry the risk of possible injuries, for example:

- Working down slope of bulk earthworks activities which may result in unstable boulders or rocks rolling downhill towards the construction work taking place at pedestrian bridge and box culvert structure below.
- Excavations below water level at some sections of the box culvert in soils possibly requiring shoring or flattening of slopes.
- Working below stream level to construct the box culvert foundations and floor slab.
- Operation and maintenance on the site of heavy civil engineering plant such as excavators, bulldozers, front end loaders, tippers, TLBs, compaction equipment, water pumps, concrete mixers, compressors, pneumatic tools, generators, etc.
- Use of power tools and hand tools
- Handling of materials such as scaffolding, cement bags, concrete materials and hand stone.
- Storage and handling of flammable materials such as fuels, oils, adhesive, and painting and cleaning products including

bituminous paint.

- Storage and handling of herbicides and ant poisons
- Presence of open excavations for the foundations, manholes and storm water and pipe trenches.
- Lifting and lowering of materials and equipment.
- Risks related to general safety and security on site.

Additional risks may arise from specific methods of construction selected by the Contractor which are not necessarily covered in the above.

2.2 Interpretations

2.2.1 Application

This specification is a compliance document drawn up in terms of South African legislation and is therefore binding. It must be read in conjunction with relevant legislation as noted previously.

2.2.2 Definitions

The definitions as listed in the Occupational Health & Safety Act 85/1993 and Construction Regulations (2014) shall apply.

2.2.3 Tenders

This Health and Safety Specification forms an integral part of the Contract and Contractors are required to use it during the tender phase for pricing the preparation of a project specific Health and Safety Plan prior to commencing any work and for pricing the cost of ensuring compliance thereto during construction. Contractors must forward a copy of this Specification to all other persons or organisation that may be submitting prices to the Contractor during the tender stage to enable them to include the cost of preparing their own Health and Safety Plan, relevant to their particular operation, and for compliance with the Health and Safety requirements during construction. Payment for compliance with the 'Occupational Health and Safety Act 85 of 1993' and with this Specification needs to be included with the rates for the work items. No separate pay item has been allowed for. It is a condition of this contract that Contractors who submit tenders for this contract shall make provision in their tenders for the cost of all health and safety measures required during the construction process.

Contractors are required to complete Form J, 'Contractor's Health and Safety

2.3 Minimum Administrative Requirements

2.3.1 Notification of Intention to Commence Construction Work

The Contractor shall notify the Provincial Director of the Department of Labour in writing before construction work commences. A copy of this notification must be forwarded to the Client on appointment.

2.3.2 Health and Safety Plan

Before commencement of any construction work, the Contractor shall prepare a project specific Health and Safety Plan to comply with the requirements of Construction Regulation 4(1) (a) and in compliance with this Health and Safety Specification. This must include a risk assessment performed and recorded in writing by a competent person (refer to Regulation 7 of the Construction Regulation 2014).

The risk assessments shall identify and evaluate the risks and hazards that may be expected during the execution of the work under the contract, and it shall include a documented plan of safe work procedures to mitigate, reduce or control the risks and hazards identified.

The Health and Safety Plan shall be available on site for inspection by inspectors, Employer, Engineer, subcontractors, employees, trade unions and health and safety committee members, and must be monitored and reviewed periodically by the Contractor.

The Contractor shall appoint in writing his employees and any subcontractors to be employed on the contract, and he shall provide them with a copy of his documented Health and Safety Plan, or relevant sections thereof. The Contractor shall ensure that all subcontractors and employees are committed to the implementation of his Safety Plan.

2.3.3 Assignment of Contractor's Responsible Persons to Supervise Health and Safety on Site

The Contractor shall submit supervisory appointments as well as any relevant appointments in writing (as stipulated by the OHSA and Construction Regulations), prior to commencement of work. Proof of competency must be included. (See annexure B)

2.3.4 Competency for Contractor's Appointed Competent Persons

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 (2014). Proof of competence for the various appointments must be included.

2.3.5 Compensation of Occupational Injuries and Diseases Act 130 of 1993 (COIDA)

The Principal Contractor shall submit a letter of good standing with its Compensation Insurer to the Client as proof of registration. Contractors shall submit proof of registration to the Principal Contractor before they commence work on site.

2.3.6 Occupational Health and Safety Policy

The Principal Contractor and all 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.

2.3.7 Health and Safety Organogram

The Principal Contractor and all Contractors shall submit an organogram, 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.

2.3.8 Preliminary Hazard Identification and Risk Assessment and Progress Hazard Identification and Risk Assessment

The Contractor shall cause a hazard identification to be performed by a competent person before commencement of construction work, and the assessed risks shall form part of the construction phase health and safety plan submitted for approval by the Client. The risk assessment must include;

- a) A list of hazards identified as well as potentially hazardous tasks;
- b) A documented risk assessment based on the list of hazards and tasks;
- c) A set of safe working procedures (method statements) to eliminate, reduce and/or control the risks assessed;
- d) A monitoring and review procedure of the risks assessment as the risks change.

The Principal Contractor shall ensure that all Contractors are informed, instructed and trained by a competent person regarding any hazards, risks and related safe work procedures before any work commences and thereafter at regular intervals as the risks change and as new risks develop.

The Principal Contractor shall be responsible for ensuring that all persons who could be negatively affected by its operations are informed and trained according to the hazards and risks and are conversant with the safe work procedures, control measures and other related rules (tool box talk strategy to be implemented).

2.3.9 Health and Safety Representative(s)

The Principal Contractor and all Contractors shall ensure that Health and Safety Representative(s) are appointed under consultation and trained to carry out their functions. The appointment must be in writing. The Health and Safety Representative shall carry out regular inspections, keep records and report all findings to the Responsible Person forthwith and at health & safety meetings.

2.3.10 Health and Safety Committees

The Principal Contractor shall ensure that project health and safety meetings are held monthly and minutes are kept on record. Meetings must be organised and chaired by the Principal Contractor's Responsible Person. All Contractors' Responsible Persons and Health & Safety Representatives shall attend the monthly health & safety meetings. Contractors shall also have their own internal health & safety committees in accordance with the OHS Act 85/1993 and minutes of their meetings shall be forwarded to the Principal Contractor on a monthly basis.

