CLUSTER

Human Settlement, Engineering, and Transport

UNIT

eThekwini Transport Authority

DEPARTMENT

Road Systems Management

PROCUREMENT DOCUMENT

INFRASTRUCTURE

Documents are to be obtained, free of charge, in electronic format, from the National Treasury's eTenders website or the eThekwini Municipality's website.

Contract No: 1T-34277

Contract Title: WP5: Widening of Sea Cow Lake Road Including the Construction of Overhead Rail Bridges

Est. CIDB Grade/ Class: 8 CE

CLARIFICATION MEETING AND QUERIES

Clarification Meeting: Compulsory Clarification Meeting

Meeting Location, Date, Time: Will be held at A225 Zavala Road, Ntuzuma A, 4360, Floor Level -1, Go Durban Offices, Go! Muvo Boardroom. On [03 August 2023] at [11h00]

Queries can be addressed to:
The Employer's Agent's Representative:
Samukelisiwe Ntshangase
Tel: 031-322-2813
eMail: samukelisiwe.ntshangase@durban.gov.za
email queries must be sent on 17 August 2023 and consolidated question and answers to be uploaded on the 24 August 2023

TENDER SUBMISSION

Delivery Location: The Tender Box in the foyer of the Municipal Building
166 KE Masinga Road, Durban

Closing Date/ Time: Friday, 01 September 2023 at 12h00

FACSIMILE, eMAIL, or POSTED TENDERS WILL NOT BE ACCEPTED

Issued by:

ETHEKWINI MUNICIPALITY

Deputy Head: Road Systems Management

Date of Issue: 28/07/2023

Document Version 24/02/2023(c)

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FOR OFFICIAL USE ONLY

Tenderer Name:			VAT Registered: Yes No
	Price (excl)	VAT	Price (incl)
Submitted:	R	R	R
Corrected:	R	R	R

FOR OFFICIAL USE ONLY

Tenderer Name:			VAT Registered: Yes No
	Price (excl)	VAT	Price (incl)
Submitted:	R	R	R
Corrected:	R	R	R

INDEX to PROCUREMENT DOCUMENT

PART T1: TENDERING PROCEDURES

T1.1.1: TENDER NOTICE AND INVITATION TO TENDER

Tenders are hereby invited for the works to WP5: Widening of Sea Cow Lake Road Including the Construction of Overhead Rail Bridges. The construction is to take 24 months.]

Subject	Description	Tender Data Ref.
Employer	The Employer is the eThekwini Municipality as represented by: Deputy Head: **Road Systems Management**	F.1.1.1
Tender Documents	Documents can only be obtained in electronic format, issued by the eThekwini Municipality. Documentation can be downloaded from the **National Treasury's eTenders website** or the **eThekwini Municipality's Website**. The entire document should be printed (on A4 paper) and suitably bound by the tenderer.	F.1.2
Eligibility	It is estimated that tenderers should have a CIDB contractor grading designation of **8 CE** (or higher). The CIDB provisions in relation to a Contractor's Potentially Emerging (PE) status do not apply.	F.2.1.1
Clarification Meeting	**Will be held at A225 Zavala Road, Ntuzuma A, 4360, Floor Level -1, Go Durban Offices, Go! Muvo Boardroom. On [03 August 2023] at [11h00]**	F.2.7
Seek Clarification	Queries relating to these documents are to be addressed to the Employer's Agent's Representative whose contact details are: **Samukelisiwe Ntshangase** **Tel: 031-322-2813** **eMail: samukelisiwe.ntshangase@durban.gov.za** **email queries must be sent on 17 August 2023 and consolidated question and answers to be uploaded on the 24 August 2023**	F.2.8
Submitting a Tender Offer	Tender offers shall be delivered to: **The Tender Box in the foyer of the Municipal Building** **166 KE Masinga Road, Durban**	F.2.13
Closing Time	Tender offers shall be delivered on or before **Friday, 01 September 2023** at or before **12h00**.	F.2.15
Evaluation of Tender Offers	**Either the 80/20 or 90/10** Price Preference Point System, as specified in the PPPFA Regulations 2022 will be applied in the evaluation of tenders. Refer to Clause F.3.11 of the Tender Data for the **Specific Goal(S)** for the awarding of Preference Points, and other related evaluation requirements.	F.3.11

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

PART T1: TENDERING PROCEDURES

T1.2: TENDER DATA

T1.2.1 STANDARD CONDITIONS OF TENDER

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

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

T1.2.2 TENDER DATA

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

F.1: GENERAL

F.1.1 **The employer**: The Employer for this Contract is the eThekwini Municipality as represented by:
Deputy Head: **Road Systems Management**

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

1) This procurement document.

2) "General Conditions of Contract for Construction Works – 3rd Edition 2015" issued by the South African Institution of Civil Engineering (GCC 2015). This document is obtainable separately, and Tenderers shall obtain their own copies.

3) "City of Durban Technical Specifications" hereinafter referred to as the Standard Engineering Specifications. This document is obtainable separately, and Tenderers shall obtain their own copies of the applicable Sections.

4) Committee of Land Transport Officials Specification (COLTO, 1998)

5) Drawings, issued separately from this document, or bound in Section C3.4 (as an Annexure).

6) In addition, Tenderers are advised, in their own interest, to obtain their own copies of the following acts, regulations, and standards referred to in this document as they are essential for the Tenderer to get acquainted with the basics of construction management, the implementation of preferential construction procurement policies, and the participation of targeted enterprise and labour.
   - The Employer's current (as at advertising date) Supply Chain Management Policy.
   - The Preferential Procurement Policy Framework Act No 5 of 2000, and the Preferential Procurement Policy Framework Act Regulations (2022).
   - The Occupational Health and Safety Act No 85 and Amendment Act No 181 of 1993, and the Construction Regulations (2014).
   - The Construction Industry Development Board Act No 38 of 2000 and the Regulations issued in terms of the Act (July 2013).
   - SANS 1921:2004 – Construction and Management Requirements for Works Contract,

Parts 1-3.
- Any other eThekwini Policy documents referenced in the Tender Documents.

Electronically downloaded documentation is obtainable from the National Treasury's **eTenders Website** or the **eThekwini Municipality's Website** at URLs:
- https://www.etenders.gov.za/
- https://www.durban.gov.za/pages/business/procurement

The entire downloaded document should be printed on white A4 paper (single-sided) and suitably bound by the tenderer.

F.1.4 Communication and employer's agent:

The Employer's Agent's is:

Bethuel Manthoadi
031 322 8651
bethuel.manthoadi@durban.gov.za

The Employer's Agent's Representative is:

Mpho Makhanya
031 322 9977
mpho.makhanya@durban.gov.za

The Project Manager is:

Samukelisiwe Ntshangase
031 322 2813
samukelisiwe.ntshangase@durban.gov.za

The Tenderer's contact details, as indicated in the Contract Data: Clause C1.2.2.2 "Data to Be Provided by Contractor", shall be deemed as the only valid contact details for the Tenderer for use in communications between the Employer's Agent and the Tenderer.

F.1.6 Procurement procedures: The competitive negotiation procedure shall be applied.

F.2: TENDERER'S OBLIGATIONS

F.2.1.1 Eligibility: General

A Tenderer will not be eligible to submit a tender if:

(a) the Tenderer does not comply with the legal requirements as stated in the Employer's current SCM Policy.

(b) the Tenderer cannot provide proof that he is in good standing with respect to duties, taxes, levies and contributions required in terms of legislation applicable to the work in the contract.

(c) In the event of a Compulsory Clarification Meeting:
i) the Tenderer fails to attend the Compulsory Clarification Meeting.
ii) the Tenderer fails to have form "Certificate of Attendance at Clarification Meeting / Site

Inspection" (in T2.2) signed by the Employer's Agent or his representative.

(d) in the case of JV submissions, two or more JV entities have common directors / shareholders or common entities tendering for the same works.

(e) at the time of closing of tenders, the Tenderer is not registered on the National Treasury Central Supplier Database (CSD) as a service provider. In the case of a Joint Venture, this requirement will apply individually to each party in the Joint Venture.

(f) The tenderer has not submitted, with this tender, a valid Letter of Good Standing from the Compensation Commissioner as proof of being registered and in good standing with the compensation fund. Reference is to be made to Returnable Document T2.2.13.

(g) The tender fails to complete and sign the Declaration of Municipal Fees in T2.2: "Returnable Documents" and submits the required documentation. Reference is to be made to Returnable Document T2.2.12.

SCM Policy (Cl.14(4)) requires suppliers/ service providers/ contractors to be registered on the eThekwini Municipality Central Supplier Database or be in a position to be so before the award.

In the event of the Tenderer not being registered on the eThekwini Municipality's Central Supplier Database, the tenderer must register on the internet at www.durban.gov.za by following these links:

- Business
- Supply Chain Management (SCM)
- Accredited Supplier and Contractor's Database.

The following are to be noted:

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

F.2.1.2 **Eligibility: CIDB**

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

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

It should be noted that this contract is not part of a Targeted Development Programme (TDP). The CIDB provisions in relation to a Contractor's Potentially Emerging (PE) status do not apply.

F.2.2.2 **The cost of the tender documents:** Replace this paragraph with the following:

"Documents are to be obtained, free of charge, in electronic format, from the **National Treasury's eTenders website** or the **eThekwini Municipality's Website**. The entire electronically downloaded document should be printed on white A4 paper (single-sided) and suitably bound by the tenderer.

F.2.6 **Acknowledge addenda:** Add the following paragraphs to the clause:

"Addenda will be published, in electronic format, on the websites specified in F.1.2. Tenderers are to ensure that the eTenders website is consulted for any published addenda pertaining to this tender up to three days before the tender closing time as stated in the Tender Data."

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

F.2.7 Clarification meeting:
Will be held at A225 Zavala Road, Ntuzuma A, 4360, Floor Level -1, Go Durban Offices, Go! Muvo Boardroom. On [03 August 2023] at [11h00]

In the event of a Compulsory Clarification Meeting, Tenderers must sign the attendance register in the name of the tendering entity. The Tenderer's representative(s) at the clarification meeting must be able to clearly convey the discussions at the meeting to the person(s) responsible for compiling the entity's tender offer.

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

F.2.13 Submitting a tender offer: Submissions must be submitted on official submission documentation issued (either in hard copy or in electronic format) by the eThekwini Municipality.

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

- Contract No. : **1T-34277**
- Contract Title : **WP5: Widening of Sea Cow Lake Road Including the Construction of Overhead Rail Bridges**

The Employer's address for delivery of tender offers is:

The Tender Box in the foyer of the Municipal Building
166 KE Masinga Road, Durban

Parts of each tender offer communicated on paper shall be submitted as an original, plus one(1) copy.

Tenderers are to include, with their paper ("hard copy") submission, a two (2) memory-sticks each containing an electronically scanned (300 dpi resolution) Public Document Format (PDF) copy of their complete bid submission. This PDF file should be named using the contract number and the Tenderer's name, eg. "**1T-34277 – Tenderers Name.PDF**". The memory-sticks must be labelled with the Tenderer's name and securely fixed to each paper submission.

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

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

- Date : **Friday, 01 September 2023**
- Time : **12h00**

F.2.16 **Tender offer validity**: The Tender Offer validity period is 120 Days from the closing date for submission of tenders.

F.2.20 **Submit securities, bonds, policies:** The tenderer is required to submit with his tender a letter of intent from an approved insurer undertaking to provide the Performance Bond to the format included in T2.2 of this procurement document.

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

Tenderers are to include, at the back of their tender submission document, a printout of the required documents/ certificates.

The Form of Offer (C1.1.1), Data to be provided by the Contractor (C1.2.2.2), and the Bill of Quantities (C2.2) are also required to be completed in full.

Tax Clearance

Reference is also to be made to returnable form T2.2.3: "Tax Compliance Status PIN/ Tax Clearance Certificate".

SARS has introduced a new Tax Compliance Status System. Tenderers must submit a **Tax Compliance Status PIN** (TCS PIN) instead of an original Tax Clearance Certificate. This TCS PIN can be used by third parties to certify the taxpayer's real-time compliance status. This TCS PIN is to be entered on Returnable Document T2.2.1: "Compulsory Enterprise Questionnaire". Separate Tax Clearance Certificates / TCS PINs are required for each entity in a Joint Venture.

Failure to comply will make the tender non-responsive.

Compensation Commissioner

Reference is also to be made to returnable form T2.2.13: "Eligibility: Registration with Compensation Commissioner".

The tenderer is to supply proof of being registered and in good standing with the compensation fund by submitting a valid **Letter of Good Standing** from the Compensation Commissioner.

Failure to comply will make the tender non-responsive.

Central Supplier Database (CSD)

Reference is also to be made to returnable form T2.2.14: "Eligibility: CSD Registration Report".

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

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

CIDB Registration

Reference is also to be made to returnable form T2.2.15: "Eligibility: Verification of CIDB Registration and Status".

Registration with the CIDB must be reflected as "Active" at time of tender closing.

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

The Joint Venture Grading Designation Calculator should be used when submitting as a Joint Venture (https://registers.cidb.org.za/PublicContractors/JVGradingDesignationCalc).

The date of obtaining the CIDB printout(s) is to be indicated on the printout.

F.3: THE EMPLOYER'S UNDERTAKINGS

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

F.3.2 **Issue addenda:** Add the following paragraph: "Addenda will be published, in electronic format, on the same platform(s) as the Tender Notification (refer to F.1.2).

F.3.4 **Opening of Tender Submissions:** Tenders will be opened immediately after the closing time for tenders. The public reading of tenders will take place in the SCM Boardroom, 6th Floor, Engineering Unit Building, 166 KE Masinga Road, Durban.

F.3.11 **Evaluation of Tender Offers:**

Eligibility

Tenders will be checked for compliance with the ELIGIBILITY requirements, as specified in T1.2.2 Clause F.2.1. Tenderers not in compliance will be deemed non-responsive.

Functionality

FUNCTIONALITY will be evaluated to determine the responsiveness of tenders received. The minimum score for FUNCTIONALITY is 70 points. Those tenders not achieving the minimum score will be deemed non-responsive.

The functionality Criteria, Sub-Criteria, Points per Criteria/ Sub-Criteria, Returnable Documentation and Schedules, Method of Evaluation, and Prompts for Judgement are as specified in T1.2.3: "Additional Conditions of Tender".

Preference Point System

The financial offer will be reduced to a comparative basis using the **Tender Assessment Schedule**.

The procedure for the evaluation of responsive tenders is **PRICE AND PREFERENCE WITH FUNCTIONALITY** in accordance with the Employer's current SCM Policy, the Preferential Procurement Policy Framework Act (5 of 2000), and the Preferential Procurement Policy Framework Act Regulations (2022).

Price Points

It is unclear (at the time of advertising) which of the two preference point systems applies, either the **80/20 or 90/10** preference point system will apply, determined by the price offered by the lowest acceptable tender.

Preference Points

Reference is also to be made to T2.2.7: "MBD 6.1: Preference Points Claim".

The Preference Points (either 20 or 10) will be derived from points allocated/ claimed for **Specific Goals** as indicated in the table(s) below, according to the specified **Goal/ Category Weightings**.

- **Ownership Goal**
  Goal Weighting: 25%

  The tendering entity's **Percentage Ownership**, in terms of the **Ownership Category(s)** listed below, is to be used in the determination of the tenderer's claim for **Preference Points**.

Ownership Categories	Criteria	80/20	90/10
Race: Black (w1)	Equals 0%	0	0
	Between 0% and 51%	8	4
	Greater or equal to 51% and less than 100%	16	8
	Equals 100%	20	10
Gender: Female (w2)	Equals 0%	0	0
	Between 0% and 51%	8	4
	Greater or equal to 51% and less than 100%	16	8
	Equals 100%	20	10
Disabilities (w3)	Equals 0%	0	0
	Between 0% and 51%	8	4
	Greater or equal to 51% and less than 100%	16	8
	Equals 100%	20	10
	Maximum Goal Points:		

The **Weightings** of the **Ownership Categories** will be:
- w1 = 50%, w2=30%, w3=20% (where: w1 + w2 + w3 = 100%)

Proof of claim as declared on MBD 6.1 (1 or more of the following will be used in verifying the tenderer's status)
- Companies and Intellectual Property Commission registration document (CIPC)
- CSD report.
- B-BBEE Certificate of the tendering entity.
- Consolidated BBBEE Certificate if the tendering entity is a Consortium, Joint Venture, or Trust (Issued by verification agency accredited by the South African Accreditation System).
- Agreement for a Consortium, Joint Venture, or Trust.

- **RDP Goal: The promotion of South African owned enterprises**
  Goal Weighting: 0%

  The tendering entity's **Address** (as stated on the National Treasury Central Supplier Database (CSD) or on the eThekwini Municipality Vendor Portal) is to be used in the determination of the tenderer's claim for **Preference Points** for this Specific Goal.

Location	80/20	90/10
Not in South Africa	n/a	n/a
South Africa	n/a	n/a
Kwa Zulu Natal	n/a	n/a
eThekwini Municipality	n/a	n/a
Maximum Goal Points:	n/a	n/a

Proof of claim as declared on MBD 6.1 (1 or more of the following will be used in verifying the tenderer's status)
- CSD report

- **RDP Goal: The promotion of enterprises located in a specific municipal area**
  Goal Weighting: 15%

The tendering entity's **Address** (as stated on the National Treasury Central Supplier Database (CSD) or on the eThekwini Municipality Vendor Portal) is to be used in the determination of the tenderer's claim for **Preference Points** for this Specific Goal. The **regions** and **zones** (or wards) within the eThekwini Municipality are as specified on the Part C4: "Site Information" of this procurement document.

Municipal Area	80/20	90/10
Not within eThekwini Municipality	0	0
Within eThekwini Municipality	8	4
Within the specified region / Adjoining Wards	16	8
Within the specified zone / Project Ward(s)	20	10
Maximum Goal Points:		

Proof of claim as declared on MBD 6.1 (1 or more of the following will be used in verifying the tenderer's status)
- CSD Report

- **RDP Goal: The promotion of export-oriented production to create jobs**
  Goal Weighting: 0%

The tendering entity's **Business Type**, in terms of the categories below, is to be used in the determination of the tenderer's claim for **Preference Points** for this Specific Goal.

Local content and production	80/20	90/10
Retailer	n/a	n/a
Distributor	n/a	n/a
Wholesaler	n/a	n/a
Manufacturer	n/a	n/a
Maximum Goal Points:	n/a	n/a

Proof of claim as declared on MBD 6.1 (1 or more of the following will be used in verifying the tenderer's status)
- SABS/ SANAS certification

- **RDP Goal: Creation of new jobs to address black youth unemployment**
  Goal Weighting: 20%

The tendering entity's **Commitment to Appointment or Actual Appointment**, in terms of the categories below, is to be used in the determination of the tenderer's claim for **Preference Points** for this Specific Goal.

Number of jobs created	80/20	90/10
0 – 49	5	3
50 – 100	10	7
Over 100	20	10
Maximum Goal Points:		

Proof of claim as declared on MBD 6.1 (1 or more of the following will be used in verifying the tenderer's status)
- Commitment letter to appoint youth from local ward (for a year or more)
- Appointment letters signed by local councillor or chief (for a year or more)
- Consider other evidence etc Copies of IDs and proof of address in Ethekwini

- **RDP Goal: Social Upliftment of communities**
  Goal Weighting: 15%

The tendering entity's **Involvement in Corporate Social Investment initiatives**, in terms of the categories below, is to be used in the determination of the tenderer's claim for **Preference Points** for this Specific Goal.

Corporate Social Investment	80/20	90/10
In-Service/New graduate employment	5	2.5
Legacy project(s)	5	2.5
Candidate Professional Development	5	2.5
Infrastructure repairs and maintenance	5	2.5
Maximum Goal Points:		

Proof of claim as declared on MBD 6.1 (1 or more of the following will be used in verifying the tenderer's status)
- List and value of projects identified through the local councillor/chief in a letter form (as a percentage of the tendered value)

- **RDP Goal: The promotion SMMEs owned by PPG – Contracts > R5m**
  Goal Weighting: 25%

The tendering entity's **Commitment to Sub-Contracting** (to Sub-Contractors conforming to the specified ownership demographics) the **percentage works**, as specified below, is to be used in the determination of the tenderer's claim for **Preference Points** for this Specific Goal.

Contract Participation Goal	80/20	90/10
Sub-contracting <5%	0	0
Sub-contracting ≥5% and ≤ 9%	10	5
Sub-contracting and >9%	20	10
Maximum Goal Points:		

Proof of claim as declared on MBD 6.1 (1 or more of the following will be used in verifying the tenderer's status)
- Contract Participation Goal Plan (% work to be allocated)

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

(a) The tenderer submits a **valid Tax Clearance Certificate OR Tax Compliance Status PIN**, issued by the TCS System of the South African Revenue Services, or has made arrangements to meet outstanding tax obligations.
(b) The tenderer is **registered, and "Active", with the Construction Industry Development Board**, at time of tender closing, in an appropriate contractor grading designation.
(c) The tenderer or any of its directors/shareholders is n**ot listed on the Register of Tender Defaulters** in terms of the Prevention and Combating of Corrupt Activities Act of 2004 as a person prohibited from doing business with the public sector.
(d) The tenderer has not:
- Abused the Employer's Supply Chain Management System; or
- Failed to perform on any previous contract and has been given a written notice to this effect.

(e) The tenderer has completed the **Compulsory Enterprise Questionnaire** and there are no conflicts of interest which may impact on the tenderer's ability to perform the contract in the best interests of the Employer or potentially compromise the tender process.
(f) The tenderer is **registered and in good standing with the compensation fund or** with a **licensed compensation insurer**.
(g) The Employer is reasonably satisfied that the tenderer has in terms of the Construction Regulations, 2014, issued in terms of the Occupational Health and Safety Act, 1993, the **necessary competencies and resources to carry out the work safely**.

The Municipality does not bind itself to accept the lowest or any tender. It reserves the right to accept the whole or any part of a tender to place orders. Bidders shall not bind the Municipality to any minimum quantity per order. The successful Tenderer (s) shall be bound to provide any quantities stipulated in the specification.

The municipality has a firm intention to proceed with the work, subject to funding being identified. Notwithstanding clause F.1.1.3 of the Standard Conditions of Tender, the municipality reserves the right to award or not award the tender based on the municipalities available budget.

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

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

Tenderers are to include, with their paper ("hard copy") submission, a two (2) memory-sticks each containing an electronically scanned (300 dpi resolution) Public Document Format (PDF) copy of their complete bid submission. This PDF file should be named using the contract number and the Tenderer's name, e.g. "**1T-34277 – Tenderers Name.PDF**". The memory-sticks must be labelled with the Tenderer's name and securely fixed to each paper submission.

T1.2.3 ADDITIONAL CONDITIONS OF TENDER

T1.2.3.1 Appeals

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

The City Manager
Attention Ms S. Pillay eMail: Simone.Pillay@durban.gov.za
P O Box 1394
DURBAN, 4000

T1.2.3.2 Prohibition on awards to persons in the service of the state

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

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

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

T1.2.3.3 Code of Conduct and Local Labour

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

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

T1.2.3.5 Functionality Specification

The value of W_2 is 100. The Functionality criteria (and sub criteria if applicable) and maximum score in respect of each of the criteria are as follows:

Functionality Criteria / Sub Criteria		Maximum Points Score
Tenderer's Experience		30
	Contracts Manager	10
	Site agent (Roadworks)	10
	Site agent (Structures)	10
	Foreman (Roadworks)	10
	Foremen (Structures)	10
Preliminary Programme		10
Construction Methodology & Quality Control		10
Maximum possible score for Functionality (M_s)		100

The minimum number of evaluation points for Functionality is **70**. Only those tenderers who achieve the minimum number of Functionality evaluation points (or greater) will be eligible to have their tenders further evaluated.

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

to the following table:

Level 0 No submission/No substantive submission	**Level 1** Generic & dissatisfactory submission	**Level 2** Satisfactory submission	**Level 3** Good submission	**Level 4** Excellent submission
0	40	70	90	100

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

Functionality Criteria	**Returnable Schedules**
Tenderer's Experience	• Experience of Tenderer (see F.2.1.3)
Project Organogram and Experience of Key Staff	• Proposed Organisation and Staffing • Key Personnel • CV's with Experience of Key Personnel
Preliminary Programme	• Preliminary Programme
Construction Methodology & Quality Control	• Construction Approach, • Methodology, and Quality Control • Schedule of Proposed Subcontractors • Plant and Equipment

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

- "**successfully completed**" implies a project has been completed on time and to specification;
- "**similar nature**" implies projects that were of a value of at least 70% of this tender's value, and had a comparable Scope of Work in terms of technical requirements and operations;
- "**experience**" implies experience on projects of a similar nature;
- "**accredited degree / diploma**" implies a minimum 3 year qualification within the built environment, from a registered University or University of Technology.