2.3.11 Health and Safety Training

2.3.11.1 Induction

The Principal Contractor shall ensure that all site personnel undergo a risk-specific health & safety induction training session before starting work. A record of attendance shall be kept in the health & safety file. **A suitable venue must be supplied to house this training.**

2.3.11.2 Awareness

The Principal Contractor shall ensure that, on site, periodic 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 & safety file. All Contractors have to comply with this minimum requirement.

2.3.11.3 Competency

All competent persons shall have the knowledge, experience, training, and qualifications specific to the work they have been appointed to supervise, control, and carry out. This will have to be assessed on a regular basis e.g. periodic audit by the Client, progress meetings, etc. The Principal Contractor is responsible to ensure that competent Contractors are appointed to carry out construction work.

2.3.12 General Record Keeping

The Principal Contractor and all 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 (2014). The Principal Contractor shall ensure that all records of incidents/accidents, training, inspections, audits, etc. are kept in a health & safety file held in the site office. The Principal

Contractor must ensure that every Contractor opens its own health & safety file, maintains the file and makes it available on request.

2.3.13 Health & Safety Audits, Monitoring and Reporting

The Client shall conduct monthly health & safety audits of the work operations including a full audit of physical site activities as well as an audit of the administration of health & safety. The Principal Contractor is obligated to conduct similar audits on all Contractors appointed by it. Detailed reports of the audit findings and results shall be reported on at all levels of project management meetings/forums. Copies of the Client audit reports shall be kept in the Primary Project Health & Safety File while the Principal Contractor audit reports shall be kept in their file, a copy being forwarded to the Client. Contractors have to audit their sub-contractors and keep records of these audits in their health & safety files, available on request.

2.3.14 Emergency Procedures

The Principal Contractor shall submit a detailed Emergency Procedure for approval by the Client prior to commencement on site. 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 Contractor shall advise the Client in writing forthwith, of any emergencies, together with a record of action taken. A contact list of all service providers (Fire Department, Ambulance, Police, Medical and Hospital, etc.) must be maintained and available to site personnel.

2.3.15 First Aid Boxes and First Aid Equipment

The Principal Contractor and all 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. The Principal Contractor shall provide an on-site First Aid Station with first aid facilities, including first aid boxes adequately stocked at all times. All Contractors with more than 5 employees shall supply their own first aid box. Contractors with more than 10 employees shall have a trained, certified first aider on site at all times.

2.3.16 Accident / Incident Reporting and Investigation

Injuries are to be categorised into first aid; medical; disabling; and fatal. The Principal Contractor must stipulate in its construction phase health & safety plan how it will handle each of these categories. When reporting injuries to the Client, these categories shall be used. All injuries shall be investigated by the Principal Contractor, with a report being forwarded to the Client forthwith. All Contractors have to report on the 4 categories of injuries to the Principal Contractor at least monthly. The Principal Contractor must report all injuries to the Client in the form of a detailed injury report at least monthly.

2.3.17 Hazards and Potential Situations

The Principal Contractor shall immediately notify other Contractors as well as the Client of any hazardous or potentially hazardous situations that may arise during performance of construction activities.

2.3.18 Personal Protective Equipment (PPE) and Clothing

The Principal Contractor shall ensure that all workers are issued and wear hard hats, safe footwear and overalls. The Principal Contractor and all Contractors shall make provision and keep adequate quantities of SABS approved PPE on site at all times. The Principal Contractor shall clearly outline procedures to be taken when PPE or Clothing is:

- Lost or stolen;
- Worn out or damaged.

The above procedure applies to Contractors and their Sub-contractors, as they are all Employers in their own right.

2.3.19 Occupational Health and Safety Signage

The Contractor shall provide adequate on-site OHS signage. Including but not limited to: '**no unauthorised entry**', '**report to site office**', '**site office**', '**beware of overhead work**', '**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, stairways, entrances to structures and buildings, scaffolding, and other potential risk areas/operations.

2.3.20 Contractors and Sub-contractors

The Principal Contractor shall ensure that all Contractors under its control comply with this Specification, the OHS Act 85/1993, Construction Regulations (2014), and all other relevant legislation that may relate to the activities directly or indirectly. The Contractor, when appointing other Contractors as 'Sub-contractors', shall mutatis mutandis ensure compliance.

2.3.21 Incentives and Penalties

Certain incentives will be provided for ongoing compliance to the provisions of the construction phase health & safety plan submitted by the Principal Contractor.

Penalties will be implemented for ongoing non-compliance to the provisions of the construction-phase health & safety plan as submitted by the Principal Contractor.

2.4 Physical Requirements

2.4.2 Excavations, Shoring, Dewatering or Drainage

The project is for the stabilisation of a landslide of up to seven Metres high and the Principal Contractor must ensure that all work takes place in a safe environment. For this purpose all safety requirements applicable to an excavation as described in the Regulations will be applicable.

The Principal Contractor and any relevant Contractors shall make provision in their tender for shoring, dewatering or drainage of any excavation as per this specification.

The Contractor shall make sure that:

- a) The excavations are inspected before every shift and a record is kept;
- b) Safe work procedures have been communicated to the workers;
- c) The safe work procedures are enforced and maintained by the Contractor's Responsible Persons at all times;

- d) The requirements as per section 11 of the Construction Regulations are adhered to.

2.4.3 Edge Protection and Penetrations

The Principal Contractor shall ensure that all exposed edges and openings are guarded and demarcated at all times until permanent protection has been erected. The Principal Contractor's risk assessment must include these items. E.g. protection of decking edges, finished floor slab edges, stairways, floor penetrations, lift shafts, and all other openings and areas where a person may fall.

2.4.4 Explosives and Blasting

The Principal Contractor shall ensure that the use of explosives and blasting (where required) be undertaken by a competent Contractor. A Safe Work Procedure (SWP) must be submitted to the Client for approval before commencement of blasting work. The Client will issue a permit to authorise the operation.

2.4.5 Piling

The Contractor shall ensure that piling is undertaken by a competent Contractor. A SWP shall be submitted to the Client for approval before commencement of this work.

2.4.6 Stacking of Materials

The Principal Contractor and other relevant Contractors shall ensure that there is an appointed staking supervisor and all materials, formwork and all equipment is stacked and stored safely.

2.4.7 Speed Restrictions and Protection

The Principal Contractor shall ensure that all persons in its employ, all Contractors, and all those that are visiting the site are aware and comply with the site speed restriction(s). Separate vehicle
And pedestrian access routes shall be provided, maintained, controlled, and enforced.

2.4.8 Hazardous Chemical Substances (HCS)

The Principal Contractor and other relevant Contractors shall provide the necessary training and information regarding the use, transport, and storage of HCS. The Principal Contractor shall ensure that the use, transport, and storage of HCS is carried out as prescribed by the HCS Regulations. The Contractor shall ensure that all hazardous chemicals on site have a Material Safety Data Sheet (MSDS) on site and the users are made aware of the hazards and precautions that need to be taken when using the chemicals. The First Aiders must be made aware of the MSDS and how to treat HCS incidents appropriately.

2.4.9 Asbestos

Not envisaged to be applicable on this project.

2.5 Plant and Machinery

2.5.2 Construction Plant

"Construction Plant" includes all types of plant including but not limited to, cranes, piling rigs, excavators, road vehicles, and all lifting equipment.

The Principal Contractor shall ensure that all such plant complies with the requirements of the OHS Act 85/1993 and Construction Regulations (2014). The Principal Contractor and all relevant Contractors shall inspect and keep records of inspections of the construction plant used on site. Only authorised/competent persons are to use machinery under proper supervision. Appropriate PPE and clothing must be provided and maintained in good condition at all times.

2.5.3 Vessels under Pressure (VuP) and Gas Bottles

The Principal Contractor and all relevant Contractors shall comply with Vessels under Pressure Regulations, including:

- Providing competency and awareness training to the operators;
- Providing PPE or clothing;
- Inspect equipment regularly and keep records of inspections;
- Providing appropriate fire fighting equipment (Fire Extinguishers) on hand.

2.5.4 Fire Extinguishers and Fire Fighting Equipment

The Principal Contractor and relevant Contractors shall provide adequate, regularly serviced firefighting 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.

2.5.5 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 (2014) shall apply. The Principal Contractor shall ensure that operators hired with machinery are competent and that certificates are kept on site in the health & safety file. All relevant Contractors must ensure the same.

2.5.6 Lifting Machines and Tackle

The Principal Contractor shall ensure that lifting machinery and tackle is inspected before use and thereafter in accordance with the Driven Machinery Regulations and the Construction Regulations (section 20). There must be competent lifting machinery and tackle inspector who must inspect the equipment daily or before use, taking into account that:

- All lifting machinery and tackle has a safe working load clearly indicated;
- Regular inspection and servicing is carried out;
- Records are kept of inspections and of service certificates.
- There is proper supervision in terms of guiding the loads that includes a trained banks man to direct lifting operations and check lifting tackle;
- The tower crane bases have been approved by an engineer;
- 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.

2.5.7 General Machinery

The Principal Contractor and relevant Contractors shall ensure compliance with the Driven Machinery Regulations, which include inspecting machinery regularly, appointing a competent person to inspect and ensure maintenance, issuing PPE or clothing, and training those who use machinery .

2.5.8 Portable Electrical Tools and Explosive Powered Tools

The Contractor shall ensure that use and storage of all explosive powered tools and portable electrical tools are in compliance with 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.

The Contractor shall consider the following:

- A competent person undertakes routine inspections and records are kept;
- Only authorised trained persons use the tools;
- The safe working procedures apply;
- Awareness training is carried out and compliance is enforced at all times; and
- PPE and clothing is provided and maintained.
- A register indicating the issue and return of all explosive round;
- Signs to be posted up in the areas where explosive powered tools are being used.

2.5.9 Public and Site Visitor Health & Safety

The Principal Contractor shall ensure that every person working on or visiting the site, as well as the public in general, shall be made aware of the dangers likely to arise from site activities, including the precautions to be taken to avoid or minimise those dangers. Appropriate health and safety notices and signs shall be posted up, but shall not be the only measure taken.

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.

2.5.10 Night Work

The Principal Contractor must ensure that adequate lighting is provided to allow for work to be carried out safely.

2.5.11 Transport of Workers

The Principal Contractor and other Contractors shall not:

- Transport persons together with goods or tools unless there is an appropriate area or section to store them;
- Transport persons in a non-enclosed vehicle, e.g. truck; there must be a proper canopy (properly covering the back and top) with suitable sitting area. Workers shall not be permitted to stand or sit at the edge of the transporting vehicle.
- Transport workers in bakkies unless they are closed/covered and have the correct number of seats for the passengers.

2.6 Occupational Health

2.6.1 Occupational Hygiene

Exposure of workers to occupational health hazards and risks is very common in any work environment, especially in construction. Occupational exposure is a major problem and all Contractors must ensure that proper health and hygiene measures are put in place

to prevent exposure to these hazards. Prevent inhalation, ingestion, absorption, and noise induction. Site-specific health risks are tabled in Annexure C e.g. cement dust, wet cement, and wood-dust, noise etc.

2.6.2 Welfare Facilities

The Principal Contractor must supply Sufficient toilets (1 toilet per 15 workers), showers (1 for every 15 workers), changing facilities, hand washing facilities, soap, toilet paper, and hand drying material must be provided. Waste bins must be strategically placed and emptied regularly. Safe, clean storage areas must be provided for workers to store personal belongings and personal protective equipment. Workers should not be exposed to hazardous materials/substances while eating and must be provided with sheltered eating areas.

2.6.3 Alcohol and other Drugs

No alcohol and other drugs will be 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 Principal 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. A full disciplinary procedure must be followed by the Contractor concerned and a copy of the disciplinary action must be forwarded to the Principal Contractor for his records.

PRE-CONSTRUCTION HEALTH AND SAFETY SPECIFICATION (HSS)

Project: **REHABILITATION & UPGRADE OF MATHEWS PHOSA ROAD**

ANNEXURE A

The Principal Contractor and Contractors must submit proof of compliance with Annexure A with the construction phase H&S plan where applicable.