Criterion: Tenderer's Experience	
Level 0	No information provided; OR submission of no substance / irrelevant information provided
Level 1	To have successfully completed 1 project of a similar nature within the past 7 years.
Level 2	To have successfully completed 2 to 3 projects of a similar nature within the past 7 years.
Level 3	To have successfully completed 4 to 5 projects of a similar nature within the past 7 years.
Level 4	To have successfully completed +6 projects of a similar nature within the past 7 years.

Criterion: Project Organogram and Experience of Key Staff			
	CONTRACTS MANAGER	**SITE AGENT**	**FOREMAN**
Level 0	No information provided OR submission of no substance / irrelevant information provided OR less than 2 year's experience OR Relevant accredited diploma / degree and less than 1 year's experience.	No information provided OR submission of no substance / irrelevant information provided OR less than 2 year's experience. OR Relevant accredited diploma / degree and less than 1 year's experience.	No information provided OR submission of no substance / irrelevant information OR Less than 2 year's experience.
Level 1	Relevant accredited diploma / degree and minimum 1 year's experience.	Relevant accredited diploma / degree and minimum 1 year's experience.	Minimum 2 year's experience.
Level 2	Relevant accredited diploma / degree and minimum 2 year's experience.	Relevant accredited diploma / degree and minimum 2 year's experience.	Minimum 3 year's experience.
Level 3	Relevant accredited diploma / degree and minimum 4 year's experience.	Relevant accredited diploma / degree and minimum 4 year's experience.	Minimum 5 year's experience.
Level 4	Relevant accredited diploma / degree and minimum 7 year's experience.	Relevant accredited diploma / degree and minimum 7 year's experience.	Minimum 8 year's experience.
Level 5	Relevant accredited diploma / degree and minimum 9 year's experience.	Relevant accredited diploma / degree and minimum 9 year's experience.	Minimum 10 year's experience.

Criterion: Preliminary Programme	
Level 0	No information provided; OR submission of no substance / irrelevant information provided
Level 1	The tenderer has misunderstood certain aspects of the Scope of Work and does not deal with the critical aspects of the project.
Level 2	The programme does not adequately deal with the critical characteristics of the project or the plan and manner in which risk is to be managed.
Level 3	Programme covers all the applicable individual activities which are in an acceptable sequence, with appropriate durations, and is in accordance with generally accepted construction practice, and is in line with Clause 1.1.1.14 of the Conditions of Contract (time for achieving Practical Completion). Programme must show the critical path
Level 4	In addition to the requirements of level 3, the programme is loaded with the preliminary cash-flow projections and is sufficiently flexible to accommodate changes that may be required during execution within project completion time.

Criterion: Construction Methodology & Quality Control	
Level 0	No information provided; OR submission of no substance / irrelevant information provided
Level 1	The technical approach / methodology, plant and equipment is poor and gives no relevant information in satisfying the projects objectives Quality control statement is poor with no relevant information
Level 2	The technical approach and/or methodology is less than acceptable and unlikely to satisfy project objectives or requirements. Plant and equipment is unlikely to provide adequate protection of the works. Quality control statement is generic.
Level 3	Brief overview of a site specific methodology which encompasses all programmed activities in appropriate order and includes staff, plant and equipment resources, including subcontractors if applicable, a brief description of preparatory work, construction processes including finishing works for each activity. Quality control statements are site specific with statements covering required sampling and testing requirements for the programmed activities.
Level 4	The methodology is specifically tailored to address specific project requirements. The methods and approach to managing risk etc. are specifically tailored to the critical characteristics of the project. The plant and equipment are specifically tailored to the project requirements and are sufficiently adaptable to accommodate changes that may be required during execution Quality control statements are site specific covering required sampling and testing for programmed activities including site specific quality control checklist for programed activities

PART T2: RETURNABLE DOCUMENTS

T2.1 LIST OF RETURNABLE DOCUMENTS

T2.1.1 General

The Tender Submission Documentation must be submitted in its entirety. All forms must be properly completed as required.

The Tenderer is required to complete each and every Schedule and Form listed below to the best of their ability as the evaluation of tenders and the eventual contract will be based on the information provided by the Tenderer. Failure of a Tenderer to complete the Schedules and Forms to the satisfaction of the Employer will inevitably prejudice the tender and may lead to rejection on the grounds that the tender is non-responsive.

T2.1.2 Returnable Schedules, Forms and Certificates

Entity Specific

Eligibility

Technical or Functionality Evaluation

T2.2 RETURNABLE SCHEDULES, FORMS, AND CERTIFICATES

The returnable schedules, forms, and certificates, as listed in T2.1.2, can be found on pages 22 to 54.

NOTE

The **Form of Offer** (C1.1.1), The **Data to be Provided by Contractor** (C1.2.2.2), and the **Bill of Quantities** (C2.2) are also required to be completed by the tenderer.

T2.2.1 COMPULSORY ENTERPRISE QUESTIONNAIRE

Ref	Description	Complete or Circle Applicable
1.1	Name of enterprise	
1.2	Name of enterprise's representative	
1.3	ID Number of enterprise's representative	
1.4	Position enterprise's representative occupies in the enterprise	
1.5	National Treasury Central Supplier Database Registration number	**MAAA**
1.6	eThekwini Supplier Database: Reference number (PR), if any:	**PR**
1.7	VAT registration number, if any:	
1.8	CIDB registration number, if any:	
1.9	Department of Labour: Registration number	
1.10	Department of Labour: Letter of Good Standing Certificate number	

2.0 **Particulars of sole proprietors and partners in partnerships (attach separate pages if more than 4 partners)**

	Full Name	Identity No.	Personal income tax No. *
2.1			
2.2			
2.3			
2.4			

3.0 **Particulars of companies and close corporations**

3.1	Company registration number, if applicable:	
3.2	Close corporation number, if applicable:	
3.3	Tax Reference number, if any:	
3.4	South African Revenue Service: Tax Compliance Status PIN:	

4.0 **Record in the service of the state** (Insert on a separate page if necessary)

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

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

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

5.0 **Record of spouses, children and parents in the service of the state** (Insert on a separate page if necessary)

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

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

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

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

i) authorizes the Employer to verify the tenderers tax clearance status from the South African Revenue Services that it is in order.

ii) confirms that the neither the name of the enterprise or the name of any partner, manager, director or other person, who wholly or partly exercises or may exercise, control over the enterprise appears on the Register of Tender Defaulters established in terms of the Prevention and Combating of Corrupt Activities Act of 2004.

iii) confirms that no partner, member, director or other person, who wholly or partly exercises, or may exercise, control over the enterprise appears, has within the last five years been convicted of fraud or corruption.

iv) confirms that I / we are not associated, linked or involved with any other tendering entities submitting tender offers and have no other relationship with any of the tenderers or those responsible for compiling the scope of work that could cause or be interpreted as a conflict of interest.

v) confirms that the contents of this questionnaire are within my personal knowledge and are to the best of my belief both true and correct.

NAME (Block Capitals): ..... **Date**

SIGNATURE: .....

T2.2.2 CERTIFICATE OF ATTENDANCE AT CLARIFICATION MEETING / SITE INSPECTION

Reference is to be made to Clauses F.2.1(c) and F.2.7 of the Tender Data.

This is to certify that:

(tenderer name): .....

of (address): .....

.....

.....

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

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

Particulars of person(s) attending the meeting:

Name:	……	Name:	..... ……
Signature:	……	Signature:	..... ……
Capacity:	……	Capacity:	……

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

Name: ……

Signature: ……

Date: ……

T2.2.3 TAX COMPLIANCE STATUS PIN / TAX CLEARANCE CERTIFICATE

Reference is to be made to Clauses F.2.23 and F.3.13(a) of the Tender Data.

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

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

The TCS PIN(s) are to be entered under item 3.4 on form **T2.1.2.1: Compulsory Enterprise Questionnaire**.

Tenderers are to include, at the back of their tender submission document, a printout of their Tax Compliance Status PIN (TCS PIN) OR an original Tax Clearance Certificate.

Failure to include the required document will make the tender submission non-responsive.

I, the undersigned, who warrants that they are authorised to sign on behalf of the Tenderer, confirms that the information contained in this form is within my personal knowledge and is to the best of my belief both true and correct, ***and that the requested documentation has been included in the tender submission****.*

NAME (Block Capitals): ---------- **Date**

SIGNATURE: ---------- ----------

T2.2.4 CONTRACTOR'S HEALTH AND SAFETY DECLARATION

If Functionality is applicable as part of tender evaluation, reference is to be made to Clause F3.11.9 of the of the Conditions of Tender.

Reference is to be made to Clauses F.2.1(e) and F.2.23 of the Tender Data.

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

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

Declaration by Tenderer

1 I, the undersigned, hereby declare and confirm that I am fully conversant with the Occupational Health and Safety Act No 85 of 1993 (as amended by the Occupational Health and Safety Amendment Act No 181 of 1993), and the OHSA 1993 Construction Regulations 2014.

2 I hereby declare that my company has the competence and the necessary resources to safely carry out the construction work under this contract in compliance with the Construction Regulations and the Employer's Health and Safety Specifications.

3 I propose to achieve compliance with the Regulations by one of the following **(Tenderers are to Circle Applicable - Yes or No)**:

	Circle Applicable	
(a) From my own competent resources as detailed in 4(a) hereafter.	Yes	NO
(b) From my own resources still to be appointed or trained until competency is achieved, as detailed in 4(b) hereafter:	Yes	NO
(c) From outside sources by appointment of competent specialist Subcontractors as detailed in 4(c) hereafter:	YES	NO

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

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

NAMES OF COMPETENT PERSONS	POSITIONS TO BE FILLED BY COMPETENT PERSONS

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

(i) By whom will training be provided?	
(ii) When will training be undertaken?	
(iii) Positions to be filled by persons to be trained or hired:	

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

Name of proposed subcontractor:	
Qualifications or details of competency of the subcontractor:	

5 I, the undersigned, hereby undertake, if this tender is accepted, to provide, before commencement of the works under the contract, a suitable and sufficiently documented Health and Safety Plan in accordance with Regulation 7(1) of the Construction Regulations, which plan shall be subject to approval by the Client.

6 I, the undersigned, confirm that copies of this company's approved Health and Safety Plan, the Client's Safety Specifications as well as the OHSA 1993 Construction Regulations 2014 will be provided on site and will at all times be available for inspection by the Principal Contractor's personnel, the Client's personnel, the Employer's Agent, visitors, and officials and inspectors of the Department of Labour.

7 I, the undersigned, hereby confirm that adequate provision has been made in the tendered rates and prices in the Bill of Quantities to cover the cost of all resources, actions, training and all health and safety measures envisaged in the OHSA 1993 Construction Regulations 2014, and that I will be liable for any penalties that may be applied by the Client in terms of the said Regulations (Regulation 33) for failure on the Principal Contractor's part to comply with the provisions of the Act and the Regulations.

8 I, the undersigned, agree that failure to complete and execute this declaration to the satisfaction of the Client will mean that this company is unable to comply with the requirements of the OHSA 1993 Construction Regulations (2014) and accept that this tender will be prejudiced and may be rejected at the discretion of the Client.

I, the undersigned, who warrants that they are authorised to sign on behalf of the Tenderer, confirms that the information contained in this form is within my personal knowledge and is to the best of my belief both true and correct.

NAME (Block Capitals): **Date**

SIGNATURE:

T2.2.5 MBD 4: DECLARATION OF INTEREST

MSCM Regulations: "**in the service of the state**" means to be:

(a) a member of:
  (i) any municipal council.
  (ii) any provincial legislature.
  (iii) the national Assembly or the national Council of provinces.
(b) a member of the board of directors of any municipal enterprise.
(c) an official of any municipality or municipal enterprise.
(d) an employee of any national or provincial department, national or provincial public enterprise or constitutional institution within the meaning of the Public Finance Management Act, 1999 (Act No.1 of 1999).
(e) a member of the accounting authority of any national or provincial public enterprise.
(f) an employee of Parliament or a provincial legislature.

"**Shareholder**" means a person who owns shares in the company and is actively involved in the management of the company or business and exercises control over the company.

1 No bid will be accepted from persons **in the service of the state**[1].

2 Any person, having a kinship with persons **in the service of the state**, including a blood relationship, may make an offer or offers in terms of this invitation to bid. In view of possible allegations of favouritism, should the resulting bid, or part thereof, be awarded to persons connected with or related to **persons in service of the state**, it is required that the bidder or their authorised representative declare their position in relation to the evaluating/adjudicating authority and/or take an oath declaring his/her interest.

3 In order to give effect to the above, the following questionnaire must be completed and submitted with the bid.

3.1	Name of enterprise	Complete T2.1.2.1 Item 1.1
	Name of enterprise's representative	Complete T2.1.2.1 Item 1.2
3.2	ID Number of enterprise's representative	Complete T2.1.2.1 Item 1.3
3.3	Position enterprise's representative occupies in the enterprise	Complete T2.1.2.1 Item 1.4
3.4	Company Registration number	Complete T2.1.2.1 Item 3.1 or 3.2
3.5	Tax Reference number	Complete T2.1.2.1 Item 3.3
3.6	VAT registration number	Complete T2.1.2.1 Item 1.7

3.7 The names of all directors / trustees / shareholders / members / sole proprietors / partners in partnerships, their individual identity numbers and state employee numbers must be indicated in paragraph 4 below. In the case of a joint venture, information in respect of each partnering enterprise must be completed and submitted.

		Circle Applicable	
3.8	Are you presently in the service of the state?	YES	NO
	If yes, furnish particulars:		
	.....		
3.9	Have you been in the service of the state for the past twelve months?	YES	NO
	If yes, furnish particulars:		
	.....		

3.10 Do you have any relationship (family, friend, other) with persons in the service of the state and who may be involved with the evaluation and or adjudication of this bid?	YES	NO
If yes, furnish particulars:		
3.11 Are you, aware of any relationship (family, friend, other) between any other bidder and any persons in the service of the state who may be involved with the evaluation and or adjudication of this bid?	YES	NO
If yes, furnish particulars:		
3.12 Are any of the company's directors, trustees, managers, principle shareholders or stakeholders in service of the state?	YES	NO
If yes, furnish particulars:		
3.13 Are any spouse, child or parent of the company's directors, trustees, managers, principle shareholders or stakeholders in service of the state?	YES	NO
If yes, furnish particulars:		
3.14 Do you or any of the directors, trustees, managers, principle shareholders, or stakeholders of this company have any interest in any other related companies or business whether or not they are bidding for this contract?	YES	NO
If yes, furnish particulars:		

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

Full Name	Identity No.	State Employee No.	Personal income tax No.

Use additional pages if necessary

I, the undersigned, who warrants that they are authorised to sign on behalf of the Tenderer, confirms that the information contained in this form is within my personal knowledge and is to the best of my belief both true and correct.

NAME (Block Capitals): **Date**

SIGNATURE:

T2.2.6 MBD 5: DECLARATION FOR PROCUREMENT ABOVE R10 MILLION
(ALL APPLICABLE TAXES INCLUDED)

For all procurement expected to exceed R10 million (all applicable taxes included), bidders must complete the following questionnaire.

		Circle Applicable	
1.0	Are you by law required to prepare annual financial statements for auditing?	YES	NO
1.1	**If YES, submit audited annual financial statements for the past three years or since the date of establishment if established during the past three years.**		
2.0	Do you have any outstanding undisputed commitments for municipal services towards any municipality for more than three months or any other service provider in respect of which payment is overdue for more than 30 days?	YES	NO
2.1	If NO, this serves to certify that the bidder has no undisputed commitments for municipal services towards any municipality for more than three months or other service provider in respect of which payment is overdue for more than 30 days.		
2.2	If YES, provide particulars.		
	……..……..		
	……..……..		
3.0	Has any contract been awarded to you by an organ of state during the past five years, including particulars of any material non-compliance or dispute concerning the execution of such contract?	YES	NO
3.1	If YES, provide particulars.		
	……..……..		
	……..……..		
4.0	Will any portion of goods or services be sourced from outside the Republic, and, if so, what portion and whether any portion of payment from the municipality / municipal entity is expected to be transferred out of the Republic?	YES	NO
4.1	If YES, provide particulars.		
	……..……..		
	……..……		

If required by 1.1 above, tenderers are to include, at the back of their tender submission document, a printout of their audited annual financial statements.

I, the undersigned, who warrants that they are authorised to sign on behalf of the Tenderer, confirms that the information contained in this form is within my personal knowledge and is to the best of my belief both true and correct, ***and, if required, that the requested documentation has been included in the tender submission****.*

NAME (Block Capitals): ---------- **Date**

SIGNATURE: ---------- ----------

T2.2.7 MBD 6.1: PREFERENCE POINTS CLAIM
In terms of THE PREFERENTIAL PROCUREMENT REGULATIONS (2022)

Reference is to be made to Clause F.3.11 of the Tender Data.

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

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

1.0 GENERAL CONDITIONS

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

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

1.2 Either the 80/20 or 90/10 preference point system will be applicable in this tender. The lowest/ highest acceptable tender will be used to determine the applicable system once tenders are received.

1.3 Preference Points for this tender shall be awarded for:

- **Price** and **Specific Goals**: Either 80 or 90 (price) and 20 or 10 (specific goals), in terms of 1.2 above.
- The total Preference Points, for Price and Specific Goals, is 100.

1.4 Failure on the part of the tenderer to submit the required proof or documentation, in terms of the requirements in the Conditions of Tender for claiming specific goal preference points, will be interpreted that preference points for specific goals are not claimed.

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

2.0 DEFINITIONS

2.1 "**tender**" means a written offer in the form determined by an organ of state in response to an invitation to provide goods or services through price quotations, competitive tendering process or any other method envisaged in legislation.

2.2 "**price**" means an amount of money tendered for goods or services, and includes all applicable taxes less all unconditional discounts.

2.3 "**rand value**" means the total estimated value of a contract in Rand, calculated at the time of bid invitation, and includes all applicable taxes.

2.4 "**tender for income-generating contracts**" means a written offer in the form determined by Municipality in response to an invitation for the origination of income-generating contracts through any method envisaged in legislation that will result in a legal agreement between the Municipality and a third party that produces revenue for the Municipality, and includes, but is not limited to, leasing and disposal of assets and concession contracts, excluding direct sales and disposal of assets through public auctions.

2.5 "**the Act**" means the Preferential Procurement Policy Framework Act, 2000 (Act No. 5 of 2000).

3.0 FORMULA FOR CALCULATION OF PREFERENCE PRICE POINTS

3.1 PROCUREMENT OF GOODS AND SERVICES

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

80 / 20 Points System **OR** **90 / 10 Points System**

$$Ps = 80\left(1 - \frac{Pt - Pmin}{Pmin}\right) \qquad Ps = 90\left(1 - \frac{Pt - Pmin}{Pmin}\right)$$

Where:
Ps = Points scored for price of tender under consideration
Pt = Price of tender under consideration
Pmin = Price of lowest acceptable tender

4.0 POINTS AWARDED FOR SPECIFIC GOALS

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

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

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

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

TABLE 1: Specific Goals for the tender and maximum points for each goal are indicated per the table below.

Tenderers are to indicate their points claim for each of the Specific Goals in the shaded blocks.

The Specific Goals to be allocated points in terms of this tender	Maximum Number of points ALLOCATED (80/20 system)	Maximum Number of points ALLOCATED (90/10 system)	Number of points CLAIMED (80/20 system)	Number of points CLAIMED (90/10 system)
Ownership Goal: Race (black)	2.5	1.25		
Ownership Goal: Gender (female)	1.5	0.75		
Ownership Goal: Disabilities	1	0.5		
RDP Goal: The Creation of new jobs to address black youth unemployment	4	2		
RDP Goal: The promotion of enterprises located in a specific municipal area.	3	1.5		
RDP Goal: Social upliftment of communities	3	1.5		
RDP Goal: The promotion of SMMEs owned by PPG (contracts >R5m)	5	2.5		
		Total CLAIMED Points		

I, the undersigned, who warrants that they are authorised to sign on behalf of the Tenderer, certify that the points claimed, based on the specific goals as specified in the tender, qualifies the tendering entity for the preference(s) shown.

I acknowledge that:

1) The information furnished is true and correct.

2) The preference points claimed are in accordance with the General Conditions as indicated in paragraph 1 of this form.

3) In the event of a contract being awarded as a result of points claimed as shown in paragraphs 1.4 and 4.2, the contractor may be required to furnish documentary proof to the satisfaction of the organ of state that the claims are correct.

4) If the specific goals have been claimed or obtained on a fraudulent basis, or any of the conditions of contract have not been fulfilled, the organ of state may, in addition to any other remedy it may have:

   (a) disqualify the person from the tendering process.
   (b) recover costs, losses or damages it has incurred or suffered as a result of that person's conduct.
   (c) cancel the contract and claim any damages which it has suffered as a result of having to make less favourable arrangements due to such cancellation.
   (d) recommend that the tenderer or contractor, its shareholders and directors, or only the shareholders and directors who acted on a fraudulent basis, be restricted from obtaining business from any organ of state for a period not exceeding 10 years, after the *audi alteram partem* (hear the other side) rule has been applied; and
   (e) forward the matter for criminal prosecution, if deemed necessary.

NAME (Block Capitals): ---------- **Date**

SIGNATURE: ---------- ----------

T2.2.8 MBD 8: DECLARATION OF BIDDER'S PAST SUPPLY CHAIN MANAGEMENT PRACTICES

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

2.0 It serves as a declaration to be used by municipalities and municipal entities in ensuring that when goods and services are being procured, all reasonable steps are taken to combat the abuse of the supply chain management system.

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

a) abused the municipal entity's supply chain management system or committed any improper conduct in relation to such system.
b) been convicted for fraud or corruption during the past five years.
c) wilfully neglected, reneged on or failed to comply with any government, municipal or other public sector contract during the past five years.
d) been listed in the Register for Tender Defaulters in terms of section 29 of the Prevention and Combating of Corrupt Activities Act (No 12 of 2004).

4.0 In order to give effect to the above, the following questions must be completed and submitted with the bid.

		Circle Applicable	
4.1	Is the bidder or any of its directors listed on the National Treasury's Database of Restricted Suppliers as companies or persons prohibited from doing business with the public sector? (Companies or persons who are listed on this Database were informed in writing of this restriction by the Accounting Officer / Authority of the institution that imposed the restriction after the audi alteram partem rule was applied.) The Database of Restricted Suppliers now resides on the National Treasury's website (www.treasury.gov.za) and can be accessed by clicking on its link at the bottom of the home page.	YES	NO

4.1.1 If YES, provide particulars.

.....

.....

4.2	Is the bidder or any of its directors listed on the Register for Tender Defaulters in terms of section 29 of the Prevention and Combating of Corrupt Activities Act (No 12 of 2004)? The Register for Tender Defaulters can be accessed on the National Treasury's website (www.treasury.gov.za) by clicking on its link at the bottom of the home page.	YES	NO

4.2.1 If YES, provide particulars.

.....

.....

4.3	Was the bidder or any of its directors convicted by a court of law (including a court of law outside the Republic of South Africa) for fraud or corruption during the past five years?	YES	NO

4.3.1 If YES, provide particulars.

.....

.....

4.4	Does the bidder or any of its directors owe any municipal rates and taxes or municipal charges to the municipality / municipal entity, or to any other municipality / municipal entity, that is in arrears for more than three months?	YES	NO

4.4.1 If YES, provide particulars.

.....

.....

4.5	Was any contract between the bidder and the municipality / municipal entity or any other organ of state terminated during the past five years on account of failure to perform on or comply with the contract?	YES	NO

4.5.1 If YES, provide particulars.

.....

.....

I, the undersigned, who warrants that they are authorised to sign on behalf of the Tenderer, confirms that the information contained in this form is within my personal knowledge and is to the best of my belief both true and correct.

I accept that, in addition to cancellation of a contract, action may be taken against me should this declaration prove to be false.

NAME (Block Capitals): **Date**

SIGNATURE:

T2.2.9 MBD 9: CERTIFICATE OF INDEPENDENT BID DETERMINATION

NOTES

[1] Includes price quotations, advertised competitive bids, limited bids and proposals.

[2] Bid rigging (or collusive bidding) occurs when businesses, that would otherwise be expected to compete, secretly conspire to raise prices or lower the quality of goods and / or services for purchasers who wish to acquire goods and / or services through a bidding process. Bid rigging is, therefore, an agreement between competitors not to compete.

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

1.0 This Municipal Bidding Document (MBD) must form part of all **bids**[1] invited.

2.0 Section 4 (1) (b) (iii) of the Competition Act No. 89 of 1998, as amended, prohibits an agreement between, or concerted practice by, firms, or a decision by an association of firms, if it is between parties in a horizontal relationship and if it involves collusive bidding (or **bid rigging**).[2] Collusive bidding is a *pe se* prohibition meaning that it cannot be justified under any grounds.

3.0 Municipal Supply Regulation 38 (1) prescribes that a supply chain management policy must provide measures for the combating of abuse of the supply chain management system, and must enable the accounting officer, among others, to:

a. take all reasonable steps to prevent such abuse;
b. reject the bid of any bidder if that bidder or any of its directors has abused the supply chain management system of the municipality or municipal entity or has committed any improper conduct in relation to such system; and
c. cancel a contract awarded to a person if the person committed any corrupt or fraudulent act during the bidding process or the execution of the contract.

4.0 This MBD serves as a certificate of declaration that would be used by institutions to ensure that, when bids are considered, reasonable steps are taken to prevent any form of **bid rigging**.

5.0 In order to give effect to the above, the attached Certificate of Bid Determination (MBD 9) must be completed and submitted with the bid.

CERTIFICATE OF INDEPENDENT BID DETERMINATION

I, the undersigned, in submitting the accompanying bid:

\- -

(Bid Number and Description)

in response to the invitation for the bid made by:

\- -

(Name of Municipality / Municipal Entity)

do hereby make the following statements that I certify to be true and complete in every respect.

I certify, on behalf of:

\- -

(Name of Bidder)

that:

1. I have read and I understand the contents of this Certificate.

2. I understand that the accompanying bid will be disqualified if this Certificate is found not to be true and complete in every respect.

3. I am authorized by the bidder to sign this Certificate, and to submit the accompanying bid, on behalf of the bidder;

4. Each person whose signature appears on the accompanying bid has been authorized by the bidder to determine the terms of, and to sign, the bid, on behalf of the bidder;

5. For the purposes of this Certificate and the accompanying bid, I understand that the word “competitor” shall include any individual or organization, other than the bidder, whether or not affiliated with the bidder, who:
   (a) has been requested to submit a bid in response to this bid invitation.
   (b) could potentially submit a bid in response to this bid invitation, based on their qualifications, abilities or experience.
   (c) provides the same goods and services as the bidder and/or is in the same line of business as the bidder.

6. The bidder has arrived at the accompanying bid independently from, and without consultation, communication, agreement, or arrangement with any competitor. However, communication between partners in a joint venture or consortium[3] will not be construed as collusive bidding.

7. In particular, without limiting the generality of paragraphs 6 above, there has been no consultation, communication, agreement or arrangement with any competitor regarding:
   (a) prices.
   (b) geographical area where product or service will be rendered (market allocation).
   (c) methods, factors or formulas used to calculate prices.
   (d) the intention or decision to submit or not to submit, a bid.
   (e) the submission of a bid which does not meet the specifications and conditions of the bid.
   (f) bidding with the intention not to win the bid.

8. In addition, there have been no consultations, communications, agreements, or arrangements with any competitor regarding the quality, quantity, specifications and conditions or delivery particulars of the products or services to which this bid invitation relates.

9. The terms of the accompanying bid have not been, and will not be, disclosed by the bidder, directly or indirectly, to any competitor, prior to the date and time of the official bid opening or of the awarding of the contract.

10. I am aware that, in addition and without prejudice to any other remedy provided to combat any restrictive practices related to bids and contracts, bids that are suspicious will be reported to the Competition Commission for investigation and possible imposition of administrative penalties in terms of section 59 of the Competition Act No 89 of 1998 and or may be reported to the National Prosecuting Authority (NPA) for criminal investigation and or may be restricted from conducting business with the public sector for a period not exceeding ten (10) years in terms of the Prevention and Combating of Corrupt Activities Act No 12 of 2004 or any other applicable legislation.

NAME (Block Capitals): ---------- **Date**

SIGNATURE: ---------- ----------

T2.2.10 JOINT VENTURES AGREEMENTS

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

T2.2.11 RECORD OF ADDENDA TO TENDER DOCUMENTS

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

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

I, the undersigned, who warrants that they are authorised to sign on behalf of the Tenderer, confirms that the information contained in this form is within my personal knowledge and is to the best of my belief both true and correct.

It is also confirmed that the requirements, as stated on the Addenda, have been complied with.

NAME (Block Capitals): **Date**

SIGNATURE:

T2.2.12 ELIGIBILITY: DECLARATION OF MUNICIPAL FEES

Reference is to be made to Clause F.2.1(f)(ii) of the Tender Data.

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

.....

(full name of Company / Close Corporation / partnership / sole proprietary/Joint Venture)

(hereinafter referred to as the TENDERER) are, as at the date hereunder, fully paid or an Acknowledgement of Debt has been concluded with the Municipality to pay the said charges in instalments.

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

Account	**Account Number: to be completed by tenderer**											
Consolidated Account												
Electricity												
Water												
Rates												
JSB Levies												
Other												

I acknowledge that should the aforesaid Municipal charges fall into arrears, the Municipality may take such remedial action as is required, including termination of any contract, and any payments due to the Contractor by the Municipality shall be first set off against such arrears.

- Where the tenderer's place of business or business interests are outside the jurisdiction of eThekwini municipality, a copy of the accounts/ agreements from the relevant municipality are to be provided.

- Where the tenderer's Municipal Accounts are part of their lease agreement, then a copy of the agreement, or an official letter to that effect, is to be provided.

Tenderers are to include, at the back of their tender submission document, a printout of the above account's and or agreements signed with the municipality.

Failure to include the required document will make the tender submission non-responsive.

*I, the undersigned, who warrants that they are authorised to sign on behalf of the Tenderer, confirms that the information contained in this form is within my personal knowledge and is to the best of my belief both true and correct, **and that the requested documentation has been included in the tender submission**.*

NAME (Block Capitals): **Date**

SIGNATURE:

T2.2.13 ELIGIBILITY: REGISTRATION WITH COMPENSATION COMMISSIONER

Reference is to be made to Clause F.2.1(f)(i) of the Tender Data.

The Occupational Injuries and Diseases Act (130 of 1993 as amended) (the Act) refers. A summary of the pertinent Clauses are listed below. The act is to be referenced for the full text of the clauses.

Clause 80: Employer to register with commissioner and furnish him with particulars
The Act requires that an Employer carrying out business in the Republic to register with the Compensation Commissioner. Any person who fails to comply with the provisions of the this clause is guilty of an offence.

Clause 82: Employer to furnish returns of earnings
The Act requires an Employer to furnish the commissioner with a return showing:

- The amount of earnings paid by him to his employees.
- Any further information as may be prescribed or as the commissioner may require.

Any Employer who fails to comply with the provisions of the this clause is guilty of an offence.

Clause 86: Assessment to be paid by an employer to commissioner
The Act states that an Employer will receive notices of assessment from the commissioner. The Employer must pay the commissioner the assessment amount on the notices.

Clause 89: Mandators and contractors
The Act requires a contractor (a person with a contract with a mandator) to register as an Employer in accordance with the provisions of the Act and pay the necessary assessments. Failing registration or payment of assessments, the mandator is required to pay the assessments in respect of the employees of the contractor. The mandator is allowed to recover the assessment amounts paid from the contractor.

The Department of labour issues contractors with a **Letter of Good Standing** if the contractor has complied with the requirement(s) of the Act and is in "good standing" with the Compensation Fund. Employers can check the validity of such Letters of Good Standing on the internet (https://cfonline.labour.gov.za/VerifyLOGS).

Tenderers are to include, at the back of their tender submission document, a printout of their most recent Letter of Good Standing from the Department of Labour.

Failure to include the required document will make the tender submission non-responsive.

I, the undersigned, who warrants that they are authorised to sign on behalf of the Tenderer, confirms that the information contained in this form is within my personal knowledge and is to the best of my belief both true and correct, ***and that the requested documentation has been included in the tender submission****.*

NAME (Block Capitals): ..... **Date** .....

SIGNATURE: .....

T2.2.14 ELIGIBILITY: CSD REGISTRATION REPORT

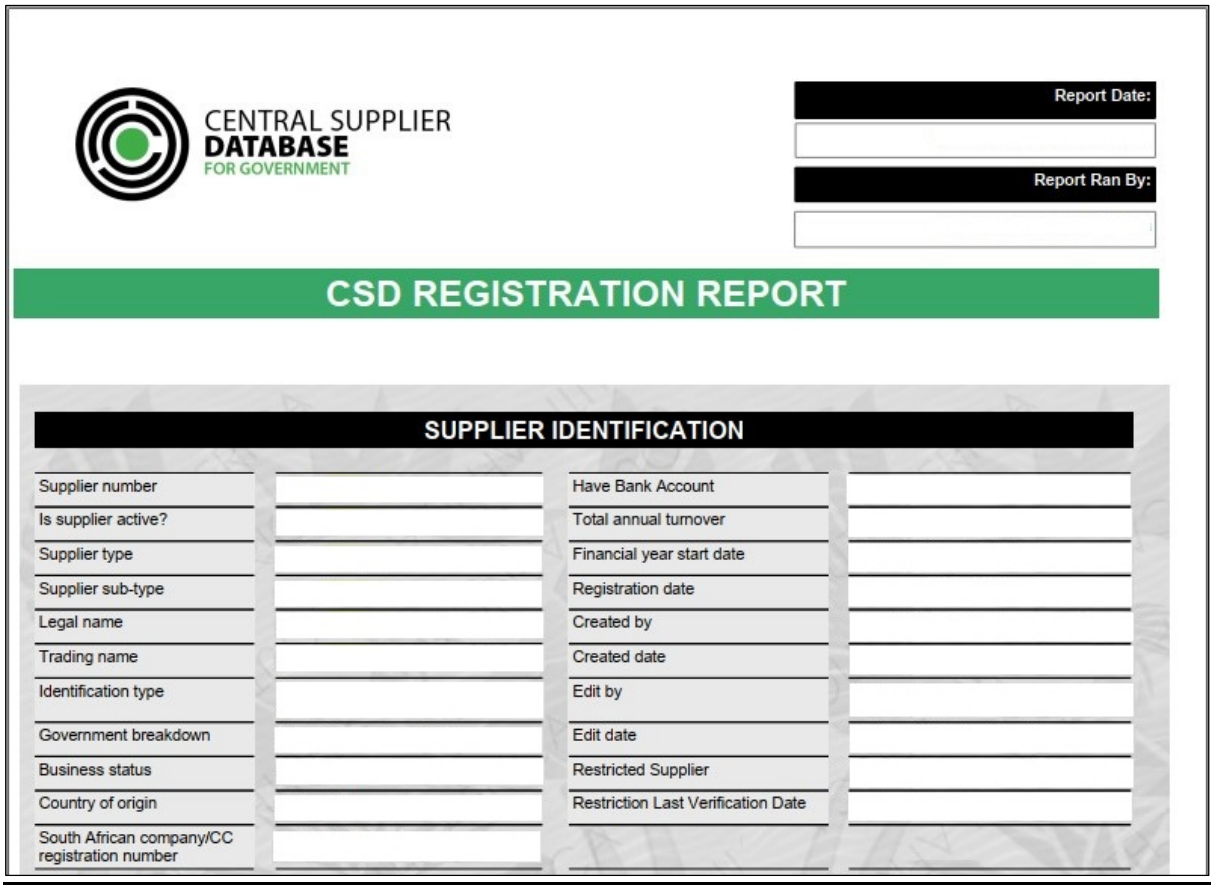
Reference is to be made to Clauses F.2.1(e) and F.2.23 of the Tender Data.

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

CSD Registration Reports can be obtained from the National Treasury's CSD website at https://secure.csd.gov.za/Account/Login.

The date of obtaining the printout is to be indicated on the printout.

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



CENTRAL SUPPLIER DATABASE FOR GOVERNMENT

Report Date:

Report Ran By:

CSD REGISTRATION REPORT

SUPPLIER IDENTIFICATION

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

Tenderers are to include, at the back of their tender submission document, a printout of their (full) CSD Registration Report.

*I, the undersigned, who warrants that they are authorised to sign on behalf of the Tenderer, confirms that the information contained in this form is within my personal knowledge and is to the best of my belief both true and correct, **and that the requested documentation has been included in the tender submission**.*

NAME (Block Capitals): ---------- **Date**

SIGNATURE: ---------- ----------

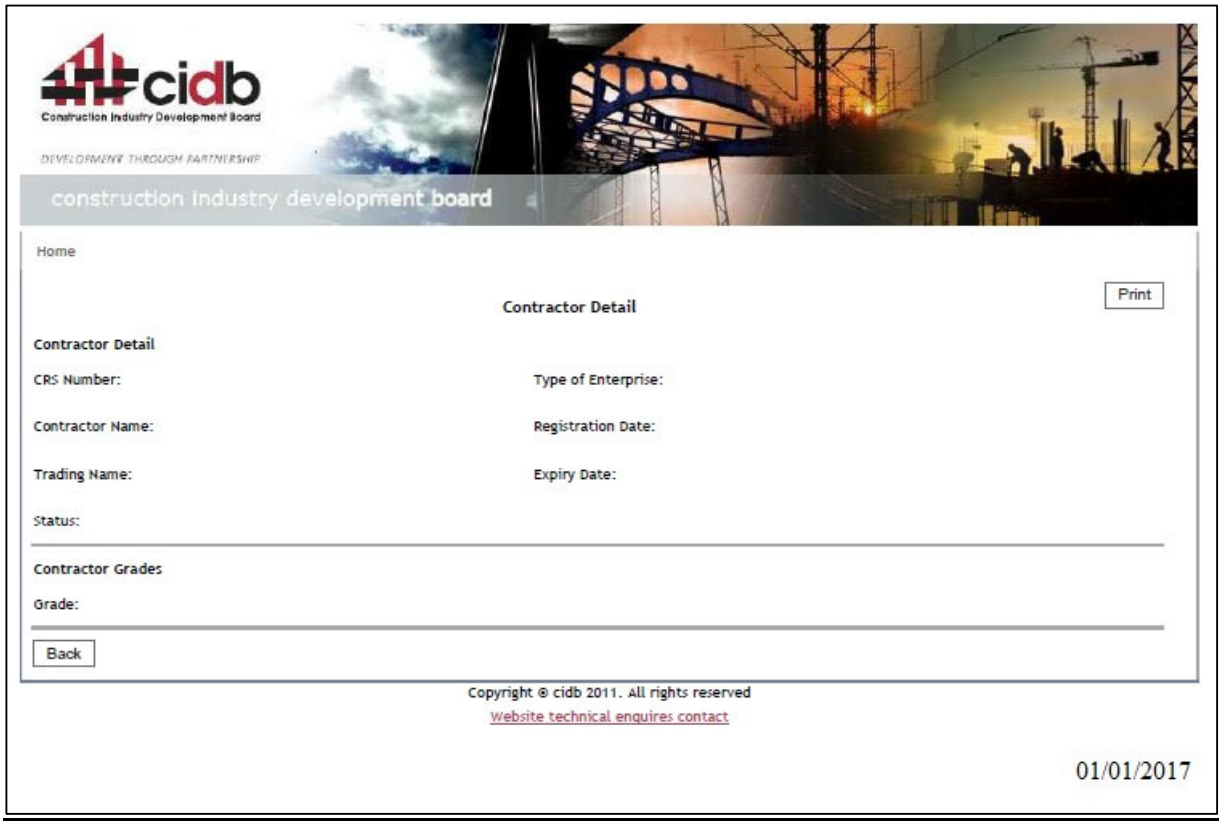
T2.2.15 ELIGIBILITY: VERIFICATION OF CIDB REGISTRATION AND STATUS

Reference is to be made to Clause F.2.1.1 and F.2.23 of the Tender Data.

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

CIDB Registrations can be obtained from the CIDB website at https://registers.cidb.org.za/PublicContractors/ContractorSearch. The date of obtaining the printout is to be indicated on the printout.

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



Tenderers are to include, at the back of their tender submission document, a printout of their registration with the CIDB.

*I, the undersigned, who warrants that they are authorised to sign on behalf of the Tenderer, confirms that the information contained in this form is within my personal knowledge and is to the best of my belief both true and correct, **and that the requested documentation has been included in the tender submission**.*

NAME (Block Capitals): ---------- **Date**

SIGNATURE: ---------- ----------.

T2.2.16 EXPERIENCE OF TENDERER

Refer to Clause F3.11.9 for Functionality Points evaluation prompts (if applicable).

The following is a statement of works of similar nature (in relation to the scope of works) recently (within the past 7 years) executed by myself / ourselves.

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

EMPLOYER: CONTACT PERSON AND TELEPHONE NUMBER	CONSULTING ENGINEER: CONTACT PERSON AND TELEPHONE NUMBER	NATURE OF WORK	VALUE OF WORK (inclusive of VAT)	DATE COMPLETED

Attach additional pages if more space is required

I, the undersigned, who warrants that they are authorised to sign on behalf of the Tenderer, confirms that the information contained in this form is within my personal knowledge and is to the best of my belief both true and correct.

NAME (Block Capitals): .... **Date**

SIGNATURE: ....

T2.2.17 PROPOSED ORGANISATION and STAFFING

Refer to Clause F3.11.9 for Functionality Points evaluation prompts (if applicable).

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

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

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

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

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

I, the undersigned, who warrants that they are authorised to sign on behalf of the Tenderer, confirms that the information contained in this form is within my personal knowledge and is to the best of my belief both true and correct.

NAME (Block Capitals): ---------- **Date**

SIGNATURE: ---------- ----------

T2.2.18 KEY PERSONNEL

Refer to Clause F3.11.9 for Functionality Points evaluation prompts (if applicable).

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

CATEGORY OF EMPLOYEE	NUMBER OF PERSONS	
	KEY PERSONNEL, PART OF THE CONTRACTOR'S ORGANISATION	KEY PERSONNEL TO BE IMPORTED IF NOT AVAILABLE LOCALLY
Site Agent, Project Managers		
Foremen, Quality Control and Safety Personnel		
Technicians, Surveyors, etc		
Artisans and other Skilled workers		
Plant Operators		
Unskilled Workers		
Others:		
.....		

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

I, the undersigned, who warrants that they are authorised to sign on behalf of the Tenderer, confirms that the information contained in this form is within my personal knowledge and is to the best of my belief both true and correct.

NAME (Block Capitals): ..... **Date**

SIGNATURE: ....

T2.2.19 EXPERIENCE OF KEY PERSONNEL

Refer to Clause F3.11.9 for Functionality Points evaluation prompts (if applicable).

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

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

A CV of the contract manager, site agent(s) and general foreman of not more than 2 pages should be attached to this schedule:

Each CV should be structured under the following headings:

a) Personal particulars
- name
- date and place of birth
- place (s) of tertiary education and dates associated therewith
- professional awards

b) Qualifications (degrees, diplomas, grades of membership of professional societies and professional registrations)

c) Skills

d) Name of current employer and position in enterprise

e) Overview of post-graduate / diploma experience (year, organization and position)

f) Outline of recent assignments / experience that has a bearing on the scope of work

I, the undersigned, who warrants that they are authorised to sign on behalf of the Tenderer, confirms that the information contained in this form is within my personal knowledge and is to the best of my belief both true and correct.

NAME (Block Capitals): **Date**

SIGNATURE:

T2.2.20 PRELIMINARY PROGRAMME

Refer to Clause F3.11.9 for Functionality Points evaluation prompts (if applicable).

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

PROGRAMME														
ACTIVITY	**WEEKS / MONTHS**													

Note: The programme must be based on the completion time as specified in the Contract Data.

I, the undersigned, who warrants that they are authorised to sign on behalf of the Tenderer, confirms that the information contained in this form is within my personal knowledge and is to the best of my belief both true and correct.

NAME (Block Capitals): **Date**

SIGNATURE:

T2.2.21 CONSTRUCTION APPROACH, METHODOLOGY, AND QUALITY CONTROL

Refer to Clause F3.11.9 for Functionality Points evaluation prompts (if applicable).

Construction Approach and Methodology

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

Quality Control

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

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

I, the undersigned, who warrants that they are authorised to sign on behalf of the Tenderer, confirms that the information contained in this form is within my personal knowledge and is to the best of my belief both true and correct.

NAME (Block Capitals): ---------- **Date**

SIGNATURE: ---------- ----------

T2.2.22 SCHEDULE OF PROPOSED SUBCONTRACTORS

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

NAMES AND ADDRESSES OF PROPOSED SUBCONTRACTORS	NATURE AND EXTENT OF WORK TO BE SUBCONTRACTED	PREVIOUS EXPERIENCE WITH SUBCONTRACTOR

Attach additional pages if more space is required

I, the undersigned, who warrants that they are authorised to sign on behalf of the Tenderer, confirms that the information contained in this form is within my personal knowledge and is to the best of my belief both true and correct.

NAME (Block Capitals): ---------- **Date**

SIGNATURE: ---------- ----------

T2.2.23 PLANT and EQUIPMENT

Refer to Clause F3.11.9 for Functionality Points evaluation prompts (if applicable).

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

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

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

Attach additional pages if more space is required

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

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

Attach additional pages if more space is required

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

I, the undersigned, who warrants that they are authorised to sign on behalf of the Tenderer, confirms that the information contained in this form is within my personal knowledge and is to the best of my belief both true and correct.

NAME (Block Capitals): ---------- **Date**

SIGNATURE: ---------- ----------

T2.2.24 CONTRACTOR'S HEALTH AND SAFETY PLAN

Refer to Clause F3.11.9 for Functionality Points evaluation prompts (if applicable).

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

Only the successful Tenderer shall submit separately the Contractor's Health and Safety Plan as required in terms of Regulation 7 of the Occupational Health and Safety Act 1993 Construction Regulations 2014.

The detailed safety plan will take into consideration the site specific risks as mentioned under C.3: Project Specification. A generic plan will not be acceptable.

I, the undersigned, who warrants that they are authorised to sign on behalf of the Tenderer, confirms that the information contained in this form is within my personal knowledge and is to the best of my belief both true and correct.

NAME (Block Capitals): ---------- **Date**

SIGNATURE: ---------- ----------

PART C1: AGREEMENT AND CONTRACT DATA

C1.1: FORM OF OFFER AND ACCEPTANCE

C1.1.1: OFFER

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

Contract No:	**1T-34277**
Contract Title:	**WP5: Widening of Sea Cow Lake Road Including the Construction of Overhead Rail Bridges**

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

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

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

R..... (*In words* .....

.....)

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

For the Tenderer:

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

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

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

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

Address : .....

: .....

Telephone : .....

Witness:

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

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

Notes:
*** Indicates what information is mandatory.**
Failure to complete the mandatory information and sign this form will invalidate the tender.

C1.1: FORM OF OFFER AND ACCEPTANCE

C1.1.2: FORM OF ACCEPTANCE

This Form will be completed by the Employer

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

The terms of the contract are contained in:

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

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

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

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

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

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

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

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

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

Address : .....

: .....

Witness:

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

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

C1.1: FORM OF OFFER AND ACCEPTANCE
C1.1.3: SCHEDULE OF DEVIATIONS

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

1. Subject : ……

Details : ……

: ……

2. Subject : ……

Details : ……

: ……

3. Subject : ……

Details : ……

: ……

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

FOR THE TENDERER		**FOR THE EMPLOYER**
……	Signature	……
……	Name *(in capitals)*	……
……	Capacity	……
……	Name and Address of	……
……	Organisation	……
……		……
……		……
……	Witness Signature	……
……	Witness Name	……
……	Date	……

C1.2: CONTRACT DATA

C1.2.1 CONDITIONS OF CONTRACT

C1.2.1.1 GENERAL CONDITIONS OF CONTRACT

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

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

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

C1.2.2 CONTRACT DATA

C1.2.2.1 DATA TO BE PROVIDED BY THE EMPLOYER

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

1.1.1.14 The **time for achieving Practical Completion**, from the Commencement Date is **24 Months**. The period as stated in 5.3.2, and the 7 days referred to in 5.3.3, are included in the above time for achieving Practical Completion. The special non-working days as stated in 5.8.1 are excluded from the above time for achieving Practical Completion.