HSS Item No.	Requirement	OHS Act Requirement	Submission Date
2.3.1	Notification of Intention to Commence Construction / Building Work	Complete Schedule 1 (Construction Regulations)	Before commencement on site
2.3.2	Assignment of Responsible Person to Supervise Construction Work	All relevant appointments, as per OHS Act and Construction Regs	Before commencement on site
2.3.3	Competence of Responsible Persons	Client Requirement & OHS Act	Together with H&S plan
2.3.4	Compensation of Occupational Injuries and Diseases Act (COIDA) 130 of 1993	COIDA Requirement	Together with H&S plan
2.3.5	Occupational Health and Safety Policy	OHS Act	Together with H&S plan
2.3.6	Health and Safety Organogram	Client Requirement	Together with H&S plan
2.3.7	Initial Hazard Identification and Risk Assessment based on the Client's assessment	Construction Regs.	Together with H&S plan
2.3.8	Health and Safety Representative	OHS Act	Submit as soon as there are more than 20 employees on site
	Other		

ASSIGNMENT OF PRINCIPAL CONTRACTOR'S RESPONSIBLE PERSONS

Project: REHABILITATION & UPGRADE OF MATTHEWS PHOSA ROAD

ANNEXURE B

The Principal Contractor shall make the following appointments according to the initial risk assessment: (further appointments could become necessary as project progresses)

APPOINTMENT	OHS-ACT / REGULATION REFERENCE
<i>Section 16.2 appointment</i>	<i>Section 16.2</i>
<i>HSE Representative (if necessary)</i>	<i>Section 17(1)</i>
<i>Incident Investigator</i>	<i>GAR 9(2)</i>
<i>First Aiders</i>	<i>GSR 3(4)</i>
<i>Fire Fighters</i>	<i>ER 9 & CR 29</i>
<i>Risk Assessor</i>	<i>HCS Reg (Incl. Asbestos & Lead); CR 9</i>

The following information must be provided in the H&SP:

- Indicate the estimated number of employees to be working on site.
- Indicate the expected number of sub-contractors to be appointed by the Principal Contractor.

The following competent persons, **where applicable**, shall be appointed in writing by the Principal Contractor, prior to any work being carried out, and shall adhere to the requirements of the specific sub-regulations.

The competency of each of these appointed competent persons must be provided and should include knowledge, training, experience & qualifications specific to the appointment.

The table below indicates the applicability of the appointments but contractors should by no means be limited to these indications.

APPOINTMENT	OHS-ACT / REGULATION REFERENCE
Construction Manager	CR 8 (1)
Assistant Construction Manager	CR 8 (2)
Construction H&S Officer where applicable	CR 8 (5)

Construction Supervisor	CR 8 (7)
Construction Assistant Supervisor	CR 8(8)
Risk assessor	CR 9(1)
Fall Protection Competent Person	CR 10 (1)
Temporary works competent person	CR12 (2)
Excavation Work Supervisor	CR 13 (1)(a)
Demolition Work Competent Person	CR 14 (1)
Competent Person (Use of Explosives for Demolition Work)	CR14(11)
Scaffolding Erector/ Team Leader/ Inspector	CR 16 (1)
Suspended platform Competent Person	CR 17(1)
Rope Access Work Competent Person	CR 18 (1) (a)
Material Hoist Competent Person	CR 19(8)(a)
Bulk Mixing Plant Competent Person	CR 20 (1)
Explosive Powered Tools Competent Person	CR 21(2)(b)
Construction Vehicle and Mobile Plant Competent Person	CR23 (1)(d)
Electrical Machinery Competent Person	CR 24 (c)
Stacking and Storage Supervisor	CR 28 (a)
Fire Equipment Inspector	CR 29(h)

OTHER REQUIREMENTS

Project: **REHABILITATION & UPGRADE OF MATTHEWS PHOSA ROAD**

ANNEXURE C

The Principal Contractor shall comply but not be limited to the following requirements: report on these to the Client at progress meetings or at least monthly whichever is sooner.

What	When	Output	Accepted by Client & date
Induction training	Every worker before he/she starts work.	Attendance registers	
Awareness Training (Tool Box Talks)	At least weekly	Attendance registers	
Health & Safety Reports	Monthly	Report covering: <ul style="list-style-type: none"> Incidents / accidents and investigations Non-conformances by employees & contractors Internal & External H&S audit reports 	
Emergency procedures	Ongoing evaluation of procedure	Table procedure in writing as well as tel. numbers	
Risk assessment	Updated and signed off at least monthly	Documented risk assessment	
Safe work procedures	Drawn up before workers are exposed to new risks	Documented set of safe work procedures (method statements), updated and signed off.	
General Inspections	Weekly & daily	Report OHS Act compliance: <ul style="list-style-type: none"> Scaffolding Excavations Formwork & support work Explosive tools 	
General Inspections	Monthly	<ul style="list-style-type: none"> Fire fighting equipment Portable electrical equipment Ladders Lifting equipment/slides 	
List of contractors	List to be updated weekly	Table list, number of workers and Company tel. numbers	
Workman's Compensation	Ongoing	Table a list of Contractors' workman's compensation proof of good standing.	
Construction site rules & Section 37.2 Mandatory Agreement	Ongoing	Table a report of all signed up Mandatories.	

ANNEXURE D

.Risk Assessment

Project: **REHABILITATION & UPGRADE OF MATHEWS PHOSA ROAD**

TASK ORIENTATED RISKS _____

DATE: _____

Rating	Task / situation	Personal protective equipment	Risk to safety	Preventative action	Risk to health	Risk to Environment

EQUIPMENT RISKS

Rating	Activity / Situation	Personal Protective Equipment	Risk to Safety	Preventative Action	Risk to Health	Risk to Environment

3.7 PARTICULAR SPECIFICATIONS

PHYSICAL RISKS

Rating	Situation	Personal Protective Equipment	Risk to Safety	Risk to Health	Preventative Action	Risk to Environment

ERGONOMICAL RISKS

Rating	Situation	Personal Protective Equipment	Risk to Safety	Risk to Health	Preventative Action	Risk to Environment

BEHAVIOURAL RISKS

Rating	Situation	Personal Protective Equipment	Risk to Safety	Risk to Health	Preventative Action	Risk to Environment

3.7: PARTICULAR SPECIFICATIONS

ANNEXURE E

Acknowledgement of receipt:

I, _____ representing

_____ Principal Contractor /

Contractor / Employer have satisfied myself with the content of the Pre-construction Health and Safety Specification and shall ensure that the Principal Contractor / Contractor and its personnel comply with all obligations / requirements in respect thereof.