1.1.1.14 The Works are to be completed in portions as set out in the Scope of Work. The time for achieving Practical Completion of the portions is as follows:

1) For portion 1: **10 months**
2) For portion 2: **10 months**

The whole of the Works shall be completed within: **24 months**.

1.1.1.15 The Employer is the eThekwini Municipality as represented by:
Deputy Head: **Road Systems Management**

1.2.1.2 The address of the Employer is:
Physical: A225 Zavala Road, Ntuzuma, DURBAN, 4001
Postal: P O Box 680, DURBAN, 4000
Telephone: 031-322-8651 (t)
E-Mail: Thami.Manyathi@durban.gov.za

1.1.1.16 The **name of the Employer's Agent** is Bethuel Manthoadi
1.2.1.2 The address of the Employer' Agent is:
Physical: 30 Archie Gumede Place, ETA Building, First Floor, DURBAN, 4001
Postal: P O Box 680, DURBAN, 4000
Telephone: 031-322-8651 (t)
E-Mail: Bethuel.Manthoadi.gov.za

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

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

6.3 : Council approval in order to authorise any expenditure in excess of the Tender Sum.

Certify a rain day(s)

4.11.1 To carry out and complete the works, the Contractor shall employ a competent Site Agent and Foreman as part of the key staff. It is a requirement for the Contractor's Site Agent and Foreman to each have a minimum of 3 years relevant experience including experience on projects of a similar nature. The CV's of the Site Agent and the Foreman should be submitted to the Employer's Agent's Representative for acceptance by the Department (reference is made to Cl.5.3.1 of the Contract Data).

Note:

i) "similar nature" implies projects that were of a value of at least 70% of this tender's value, and had a comparable Scope of Work in terms of technical requirements and operations.
ii) "experience" implies experience on projects of a similar nature.
iii) "accredited degree / diploma" implies a minimum 3-year qualification within the built environment, from a registered University or Institute of Technology.

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

- Health and Safety Plan (refer to Clause 4.3)
- Initial Programme (refer to Clause 5.6)
- Security (refer to Clause 6.2)
- Insurance (refer to Clause 8.6)
- CV(s) of Key Site Staff (refer to Clause 4.11.1)
- CPG Implementation Plan
- Youth Employment Plan
- In-Service/New Graduate Employment Plan
- Candidate Professional Development Plan
- Legacy Project(s) Implementation Plan
- Infrastructure Repair and/or Maintenance Plan

5.3.2 The **time to submit the documentation** required before commencement with Works is **28 Days**.

5.3.3 Add the following paragraph:

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

5.4.2 The access and possession of Site shall not be exclusive to the Contractor but as set out in the Site Information.

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

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

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

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

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

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

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

5.13.1 The **penalty for delay** in failing to complete a section of the Works and/or the whole of the Works by a stipulated date and/or within a specified period is:

- **75% of the average Ps & Gs paid to the Contractor in the three (3) immediately preceding the date on which the late completion penalties came into effect** (per Day) for the first three (3) weeks and thereafter;
- **90% of the average Ps & Gs paid to the Contractor in the three (3) immediately preceding the date on which the late completion penalties came into effect** (per Day)

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

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

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

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

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

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

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

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

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

- The proportion not subject to adjustment: **x = 0.10**.
- The base month will be the month prior to the month in which tenders close.

- The Index for Labour, Plant, and Materials shall be based on **December 2021 = 100**.
- The Index for Fuel shall be based on **December 2020 = 100**.

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

6.8.3 Price adjustments for **variation in the cost of the special material(s)** listed below, will be allowed.

Bitumen - escalation will be calculated using the "Rise and Fall" method as determined by the Employer. The base price for bitumen on this contract shall be the ruling price of 50/70 grade bitumen based on the "Shell Whole Sale List Selling Price for Penetration Grade Bitumen", seven (7) days prior to the closing date of tenders.

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

The **percentage advance** on Plant not yet supplied to Site: **State 50%**

6.10.3 **Retention Money:** Delete the word "selected".
The percentage retention on the amounts due to the Contractor is 10%.
The limit of "retention money" is 5% of the Contract Sum.
Should the Contract Price exceed the Contract Sum then the limit of "retention money" is 5% of the Contract Price.
Interest will not be paid on retention withheld by the Employer.

8.6.1.1.2 The **value of Plant and materials** supplied by the Employer to be included in the insurance sum: **Not Required.**

8.6.1.1.3 The **amount to cover professional fees** for repairing damage and loss to be included in the insurance sum: **R 1000 000-00**.

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

8.6.1.3 The limit of indemnity for **liability insurance**: **R 10 000 000-00**.

8.6.1.4 **Ground Support Insurance**:

- Minimum amount for any one occurrence, unlimited as to the number of occurrences, against any claim for damages or loss caused by vibration and / or removal of lateral support: **R 3 000 000-00**.
- Maximum first excess: **R 50 000-00**.

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

Third Party Insurance (Public Liability)

- Minimum amount for any one occurrence, unlimited as to the number of occurrences, for the period of the contract, inclusive of the maintenance period: **R 5 000 000-00**.
- Consequential loss to be covered by policy: **Yes**
- Liability section of policy to be extended to cover blasting: **R 3 000 000-00**.
- Maximum excess per claim or series of claims arising out of any one occurrence: **R50 000-00**.

Principal's own surrounding Property Insurance

- Minimum amount for any one occurrence unlimited as to the number of occurrences against any claim for damage which may occur to the Council's own surrounding property: **R3 000 000-00**.
- Maximum first excess: **R 50 000-00**.

Insurance of Works

- Minimum amount for additional removal of debris (no damage): **R 1 000 000-00**.
- Minimum amount for temporary storage of materials off site, excluding Contractor's own premises: **R 1 000 000-00**.
- Minimum amount for transit of materials to site: **R 1 000 000-00**.

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

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

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

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

10.5.1 **Dispute resolution** shall be by Ad-hoc adjudication.

10.5.3 The **number of members** of the Adjudication Board to be appointed: 3.

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

C1.2.2.2 DATA TO BE PROVIDED BY CONTRACTOR

1.1.1.9 The legal name of Contractor is:

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1.2.1.2 The Physical address of the Contractor is:

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The Postal address of the Contractor is:

……

……

……

……

The contact numbers of the Contractor are:

Telephone: ……

Fax: ……

The E-Mail address of the Contractor is:

……

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

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

C1.2.3 ADDITIONAL CONDITIONS OF CONTRACT

C1.2.3.1 COMMUNITY LIAISON OFFICER

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

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

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

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

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

C1.2.3.2 EMPLOYMENT OF LOCAL LABOUR

It is a condition of contract that the contractor will be required to employ local labour as specified in eThekwini Council Policy "The use of CLOs and Local Labour". The contractor will be required to ensure that a minimum of 100% of the labour force is made up of local labour. For the purposes of this contract, "Local labour" will be deemed to be any **persons who reside within Ward(s) 36 and 34.** The contractor will be required to provide proof of authenticity of local labour. Signed confirmation by the appointed CLO will suffice for this.

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

C1.2.3.3 CONTRACTOR PARTICIPATION GOAL (CPG)

It is a condition of contract that the contractor must allow for a minimum of **30%** of the contract value (excluding PC Sum items and Fixed Cost allowances) to be subcontracted to contractors who are **>51% PPG** (Priority Population Group) owned. Proof of payment to the subcontractors will be required to verify that the minimum has been achieved.

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

C1.2.3.4 FTE (Full Time Equivalent) EMPLOYMENT INFORMATION

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

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

Level 1 Unknown	**Level 2** No Schooling	**Level 3** Grade 1-3	**Level 4** Grade 4	**Level 5** Grade 5-6
Level 6 Grade 7-8	**Level 7** Grade 9	**Level 8** Grade 10-11	**Level 9** Grade 12	**Level 10** Post Matric

- Category of Employment

Category A: Employed as Local Labour for this contract only
Category B: Temporarily employed by the Contractor
Category C: Permanently employed by the Contractor

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

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

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

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

C1.2.3.5 PERFORMANCE MONITORING OF SERVICE PROVIDERS

[For contract awards over R10m] The Contractor shall be subjected to "Performance Monitoring" assessments in terms of the applicable Section (S.53) of the Employer's Supply Chain Management Policy.

Key Performance Indicators (KPIs) as specified in the C3: Scope of Works are:

Indicator	**Description and targets**
On-time monthly payment certificate submission	Final verified payment certificate submitted by the 20th monthly
On-time monthly programme submission	Revised/updated programme submitted for approval by the 20th monthly
On-time monthly progress report submission	Progress report submitted by the 22nd monthly
Cashflow plan performance	Actual cashflow deviation to be limited to -5% and +10% of plan for the month

Indicator	Description and targets
Schedule plan performance	Delays to the critical path to be limited to 1% of original project duration per quarter
Risk management plan performance	- 100% emerging risks captured in the risk register within 7 days of identification - 100% of all "high" risk rating risk treatment actions executed by due date. - 95% of all "medium" risk rating risk treatment actions executed by due date. - 90% of all "low" risk rating risk treatment actions executed by due date.
Quality Control plan performance	- 100% of all planned quality control tests successfully executed - Minimum 97.5% success rate on all planned quality control tests per quarter - No requests for concession(s) on quality of materials and workmanship

C1.2.3.7 EXCEPTED RISKS (Clause 8.3)

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

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

C1.2.3.8 Ownership Goals & RDP Goals

The Contractor is to discharge all commitments, towards the Employer's Ownership Goals and RDP goals, as Preference Points Claim table (and supporting information/documents) in part T2 of this tender document and (where applicable) detailed in the goal specific implementation plans required by 5.3.1 of this document.
Details of the scope of works and (where applicable) specification(s) for the development and execution of these goal specific plans are contained in C3.1 and C3.2 respectively.
Failure to meet and/or demonstrate that these commitments have been met by the Contractor will attract a penalty (P_n), the value of which shall under no circumstances be less than that calculated as per the formula below:

P_1 = %weight of specific goal x %specific goal short-fall x contract sum (incl. PC sums, PR sums and excl. Fixed Costs)

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P_n = %weight of specific goal x %specific goal short-fall x contract sum (incl. PC sums, PR sums and excl. Fixed Costs)

The total value of the penalty (P_t) shall be the sum of the penalties per individual goals;

$P_t = P_1 + P_2 + \ldots + P_n$

C1.2.3.9 Timeous Setting Out of the Works

a) The Contractor sets out/stakes out all the areas where the contract is planned to tie-in to existing infrastructure and/or networks and submits a report to the Project Manager within four (4) weeks of the date of issue of the Site Access Certificate(s).
b) The Contractor sets out/stakes out the entirety of each planned sequence of works and submits a report to the Project Manager at least four (4) weeks before the planned start date of construction on the specific construction sequence

C2.1: PRICING ASSUMPTIONS / INSTRUCTIONS

C2.1.1 GENERAL

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

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

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

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

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

C2.1.3 QUANTITIES REFLECTED IN THE SCHEDULE

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

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

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

C2.1.5 MONTHLY PAYMENTS

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

C2.1.4 PROVISIONAL SUMS / PRIME COST SUMS

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

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

C2.1.6 PRICING OF THE BILL OF QUANTITIES

The prices and rates to be inserted by the Tenderer in the Bill of Quantities shall be the full inclusive prices to be paid by the Employer for the work described under

the several items, and shall include full compensation for all costs and expenses that may be required in and for the completion and maintenance during the defects liability period of all the work described and as shown on the drawings as well as all overheads, profits, incidentals and the cost of all general risks, liabilities and obligations set forth or implied in the documents on which the Tender is based.

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

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

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

C2.1.7 "RATE ONLY" ITEMS

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

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

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

C2.1.8 PRELIMINARY AND GENERAL

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

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

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

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

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

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

C2.2: BILL OF QUANTITIES

The Bill of Quantities follows and comprises of 95 pages.

PART C3: SCOPE OF WORK

C3.1: PROJECT DESCRIPTION AND SCOPE OF CONTRACT

C3.1.1 Description of Works

[The eThekwini Municipality is in the process of restructuring Public Transport (PT) within the City in order to ensure that a sustainable, safe and efficient service is delivered. The overall goal of this initiative is to improve the quality of life for the City's residents through the establishment of an Integrated Rapid Public Transport Network (IPTN). This public transport service in the City will ultimately be in line with Government's PT Action Agenda as approved by Cabinet in 2008 where all the major cities have been mandated to create and implement fully integrated public transport networks over the next 15 years.

The eThekwini Municipality has completed a comprehensive plan for the project. The planning yielded a public transport system with special features that are currently not available in the public transport system. The network will comprise an integrated package of rail and rapid bus trunk routes with dedicated Right of Ways (ROW), feeder and complimentary services for public transport. The system will be universally accessible. The following are the key system features:

- Trunk Routes with dedicated Right of Ways (ROW),
- Feeder Routes to Trunk routes,
- Complementary Routes,
- Transfer and Terminal Stations,
- Park and Ride Facilities,
- Information, Communication Technologies (Integrated Fare Management and Intelligent Transport Systems),
- Fleet,
- Non-Motorised Transport Facilities,
- Depots, and
- A Transport Management Centre.

The IRPTN has 9 corridors that would make up the proposed public transport network. In the first phase of the IRPTN, 3 Corridors have been designed and being implemented, that three Corridors being the C1, C3 and C9.
The above-mentioned Corridors originate at the Bridge City terminal and terminate at the City Centre, Pinetown Centre, and Umhlanga Rocks Town Centre, respectively.

The C1 Corridor is from Bridge City terminal to the City Centre. The corridor has been divided into several work packages and this contract that is being let out is for work package 5 of the C1 Corridor. It is for the construction of the C1 Corridor from the Inanda Road/Teakfield Road Intersection to the overhead railway bridges together with other associated works. The Railway Bridges form part of this scope.]

C3.1.2 Description of Site and Access

[The project involves the construction of the IPTN Go! Durban C1 Route, Work Package 5, Inanda Road from or near the Inanda Road/Teakfield Road Intersection to the Railway bridges before the Inanda Road / Chris Hani Road Intersection. Also included in this project are the reconstruction of a portion of Sea Cow Lake Road

and completion of Kenville Road bridge and roadworks not completed under Contract 1T-30980.

Inanda Road, in its original state between Ch 15 360 and Chainage 16 050, is a single carriageway. Under the proposed scope of works the work has been split up as follows:

ROADWORKS: Chainage 15950 – 16150

- A dual carriageway for Mixed Use (MU) vehicles with a minimum of two lanes in each direction;
- A dual carriageway for the Right of Way (RoW) for the bus lanes with one lane in each direction;
- A raised median of varying width between the RoW and MU carriageways;
- A 1.5m wide raised median between the RoW lanes;
- Tie-in to C1 Work Package 4 and tie-in to the layerworks constructed under 1T-45729;
- At intersections, the MU carriageway will have auxiliary turning lanes;
- The MU and RoW share the same horizontal alignment, vertical alignment and cross falls, hence the centre line will be common to both roads;
- The lane widths are a standard 3.5m per lane in each carriageway with auxiliary lanes being reduced to 3.0m
- Intersecting roads (tie-in to Chris Hani Road);
- Service ducts, Intelligent Transport System (ITS) ducts, CCTV masts and associated manholes;
- Stormwater drainage systems, temporary and permanent;
- Landscaping;
- Sewerage systems, including construction of a new rising trunk sewer along Sea Cow Lake Road and the northern edge of Inanda Road.

Pavement Layer works:

Inanda Road Mixed use	Inanda Road Right-of-Way
50mm SA-H14 asphalt wearing course	50mm SA-H14 asphalt wearing course
120mm EME-E14 asphalt base	160mm EME-E14 asphalt base
400mm C3 Cement stabilised subbase	450mm C3 Cement stabilised subbase
300mm G7	300mm G7
150mm G9 fill	150mm G9 fill

Structural Works

This includes all structural work relating to the overhead rail bridges accommodating two TFR lines and one PRASA line. Demolition of the existing three bridge structures is required. The existing bridges consist of steel deck sections on reinforced concrete abutments and earwings. The three (3) bridges will be constructed whilst trains were running so that bridge construction would have minimal effect on the train running schedule. The piles (piers) would be constructed in situ by auguring. The decks would be constructed on temporary construction beds located alongside the railway lines and then slid into position beneath the tracks using way beams.

The three replacement bridges each comprise of a four-span reinforced concrete deck with reinforced concrete piers and abutments. The decks square spans are 13.4m on the internals and 11m in the jack spans. Transnet Freight Rail (TFR) bridges (Bridge 1 & 2) substructures are founded on a combination of spread footing and augured piles. The PRASA bridge (Bridge 3) substructure is completely founded on augured piles.

Transnet Freight Rail (TFR) bridges (Bridge 1 & 2) cross the Sea Cow Lake Road at differing skews and will be constructed consecutively with rail traffic always maintained on one line (partial occupation). Construction of Bridge 1 (middle bridge) shall commence first.

The PRASA Bridge (Bridge 3) with a horizontal curve will be constructed adjacent to the existing bridge without interruption to PRASA trains. Once completed the lines on both sides of the bridge will be slewed at the tie-in points during a weekend occupation. Construction of the PRASA Bridge (Bridge 3) shall be executed simultaneously with the TFR bridges

Rail Infrastructure Upgrades

This includes all the associated rail infrastructure upgrades as a result of the construction of the overhead rail bridges for temporary and final operational requirements. The upgrades include all signalling/interlocking, OHTE and perway requirements for the two TFR lines and the PRASA line. Temporary rail changes to be undertaken during weekend occupation during the mobilisation period of the construction contract.

Umgeni Ironworks Access

Umgeni Iron Works is located between the PRASA and TFR railway lines, the driveway access lies between the two existing rail bridges on Sea Cow Lake Road. The road realignment necessitates a reconfiguration of the Umgeni Iron Works access and internal driveways.

Layout of The Site: Extent of The Works

[Refer to Item C4.1]

Contract No. 1T-34277 commences at Chainage 15950, near the overhead Rail bridges on Inanda Road and terminates at Chainage 16150, near the Inanda Road / Chris Hani Intersection.]

C3.1.3 Nature of Ground and Subsoil Conditions

[Refer to Item C4.1]

The project is located within Springfield Industrial Park, situated north-west of the CBD. The site is accessible from the N2 Freeway via Inanda Road (M21) and Chris Hani Road in the east.

C3.2: PROJECT SPECIFICATION

PREAMBLE

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

C3.2.1 GENERAL

PS.1 PROGRAMME, METHOD OF WORK, AND ACCOMMODATION OF TRAFFIC

This Clause is to be read in conjunction with the provisions and obligations as contained in SANS 1921-1 and SANS 1921-2.

PS.1.1 Preliminary Programme

The Contractor shall include with his tender a preliminary programme on the prescribed form (see Part T2.2: Preliminary Programme) to be completed by all Tenderers. The programme shall be in the form of a simplified bar chart with sufficient details to show clearly how the works will be performed within the time for completion as stated in the Contract Data.

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

The Contractor shall be deemed to have allowed fully in his tendered rates and prices as well as in his programme for all possible delays due to normal adverse weather conditions (refer to Clause 5.12.2.2) and special non-working days (refer to Clause 5.1.1.1) as specified in the in the Contract Data.

PS.1.2 Programme in Terms of Clause 5.6 of the General Conditions of Contract

It is essential that the construction programme, which shall conform in all respects to Clause 5.6 of the General Conditions of Contract, be furnished within the time stated in the Contract Data (refer to Clause 5.3.1/2).

The preliminary programme to be submitted with the tender shall be used as basis for this programme.

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

a) The Contractor must, in the first six weeks after the Letter of Award is given, fully establish a functional business desk (Refer to Clause C.1.2.3.9)

b) Proving of services: The Contractor shall make provision of two (2) months to prove services on site from the Commencement of the Works.

c) Relocation of Services: The notice period required for the relocation of services is 60 calendar days from date of proving and providing of notice.

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

d) All pavement mix designs to be done and submitted at-least one month before the pavement is to be laid.

e) Vehicular access to private property is to be maintained.

f) Trunk Sewer Rising Main – the following factors will affect the programming of and methods of carrying out the works

- Approvals from Rail Agencies. The Contractor shall allow a period of 6 months before work can begin on the trunk sewer
- Time allowances to be made for ordering pipe specials.
- Notification required by service organizations.
- Any special sequence in which work must be carried out (including pipe jacking and sewer tie-in operations).

g) Due consideration shall be given to the timing of the setting out of tie-ins into existing as well as the timeous setting out of each construction/installation sequence as stipulated in the applicable additional condition of contract of this contract, any delays resulting setting out queries/RFIs raised late shall be to the Contractor’s account.

PS.1.3 Requirements for Accommodation of Traffic

PS.1.3.1 General

Due to the area of works being situated in a high volume and high-speed trafficked area, as well as a high volume of pedestrians, every emphasis should be placed on accommodation and regulating these aspects. The Contractor is to make sure that his provisions within the contract will allow him to adequately carry out these functions successfully.

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

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

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

Particular reference is made to Clause PS.1.2 – Programme in Terms of Clause 5.6 of the GCC wherein the Engineer has provided direction on how the works may be constructed. Should the contractor adopt this method of construction then he must provide a traffic deviation plan to the Engineer for approval. The Contractor shall remain the custodian of the Traffic Deviation Plan and accept all responsibility relating to the plan even on approval of the plan by the Engineer.
Should the Contractor propose an alternative method of construction, then a detailed programme of the sequence of works as well as the traffic deviation plan must be provided to the Engineer for approval. Again, the Engineer's approval of the plan would not exonerate the contractor from being the custodian of the plan and of accepting full responsibility for the plan.

PS.1.3.2 Basic Requirements

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

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

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

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

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

PS.1.3.3 Traffic Safety Officer

A full time Traffic Safety Officer is a requirement on this project. It is critical that the Traffic Safety Officer is fully qualified and substantially experienced to fulfil the demanding duty requirements of this project. The traffic safety officer is to be responsible for the arrangement and maintenance of all the measures for the accommodation of all types of traffic for the duration of the project.

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

PS.1.3.4 Payment

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

PS.1.3.5 Pedestrian movement

The Contractor shall make provision for accommodating all pedestrian movements in the area of the works. Allowance shall be made in the relevant rates for any barricades and signs required.

The plan for pedestrian accommodation shall be included in the Traffic Management Plan.

PS.1.3.6 Temporary Reinstatement

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

(a) if the permanent reinstatement of such road or way is to be carried out by the appropriate authority or by some person other than the contractor (or any subcontractor to him), the contractor shall at his own cost and independently of any requirement of or notice from the

Engineer be responsible for the making good of any subsidence or shrinkage or other defect, imperfection or fault in the temporary reinstatement of such road or way, and for the execution of any necessary repair or amendment thereof from whatever cause the necessity arises, until the end of the period of maintenance in respect of works beneath such road or way until the authority or other person as aforesaid shall have taken possession of the site for the purpose of carrying out permanent reinstatement (whichever is the earlier), and shall indemnify and save harmless that Council against and from any damage or injury to the Council or to third parties arising out of or in consequence of any neglect or failure of the Contractor to comply with the foregoing obligations or any of them and against and from all claims, demands, proceedings, damages, costs, charges and expenses whatsoever in respect thereof or in relation thereto.

(b) where the authority or person as aforesaid shall take possession of the site as aforesaid in sections or lengths, the responsibility of the contractor under paragraph (a) of this sub-clause shall cease in regard to any such section or length at the time possession thereof is so taken, but shall during the continuance of the said period of maintenance continue in regard to any length of which possession has not been taken and the indemnity given by the contractor under the said paragraph shall be construed and have effect accordingly.

PS.1.3.7 Penalties for Non-Compliance of Traffic Accommodation Clauses

For every road and traffic rule violation by the Contractor and/or his Sub-Contractor's, Suppliers and labourers (including local labour), he shall be charged a penalty for that offence. The engineer will raise the charge.

Two items have been provided in the BOQ, Section 1, Part AB: Item 62 and Item 63 for the application of the penalty.

A fixed cost of R1000 shall be applicable for every event of non-compliance.