Signature of Principal Contractor / Contractor Date

Signature of Client / Client's Agent Date

Comments:

PREFERENTIAL PROCUREMENT SPECIFICATION

PARTICIPATION AND CONDITIONS PERTAINING TO TARGETED PROCUREMENT AND BLACK ECONOMIC EMPOWERMENT

Emalahleni Municipality has committed itself to the following with respect to all procurement dealings:

The Emalahleni' Supply Chain Management Policy in terms of section 111 of the Local Government Municipality Finance Management Act (Act No. 56 of 2003)

This document is available on the Employer's website at www.emalahleni.gov.za or available for review at the office of the Employer and/or the Employer's agent. Tenderers shall obtain their copies.

ENVIRONMENTAL MANAGEMENT SPECIFICATION

PRE - CONSTRUCTION			
ISSUE	ACTIVITY AND MITIGATION	RESPONSIBILITY	TIMING
Authorizations, Permits and Licenses	All necessary authorizations, permits and licenses must be obtained prior to the commencement of construction.	C	Once- off
Method Statements	Method Statements must be created and submitted by the Contractor and therefore adhered to by the Contractor and Project Engineer. The ECO will monitor and ensure that the Method statement is implemented. Copies of the Method Statement should must be submitted to the appointed ECO.	ECO	Once-off
Appointment of ECO	The appointed ECO must undertake monthly site inspections and provide monthly audit reports for the duration of the construction and rehabilitation phases. Each audit report must contain the results of the full audit. Audit report results should indicate whether the audited item is in compliance, non-compliance or not applicable during site inspection. Not applicable answers are for those aspects of the construction that have not yet started or are not applicable to activities being undertaken	C ECO	Once- off Once off/ Monthly

10.2

Pre-construction and Construction Phase

Activity	Management / Mitigation	Responsibility	Frequency / Timing
Access to the Site and Surveys	Routing, Access and Surveying		
	a) Access to site must be via existing roads only. The Contractor will have to ascertain the existing condition of access roads and repair accordingly should damage occur due to construction activities.	C & PM	Prior to moving onto site and during the construction
	b) The location of all underground services and servitudes must be identified and confirmed before construction commences.	C & PM	Prior to moving onto site.
	c) Marking of survey points must be done with the ECO's approval.	PM	Prior to moving onto site.
	d) Vegetation disturbance must be kept to a minimum during the survey operations.	PM&ECO	During surveys and preliminary investigations
	e) Staff shall ensure that they drive sensibly such that the surrounding public roads and road users are not adversely affected.	C & PM	On-going

Activity	Management / Mitigation	Responsibility	Frequency / Timing
	f) Machine / vehicle operators must receive clear instructions to remain within demarcated access routes.	C & PM	On-going
Construction Camp Site	a) The Applicant must seek approval for a suitable camp site from the Engineer and ECO prior to any construction works.	C, PM & ECO	Prior to moving onto site.
	b) If the Contractor chooses to locate the camp site on private land, he must get prior permission from the Engineer, ECO and the landowner.	C, PM & ECO	Prior to moving onto site.
	c) The size of the construction camp must be minimized (especially where natural vegetation or grassland has to be cleared for its construction).	C&PM	During site establishment.
	d) The Contractor must attend to, monitor and manage drainage of the camp site. Run-off from the camp site must not discharge into neighbouring properties.	C&PM	During site establishment and on-going; the PM is to conduct on-going weekly inspections of the construction camp.
	e) No vehicle / machinery maintenance or servicing is permitted in the camp site.	C&PM	On-going
	f) The boundary of the camp site must be fenced with 1.8-2m bonnox fencing covered with shade cloth (shade cloth must have a density of no less than 80%).	C	During site establishment.
	g) No refuse outside the fence will be permitted.	C C&PM	During site establishment.
Sewage and Sanitation	Ablutions		
	a) Temporary chemical toilets must be provided by an approved and registered company at a ratio of 1 toilet per 7 workers.	C	On-going monitoring
	b) Toilets must be no closer than 32m from any watercourse. Such facilities, which shall comply with local authority regulations, shall be maintained in a clean and hygienic condition. Their use shall be strictly enforced. They must be positioned in an appropriate place, also taking into consideration, wind movement and strength, and gradient of the land.	C&ECO	During set-up, with on-going monitoring as work progresses
	c) The construction of a "long-drop" is forbidden.	C	On-going
	d) Under no circumstances may open areas, plantations, or the surrounding bush or degraded areas be used as a toilet facility.	C&ECO	On-going
	e) Under no circumstances may any worker utilise the toilet facilities of nearby residences and businesses. It is the responsibility of the Contractor to ensure that sufficient hygienic toilet facilities are provided for workers at all times.	C&ECO	On-going

Activity	Management / Mitigation	Responsibility	Frequency / Timing
	f) The sanitation facilities need to be monitored daily to ensure maintenance of high sanitation standards.	C&ECO	On-going
Education of Site Staff on General and Environmental Conduct	Education		
	a) Staff, operating equipment, shall be adequately trained and sensitised to any potential hazards associated with their tasks.	C&ECO	During staff induction, followed by on-going monitoring
	Use of environmental awareness posters on site should be advocated.	C&ECO	On-going
	No alcohol / drugs to be present on site; no vehicles or machinery are to be operated whilst under the influence of alcohol or drugs.	C	During staff induction, followed by on-going monitoring
	No fires to be permitted on site.	C&PM	During staff induction, followed by on-going monitoring
	All employees must undergo the necessary safety training and wear the necessary protective clothing at all times.	C	Within 14 days of being appointed and on-going
Education of Site Staff on Health and Safety Education and Awareness	Education		
	A health and safety induction must be conducted prior to the commencement of the project. This training must include safety in the workplace training	EAP/C	During staff induction, followed by on-going monitoring
Social Impacts	A site notice (i.e. a public notice) must be erected on the construction site giving contact details of the Applicant; the Environmental Control Officer; the project manager; the engineer; the contractor before construction activities commence.	C&ECO	Prior to moving onto the site.
	The Contractor is to inform neighbours in writing of disruptive activities at least 24 hrs beforehand. This can take place by way of distributing flyers to I&APs.	C&PM	As needed
	Drivers of construction vehicles must exercise care when travelling to and from the site – and adhere to all legally enforceable requirements	C	On-going monitoring
	A complaints register must be kept on site. Details of complaints must be incorporated into the audits as part of the monitoring process.	C, ECO	During site setup and on-going
Geology	To induce any collapse settlement in the recent dune sand and Berea formation, the upper 0.3 metres in the dune sands and Berea Formation must be ripped and recompacted to a 95% of Mod AASHTO dry density and at optimum moisture content.	E/ECO/C	Before construction activities
	Subsoil drains to intercept subsurface flows into the pavement layers.	E/ECO/C	During construction