A Time related cost of R1000/hour shall be applicable for delay caused by the above-mentioned non-compliance. The measurement of time shall be from when the Level of Service in vehicular capacity has reduced due to the act of non-compliance to the time that the Level of Service is restored to before the incident had occurred.

PS.2 SERVICES

This Clause is to be read in conjunction with the provisions and obligations as contained in SANS 1921-1 and SANS 1921-2.

PS.2.1 Existing Services

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

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

The Contractor will comply with the conditions for dealing with existing services as attached in C3.4, Particular Specifications, and approach the relevant authorities for additional information where applicable.

PS.2.2 Proving Underground Services

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

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

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

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

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

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

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

It should be noted that 33,000 Volt and 132,000 Volt cables may only be exposed by the

eThekwini Electricity's personnel. The cables are usually protected by concrete covering slabs, and therefore if the slabs are inadvertently exposed, excavation work must stop, and the eThekwini Electricity shall be contacted immediately on the above telephone numbers.

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

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

PS.2.3 New Services and Relocation of Existing

This clause shall be read in conjunction with Clause PS.1.

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

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

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

Services affected by the contract are described as follows:

- PS.4: Watermains;
- PS.5: Sewers;
- PS.6: Stormwater;
- PS.7: Electrical Cables / Lighting;
- PS.8: Telkom / Neotel / MTN
- PS.9: CCTV;

Further to the above, tenderers are referred to the services drawing and are to note that several minor cables / pipes may be encountered during excavation works which may require to be relocated to some extent. It is anticipated that the two-week period required under PS.2.2 will

allow sufficient time for these relocations.

PS.2.4 Accommodation of Services

Further to Clauses PS.1 and PS.2 of this specification, tenderers are to note that allowance must be made under this item and / or the appropriate rates, for all costs incurred as a result of complying with these clauses. It shall also cover liaison with the services organisations and accommodation of their work gangs / contractors on site.

PS.3 WATERMAINS

PS.3.1 General

The contractor shall prove the position of water lines and ensure they are not damaged during construction. The proving of these water lines shall be included in the tenderer's rates.

There are water-mains with diameters ranging from 25mm (property connections) to 600mm diameter trunk mains (Steel, MPVC and UPVC pipes) that traverses the site.

All known services have been shown on the services drawing, however, should any unknown water-mains be discovered the Contractor shall be responsible for ensuring that water-mains are not damaged during construction and if a need to relocate or modify, the Contractor shall notify eThekwini Municipality.
Any relocations will be carried out by a Contractor/sub-contractor that will be approved by Metro Water, while the connection to the existing main will be done by Metro Water. Civil works will be carried out by the Main contractor.

The Contractor shall notify the Engineer and service providers **at least twelve weeks** in advance for any relocations required, to enable all parties involved to be on site timeously.

Water-main special items: The notice period required for the items required for water-mains, fittings, steel pipes etc., is **twelve weeks** from date of providing of notice. All tie-ins to be done by Metro Water.

A PC sum has been allowed in the BOQ for the relocations of all water-main relocations and ancillary works.

PS.3.2 Water Main Valve Access

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

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

PS.3.3 Restriction on Compactive Equipment

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

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

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

PS.4 SEWERS

Tenderer's attention is drawn to the fact that there are existing sewer lines within the site. The Contractor shall be responsible for ensuring that sewer pipes are not damaged during construction and if a need to relocate or modify sewer pipes/manholes is identified, the Contractor shall notify eThekwini Municipality.

The relocation of any sewer lines required shall will be as per the eThekwini Sanitation Department Specifications.

PS.4.1 BLOCKAGE OF FOUL WATER SEWERS

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

to failure to comply with the above requirement.

PS.5 STORMWATER

Tenderer's attention is drawn to the fact that existing stormwater lines traverse the site area. The Contractor shall be responsible for constructing a temporary and a new stormwater drainage system (surface and/or sub-surface) which may tie into the existing stormwater drainage system. The Contractor shall ensure that any existing stormwater lines that requires removal and disposal does not result in aqua-planing of vehicles during inclement weather conditions. The Contractor shall also adopt proper stormwater management practices to channel/control runoff that once flowed through the existing drainage systems and/or additional runoff generated as the result of construction.

Stormwater drainage will be in the form of minor and major works.

The minor works will comprise of the following:

- Construction of the drainage system using varying concrete pipe sizes,
- Subsoil drainage system using either conventional sub-soils or the Flo-drain or similar approved system,
- Inlets, Manholes of varying configurations, and
- Concrete and natural V-drains.
- Headwalls
- Reno-mattresses and Gabion installation

PS.5.1 Blockage Stormwater Sewers

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

PS.6 ELECTRICAL PLANT

Existing electrical services which are affected will be relocated or replaced.

PS.6.1 General

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

PS.6.2 Street Lighting

The Contractor's attention is drawn to the overhead cables and existing pylons that are in close proximity to the site, and it is the contractor's responsibility to ensure there is no damage to said infrastructure. It is a requirement that the street lighting be operational at all times and therefore the work must be carried out in stages. Any relocation required during this contract will be executed by eThekwini Electricity or their agents.

The Contractor is being made aware that street lighting will be installed as part of this contract. An **allowance has been included in the BOQ** for the main contractor to secure a subcontractor, who shall be approved by Metro Electricity, to undertake the laying, and jointing of all cables and installation of the Street lighting infrastructure.
The Electricity Department shall provide a Bill of Quantities and list of Electricity approved service providers to the Main Contractor who will let out a tender to the said service providers. On receipt of the priced tenders, the Contractor shall forward the tenders to the Electricity Department who will undertake an evaluation of the tenders and provide a recommendation to the Main Contractor for appointment.

The Electricity Contractor shall then become the Domestic Sub-Contractor of the Main Contractor. The said sub-contractor shall undertake the electricity work which shall be inspected and approved by the Electricity Department. The Electricity Department will undertake measurement and confirm payment that needs to be made to the sub-contractor by the Main Contractor.

The installation of sleeves, trenching and backfilling operation will be carried out by the Main Contractor appointed under Contract 1T-45729.

The notice period required for relocation and/or installation of infrastructure is **twelve weeks** from date of providing of notice.

An allowance has been included in the **Bill of Quantities, Section 1, Part AB: Item 28** for the Main Contractor to supply and install new street lighting infrastructure as well any relocations/removals that are required. The contractor is to make allowance for liaisons, working simultaneously and cordially with the eThekwini Electricity's work gangs, or agents appointed by them. The Contractor shall notify the Engineer and service providers **in advance** as to when sections of the work would be ready for street lighting installation to enable Metro Electricity to be on site timeously. The installation of the lighting shall only be done once the sidewalk formation has been completed and prior to the surfacing of the sidewalks.

PS.6.3 MV / LV Cables

Certain MV / LV cables may be replaced within the contract area. The actual cable work

associated with this relocation and / or replacement of these cables will be carried out by eThekwini Electricity and it is stressed that the two month period referred to in Clause PS.2 is the minimum period required to enable eThekwini Electricity to be on site timeously.

PS.6.4 Relocation of Existing Services

Should it be necessary to adjust the line, level and / or position of any service not catered for in the contract to enable the construction to proceed the Contractor shall on no account effect such adjustment himself but shall notify the Engineer who will arrange for the work to be carried out at no cost to the Contractor.

PS.7 TELKOM S.A. LIMITED / NEOTEL / SASOL PLANT

The tenderers attention is drawn to the fact that they may be live copper cables and fibre optic cables within the contract area.

Special care should be taken when exposing these cables. The lowering / relocation of these cables may be required should any be found on site. The Contractor shall notify the Engineer and service providers **at least 3 months** in advance for any relocations that are required.

PS.8 CCTV PLANT

No work to CCTV Plant is envisaged, but the tenderers attention is drawn to the fact that CCTV cables and fibre optic cables are existing in the contract area.

PS.9 MANAGEMENT OF THE ENVIRONMENT

The Contractor shall pay special attention to the following:

PS.9.1 Natural Vegetation

The Contractor shall confine his operation to as small an area of the site as may be practical for the purpose of constructing the works.

Only those trees and shrubs directly affected by the works and such others as the Employer's Agent may direct in writing shall be cut down and stumped. The natural vegetation, grassing and other plants shall not be disturbed other than in areas where it is essential for the execution of the work or where directed by the Engineer.

PS.9.2 Fires

The Contractor shall comply with the statutory and local fire regulations. He shall also take all necessary precautions to prevent any fires. In the event of fire the Contractor shall take active steps to limit and extinguish the fire and shall accept full responsibility for damages and claims resulting from such fires which may have been caused by him or his employees.

PS.9.3 Environmental Management Plan

In addition to the above, all requirements according to the Environmental Management Plan as detailed in C3.4: Particular Specifications, will be adhered to.

PS.10 OCCUPATIONAL HEALTH AND SAFETY

PS.10.1 General Statement

When considering the safety on site the Contractor's attention is drawn to the following:

i) The contract area has high volumes of both pedestrian and vehicular traffic;
ii) The works will require machinery and plant of varying size;
iii) The asphalt used will be delivered to site at a high temperature, which, after processing, remains hot for some time;
iv) A portion of road construction will be around an active Methane Gas line;
v) A portion of road construction will be near an active 132 kV line;
vi) Work will take place near an active railway above;
vii) The area is bound by business / residential / private properties;
viii) The gradient of embankments on the site is fairly steep in some areas. Plant and machinery need to be well controlled;
ix) Stormwater run-off from the site will have to be well managed;
x) The contractor shall be working adjacent to other contractors which may result in plant, labour, materials etc. passing / working in the site area;
xi) There numerous services which the Contractor will either have to protect or relocate.

It is a requirement of this contract that the Contractor shall provide a safe and healthy working environment and to direct all his activities in such a manner that his employees and any other persons, who may be directly affected by his activities, are not exposed to hazards to their health and safety. To this end the Contractor shall assume full responsibility to conform to all the provisions of the Occupational Health and Safety Act No 85 and Amendment Act No 181 of 1993, and the OHSA 1993 Construction Regulations 2014 issued on 7 February 2014 by the Department of Labour.

For the purpose of this contract the Contractor is required to confirm his status as mandatory and employer in his own right for the execution of the contract by entering into an agreement with the Employer in terms of Section 37(2) of the Occupational Health and Safety Act.

PS.10.2Health and Safety Specifications and Plans to be submitted at tender stage

PS.10.2.1 Employer's Health and Safety Specification

The Employer's Health and Safety Specification is included in Part C3.4: Particular Specifications.

PS.10.2.2 Tenderer's Health and Safety Plan

At tender stage only a brief overview of the tenderer's perception on the safety requirements for this contract will be adequate. This will be attached to Part T2.2: Contractor's Health and Safety Plan.

Only the successful Tenderer shall submit a separate Health and Safety Plan as required in terms of Regulation 7 of the Occupational Health and Safety Act 1993 Construction Regulations 2014 and referred to in Part T2.2: Contractor's Health and Safety Plan.

The detailed safety plan will take into consideration the site specific risks as mentioned under PS.10.1 and must cover at least the following:

(i) A proper risk assessment of the works, risk items, work methods and procedures in terms of Regulations 9 to 29;
(ii) Pro-active identification of potential hazards and unsafe working conditions;
(iii) Provision of a safe working environment and equipment;
(iv) Statements of methods to ensure the health and safety of subcontractors, employees and visitors to the site, including safety training in hazards and risk areas (*Regulation 7)*;
(v) Monitoring health and safety on the site of works on a regular basis, and keeping of records and registers as provided for in the Construction Regulations;
(vi) Details of the Construction Supervisor, the Construction Safety Officers and other competent persons he intends to appoint for the construction works in terms of Regulation 8 and other applicable regulations; and
(vii) Details of methods to ensure that his Health and Safety Plan is carried out effectively in accordance with the Construction Regulations 2014.

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

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

PS.10.3 Cost of compliance with the OHSA Construction Regulations

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

Items that may qualify for remuneration will be specified in the Employer's Health and Safety Specification.

PS.11 PS.11 SITE SECURITY

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

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

Payment for this item shall be made under Section 1, Part AB of the Bill of Quantities.

PS.12 PERFORMANCE MONITORING OF SERVICE PROVIDERS

The performance of service providers that have been selected to provide assistance in the provision of a municipal service, otherwise than in circumstances where Chapter 8 of the Municipal Systems Act applies, is required, by Section 116 of the Municipal Finance Management Act, to be monitored and reported on (see Cl.53 of the SCM Policy).

Appropriate key performance indicators (KPIs) for the contract must be set by the Municipality as a yardstick for measuring performance.

The following KPIs will be applicable to this contract:

Indicator	Description and targets
On-time monthly payment certificate submission	Final verified payment certificate submitted by the 20th monthly
On-time monthly programme submission	Revised/updated programme submitted for approval by the 20th monthly

Indicator	Description and targets
On-time monthly progress report submission	Progress report submitted by the 22nd monthly
Cashflow plan performance	Actual cashflow deviation to be limited to -5% and +10% of plan for the month
Schedule plan performance	Delays to the critical path to be limited to 1% of original project duration per quarter
Risk management plan performance	- 100% emerging risks captured in the risk register within 7 days of identification - 100% of all "high" risk rating risk treatment actions executed by due date. - 95% of all "medium" risk rating risk treatment actions executed by due date. - 90% of all "low" risk rating risk treatment actions executed by due date.
Quality Control plan performance	- 100% of all planned quality control tests successfully executed - Minimum 97.5% success rate on all planned quality control tests per quarter - No requests for concession(s) on quality of materials and workmanship

PS.11 SURVEY - SUBMISSION OF AS-BUILT DATA

Payment for this item shall be made under **Section 1, Part AB: Item 13 of the Bill of Quantities** covering the submission of as-built data.

The contractor shall supply the Engineer with an electronic copy and hard copy of:

(a) A list of surveyed co-ordinates of all work carried out.

(b) The survey must include:

- A list of co-ordinates of cable duct markers and watermain valve covers newly constructed, modified or existing within the vicinity of the works
- A list of surveyed invert and cover levels, and co-ordinates of all catchpits, manholes/barrier inlet unit and headwalls newly constructed, modified or existing within the vicinity of the works.
- A list of surveyed invert and cover levels, and co-ordinates of all cable duct manholes newly constructed, modified or existing within the vicinity of the works.
- A list of surveyed invert and cover levels, and co-ordinates of all sewer manholes newly constructed, modified or existing within the vicinity of the works.
- A list of co-ordinates kerb line including channel, road edge, road markings, edge of sidewalks, trees, access points, services (existing and new), different hatching to indicate different types of surfacing.

(c) Materials As-Built records captured as per the eThekwini Municipality Materials As-Built record template

(d) Hard copies in A0 paper, and
a coordinated soft copy of the survey in .dxf/.dwg/.dr4 format.

The contractor must also give the Engineer a materials as-built spreadsheet in the format approved by the Senior Manager of the Pavement and Geotechnical Laboratory – City Engineers.

The Certificate of Completion shall not be issued unless the above information has been forwarded and approved by the Engineer.

PS.12 TESTING

The Contractor is to include in his unit rates for the cost of classification testing of all materials delivered to site intended for use in the layerworks and for all density of all materials delivered to site intended for use in the layerworks as per the pavement design illustrated on the contract drawings.

The Contractors is to provide results of all control testing to the Engineer. If the Engineer is satisfied with the results, the Contractor will then be given the go ahead by the Engineer's representative to proceed with the next stage of construction.

Random acceptance testing will be undertaken by the Roads Provision Department, Pavement and Geotechnical Engineering Branch.

The Contractor is to also include in his unit rates for the cost of classification testing and density tests of all materials excavated from site intended for use in the bulk earthworks. The Contractor is to provide the test results of all these materials to the Engineer. If the Engineer is satisfied with the results, the Contractor will then be given the go ahead by the Engineer's representative to proceed with the next stage of construction.

Random acceptance testing will be undertaken by the Roads Provision Department, Pavement and Geotechnical Engineering Branch.

PS.13 TESTING REQUESTED BY ENGINEER

At the discretion of the Engineer, he may request the Contractor to undertake additional control testing of which payment shall be made under **Section 1-Part AB-Item 46.**

PS.14 CONTAMINATION OF MATERIALS

The contractor is to ensure that contamination/mixing of different materials are prevented during excavation/handling or processing to ensure maximum re-use of suitable material (engineered fill of G9 or better quality). Should the Engineer become aware of suitable material from excavation being contaminated and sufficient care has not been taken to prevent such contamination, he shall have recourse to request testing on such materials. If the contractor has been negligent in preventing such contamination, spoiling of such materials shall be to his account and he shall have no recourse for any payment.

PS.15 RESTRICTED WORKS

PS.15.1 GENERAL

There are inherent risks in working near utilities, especially where cables and pipes are energised (eg electrical pylon, live electric cables), pressurised watermains, etc.
The contractor shall ensure that the construction methodology, plant and equipment in these areas are adapted to suit the environment such that the work is carried out in a safe manner without risk to the public and the workers' health and safety whilst preventing damage to these live services. The Contractor shall take necessary precautions to eliminate or minimise and effectively manage any hazards and risks, especially when working near above-ground, overhead and underground utilities.

The contractor is to make the respective service providers aware and acquire approvals for work to be carried out in the vicinity of their services **at least two weeks prior** to the scheduled work.
The payment item as a sum item has been included in the **BOQ, Section 1, Part AB, Item 35** and is an extra over item for the contractor to work under restricted conditions and in the vicinity of live services.

PS.15.2 LAYERWORKS

Refer to drawing detail 48901-05 for detail.

The restricted works apply during both the excavation of the temporary layerworks constructed under Work Package 4 as well as the construction of the permanent layerworks for Work Package 5.

The stagger in the pavement layers is to allow working space for the excavators, TLB, grader, watercart and compaction plant. Material is to be end-tipped and then pushed and spread over the staggered areas.

No haulage vehicles are to be driven over the permanent layerworks except for the asphalt haulers during the time of asphalting. Should the Contractor damage the layerworks constructed under Work Package 4, then the Contractor is to repair at their own cost.

The Tender shall make provision in their rates for the restricted works.
An item has been allowed for repairs/rectification of the existing layerworks where it is found that the layerworks were damaged through no fault or action of the Contractor or their Sub-contractors.

PS.16 INTERACTIONS WITH OTHER CONTRACTORS

The contractor shall make allowances for all interactions, meetings, sharing of information, site accesses and working in close proximity to the following projects:

1) Contract 1T45729: Re-alignment and widening of Inanda Arterial Road west bound between Teakfield road and Chris Hani Road.

PS.17 TRUNK SEWER

PS.17.1 CONSTRUCTION AND MANAGEMENT REQUIREMENTS

PS.17.1.1 General

The Sub-Contractor is referred to SANS 1921: 2004 parts 1, 2, 3 and 5: Construction and Management Requirements for Works Contracts. These specifications shall be applicable to the contract under consideration and the Sub-Contractor shall comply with all requirements relevant to the project.

Certain aspects, however, require further attention as described hereafter.

PS.17.1.2 Quality **Assurance (QA)** (*Read with SANS 1921 – 1: 2004 clause 4.4*

The Sub-Contractor will be solely responsible for the production of work that complies with the specifications to the satisfaction of the Employer's Agent. To this end it will be the full responsibility of the Sub-Contractor to institute an appropriate Quality Assurance (QA) system on site. The Employer's Agent will audit the
Sub-Contractor's quality assurance (QA) system on a regular basis to verify that adequate, independent checks and tests are being carried out and to ensure that the Sub-Contractor's own control is sufficient to identify any possible quality problems which could cause a delay or failure.

The Sub-Contractor shall ensure that efficient supervisory staff, the required transport, instruments, equipment and tools are available to control the quality of his own workmanship in accordance with his QA-system. His attention is drawn to the fact that it is not the duty of the Engineer or the Engineer's representative to act as foreman or surveyor.

PS.17.1.3 Management **and disposal of water** *(Read with SANS 1921 - 1: 2004 clause 4.6)*

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

The possibility of flooding shall be borne in mind by the Sub-Contractor when drawing up his tender and he shall effect relevant insurance as the Council will accept no responsibility whatsoever for any loss or damage from such flooding, including any loss or damage to the

temporary or the permanent works.

PS.17.1.4 Disposal of Spoil or Surplus Material *(Read with SANS 1921 - 1: 2004 clause 4.10)*

The Sub-Contractor shall dispose all surplus and unsuitable material (demolished concrete) in legal spoil areas of his own choice. He shall be responsible for all arrangements necessary to obtain such spoil sites.

PS.17.1.5 Testing *(Read with SANS 1921 – 1: 2004 clause 4.11)*

PS.17.1.5.1 Process control

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

The Sub-Contractor may utilise the Principal Contractor's laboratory on site (if established) or he may employ the services of an independent commercial laboratory. Whatever method is used, the Sub-Contractor must submit the results of tests carried out on materials and workmanship when submitting work for acceptance by the Employer's Agent. The costs for these tests shall be deemed to be included in the relevant rates and no additional payment will be made for testing in this regard.

PS.6.5.2 Acceptance control

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

PS.17.1.6 Survey beacons *(Read with SANS 1921 - 1: 2004 clause 4.15)*

The Sub-Contractor shall take special precautions to protect all permanent survey beacons or pegs such as bench-marks, stand boundary pegs and trigonometrical beacons, regardless of whether such beacons or pegs were placed before or during the execution of the contract. If any such beacons or pegs have been disturbed by the Sub-Contractor or his employees, the Sub-Contractor shall have them replaced by a registered land surveyor at his own cost.

PS.17.1.7 Overhaul

No payment will be made for overhaul on this contract unless provision is made under specific items.

PS.17.1.8 Pre **and Post Construction Digital Photographs**

Item 1.10 in the Bill of Quantities has been allocated to cover costs of pre, post and progress photographs during construction of the works. The Sub-Contractor shall provide relevant good

quality photographs which must be labelled accordingly with the correct date and description.

PS.17.2 SITE FACILITIES AVAILABLE

PS.17.2.1 Contractor's camp site and depot

(a) Sub-Contractor's camp site/store yard

The Principal Contractor has already established a suitable site camp which the Sub-Contractor shall make use of for his offices, stores, sheds and all other facilities required by the Sub-Contractor for the execution of the works under this contract. Security for the site camp has been provided by the Principal Contractor.

Provision must be made for an office for the Sub-Contractor under item 1.2.2.1 in the BILL.

PS.17.3 SITE **FACILITIES REQUIRED**

PS.17.3.1 Facilities for the Resident Engineer

The rate tendered by the Sub-Contractor shall be deemed to include for providing and maintaining a single office (one room) with a floor area of at least 13m² and a ceiling height of at least 2.3m. The office shall be lockable and waterproof. The Resident Engineer shall utilise the ablution facilities provided by the Principal Contractor. The office furnishings shall include:

A. One standard office desk
B. Three chairs
C. Acceptable lighting
D. A connection for electricity
E. Air-conditioning

PS.17.4 DRAWINGS

Any information in the possession of the Sub-Contractor which is necessary for the Employer's Agent Representative to complete the "as-built" drawings must be submitted to the Employer's Agent Representative before a certificate of completion will be issued.

Only figured dimensions shall be used and drawings shall not be scaled unless so instructed by the Employer's Agent. The Employer's Agent will supply any figured dimensions, which may have been omitted from the drawings.

PS.17.5 DRAWINGS AND SPECIFICATIONS TO BE PROVIDED

The Sub-Contractor shall be entitled to receive the following drawings free of charge:-

(a) THREE (3) paper copies of each design drawing in A0 size

PS.17.6 CONTRACTOR'S PLANT

The Employer's Agent shall have the right to order the immediate removal, from the site, any plant which he may deem to be unsatisfactory for the proper execution of the work. The Sub-Contractor shall obtain without delay satisfactory plant to replace that removed. Any costs arising out of the removal and subsequent replacement of plant shall be to the Contractor's account.

PS.17.9 BARRICADING OF EXCAVATIONS

All excavations in road reserves and in any other areas in close proximity to pedestrian and vehicular traffic are to be barricaded to the satisfaction of the Employer's Agent. All costs arising from these requirements are to be included in the tendered rates.

PS.17.10 LENGTH OF TRENCHES

No trenches may be left open over the Builder's Break. The cost of backfilling any trenches before the shut down and re-opening thereof after the shutdown period shall be for the Contractor's account. Unless otherwise permitted in writing by the Employer's Agent, no more than **200m** of trench shall be opened in advance of pipe laying operations.

PS.17.11 TEMPORARY WORK

The Sub-Contractor shall carry out such temporary work, including the necessary access and construction roads, shoring of trenches and excavations etc. as he may require to enable the permanent work to be constructed. He shall allow for the cost of all temporary works, including their removal, in his rates.

PS.17.12 TESTING

The Employer's Agent shall require the following testing to be applied under this contract:-

a) Pressure Testing

PS.17.13 ACCESS TO PRIVATE PROPERTIES

The Sub-Contractor shall give written notice to the owner of each property, crossed by the new sewer pipeline, of construction work to be undertaken on the property at least 7 days prior to commencement of work on the property.

The Sub-Contractor shall keep the occupants of affected properties advised at all times prior to disrupting access to, or egress from their properties.

Vehicular and pedestrian access may not be denied to occupants of affected properties unless prior approval has been obtained in writing from the land owners concerned and the Employer's Agent.

The Sub-Contractor must make allowance in his rates for all necessary bridging of excavations in order to permit uninterrupted access at all times.

PS.17.14 TRENCHING IN PRIVATE PROPERTY

Trenching in private property shall be carried out manually. Trenching by mechanical means will only be allowed with the written permission from the land owner and the Employer's Agent.

PS.17.15 WORK IN A RESTRICTED / CONFINED AREA

Due to the presence of structures and certain underground and overhead services which exist on the site, the Sub-Contractor may experience difficulty in working in a confined or restricted space. Tenderers are to take cognisance of this fact and allow for the difficulty of working in a restricted space in their rates. No additional payment will be made in this regard.

PS.17.16 FINISHING / TIDYING AND SITE MAINTENANCE

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

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

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

PS.17.17 CERTIFICATE FROM PROPERTY OWNERS ON COMPLETION OF WORK

After completion of all construction work across any property, the Sub-Contractor shall obtain from the owner of such property, a signed certificate addressed to the Sub-Contractor confirming that the property has been reinstated to the owner's satisfaction.

PS.17.18 SPOIL MATERIAL

No indiscriminate spoiling of material will be allowed. All surplus or unsuitable material shall be spoiled in designated areas as directed by the Employer's Agent, unless otherwise specified in the Project Specifications.

PS.17.19 UPLIFTING GRASS SODS AND RELAYING

Neatly mark out the area where sods are to be uplifted and wet the area to facilitate lifting of sods. Using spades or a grass kicker, cut out sods over the width of the trench, in neat sections, complete with roots, and place clear of excavation in preparation for replanting after trench has been backfilled. Sods are to be watered regularly whilst being stockpiled to prevent them from drying out.

After the trench has been backfilled, replace the topsoil and apply a fertilizer and compost mixture [premixed at a rate of 1m³ of compost with 20kg of 2:3:2 (22)] at a rate of ½ kg to every metre of trench. Replace stockpiled grass sods, tamp down and water regularly until re-established.

Should the stored sods be damaged in their removal or become non-viable due to lack of watering, the contractor will be required to replace these with instant lawn.

PS.17.20 DEFECTS LIABILITY PERIOD (MAINTENANCE PERIOD)

The defects liability period shall be 12 months and shall be calculated from the date of completion of the

works as certified by the Employer's Agent. It is noted that only one date shall be certified for the completion of the works.

Once the works have been handed over to the Employer, any repairs to the works deemed necessary will generally be undertaken by the Employer. Should such repairs be found to be the result of poor workmanship by the Sub-Contractor, then the cost of the repairs will be invoiced to the Sub-Contractor.

Where any repairs to the works will not affect consumers, the Employer's Agent may decide to instruct the Sub-Contractor to effect such repairs, in which case the repairs must be completed within the period specified by the Employer's Agent.

PS.17.21 CONNECTION TO EXISTING SEWER CHAMBER

Connection to the existing sewer chamber is subject to the completion of the new sewer rising main. Should the Employer not obtain rail approvals then the Sub-Contractor will not be permitted to complete works across the railway and the sewer tie-in shall not be completed. The connection to the existing sewer chamber is subject to the Employer's instruction.

The new sewer pipe shall be built in at the correct line and level and the chamber walls repaired as directed by the Employer's Agent.

The rate shall include for the supply of labour, equipment and materials required for breaking the chamber wall, setting the new sewer pipe to the correct level, making good the chamber walls and the disposal of all unsuitable or surplus material.

PS.17.22 MATERIALS

The proposed new sewer pipe shall comprise High Density Polyethylene Pipe (HDPE) manufactured from PE 80 material, complying with SABS ISO 4427. Class (PN) 4 pipe shall be used.

The HDPE pipe shall be supplied in the maximum possible lengths that diameter and handling constraints will permit in order to reduce the number of site-welded joints. The handling of HDPE piping shall be in accordance with the manufacturer's standards and to the approval of the Employer's Agent.

PS.17.23 WELDING OF THE HDPE PIPE

The HDPE pipe shall be welded by means of heat fusion using approved butt-welding equipment and fully trained operators in accordance with the pipe manufacturers code of practice. The Sub-Contractor shall undertake the following steps prior to the commencement of welding on site:-

a) Provide certified welders certificates for approval by the Employer's Agent prior to the commencement of any welding.
b) Provide welding tables applicable to HDPE Class (PN) 4 pipe as applicable and the welding plant to be used.
c) Provide a certificate of calibration for the welding plant to be used. The certificate shall bear the model number of the welding machine to be used on site, the name and address of the certifying agent, the date of the test and a statement as to the accuracy of the temperature and pressure gauges on the machine in question. A certificate of calibration dated prior to the date on the letter from the Employer, instructing the Sub-Contractor to commence work, is not acceptable.

   No separate payment shall be made for the calibration of the welding plant as required in this Contract. Provide certification that the welder/operator has successfully completed an approved training course and is qualified to weld the size and class of HDPE pipe to be used on this contract.
d) A test weld is to be undertaken on site in the presence of the Employer's Agent Representative for approval prior to the commencement of welding proper.

Under no circumstances will welding be permitted to commence prior to the provision of the above certificates and the test weld, and any delays resulting from failure to timeously undertake the above-mentioned steps shall be borne by the Sub-Contractor.

The Sub-Contractor shall ensure that the required gap spacing is constant over the total weld length and that the weld temperatures specified by the manufacturer are attained throughout the weld length.

Once the welding of a joint has been completed, each joint shall be carefully examined and shall be watertight.

No separate payments shall be made for butt-welding of the HDPE pipe as required under this contract.

PS.17.24 STANDARD HYDRAULIC PIPE TEST

The Employer's Agent shall require a pressure test to be applied to the HDPE pipeline before the pipe re-connecting operation. For this purpose the pipeline will be temporarily sealed by using a bolted blank flange. Where practicably possible, joints are left uncovered during construction for detection of possible defects during testing. Spool pieces are used to repair problematic sections.

The Sub-Contractor shall, at his own cost, provide a suitable means of conveying water for testing. Approximate volume of water required to fill pipeline = 571kl. It is recommended that the Sub-Contractor arrange to utilise second class water from the Northern WWTW situated at the end of Johanna Road in Sea Cow Lake.

Payment for this shall be included in the Sub-Contractor's rate under item 4.7 in the Bill of Quantities.

The required test pressure for all pipework shall be as indicated below and measured at the lowest point of the pipeline -

HDPE: 1.25 x 4 = 5bar (50MPa)

There are two (2) pressure testing methods highlighted below which the Sub-Contractor can apply. All tests shall be carried out in the presence of the Employer's Agent Representative at such times and in such manner as he may direct.

Method 1

A: Main Experiment

1. The pipeline is filled with water (ensure that there is no air trapped in the pipeline).
2. The pipeline is closed on both ends and pressure testing equipment is connected.
3. The pipe will be pressurised up to 50% test pressure, it will then be allowed to stand for 10 minutes to stabilise and observe any major leaks.
4. Pressurising will continue until 75% test pressure is reached, the pipe will be left for 5 minutes to stabilise and again checking for any major leaks.
5. The pipe will now be boosted up to the final test pressure and at that point the pump will be used to maintain that pressure for 10 minutes, during this period the pipe will be checked again for any leaks.
6. The test pump will then be stopped ensuring it is on test pressure. The pipeline will now be observed for 60 minutes. The pressure drop should not exceed 10%.

To confirm the results above a second and final test will be conducted.

B: The Pressure Drop Test

1. After 30 minutes of the first test, the pressure is decreased back to pipeline pressure rating (PN Rating).
2. After this, the pipeline will be observed for 30 minutes (it should contract at this pressure and

a) Either increase pressure or b) remain the same. In the case of a or b, the pipeline is accepted as having no leakage.

3. If there is a conflict, this test will be conducted for a further 60 minutes, during this time the pressure may not drop more than 0.25 bar. If the pressure drop is more, the pipe is considered to have a leak.

Method 2

A: Preliminary Test

1. Pipeline is filled with water and the valve at the highest point is opened to release air.
2. Pipeline is closed on both ends and pressure testing equipment is connected.

3. Testing pressure is determined at 4 x 1.25 = 5bar (50MPa).
4. Test pressure is reached and pump is stopped, pipeline is observed for 30 minutes (the pipeline will deform in a visco-elastic way, the pressure shouldn't decrease by more than 30% in 30 minutes).

Note: If pressure decreases by more than 30% there's either a leakage or a temperature increase in the pipeline, either way the test is stopped, visually inspect line and joints for leaks, check surface temperature of HDPE pipeline, if above 30°C test is aborted.

B: Main Experiment

1. After a successful 30 minute period with pressure decrease within 30% the pipeline test pressure, pressure is decreased back to pipeline pressure (PN) rating i.e. 4bar (40MPa). This is observed for 30 minutes for contraction.
2. If the pressure maintains or increases within the 30 minutes, test is accepted.

Tips

- Always ensure that there is no air trapped in the pipeline.
- Refrain from performing test when pipe surface temperature is above 30°C.
- Always ensure that all flange joints or other connections are leak free.
- Visually inspect all pressure gauges for any damage, if damaged do not use, replace before test.

Once the pipeline has been passed it must be drained. All costs relating to this work inclusive of scouring, supplying and install blank flanges etc. are to be included in the rate for testing.

PS.17.25 DEALING WITH SEWAGE FLOWS DURING TIE-IN OPERATIONS

The tie-in of the 900mm diameter HDPE Rising Main diversion requires planning and co-ordination in order to complete the tie-in successfully within the time constraints. The Sub-Contractor will have to deal with off-peak flow conditions, from the Riverside Road Wastewater Pump Station (WWPS), by the use of water tankers and large pumps or honey suckers for the duration of the tie-in.

During this period the existing sewer rising main (ranging between 700 – 900mm diameter) shall be drained and the tie-in shall commence. The existing pipe shall be cut at the pre-determined points and the pipe specials installed.

Furthermore, the Sub-Contractor shall ensure that everything is in place prior to being permitted to complete the tie in.

- The HDPE pipe has been pressure tested and passed.
- The tie-in details have been measured and finalised and approved by the Employer's Agent.
- The sewage discharge point must be located for emptying tankers.
- All pipe specials and fittings are on site and the dimensions are correct.
- All necessary tools, plant and equipment are available (pumps, water tankers, honey suckers etc.).
- The Riverside Road WWPS has been made aware and is prepared for the shutdown.
- All teams involved in the operation (over-pumping team, tie-in team and discharge team) must be briefed and informed of their responsibilities.
- The weather forecast will need to be checked to ensure that there is no rainfall predicted for that day which could increase inflow to the Pump Station.

The Sub-Contractor is to allow for all costs, including labour, plant and equipment, associated with the dealing of sewage flows into the pump station.

PS.17.26 DE-COMMISIONING OF THE EXISTING SEWER RISING MAIN

De-commissioning of the existing sewer rising main is subject to the completion of the new sewer rising main. Should the Employer not obtain rail approvals then the Sub-Contractor will not be permitted to complete works across the railway and the sewer tie-in shall not be completed. The de-commissioning of the existing sewer rising main is subject to the Employer's instruction.

The Sub-Contractor shall seal both ends of the abandoned sewer rising main, using welded blank flanges, demolish the existing air valve chamber and make good the surrounding ground to the satisfaction of the

property owner.

PS.17.27 RE-COMMISIONING OF THE NEW SEWER RISING MAIN

Once the tie-in has been completed and approval has been given by the Employer's Agent to re-commission the new sewer rising main, the Riverside Road WWPS may be permitted to start filling up the line. Care must be taken during this procedure to ensure that the pipeline is recommissioned in a slow and controlled manner to reduce excessive hydraulic forces on the newly installed fittings.

All plant and personnel will remain on duty until it is declared, by the site agent, that the tie-in has been successfully completed.

The pipeline must be monitored closely, within the subsequent hour, to ensure that the fittings are not leaking and that there is no critical movement at the tie-in points.

C3.3: STANDARD SPECIFICATIONS

C3.3.1 Listing of Standard Specifications

The Standard Specifications on which this contract is based are the **South African National Standard (SANS1200)** and the **EThekwini Standard Drawings**. Although not bound in, nor issued with this document, they shall form part of this Contract:

C3.3.2 AMENDMENTS TO THE STANDARD SPECIFICATIONS - City of Durban Technical Specifications

INTRODUCTION

In certain clauses the standard, standardized and particular 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 alternative or additional requirements applicable to this contract are contained in this part of the project specifications. It also contains additional specifications required for this particular contract.

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

PS AB General Specifications
PS B Site Clearance
PS C Concrete Work
PS DA Earthworks: Bulk
PS DB Earthworks for Pipe Trenches
PS DD Earthworks for Structures
PS EB Graded Crushed Stone
PS EC Cement Treated Graded Crushed Stone
PS ED Road Asphalt
PS EF Kerbs and Haunches
PS EG Sidewalks, Footpaths and Median Areas
PS EH Steel Guardrails & Conc. Median Barriers
PS EL Dumprock Subgrade Improvement
PS F Protection Works
PS PC Stabilisation of Gravel Base
PS PD Surface Treatment: Modified Binder
PS PE Pressure Pipelines: Steel
PS PF Pressure Pipelines: other than Steel
PS PG Non Pressure Pipelines and Pc Culverts
PS PH Manholes and Appurtenant Drainage Works
PS PJ Pipe Jacking
PS PG Lateral Support Systems
PS PS Pump Stations: Sewage
PS S Reinstatement
PS TA Road Signs
PS TB Road Markings

PS.AB.1 SITE FACILITIES

PS.AB.1.1 Temporary Offices for Engineer and Staff

The offices for the Engineer and staff shall be situated in the Site camp area with general security arrangements.

The Contractor is to provide cleaning and maintenance to the Engineer's office complex. The following shall be provided by the Contractor:-

(a) Engineer's Offices

(i) 2 No. (Two) of equivalent Type 1 air conditioned office as are specified in Clause AB.2.2 of the Departmental Technical Specification but modified to dimensions of at least 3m x 3m or 3m x 4m per office. Number of chairs to be reduced to 3 chairs, ie 1 swivel and 2 standard padded chairs.

(ii) The offices shall allow for an L-shaped desk with 4 drawers, a filing cabinet, a drawing rack, 1 swivel chair and 2 padded chairs. All the necessary insurance shall to be provided for all the above equipment.

(iii) 1 No. (one) 18m^2 air conditioned office to be used as a boardroom, including table (to accommodate for a minimum of 10 people), chairs and a 2m long x 1m high board.

(iv) 2 No (two) Toilet facilities with wash basins, {1 no. (one) male and 1 no.(one) female}.

(v) 1 No (one) kitchen with cupboards, sink, a fridge, microwave oven, and hot and cold potable water.

(vi) 3 No. (Three) covered car ports adjacent to the above offices.

(vii) All necessary insurance shall be provided for all the equipment.

(b) Stationary and office equipment for engineer

(i) Photocopy / scanning machine,

(ii) The 2 offices and the Boardroom shall have a white board marker and a pin-up

(iii) Board mounted on the wall.

Areas around Site Office

The access and other roads around the Engineer’s Offices shall be treated to make them dust free either by crushed stone, suitable dust-laying oils, or bituminous surfacing being used or other approved means being adopted. They shall be well drained and kept trafficable and free from mud at all times. Footpaths shall be similarly treated to provide convenient access to all buildings.

Allowance for the costs of the above listed items must be made under the relevant items in the Bill of Quantities **(BOQ): Section1, Part AB: Item 1.**

PS.AB.1.2 Contractor's Camp Site and Depot

The Contractor is responsible to provide a suitable site for his camp and to provide accommodation for his personnel and labourers. Also, there are various other private locations around the site that the contractor may consider leasing to use as the Camp Site. The tenderer shall allow for this in his rates. As these sites are privately owned, the Contractor shall be required to engage directly with the land-owner should he choose to occupy any of the privately owned sites. Proof of agreement with the private owner must be provided to the Engineer.

(a) Contractor's Camp Site / Store Yard

The Contractor must secure written permission of the landowner confirming that permission has been granted or that an agreement is in place for the use of the privately owned land. This documentation must be submitted to the Engineer.

Any clearing of the site that is necessary and the making good after de-establishment will be the responsibility of the Contractor.

In addition to the requirements of SABS 1200A Clause 8.3.2.2 the following conditions shall also apply:

(i) None of the existing roads shall be damaged in any way.
(ii) No waterborne sewerage facilities or potable water connection are available on the site. The Contractor shall make his own arrangements in this regard.
(iii) No electrical facilities exist on site.
(iv) It shall be the responsibility of the Contractor to make good any damage caused to the camp site area or any improvements on it, including services, and for reinstating it to its former condition when vacated. The standard of reinstatement must be to the satisfaction of the Engineer; Director: Real Estate and/or Director of Parks, Recreation and Beaches Department; or other owner. Particular attention should be directed to these requirements and written clearances from the relevant Departments or other owners will be required.

Allowance for the costs of the above listed items must be made under the relevant items in the Bill of Quantities **(BOQ): Section1, Part AB: Item 6.**

PS.AB.1.3 Accommodation of Employees

No employees except for security guards will be allowed to sleep or be accommodated on the site in urban areas.

No housing is available for the Contractor's employees and the Contractor shall make his own arrangements to house his employees and to transport them to site.

No informal housing or squatting will be allowed.

The Contractor shall provide the necessary ablution facilities at his camp site and the site of the works for the use of his employees. Chemical toilets only will be allowed where temporary facilities have to be provided.

PS.AB.1.4 Power Supply, Water and other Services

The Contractor shall make his own arrangements concerning the supply of electrical power, water and all other services. No direct payment will be made for the provision of electricity, water and other services. The cost thereof shall be deemed to be included in the rates and amounts tendered for the various items of work for which these services are required, or in the Contractor's preliminary and general items as the case may be.

(a) Water for Works

The Contractor shall allow in his Establishment rates for the securing of a suitable water supply, the payment of any connection fee and for any water charges for the duration of the contract.

(b) Power Supply for Works

The power supply authority is eThekwini Electricity Service Unit. The Contractor will be responsible for arranging for whatever temporary supplies may be required and he will be required to bear all costs involved and to pay the ruling tariffs applicable to such supplies.

(c) Telecommunication

The method telecommunication may be either through fixed land line in which case 2 landlines must be made available and connected to the Engineer and his staff's offices, one line per office. Alternatively, should it be impractical to connect a fixed land line, the communication shall be by way of cellular communication, in which case the contractor will provide the Engineer and the Engineer's team with airtime.

PS.AB.2 SERVICES CONNECTION FEE

Further to Clause AB.2.3 **a prime cost item** has been included in the **Bill of Quantities, Section 1, Part AB: Item 2**. This item covers the connection fee for the following services to the camp site area for the Engineer's office:

(i)	Electricity	:	Connection of one single phase 220 volt 60 amps electrical supply to the site distribution box.
(ii)	Water	:	25 mm Diameter connection.
(iii)	Telephone	:	2 lines

Should the Contractor require either additional connection or an increased power supply any additional costs shall be to the Contractor's account.
Payment under **Section 1, Part AB: Item 2** will be based on the actual accounts for the connection fees described above.

PS.AB.3 ROAD DEVIATIONS AND TRAFFIC CONTROL

(a) No allowance has been made in the Bill of Quantities for deviations other than for the deviations mentioned in **Clause PS.1.** Costs of any other deviations required by the Contractor shall be included in the rates tendered. The other deviations required by the contractor shall be of Type A, unless otherwise stated by the Engineer.

(b) Deviations required by the Contractor shall comply with the requirements of Clause AB.7. Details shall be submitted to the Engineer for approval at least **four weeks** in advance of date on which it is anticipated that work on the deviation will commence.

(c) On deviations provided in terms of (b) above the Contractor shall ensure at all times and during all weather conditions that all temporary surfaces that are intended to carry traffic are in fact trafficable with regard to reasonable standards of safety and comfort. No additional payment shall be made to the Contractor for compliance with this clause.

(d) Unless indicated otherwise over the entire length and for the duration of the contract, traffic is required to be accommodated in both directions at all times.

The Contractor shall ensure that the full width of the road, or a width of road approved by the Engineer, is available for traffic during the peak traffic periods (i.e. 06:30 - 09:00 and 16:00 to 18:30).

PS.AB.4 NOTICE BOARD

The typical notice board layout is given in Part C3.6.1. The following requirements shall apply with regards to the notice board. As per the BOQ, two (2) number notices boards are to be provided for the contract. Payment for this item shall be made under **Section 1, Part AB: Item 5 of the Bill of Quantities.**

PS.AB.5 PROGRESS PHOTOGRAPHS

Progress photographs will be required. Progress photographs are to be taken using a minimum 15 megapixel digital camera. The photographs are to be taken on a weekly basis and to be submitted to the Engineer's Representative. Aerial photographs are to be taken monthly across the entire site by using the drone or at the discretion of the engineer.

A sum has been included in the **BOQ, Section 1, Part AB: Item 22** for digital photographs and aerial photographs by using drones to be taken.

PS.AB.6 SUPPLY OF PLANT, MATERIAL AND LABOUR

Except where otherwise specified the Contractor shall at his own expense supply and provide all the construction plant, temporary works, materials for both temporary and permanent works, labour (including supervision thereof), transport to and from the site and in and about the works and other things of every kind required for the construction, completion and where specified, maintenance of the works. The contractor shall also make his own arrangements with the proper authorities and at his own cost for the supply of water, electricity and any other services he may require for the construction and completion of the works.

PS.AB.7 SECURITY

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

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

The Contractor must ensure that all his employees as well as the employees of his subcontractors are able to identify themselves as members of the construction team.
Payment for this item shall be made under **Section 1, Part AB: Item 45 of the Bill of Quantities.**

PS.AB.8 SURVEY COORDINATION - SURVEY OF EXISTING SERVICES

The Contractor, immediately upon commencing work, shall survey existing valves, manholes, catchpits and cable duct markers. The coordinates (X, Y and Z) are to be submitted to the Engineer.

Particular attention should be drawn to the following information which is required within **two weeks** of commencement:
Existing services require accurate survey to be done to determine if a particular service is to be relocated. The as-built information of all services depicted on the services is inaccurate and, as a result, the Contractor will be required to search for all sewer manholes and survey these manholes, (X, Y and Z) of the cover and invert levels.
This shall be done at the immediate commencement of the contract and forwarded to the Engineer. The Engineer will then provide the contractor with setting out information for the new sewer line within **two weeks** from receipt of the survey for the existing sewer line.

Payment for this item shall be made under **Section 1, Part AB: Item 10 of the Bill of Quantities**.

PS.AB.9 PROTECTION OF DWELLINGS, BUSINESSES AND PRIVATE PROPERTIES

All necessary precautions must be taken by the contractor not to damage any surrounding properties. Should the contractor cause any damage due to the construction of works, the cost to rectify the damage will be to the contractor. The contractor must also carry the appropriate insurance to cover loss of personal property or lives.

- Special attention is drawn to the use of compaction/vibratory equipment. The Contractor must take extra precaution to ensure that the use of construction equipment does not cause direct and indirect damage on structures/buildings in the vicinity of the construction area. Any damage caused will be to the contractors account.
- Negligence of any sort by the Contractor/Sub-contractor or any person employed by the contractor, the cost to correct the error will be to the contractor.
- The Contractor shall take precautions not to damage any plant, structure or property being that of the eThekwini Municipality or that of any third party for the duration of the contract. The Contractor will be held liable for any damage he causes, willfully or un-willfully, either that of the eThekwini Municipality or that of any other third party.

PS.AB.10 BARRIERS FOR ACCOMMODATION OF TRAFFIC

The contractor shall use temporary barriers for accommodation of traffic, plastic barriers filled with sand (New Jersey type, similar products as approved by the Engineer. The rate shall be in meters (m) and shall include the supply and installation of barriers for the accommodation of traffic.