Activity	Management / Mitigation	Responsibility	Frequency / Timing
	The subsoil drains must comprise a geofabric 'sock' which should be separated from the in-situ materials by a coarse sand.	E/ECO/C	During construction
Soil erosion	Topsoil and Stockpiling		
	Soil disturbance must be minimized by establishing the extent of the construction site (pre-construction).	C&ECO	Before construction activities and on-going
	Clear demarcation must be provided on site and on route layout.	C&ECO	Before construction activities and on-going
	No construction personnel or vehicles may leave the demarcated areas except when authorised to do so by the relevant authority / ECO.	C&ECO	On-going
	Topsoil stripped from the construction areas must be stockpiled away from any potential disturbances.	C&PM	On-going
	Stockpiles must not exceed 1.5 metres in height unless otherwise permitted by the ECO.	C&PM	On-going
	Stockpiles must not be situated such that they obstruct natural water pathways	C&PM	On-going
	Stockpiled topsoil must be vegetated with indigenous grasses, especially if left for longer than three (3) months.	C	On-going
	Conservation and Management of Soil Resources		
	Wind screening and storm water control must be undertaken to prevent soil loss from the site.	C&PM	During setup and throughout the duration of the project
	Erosion prevention and control measures must be implemented in areas where there are steep slopes. Berms, sand bags and hessian sheets must be used to contain all sediment whilst energy dissipaters must be constructed at all outflow points. The site must be monitored for any sign of off-site siltation. All exposed earth must be rehabilitated promptly with suitable vegetation to protect the soil.	C&PM	On-going
	Side tipping of soil and excavated materials shall not be permitted – all spoil material shall be disposed of as directed by the ECO and the Engineer.	C&PM	On-going
Conservation of the Natural Environment	Fauna and Flora		
	Areas which are identified by the Environmental Control Officer (ECO) as being ecologically sensitive and which are adjacent to any construction work are to be suitably demarcated to prevent damage by labour. These areas are	C, ECO&PM	Prior to the commencement of construction activities

Activity	Management / Mitigation	Responsibility	Frequency / Timing
	to be recognised as “no-go” areas – especially the watercourses that are found along the route of the road to be rehabilitated.		
	No natural vegetation may be cleared without prior permission from the ECO and if applicable from any relevant authority. Indigenous vegetation that is removed is to be replanted either back to the point from which it was taken or must be replaced by new relevant indigenous vegetation.	C&ECO	On-going
	Care must be taken to avoid the introduction of alien plant species to the site and surrounding areas.	C&ECO	On-going
	Disturbance to birds, animals and reptiles and their habitats must be minimized wherever possible.	C&PM	On-going
Water	Stormwater Control		
	To prevent stormwater damage, the increase in stormwater runoff resulting from the construction activities must be estimated and the drainage system assessed accordingly.	C&PM	Prior to moving onto site.
	Stormwater culverts and drains are to be located and covered with metal grids to prevent blockages if deemed necessary by the ECO.	C&PM	During site establishment
	Stormwater culverts must also need to be covered with bidim geotextile to filter sand and silt to prevent it from entering the stormwater system.	C&PM	During site establishment
	The stormwater drainage system must not be contaminated by other sources; i.e. must be separated from other wastewater drainage systems. The stormwater management plan must ensure that flow from the development does not result in negative impacts on downstream properties.	C&PM	Prior to moving onto site and on-going
	Hydrology and surface run-off		
	Vegetation must be preserved as far as possible.	E/ECO/C	Weekly
	If necessary, flood lines must be clearly demarcated on the layout plans.	E/ECO/C	Weekly
	Water on the road must be diverted away immediately to minimise the amount of water running directly from the road into the watercourses.	E/ECO/C	Weekly
	Activities directly impacting on watercourse must occur during the dry winter months (low or zero flow periods) in order to limit the potential impact linked to high runoff rates.	E/ECO/C	Weekly
	The watercourse areas must be monitored for any signs of off-site siltation	E/ECO/C	Weekly

3.7: PARTICULAR SPECIFICATIONS

Activity	Management / Mitigation	Responsibility	Frequency / Timing
	No stockpiling of any materials may take place adjacent to the drainage lines and watercourses.	E/ECO/C	Weekly
	Contractor laydown areas must be outside of watercourse areas.	E/ECO/C	Weekly
Waste Management	On-Site Waste Management		
	The excavation and use of rubbish pits is forbidden.	C&PM	On-going
	Burning of waste is forbidden. A possible exception to this may be that the alien invasive vegetation which is removed from the site should be burned to prevent the spread of the plants.	C&PM	On-going
	Littering on the site is forbidden and the site shall be cleared of litter at the end of each working day.	C&PM	On-going
	All waste generated during construction is to be disposed of at a facility registered in terms of section 20(b) of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008).	C&PM	On-going
	Waste from chemical toilets must be disposed of regularly and in a responsible manner by a registered waste contractor. Care must be taken to avoid contamination of soils and water, pollution and nuisance to adjoining areas	C&PM	On-going
Handling of Hazardous materials	Hazardous Materials		
	Material Safety Data Sheets (MSDSs) shall be readily available on site for all chemicals and hazardous substances to be used on site, this includes diesel. Where possible and available, MSDSs must additionally include information on ecological impacts and measures to minimize negative environmental impacts during accidental releases or escapes.	C, PM& ECO	On-going
	Bitumen, cement and other potential environmental pollutants must be stored in the camp site within an impervious (concrete) bunded, roofed and sign posted area.	C&PM	During site set-up and on-going
	Bitumen, cement and other potential environmental pollutants must be mixed on a concrete surface that is bunded and lipped to prevent the leakage of pollutants onto the ground.	C&PM	On-going
	All empty contaminated containers must be stored within the hazardous bunded area until collection by a reputable hazardous waste collection company. Way bills must be presented to the ECO for review and filing purposes.	C&PM	On-going