The contractor must also allow for the installation and removal of the barriers.

Payment for this item shall be made under Section 1, Part AB: Item 9 of the Bill of Quantities.

PS.AB.11 ADDITIONAL SURVEY

An item has been provided in the BOQ for additional survey to be undertaken upon the Engineer's request by the contractor for the Engineer's use.

Payment for this item shall be made under Section 1, Part AB: Item 11 of the Bill of Quantities.
An item for handling cost has been provided in the BOQ for the Contractor administration in this regard.

PS.AB.12 ALLOWANCE FOR GEOTECHNICAL INVESTIGATIONS AND TESTING BY ENGINEER

An allowance has been made in the BOQ for materials investigation and/or testing, as required by the Engineer.
An item has also been allowed for in the BOQ for the contractor's administration cost in this regard. It is a percentage of the cost of the testing.

PS.AB.13 SEISMIC VELOCITY TESTING

The method of Seismic Velocity Testing shall be used to determine the classification of the material to be excavated. Should the Contractor believe that the material to be excavated is not considered as 'soft' material or that it may be more adverse in terms of hardness than that agreed to by the Engineer, then a seismic velocity test must be undertaken before any further excavation is undertaken. Alternatively, should the Engineer consider the material to be changing in classification to a less adverse classification, in other works not as hard as the material that was being cut, the Engineer may order a seismic test to be undertaken.

All requests for seismic testing must be approved by the Engineer before the test can be undertaken. Should the contractor make gratuitous claims for the test to be undertaken when it is apparent that the material has not changed to a harder classified material, then the test may proceed at risk in that should the test results indicate the material has not changed to a harder classification, then the contractor shall bear the cost of the test. Alternatively, should the test results indicate that the material has changed classification to a harder type material the cost for the test will be paid for through the contract under the relevant item in the **BOQ in Section 1, Part AB: Item 64.**

PS.AB.14 AD-HOC ADJUDICATION

Alternate dispute resolution for the Contract will commence with Ad-Hoc Adjudication as per GCC2015.

The number of Adjudicators to be used on each unsettled claim shall be one (1) or three (3) members as agreed by the parties, failing agreement, it shall be three (3) members.

All proposed Adjudicators must be registered with SAICE and/or the Association of Arbitrators as an Adjudicator at the least.

The payment item has been included in the **BOQ, Section 1, Part AB: item 66**, for the partial cost of appointment and services of Adjudicator. This item shall cover only 50% of the Adjudicator's cost which shall be the Employer's contribution only. The Contractor shall be responsible for payment of his costs and shall not be allowed in the Contract.

An item has also been allowed for in the BOQ for the contractor's administration cost in this regard. It is a percentage of the cost of 50% of the Adjudicator's fees.

PS.AB.15 ECONOMIC EMPOWERMENT

In summary, the Empowerment Charter comprises of 4 Aspects, i.e.:

i. Contract Sub-Contracting,
ii. Skills Development and,
iii. Socio-Economic Development.
iv. ECSA Candidate Secondment

Two items have been provided in the BOQ in Section 1, Part AB, for the Contractor to achieve the requirements of the, specifically for the aspects of Skills Development and Graduate Employment, Socio-Economic Development and ECSA Candidate Secondment. The percentages for the afore-mentioned aspects shall be converted to a monetary value by the contractor and entered into the relevant items in BOQ.

PS.AB.16 EMPLOYMENT OF MENTOR(S) TO TRAIN AND GUIDE THE CPG SUB-CONTRACTORS

Economic Empowerment requires that a minimum of 30% of the Award Value be sub-Contracted to Contractor's registered with the CIDB in categories 1 to 7. To promote development of 1 and 2CE sub-contractors, the Principal Contractor is to appoint a Mentor(s) to train and guide the sub-contractors in undertaking work awarded to them.

The Construction Mentor position is about forming a relationship between the Mentor and subcontractors. The relationship is built on trust and respect for advice given. The Mentor position

requires the Mentor to have a formal and regular involvement with each sub-contractor. The Mentor is to impart advice and knowledge in the running and managing of a small construction entity. The advice relates to identifying skills shortfalls, identifying statutory compliance and general business skills relevant to a small construction entity. The Mentor shall be a senior construction person who is independent of the Main Contractor.

The Mentor shall be on site full time and shall be responsible for the mentoring of all 1CE and 2CE sub-contractors operating on site that form part of the CPG calculation. Each sub-contractor shall have the right to opt out of the Mentor's involvement.

The Mentor's duties shall include the following:

- To undertake a needs analysis of each sub-contractor to determine their compliance with the statutory requirements, their experience with the commercial operation of their business, their technical capabilities;
- Following the needs analysis, the Mentor is to provide a report indicating what interventions, if any, are necessary for the successful completion of the sub-contractor's scope of work. These interventions shall include training needs and possible discussion with experts;
- To interact formally with the sub-contractors on a weekly basis to ensure that business requirements and fundamentals are implemented;
- To highlight and table any issued raised by the sub-contractor with the Main Contractor. The Mentor shall assist the sub-contractors in resolving the issues with the Main Contractor;
- Assist the 1CE Contractors in the formulation of their rates in preparation for the submission of their priced schedule;
- To facilitate and participate in the discussions between the Main Contractor and sub-contractors.

A Prime Cost item has been provided in the Bill of Quantities under Section 1 for the Services of the Mentor(s). The cost of the mentor(s) shall be a Time-Based Fee, in line with the ECSA Guidelines, for a person in Category D. The hourly rate of the mentor(s) must be market related and shall be approved by the Employer prior to Mentor(s) commencing with their services.
An additional item has also been allowed for in the BOQ for the contractor's administration cost in this regard. The administration cost is based on a percentage of the cost paid to the Mentor(s). The Handling cost is limited to 7.5%.

PS.AB.17 FACILITATION AND MANAGEMENT OF 1CE AND 2CE SUB-CONTRACTORS

The main contractor must meet the following responsibilities, and price it accordingly.

- To facilitate engagements with Ward Councillors in identifying sub-contractors from Target Area 1 (Wards 34 and 36) and facilitating the process of appointment;
- Assist the sub-contractor in planning his/her works;

- Assist the sub-contractor to execute the works according to the required specification;
- Assist the sub-contractor in managing his/her labour so that the allowable production can be achieved and possibly exceeded;
- To facilitate discussions with the sub-contractor for plant required;
- To facilitate discussions with the sub-contractor for provision of materials;
- Facilitate discussions and assist the sub-contractor in terms of accessibility to site and work area;
- To assist the sub-contractor in the calculation of quantities claimed and the completion of his/her payment certificate timeously;
- Assist the sub-contractor in his interpretation and application of his/her sub-contract agreement

Two items have been provided in the Bill of Quantities under Section 1 for the Facilitation and management of 1CE and 2CE Subcontractors. The cost to facilitate and manage the 1 and 2CE's shall be a time-based fee, payable monthly. There is an additional fee for providing PPE and Medicals for sub-contractors and their staff.

AB.3; PS.AB.1.5

An allowance has been made in the BOQ for Trunk Sewer Reticulation, as required by the Engineer.

An item has also been allowed for in the BOQ for the contractor's administration cost in this regard. It is a percentage of the cost of the works.

Main Contractor to take note that the appointment of the sub-contractor will be undertaken by EWS.

PS.B SITE CLEARANCE

Clause	Description
PS.B.1	REMOVAL OF CONCRETE BOLLARDS AND WOODEN POSTS
PS.B.2	REMOVAL OF BRICKWORK
PS.B.3	REMOVAL OF ABANDONED ROADWAYS
PS.B.4	REMOVAL OF EXCESS SCARIFIED MATERIAL TO SPOIL
PS.B.5	SEAL ENDS OF PIPES WITH GRADE 15/26 CONCRETE
PS.B.6	SEAL ENDS OF PIPES WITH 230 mm BRICKWORK
PS.B.7	REMOVAL OF STREET SIGNS AND POSTS
PS.B.8	REMOVAL OF CONCRETE INLET COVERS AND FRAMES
PS.B.9	REMOVAL OF CAST IRON COVERS
PS.B.10	DEMOLITION OF MANHOLES AND INLETS
PS.B.11	REMOVAL OF WIRE MESH FENCE
PS.B.12	REMOVAL OF PIPE CULVERTS
PS.B.13	REMOVAL OF EXISTING PRECAST CONCRETE FENCES AND STORAGE ON SITE FOR RE-USE
PS.B.14	REMOVAL OF STEEL BUS SHELTERS
PS.B.15	REMOVAL OF STEEL PALISADE FENCE
PS.B.16	GENERAL CLEARANCE AND GRUBBING IN CULVERTS
PS.B.17	TRANSPORTING MATERIAL TO MUNICIPAL SITES
PS.B.18	DEMOLISHING EXISTING CONCRETE
PS.B.19	REMOVE AND REINSTATE THE “SHELL” SIGNAGE AT THE SHELL FILLING STATION
PS.B.20	REMOVE ELECTRIC FENCE AND STORE ON SITE FOR RE-USE
PS.B.21	REMOVAL OF STRUCTURE AT CH 4400 ON PHOENIX HIGHWAY TO TIP
PS.B.22	REMOVAL OF GABIONS BASKETS
PS.B.23	SAWING EXISTING CONCRETE
PS.B.24	REMOVE AND RELOCATE STRUCTURE AT CH 4750, RHS

PS.B.1 REMOVAL OF CONCRETE BOLLARDS OR WOODEN POSTS

The cross reference to Clause B.8.18 in Clause B.8.9 shall be amended to refer to Clause B.8.21

The unit of measurement shall be number (No.) and the rate shall include for the labour and plant necessary for the careful removal of the bollards, loading and either:

(a) Storing on site for re-use, or;
(b) Storing on site for transport to Municipal store
(c) Transporting to the Municipal store at Alice Street, Durban and off-loading, or;
(d) Transporting and disposing to an approved dump/tip site.

PS.B.2 REMOVAL OF BRICKWORK

The cross reference to Clause B.8.18 in Clause B.8.9 shall be amended to refer to Clause B.8.21.

PS.B.3 REMOVAL OF ABANDONED ROADWAYS

The Tenderer's attention is drawn to the fact that the measurement of abandoned roadway is based on the types of materials as listed under Clause B.5.6 and not the full depth of the in-situ road layers.

PS.B.4 SEAL ENDS OF PIPES WITH GRADE 15/26 CONCRETE

The unit of measurement shall be the cubic meter (m^3) and the rate shall include for all the materials, labour and plant necessary to seal the ends of pipes as directed on site by the Engineer.

PS.B.5 SEAL ENDS OF PIPES WITH 230 mm BRICKWORK

All brickwork shall conform to the relevant clauses in Part F, Departmental Specification for Protection Works.
The unit of measurement shall be the square meter (m^2) and the rate shall include for all the materials, labour and plant necessary to seal the ends of the pipes as directed on site by the Engineer.

PS.B.6 REMOVAL OF CONCRETE INLET COVERS AND FRAMES

The unit of measurement shall be number (No.) and the rate shall include for the labour and plant necessary for the careful removal of the inlet covers and frames, loading and either:

(a) Storing on site for re-use, or;
(b) Transporting to the Municipal store at Alice Street, Durban and off-loading, or;

(c) Transporting to the approved tip and dumping.

PS.B.7 REMOVAL OF CAST IRON COVERS

The unit of measurement shall be number (No.) and the rate shall include for the labour and plant necessary for the careful removal of the signs, loading and either:

(a) Storing on site for re-use, or;
(b) Transporting to the Municipal store at Alice Street, Durban and off-loading, or;
(c) Transporting to the approved tip and dumping.

PS.B.8 DEMOLITION OF MANHOLES AND INLETS

The unit of measurement shall be number (No.) and the rate shall include for the labour, plant and material necessary for:

(a) Breaking down brickwork to 1 m below formation level;
(b) Sealing the incoming and outgoing pipes with concrete;
(c) Backfilling with clean, coarse sand and compacting to 95% MOD AASHTO;
(d) Storing manhole covers on site for re-use or spoiling to tip.

PS.B.9 REMOVAL OF PIPE CULVERTS

The unit of measure is meter (m). The rate shall cover labour and plant necessary for the removal of the existing pipe culverts, loading and spoiling at the approved spoil site. The rate also includes for excavation.

PS.B.10 REMOVAL OF EXISTING PRECAST CONCRETE/PALISADE FENCES AND STORAGE ON SITE FOR RE-USE

The unit of measurement is the meter (m). The rate shall include the cost of removing the precast concrete panels and posts, sorting, loading, transporting, off-loading and stacking all material on site for later re-use or loading and spoiling at the approved spoil site.

PS.B.11 DEMOLISHING EXISTING CONCRETE

Add the following paragraphs to Clause B.5.5:

Where partial demolition is required for extension work to existing structures, the contact face shall be cut to predetermined lines and levels, any loose and fragmented material shall be removed, and projecting steel cleaned and bent as directed by the engineer. Where partial demolition is not required but extension work only, the contact surface shall be roughened and

cleaned of all dirt and loose particles.

The contractor shall take great care to ensure that the reinforcement required to tie in any extension work is not cut off or damaged in the demolition process. Where reinforcement is cut off, or where in the opinion of the engineer, the reinforcement has been damaged to such an extent that it will not adequately perform its function, the contractor shall, at his own expense, install dowel bars of the same diameter as the bar cut off or damaged, to the satisfaction of the engineer.

Only hand operated breaking equipment shall be used for the demolition of concrete where extension work is required.

The unit of measurement shall be the cubic meter of plain or reinforced concrete demolished. The tendered rate shall include full compensation for all labour, plant and equipment (including any specialised equipment) required to demolish the existing concrete.

The tendered rate shall include disposal of the product of the demolition to an approved borrow pit. The tendered rate shall also include for any river diversions, coffer damming and/or any dewatering activities that is necessary for the demolition activities.

The tendered rate shall also include full compensation for any necessary measures to ensure no debris contaminates or restricts the stream flow in rivers and for any debris that has fallen into rivers to be recovered.

In the case of retaining structures (example of wing walls) and slabs, beams or bridge superstructures, the tendered rate shall include for any falsework access required to demolish the structure and the removal thereafter. The Contractor shall be entirely responsible for the foundation assessment, loading assessment, analysis, safe design, production of working drawings, construction and dismantling of the Falsework.

The tendered rate shall include for safe retention of material behind the demolished retaining structure during demolishing activities and safe retention of material after the demolishing activity is complete.

The contractor is to submit a detailed method statement for the pre and post demolition activity that is to be reviewed by the engineer for record and comment, prior to the construction activity.

Approval by the Engineer of the contractor's proposals for falsework, retaining of banks shall not relieve the contractor of his responsibility for its stability or for any loss or damage arising out of design errors or the use of defective materials.

PS.C CONCRETE WORKS

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PS.C.5.2 FALSEWORK FOR CONCRETE

The Contractor shall be entirely responsible for the safe design, construction and dismantling of the falsework

The contractor will be required to submit a drawing to the Engineer for record and comment before any falsework is erected. The drawing shall be signed by a registered Professional Engineer certifying that he has checked the design of the falsework and that the drawing is correct and in accordance with the design. Before any load is applied to the falsework, a certificate shall be provided by a professional engineer certifying that he has checked the falsework and that it has been erected in accordance with the drawing.

Approval by the Engineer of the contractor's proposals for falsework shall not relieve the contractor of his responsibility for its stability or for any loss or damage arising out of defective materials.

The Contractor shall make good any damage to the completed structure caused by falsework or shuttering. The centering shall be accurately maintained in line and level.

All levels shall be checked with a surveyor's level immediately before concreting is commenced and immediately it is completed.

PS.C.5.3 FORMED CONCRETE SURFACE FINISHES

The finish to exposed concrete surfaces shall be Class 3(a) smooth finish. No steel shutters shall be used for this finish with the exception that purpose made steel moulds will be permitted for circular columns, traffic barriers and precast items.

PS.C.5.3 CONCRETE UPPER SURFACE FINISHES

All exposed horizontal concrete surfaces shall be finished to a Class 3 wood float finish unless otherwise indicated. The surface of exposed bridge parapets, traffic barriers and retaining wall parapets shall be to a Class 4 steel trowel finish.

All exposed concrete edges shall receive a 20x20mm chamfer, the cost of which shall be included in the rate for shuttering.

PS.C.1 NEW SABS SPECIFICATION FOR PORTLAND BASED CEMENT

The new SABS ENV. 197-1 (adopted in 1996): Cement - composition, specification and conformity criteria Part 1: Common Cement, replaces SABS 471 - 1979, SABS 626 - 1971 and SABS 831 - 1971 in Clause C.2 of Part C: Concrete Work. This also has reference to Part G: Prestressing, specifically for the cement for grouting of prestressing ducts.

PS.C.2 PLANT FOR CONCRETE WORK

Where the mixing and placing of concrete is concerned, the Contractor shall have at least one standby machine available for each operation of the processes of mixing, hoisting, transporting or placing. No concrete work may be commenced unless the above requirements are fully met.

PS.C.3 PLACING OF CONCRETE/REINFORCMENT/SHUTTERING/FORMWORK

No concrete is to be placed in the excavations until this has been approved by the Engineer or his Representative.

The nature of the concrete work is such that a considerable amount of the work shall be in restricted conditions. No additional payment shall be made for such work and the Tenderer shall therefore make due allowance in the rates for concrete works for any additional work.

PS.C.4 CONCRETE LINED V-DRAIN

A “V” drain comprising 30/19 cast in-situ concrete shall be laid where so shown in the drawings or instructed by the Engineer. The top edges shall be flush with the finished road level and finished with a wood float. Details of the drain are shown on Drawings.

The unit of measurement shall be the meter (m) and the rate shall include for excavation, shuttering joints and the supply, placing, finishing the concrete, provision of mesh reinforcement and material for the expansion joints, curing and protecting the work on completion.

It is drawn to the contractors attention that it is vital that both edges of this drain are parallel, perfectly straight (or perfectly curved if on a curve) and this will be insisted upon. Provision must therefore be made in the rate for suitable shutters, supports, workmanship and intense supervision to achieve the required standards. Deviations form tolerances will not be accepted. The horizontal alignment of the edges shall not deviate from the prescribed alignment by more than 5mm and the rate of deviation from the design line or lines shall not exceed 1 in 500 when tested over any section of length exceeding 10m. Surface irregularities (line or level) when tested with a 3m straight edge shall not exceed 3mm. For vertical alignment, the tolerances in level shall not exceed those specified in the wearing course

PS.C.5 PRE CAST CONCRETE WORK

The tendered rate shall include full compensation for all labour, material, equipment and plant as well as for all work and incidentals required to complete the work as specified.

PS.DA.1 INTERPRETATIONS

The following shall be added to the list of definitions.

Top of earthworks: The top of earthworks shall be defined as the underside of the selected layers under roads, the base under sidewalks and the underside of the topsoil layer under verges and embankments.

PS.DA.2 GEOTECHNICAL INFORMATION

Tenderer's attention is drawn to Part C.4 of this contract document, "Geology, Geotechnical and Materials Information", which describes the geology of the area and the associated material properties.

PS.DA.3 TOPSOIL

Tenderers are to note that all topsoil from site is to be excavated to stockpile for later use. The volume of topsoil removed is included in Section 3 Part DA of the Bill of Quantities.

PS.DA.4 EXCAVATION OF MATERIAL FROM SITE

(a) Further to Clauses DA.8.1 and DA.8.3 Tenderer's are to note that the measurement of excavation of material on site is based on the cut volumes in place before excavation between the original ground levels after stripping of topsoil and the top of earthworks calculated from cross sections as described in Clause DA.8. No allowance will be made for bulking or shrinkage and it shall be assumed that 1 cubic meter of excavated material from the site shall form 1 cubic meter of compacted fill.

(b) The nature of the roadworks is such that a considerable amount of the excavation shall be in restricted conditions. No additional payment shall be made for such excavation and the Tenderer shall therefore make due allowance in the rates for Bulk Earthworks for any additional work or hand excavation.

(c) The Contractor's attention is drawn to the possible presence of watermains in the road reserve area. The Contractor shall limit the size and type of construction plant used in this area so as not to damage any existing watermain. Any damage to the watermain due to the size and type of construction plant used will be to the Contractor's account.
No additional payment will be made for compliance with this clause and Tenderer's shall include in the relevant rate for all extra plant, labour and materials required to work in these areas.

PS.DA.5 EXCAVATE UNSUITABLE MATERIAL BELOW EMBANKMENTS OR FORMATION

Further to Clause DA.8.3 the rate shall also include for trimming the area excavated to the required level and compaction of the in-situ material.

PS.DA.6 IMPORT SUITABLE FILL MATERIAL

The fill material shall conform to the requirements for a G9 or better Material as described in TRH 14 with the following Amendments:-

(a) The material shall be free of weathered shale and will be subject to the approval of the Engineer.

PS.DA.7 COMPACTION OF FILL

The second paragraph of Clause DA.8.5 is to be amended by substituting "top of earthworks" for 'formation' where it occurs.

PS.DA.8 FORMATION

The Tenderers shall make full allowance in the rates for areas of formation in cut or where the fill layer thickness is less than 150 mm. The contractor shall not be paid separately for formation that is within 150mm of the existing ground line.

PS.DA.9 TOLERANCES

Clause DA.6 shall be amended to read as follows:

The allowable tolerances shall be:

(a) the design angle $\pm$ 2 degrees for the angle of the cut or fill slope;
(b) not less than the design width, nor more than 300 mm greater than the design width for the transverse horizontal embankment width at any level; and
(c) the layer thickness $\pm$ 20 mm for topsoil;
(d) For the formation, the Contractor will be required to place level pegs longitudinally at 10 m intervals on the road construction contract and elevation tolerances shall be taken on a section of the works. (When a portion of the works is less than 500 m² one tolerance reading per 10 m² shall be taken).

In any section the average of the elevations taken shall be such that the average thickness of the succeeding layer or layers above the formation shall be not less than that specified/nor greater than that specified plus 20 mm.
The standard deviation of the differences between the actual and design levels shall not be greater than 10 mm.

PS.DA.10 DEDUCTIONS FOR RETESTS

Deductions for re-tests is expanded in Clause PS.5.5 of this Project Specification.

PS.DA.11 OVERHAUL

Notwithstanding the requirements of Clause DA.8.10 no additional payment shall be made for overhaul.

PS.DA.12 STOCKPILE HANDLING

Cut material suitable for fill, shall be placed directly into fill without being stockpiled. If this is not possible, the Tenderer shall stockpile material as directed by the Engineer.

PS.DA.13 STOCKPILE AREAS

The stockpile sites will be located along the cut areas of the proposed works Along Phoenix Highway. Cut material should ideally be moved directly to fill unless there are circumstance that prevent the contractor from doing so. Moving of material from cut to stockpile shall only be done with the approval of the Engineer. The exact location shall be pointed out by the Engineer. The unit of measurement shall be cubic meter (m3) and shall include for labour, plant, and material.

PS.DA.14 RESTRICTED EXCAVATION

The nature of the roadworks is such that a portion of the excavation may be in restricted conditions.

PS.DA.15 GEOFABRIC BLANKET

The geofabric shall comply with Clause PG.3.8. In addition to the afore-mentioned clause, there have been many new developments in the geotextile industry with each manufacture detailing its own specification. The instruction from the Engineer to use a certain geotextile shall require the Contractor to supply and install that geotextile or an approved equivalent by the Engineer.

The unit of measurement shall be the square metre (m^2). The rate shall include for the supply of the material, laying, joining, cutting and waste.

PS.DA.16 EXCAVATION OF MATERIALS

The nature of the roadworks is such that a fair amount of the excavation shall be in concrete / asphalt / intermediate / hard and soft materials. Quantities for any concrete / asphalt requiring breaking up with the use of excavators / breakers shall be measured prior to excavation and agreed upon by the Engineer. Area to be excavated shall measured in square meters (m^2) multiplied by the depth / thickness of the material.

The unit of measure is an extra over (m^3), i.e. an additional cost over and above the main pay Section 3, Part DA . The rate shall cover labour and plant necessary for removal of abandoned roadways, sidewalk / median, concrete sidewalks, scoops, pedestrian and vehicular, interlocking blocks, asphalt paving, brick paving, precast kerb / channel and base, precast kerb/ fillet and base, underground reinforced / unreinforced concrete / builders rubble.