Activity	Management / Mitigation	Responsibility	Frequency / Timing
	No vehicles, especially those transporting hazardous materials to the site, may be washed on or near site. They must return to the supplier of such material to be cleaned out	C&PM	On-going
	Spill kits from a commercial supplier must be present on site and several staff members must be trained in the use thereof.	C&PM	On-going
Construction Equipment	The Use of Construction Equipment		
	Drip trays must be present under all parked vehicles; irrespective of evidence or not of oil or fuel leaks.	C&PM	On-going

10.3

Post-Construction and Operational Phase

Activity	Management / Mitigation	Responsibility	Frequency / Timing
Vegetation Rehabilitation	Vegetation		
	All disturbed areas, or areas which have been disturbed for the purpose of the development, are to be re-vegetated. This will aid in preventing erosion within the site. A 100% indigenous planting plan must be adhered to in terms of all planting carried out on the site.	C, PM&ECO	Project completion
	During the Operational Phase, all rehabilitated areas must be maintained through weekly inspections until the 80% success rate has been achieved	CPM&ECO	During Operational phase
	Encroachment of invasive alien plants in this regard will need to be monitored on a regular basis to prevent re-infestation.	C,PM, A &ECO	Project completion and operational phase
Land Rehabilitation	Land		
	Rehabilitation must be executed in such a manner that surface runoff will not cause erosion of disturbed areas during and after rehabilitation.	C, PM&ECO	Project Completion
	Any rubble is to be removed from site to an appropriate disposal site. Burying of rubble on site is prohibited.	C&PM	Project Completion
	The site is to be cleared of all litter.	C&PM	Project completion and operational phase
	Monitoring and / or rehabilitation of impacted soils and / or groundwater may be required on areas where chemical spillages have occurred during construction.	C, PM & A	Project completion and operational phase
Removal and Repair	Materials and Infrastructure		

Activity	Management / Mitigation	Responsibility	Frequency / Timing
of Materials and Infrastructure	All material used for building and maintenance must be removed from site after construction or maintenance.	C&PM	Project Completion
	Fences, barriers and demarcations associated with the construction phase are to be removed from the site unless stipulated otherwise by the ECO.	C&PM	Project Completion
	The Contractor must repair any damage that the construction works has caused to adjacent areas.	C	Project Completion
Stormwater Management	Stormwater		
	Any negative stormwater effects related to the construction phase must be remediated	C	Project Completion
	On-going monitoring and assessing of stormwater drainage must occur on site during the operational phase of the proposed project.	Applicant	During Operational phase
Waste	Removal of Hazardous and Non-Hazardous Waste		
	All hazardous and non-hazardous materials and containers must be collected by a reputable hazardous waste collection company and disposed of appropriately. This must be actioned before any operations take place	C	Project completion
	Collection and disposal of non-hazardous waste to a registered landfill site must occur at least once a week.	C	During Operational phase

C4: SITE INFORMATION

C4.1 CONDITIONS ON SITE

SUMMARY RESULTS FROM GETOECHNICAL INVESTIGATIONS:

The geological map from the Council for Geosciences indicates that the site is underlain by shale, shaly sandstone, grit, sandstone, conglomerate, coal in places near base and top of the Eccu (Pe) Formation of the Karoo Sequence.

The soil horizons consisted of silty, gravelly and sandy materials. Due to the nature of the development, corrosiveness is not considered to be a restrictive factor.

The following geotechnical considerations that could influence structure were identified:

Engineering properties of soils:

- The materials typically encountered on site was silty, gravelly and sandy with minimal clayey materials encountered during the investigation. Material classifications ranging between G6 and >G9 were recorded in the laboratory results summary.
- Materials classified as G8 (typically used for selected subgrade/fill), G7 (typically used for selected subgrade/fill) and G6 (often stabilised as subbase) may be utilised as road construction materials, subject to control testing and consistency.
- No excavability constraints are expected on site. No shallow refusals were recorded on the site profiles.

C4.2 LOCALITY PLAN

DRAWING NUMBERS	DESCRIPTION
EMAL 2018 001- RDS-GA-01-T-A	LOCALITY PLAN

Attached in drawings

C5 ANNEXURES
C5.1 DRAWINGS

The drawings issued to tenders as part of the tender documents must be regarded as provisional and preliminary for the tenderer's benefit to generally assess the scope of work. The drawings may be issued as a separate book of drawings or else bound in as part of this document.

The work shall be carried out in accordance with the latest available revision of the drawings approved for construction (AFC)

At commencement of the contract, the Engineer shall deliver to the Contractor copies of the AFC drawings and any instructions required for the commencement of the works. From time to time thereafter during the progress of the works, the Engineer may issue further drawings for construction purposes as may be necessary for adequate construction, completion and defects correction of the works.

Drawings issued separately are listed in the Book of Drawings. Drawings issued as part of this volume are listed hereafter.

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

LIST OF DRAWINGS:

DRAWING NUMBERS	DESCRIPTION
SECTION A: ROAD WORKS	
EMAL 2018-001-RDS-GA-02-T-A	CONTACT NAME BOARD
EMAL 2018-001-RDS-GA-03-T-A	ACCESS 1 CH 0000
EMAL 2018-001-RDS-GA-04-T-A	ACCESS 2 CH 1330
EMAL 2018-001-RDS-GA-05-T-A	ACCESS 3 CH 3300
EMAL 2018-001-RDS-GA-06-T-A	ACCESS 4 CH 4500
EMAL 2018-001-RDS-GA-07-T-A	TRAFFIC CIRCLE GENERAL ARRANGEMENT CH 360
EMAL 2018-001-RDS-GA-08-T-A	TRAFFIC CIRCLE GENERAL ARRANGEMENT CH 810
EMAL 2018-001-RDS-GA-09-T-A	TRAFFIC CIRCLE GENERAL ARRANGEMENT CH 1800
EMAL 2018-001-RDS-GA-10-T-A	TRAFFIC CIRCLE GENERAL ARRANGEMENT CH 3000
EMAL 2018 001- RDS-LS-01-T-A	LONGSECTION AND LAYOUT (0-560)
EMAL 2018 001- RDS-LS-02-T-A	LONGSECTION AND LAYOUT (560-1200)
EMAL 2018 001- RDS-LS-03-T-A	LONGSECTION AND LAYOUT (510-1100)
EMAL 2018 001- RDS-LS-04-T-A	LONGSECTION AND LAYOUT (1080-1660)
EMAL 2018 001- RDS-LS-05-T-A	LONGSECTION AND LAYOUT (1620-2220)
EMAL 2018 001- RDS-LS-06-T-A	LONGSECTION AND LAYOUT (2180-2760)
EMAL 2018 001- RDS-LS-07-T-A	LONGSECTION AND LAYOUT (2750-3310)
EMAL 2018 001- RDS-LS-08-T-A	LONGSECTION AND LAYOUT (3300-3850)
EMAL 2018 001- RDS-LS-09-T-A	LONGSECTION AND LAYOUT (4290-4850)
EMAL 2018 001- RDS-LS-10-T-A	LONGSECTION AND LAYOUT (5490-5150)
EMAL 2018 001- RDS-LS-11-T-A	SETTING OUT
EMAL 2018 001- RDS-XS-01-T-A	TYPICAL CROSS SECTIONS
EMAL 2018 001- RDS-XS-02-T-A	TRAFFIC CIRCLES CROSS SECTIONS
EMAL 2018 001- RDS-SW-01-T-A	STORMWATER LAYOUT
EMAL 2018 001- RDS-SW-02-T-A	STORMWATER LAYOUT
EMAL 2018 001- RDS-SW-03-T-A	STORMWATER LAYOUT
EMAL 2018 001- RDS-SW-04-T-A	STORMWATER LAYOUT
EMAL 2018 001- RDS-SW-05-T-A	STORMWATER LAYOUT
EMAL 2018 001- RDS-SW-06-T-A	STORMWATER LAYOUT
EMAL 2018 001- RDS-SW-07-T-A	STORMWATER LAYOUT
EMAL 2018 001- RDS-DET-01-T-A	CONCRETE PIPE CULVERT BEDDING
EMAL 2018 001- RDS-DET-02-T-A	TYPICAL STORMWATER CATCHPIT & MANHOLE DETAILS
EMAL 2018 001- RDS-DET-03-T-A	STORMWATER BEAM DETAILS

EMAL 2018 001- RDS-DET-04-T-A	STORMWATER COVER SLAB & INLET DETAILS
EMAL 2018 001- RDS-DET-05-T-A	PIPE CULVERT HEADWALL (MASONRY)
EMAL 2018 001- RDS-DET-06-T-A	DEPRESSED INLET
EMAL 2018 001- RDS-DET-07-T-A	SUBSOIL DRAINAGE ROAD EDGE SUBSOIL DRAINS
EMAL 2018 001- RDS-DET-08-T-A	DRAINAGE IN CUTTING SIDE DRAINS
EMAL 2018 001- RDS-DET-09-T-A	DRAINAGE IN CUTTING SIDE DRAINS OUTLET
EMAL 2018 001- RDS-DET-10-T-A	MITRE CHUTE
EMAL 2018 001- RDS-DET-11-T-A	UNDERGROUND SERVICE CROSSINGS SIDE INLET DETAILS
EMAL 2018 001- RDS-DET-12-T-A	GUARD RAIL INSTALLATION
EMAL 2018 001- RDS-DET-13-T-A	GUARD RAIL ERECTION
EMAL 2018 001- RDS-DET-14-T-A	POSITIONING AND STRUCTURAL DETAILS
EMAL 2018 001- RDS-DET-15-T-A	ERECTION OF METAL SIGNS CREOSOTED
EMAL 2018 001- RDS-DET-16-T-A	SIGNPOSTING FOR DETOURS AND LANE CLOSURES
EMAL 2018 001- RDS-DET-17-T-A	SIGNPOSTING AT ROADWORKS
EMAL 2018 001- RDS-DET-18-T-A	SIGNPOSTING FOR MOBILE MAINTANANCE OPERATOR
EMAL 2018 001- RDS-DET-19-T-A	SETTING OUT DETAILS BUS AND PEDESTRIAN CROSSING ISLAND
EMAL 2018 001- RDS-DET-20-T-A	SETTING OUT DETAILS TYPE B1/B3 ACCESS
EMAL 2018 001- RDS-DET-21-T-A	SETTING OUT DETAILS TYPE A2 ACCESS
EMAL 2018 001- RDS-DET-22-T-A	STORMWATER DETAILS _ KERBS & GRID INLETS

EMAL 2018 001- RDS-LSP-01-T-A	LONGSECTION AND LAYOUT PICTORIAL (0-560)
EMAL 2018 001- RDS-LSP-02-T-A	LONGSECTION AND LAYOUT PICTORIAL (560-1200)
EMAL 2018 001- RDS-LSP-03-T-A	LONGSECTION AND LAYOUT PICTORIAL (510-1100)
EMAL 2018 001- RDS-LSP-04-T-A	LONGSECTION AND LAYOUT PICTORIAL (1080-1660)
EMAL 2018 001- RDS-LSP-05-T-A	LONGSECTION AND LAYOUT PICTORIAL (1620-2220)
EMAL 2018 001- RDS-LSP-06-T-A	LONGSECTION AND LAYOUT PICTORIAL (2180-2760)
EMAL 2018 001- RDS-LSP-07-T-A	LONGSECTION AND LAYOUT PICTORIAL (2750-3310)
EMAL 2018 001- RDS-LSP-08-T-A	LONGSECTION AND LAYOUT PICTORIAL (3300-3850)
EMAL 2018 001- RDS-LSP-09-T-A	LONGSECTION AND LAYOUT PICTORIAL (4290-4850)
EMAL 2018 001- RDS-LSP-10-T-A	LONGSECTION AND LAYOUT PICTORIAL (5490-5150)

SECTION B: ELECTRICAL WORKS	
EMAL-2018-01-SLA-T-A	STREET LIGHTS GENERAL ARRANGEMENT DRAWING
MPCR-28/11/1E	LAYOUT
MPCR-28/11/1E	ZONE 1
MPCR-28/11/1E	ZONE 2
MPCR-28/11/1E	ZONE 3
MPCR-28/11/1E	ZONE 4