No additional payment shall be made for restricted excavation and the Tenderer shall therefore make due allowance in the rates for any additional work or hand excavation.

PS.DA.17 EXCAVATION OF ROAD LAYERS

Existing road layerworks, excluding the asphalt, shall be excavated as restricted excavation ensuring no contaminating between layers and either:

(a) Storing on site for re-use, or;
(b) Transporting and off-loading to the Municipal Depot, either in Malacca in Durban North or the Phoenix Depot,
(c) Transporting to the Municipal deport in Verulam and off-loading or
(d) Spoiling at an approved tip site.

The Contractor's rate for the removal of the layerworks, excluding the asphalt, shall include for the full operation, inclusive of haulage, and is to include for the restricted operation as well.

PS.DA.18 MILLING OF EXISTING ROADWAY TO MUNICIPAL STOCKPILE

The asphalt on the existing roadway shall be milled out and stockpiled at the eThekwini Municipality's Roads Provision's Depots in Phoenix and in Malacca Road, Durban North. Items have been provide in Section 3, Part DA, for the milling and stockpiling of the milled material for the depot. The rates tendered for the items must include for the haulage distance and no extra over cost for the additional haulage distance with be considered. The Unit of Measurement shall be square meter (m^2).

PS.DA.19 CHOKING OF G5 MATERIAL INTO DUMPROCK LAYER

After the dumprock layer has been processed and approved by the Engineer, G5 material shall be imported and spread over the dumprock layer. The G5 material must fill the voids of the upper surface of the dumprock and then be used to provide for level/uniform surface on the dumprock layer. Rate to include for importing, spreading, choking, spreading again and then rolled with a steel drum roller with vibration. On completion of the rolling and vibration, all voids are to be closed to provide a uniform surface. A light roll without vibration by the roller may be required again. The unit of measurement shall be in tonnes (t) and the quantity used will be based on the tally slips. All original tally slips to be received by the Resident Engineer.

PS.DB EARTHWORKS FOR PIPE TRENCHES

Clause	Description
PS.DB.1	BEDDING AND BACKFILL MATERIALS
PS.DB.1.1	GENERAL
PS.DB.1.2	WATERMAINS
PS.DB.1.3	SEWER PIPES
PS.DB.1.4	STORMWATER PIPES
PS.DB.1.5	TELKOM DUCTS
PS.DB.2	EXCAVATION AND BACKFILLING - EXISTING SERVICES
PS.DB.3	EXCAVATION, BACKFILLING AND REINSTATEMENT OF TRENCHES
PS.DB.4	SHORING OF TRENCHES TO EXCAVATIONS
PS.DB.5	EXCAVATION FOR SERVICES TO BE LAID BY OTHERS
PS.DB.6	EXCAVATION IN ROAD AND PAVED AREAS
PS.DB.7	RESTRICTED EXCAVATION
PS.DB.8	COMPACTION OF TRENCHES
PS.DB.9	BACKFILLING OF SERVICE TRENCHES
PS.DB.10	OVERHAUL
PS.DB.11	GEOFABRIC BLANKET
PS.DB.12	EXCAVATION FOR CONCRETE LINED DRAIN
PS.DB.13	BACKFILLING
PS.DB.14	SOIL COMPACTION TESTING
PS.DB.15	SAFEGUARDING OF EXCAVATIONS
PS.DB.16	BARRACADING OF EXCAVATIONS

PS.DB.1 BEDDING AND BACKFILL MATERIALS

PS.DB.1.1 GENERAL

1) The measurement for bedding shall be the total through length along the centre of the pipeline measured HORIZONTALLY with deductions made for line valve chambers.
2) Bedding material required for the backfill of bell holes will be paid for by the Council.
3) The unit of measurement for bedding shall be the Linear Meter (m), and the rate shall include for the placing and compacting of the bedding material up to the underside of the backfill for the various pipe diameters.
4) Separate items have been included in the Bill of Quantities for the provision of bedding material from a Contractor's commercial source.
5) Backfill materials shall comply with Clause DB.3.4. An item has been allowed in the Bill of Quantities for the importation of backfill material where so ordered by the Engineer.
6) The Contractor shall allow for haulage in the rate for provision of imported bedding and backfill. No overhaul will be paid for these items.

PS.DB.1.2 WATERMAINS

1) Notwithstanding Clause DB.3.6 of Part DB : "Earthworks for Pipe Trenches", only a clean sand containing no particles of diameter exceeding 10mm, having a Plasticity Index (P.I.) not exceeding 10 and free from vegetation and lumps shall be used for the bedding cradle and selected fill blanket. It is anticipated that most of the bedding material will have to be provided from an off-site source. Bedding shall be constructed to the dimensions required for Class 'C' bedding.

2) Contractors are advised that the choice, placement and compaction of bedding and backfill materials are critical to the satisfactory performance of steel pipes. Therefore, strict adherence to all specifications in this regard will be enforced.

PS.DB.1.3 SEWER PIPES

Bedding for the sewers shall be class "C" for rigid pipe or "flexible" for flexible pipes. Where the sewer pipe offered is classified in accordance with SABS 0102 part 1 1987 as a rigid pipe, the bedding shall be class "B" and for flexible / semi-flexible pipes, the bedding shall be as for flexible pipes as detailed in the Standard Engineering Specification Part DB, Earthworks for pipe trenches. However in the case of flexible / semi-flexible pipes the material to be used in the selected fill blanket and selected fill bedding cradle shall be selected granular material.

PS.DB.1.4 STORMWATER PIPES

All bedding to stormwater pipes on this Contractor shall be either Type “A”, "B" or Type "C" as is specified in Part DB of the Departmental Technical Specification.

PS.DB.1.5 TELKOM DUCTS

Notwithstanding Clause DB.3.6 of Part DB : "Earthworks for Pipe Trenches", only a clean sand containing no particles of diameter exceeding 10 mm, having a Plasticity Index (P.I.) not exceeding 10 and free from vegetation and lumps shall be used for the bedding cradle and selected fill blanket. It is anticipated that most of the bedding material will have to be provided from an off-site source. Bedding shall be constructed to the dimensions as is detailed on Drawing No. 38589 : "Telkom Cable Ducts and Junction Box Details".

PS.DB.2 EXCAVATION AND BACKFILLING - EXISTING SERVICES

The Tenderer's attention is drawn to the presence of existing services in the area. The Contractor may find it impractical to use mechanical plant for excavation on some portions of the works due to conditions caused by the presence of these services.

The Tenderer's attention is further drawn to the fact that his rates for excavation and backfilling must include for all costs associated with working around these existing services and their protection and accommodation, as no claim for extra payment will be accepted for increased working space or for the inability to use plant in any circumstances.

PS.DB.3 EXCAVATION, BACKFILLING AND REINSTATEMENT OF TRENCHES (CLAUSE DB.5.3.2)

Further to and notwithstanding the requirements of the Departmental Specification, Part DB, the following requirements in respect of trench excavation, backfilling and reinstatement shall be adhered to:

1) It is considered that portion of the excavated material will not comply with the specification for material suitable for backfilling. It will be the Contractor’s responsibility to use selective methods of excavation to ensure that this unsuitable material does not contaminate other materials suitable for reuse.

2) It is anticipated that a fair portion of the material excavated for trenches in existing natural ground is likely to be classified as "Rock" in terms of Part DB of the Departmental Technical Specification, and that blasting methods will be employed to facilitate excavation. Tenderers are to note that the unit of measurement shall be the linear meter (m), and that the rate tendered shall be inclusive of all work or operations necessary to drill, blast, excavate, backfill, spoil or stockpile the material.

3) It is considered that portion of the excavated material will not comply with the specification for material suitable for backfilling in areas subject to traffic loading. An item has been included in the Bill of Quantities for the disposal of unsuitable material to tip and the Contractor's tendered rate for this item shall include for stockpiling if deemed necessary.

4) Where the Contractor chooses to trench by open excavation e.g. battering sides of the trenches, this over-excavation shall not be backfilled with unsuitable excavated material but shall be backfilled with the same imported material as used for the pay-width of the trench. Payment for the imported backfill shall be limited to the pay-width of the trench only and the Contractor shall allow in his rates for any extra backfill material that may be required as a result of over-excavating

5) Notwithstanding the method of trench excavation adopted by the Contractor, the restriction on the maximum trench width as defined in specification Clause DB.6.1 - must be strictly adhered to. Should the Contractor over-excavate the trench then he will be responsible for increasing the pipe strength and / or bedding class to be used, all to his cost.

The measurements for excavation shall be the total through-length along the centre-line of a pipeline measured HORIZONTALLY with deductions for manholes. In addition, trench depth will be measured vertically on the centre-line of the pipeline from the existing ground level to the invert level.

PS.DB.4 SHORING OF TRENCHES TO EXCAVATIONS

The Contractor shall be responsible for the design and installation of all shoring where applicable, which must not only comply with all of the relevant safety regulations pertaining to the provision of safe working conditions in earthwork excavations but also will provide sufficient lateral support to minimise any damage to adjacent structures, services or road surfaces.

In addition to the above and the requirements of Clause DB.5.3.2 (a) all excavations in road reserves and adjacent to structures and where excavations are in excess of 1,0 m in depth shall be supported with close shoring and no open or intermittent shoring of any description will be permitted.

The minimum requirements for shoring of these trench excavations shall be as follows:

1) Either ribbed steel trench sheeting of suitable thickness with an edged return for interlocking or suitably sized timber poling boards or runners are to be used. Adequate sized waling's at suitable intervals are to be provided. Struts shall consist of either adjustable tubular steel jacks or timber suitably sized for the load application.

2) The shoring for the excavations shall be progressively installed as the excavation proceeds. Care being taken to ensure the soil is not removed within a minimum 300 mm of the toe of the runners.

3) Installation of shoring after the trench has been excavated to a depth in excess of 1,5 m is not acceptable.

4) Details of the proposed shoring must be supplied to the Engineer at least two weeks before the operation commences. During the backfilling, the sides of the trench including the road layers above any over-excavated sections are to be cut back to a point behind the over excavation.

5) No separate item has been allowed for in the Bill of quantities and the Contractor shall allow in his excavation rates for shoring as necessary.

The cutting back of the trench sides shall be to the Contractor's account. Payment for reinstatement of the road hardening shall be based on the widths given in Clause DB.8.3.3.

PS.DB.5 EXCAVATION FOR SERVICES TO BE LAID BY OTHERS

Where indicated, the Contractor shall be required to excavate a trench for the installation of services by others. (Depth and width of trench shall be confirmed on site). The trench bottom shall be trimmed to comply with the tolerances specified under Clause DB.6.3, after which it shall be taken over by the service organisation. After installation of the services the trench shall be backfilled as part of the bedding operation to approximately 300 mm above the service.

Thereafter the Contractor shall continue the backfilling utilising suitable material from the trench excavation, in 150 mm layers which shall be compacted to 95% Mod. A.A.S.H.T.O. density. The unit of measurement shall be the cubic meter (m^3) and the rate shall cover the work described under Clause DB.8.1.

PS.DB.6 EXCAVATION IN ROAD AND PAVED AREAS

Further to Clause DB.8.7 the rate tendered shall include for saw cutting the existing road asphalt.

PS.DB.7 RESTRICTED EXCAVATION

The nature of the trench excavations are such that a considerable amount of the excavation shall be in restricted conditions. No additional payment shall be made for such excavation and the Tenderer shall therefore make due allowance in the rates for any additional work or hand excavation.

PS.DB.8 COMPACTION OF TRENCHES

Further to Clause DB.8.5, Tenderers are to note that in all cases the compaction of the trench bottom and the trench backfill shall be to 95% Mod. A.A.S.H.T.O. An extra-over item has not been included in the Bill of Quantities and tenderers shall include for these costs under the relevant excavate and backfill items.

PS.DB.9 BACKFILLING OF SERVICE TRENCHES

As part of the bedding operation, services laid or relocated by others will be backfilled by them to approximately 300 mm above the service. The backfill shall then be continued by the Contractor up to the original level. The backfilling shall be carried out using suitable material from the trench excavation, in 150 mm layers which shall be compacted to 95% Mod. A.A.S.H.T.O. density.

The unit of measurement shall be the cubic meter (m^3) and the rate shall include for all plant and labour required to select, place and compact the material as specified.

PS.DB.10 OVERHAUL

Notwithstanding the requirements of Clauses DB.8.1 and DB.8.17 no additional payment shall be made for haulage.

PS.DB.11 GEOFABRIC BLANKET

The geofabric to stone bedding must comply with Clause PG.3.8 of Part PG : Non-Pressure Pipelines and Precast Concrete Culverts.

The unit of measurement shall be the square meter (m^2). The rate shall include for its supply, laying, joining, cutting and waste.

PS.DB.12 EXCAVATION FOR CONCRETE LINED DRAIN

The unit of measurement shall be the cubic meter (m^3). The rate shall include for all labour, plant and material necessary for the excavation of soft material to spoil for the concrete lined drain.

The rate shall include for all setting out, clearing and grubbing, excavation by hand or plant, loading the material directly into trucks and transporting the material to the approved tip and disposal.

PS.DB.13 BACKFILLING

Where bedding is compacted by saturation, no backfill material may be placed or compacted on top of this, until such time as the bedding has sufficiently dried.

PS.DB.14 SOIL COMPACTION TESTING

The following are the minimum frequencies for the process control tests to be executed by the Contractor at his own expense:

1. Pipe bedding: one density test on each 9m of pipe trench.
2. Normal trench backfilling: one density test on every layer for every 9m of pipe trench.
3. Backfilling in areas subject to vehicle loads: one test on each layer of 100mm at each road.

The positions of these minimum number of density tests shall be determined randomly by the Contractor and shall be clearly documented with the results. The results of the tests be submitted to the Engineer and shall prove to the Engineer that the work as a whole was done satisfactorily.

PS.DB.15 SAFEGUARDING OF EXCAVATIONS

The precautions for excavations as specified in the relevant clauses in this section shall apply to all trench excavations.

The Contractor or his agent or his representative shall take all the steps necessary to ensure that no person is required or allowed to work in a trench or any other unsupported overhanging excavation which is more than 1,0m deep, and any excavation which has not been adequately supported, shored or braced if there is any danger whatsoever of the sides of the excavation collapsing. The support, shoring or bracing to be designed and constructed by the Contractor, shall be strong and sturdy enough to support the sides of the excavation in question.

The Contractor shall note that this clause does not relieve him of any obligations required in terms of the Occupational Health and Safety Act.

PS.DB.16 BARRICADING EXCAVATIONS

All excavation areas are to be barricaded to the satisfaction of the Engineer

All costs arising from these requirements are to be included in the relevant rates for excavation.

PS.EC CEMENT TREATED GRADED CRUSHED STONE

Clause	Description
PS.EC.1	STABILISED LAYERWORKS
PS.EC.1.1	SUPPORTING SPECIFICATIONS
PS.EC.1.2	CEMENTING AGENT
PS.EC.1.3	GRADED CRUSHED STONE
PS.EC.1.4	APPLICATION
PS.EC.1.5	WATERING
PS.EC.1.6	TESTING
PS.EC.1.7	TRIAL LAYER

PS.EC.1 STABILISED LAYERWORKS

The standard Departmental Specification Part EC has been amended with respect to the following items for the purposes of this contract:

PS.EC.1.1 SUPPORTING SPECIFICATIONS

Replace SABS 471 and SABS 626 with SABS ENV 197-1.

PS.EC.1.2 CEMENTING AGENT

The cement used shall conform to SABS ENV 197-1 and shall be classified as either CEM II/A-S 42.5 or CEM III/A 32.5 respectively.

PS.EC 1.3 GRADED CRUSHED STONE

The material shall conform to the requirements for a **G4** or better material as described in TRH 14:1985 and shall be free of shale or weathered dolerite materials. The following additional requirements shall also be met:

Before stabilising :-

Percent passing 0.425 mm sieve (TMH1-A1)	Max. 15
pH (of fines passing 0.425 mm sieve)	Min. 6

After stabilising :-
Plasticity Index (TMH1-A3) after treatment Max. 6

UCS (7 day) @ 100% Mod. AASHTO
(TMH 1-A14) Min. 1.5 Mpa
Max. preferably < 3.0 MPa

ITS (TMH1-A16T) Min. 250 kPa
Cement content Min. ICL value or 2% by mass of raw material - whichever is greater
Max. 5% by mass of raw material.

PS.EC.1.4 APPLICATION

The first paragraph of Clause EC 5.2 shall be replaced with the following :

The rate of application of the stabilising agent when applied by mechanical bulk-spreading equipment and measured by the canvas-patch method, shall be equal to the specified rate

of application not greater than 5% of the rate of application, and no single measurement shall show a value deviating by more than 20% from the specified rate.

PS.EC.1.5 WATERING

Further to the requirement of Clause EC 5.4, the moisture content of the stabilised material shall not exceed 80% of the saturation moisture content of the unstabilised material at maximum dry density. Any portion of the work that exceeds this requirement shall be dried and restabilised to the required stabiliser content.

PS.EC.1.6 TESTING

Paragraph 1 of Part (a) shall be replaced with the following:

The Contractor is to provide a mix design proposing a stabiliser content proving compliance with the requirements of Clause EC 3.2 using the material he intends using. The mix design shall include an ICL test which will be used to establish the minimum stabiliser content. The final cement content shall be subject to the Engineer's approval.

Further to Item (b) the following additional acceptance test requirements shall apply:

The uniformity of application of the stabiliser shall be ascertained by retrieving a minimum of 10 samples selected randomly over the extent of the works and establishing the stabiliser content of the samples. The samples shall be retrieved immediately before compaction (after the stabiliser has been mixed with the parent material). Not more than 10% of the test results shall fall below the specified stabiliser content and the coefficient of variation of the stabiliser content should be less than 30%. No single measurement shall deviate from the specified rate by more than ∀ 30% of the specified rate.

The following item is to be included under Part EC.5 construction:

PS.EC.1.7 TRIAL LAYER

Prior to the commencement of paving of the layer the Contractor shall construct a section of trial layer to demonstrate his capability of constructing the layer in accordance with the specifications. The trial layer shall be constructed with the same materials, mix proportions and equipment as the Contractor intends using for the main layer.

A trial section of not less than 2 000 m^2 shall be submitted for approval. The Engineer shall also have the right to call for a new trial section at any stage of the contract when, in his opinion, changes by the Contractor in the approved equipment, materials, mix or plant warrant such a procedure.

The Contractor may, unless advised of any deficiencies in the trial layer, proceed with the main layer from a time ten days after the completion of the trial section or such earlier time as the Engineer may allow. In the event of deficiencies in the trial layer, the Engineer may order the Contractor to construct further trial sections until a satisfactory section is achieved. The Contractor may then proceed with the main layer from a time ten days after the successful completion of the satisfactory trial section.

PS.ED ROAD ASPHALT

Clause	Description
PS.ED.1	SMOOTHNESS APPLICABLE TO WEARING COURSE
PS.ED.2	RESTRICTION ON PLACING OF ASPHALT
PS.ED.3	PATCHING OF EXISTING SURFACE
PS.ED.3.1	CONSTRUCTION
PS.ED.3.2	MATERIALS
PS.ED.3.3	MEASUREMENT AND PAYMENT
PS.ED.4	BASE COURSE MIX REQUIREMENTS
PS.ED.5	WEARING COURSE
PS.ED.6	LAYING OF ASPHALT
PS.ED.7	LONGITUDINAL AND TRANSVERSE JOINTS
PS.ED.8	SAW CUT TO LONGITUDINAL AND TRANSVERSE JOINTS
PS.ED.9	PLANING OF EXISTING ASPHALT ROAD SURFACE
PS.ED.10	MILLING OF ROAD SURFACE
PS.ED.11	ASPHALT REINFORCEMENT
PS.ED.12	CRACK SEALING
PS.ED.13	TECHNICAL SPECIFICATION FOR ASPHALT

PS.ED.1 SMOOTHNESS APPLICABLE TO WEARING COURSE (Clause ED.6.2)

The smoothness applicable to the wearing course shall be that specified in this clause and not as in Clause ED 6.2(b). A Category "A" Road is required for all roads constructed under this contract.

(1) The smoothness of the pavement will be determined by using a profilograph and the surface finish shall be tested in accordance with the following specification.

The profile index will be determined using a California type profilograph furnished and operated by the Engineer in the presence of the Contractor. The profilograph shall be moved longitudinally along the pavement at a speed no greater than 5 kph and shall record the surface profile at full scale vertically. The results of the profilograph test will be evaluated as described in the metricated version of Test No. Calif. 526-D.

The Contractor shall furnish paving equipment and employ methods that produce a riding surface having a profile index of 300 mm per kilometer or less for category "A" Roads and 500 mm per kilometer or less for Category "B" Roads. The profile measurements will start 10 m and will terminate 20 m from each bridge approach pavement or existing pavement that is joined by the new pavement in the direction of placement.

Two pavement profiles will be taken of each day's production and the Profile Index shall be defined as the average of the two profiles. The position the profiles are taken will be either on the centre line of each planned traffic lane, if two traffic lanes are paved, or in the wheel paths of the traffic lane (i.e. 1 m from each edge) if only one traffic lane is included in the paved width.

A daily average profile index shall be determined for each day's paving and a profile index of each day's production shall be established as soon as possible. A day's paving is defined as a minimum of 0,1 km of pavement placed in a day. If less than 0,1 km is paved, the day's production will be grouped with the next day's production.

(2) Rectification

The full depth of the layer shall be removed and replaced with fresh material laid and compacted to specification.

Where the surface level is too high or too low the area rectified shall be not less than one lane wide and at least 15 m long for wearing course.

Where the number of surface irregularities exceeds the specified limits the area to be rectified shall be 100 m long and not less than one lane wide.

PS.ED.2 RESTRICTION ON PLACING OF ASPHALT

The Contractor shall, wherever possible, complete the earthworks and compaction to sidewalks prior to the laying of the wearing course on the adjacent section of road so as to prevent construction plant and equipment from damaging the freshly laid wearing course.

PS.ED.3 PATCHING OF EXISTING SURFACE

Where existing roads are to be patched, or prior to resurfacing existing roads, those areas of the existing asphalt pavement which require patching will be marked by the Engineer.

PS.ED.3.1 CONSTRUCTION

In the areas to be patched the in-situ asphalt surfacing shall be removed to a depth of 100 mm. The sides shall be cut vertically with the edges square. The exposed surface shall be swept of all loose material, a tack coat applied to the bottom and sides and then patched with asphalt base course. After compaction the surface of the patch shall be flush with the adjacent road surface.

PS.ED.3.2 MATERIALS

The asphalt base course shall comply with the requirements of Part ED : Road Asphalt.

PS.ED.3.3 MEASUREMENT AND PAYMENT

The unit of measurement shall be the square meter (m^2) and the rate shall include for removal of the in-situ layers, trimming the sides, compaction, application of the tack coat, supply and laying of the asphalt, loading and haulage to the tip of excess material.

PS.ED.4 BASE COURSE MIX REQUIREMENTS

Further to Clause ED.5.1 the asphalt base course mix used for the roadworks shall comply with the specifications contained in PS.ED.13.

PS.ED.5 WEARING COURSE

The continuously graded wearing course shall be a compacted layers of 50 mm, or as specified on the contract drawings. The asphalt wearing course mix used for the roadworks shall comply with the specifications contained in PS.ED.13.

PS.ED.6 LAYING OF ASPHALT

(a) The Contractor shall provide the Engineer with the name of the asphalt Sub-Contractor before asphalt is laid.

The asphalt shall be laid by an approved paving machine. Hand-laying shall be permitted at the Engineer's discretion when the area involved is small. The asphalt shall not be laid if its temperature is below 140 °C.

The asphalt shall be rolled in accordance with the method described in chapter VI of the Asphalt Institute Paving Manual (MS-8). A final density is required of at least 96% of the Marshall density of the mix.

An acceptance certificate for this layer will be issued by the Engineer's inspector when all requirements have been met.

(b) Further to Clause ED.8.1, the rate tendered shall include for all extra work required to lay and compact the asphalt base and make-up courses in restricted areas.

PS.ED.7 LONGITUDINAL JOINTS

Tenderers are to note that the tendered rate per Section 4 Part ED are not to include for saw cutting. If the Engineer requires the joint to be saw cut, the saw cutting to the longitudinal joint and transverse joint will be paid for under Section 4 Part ED as an extra over.

A longitudinal joint is to be formed by cutting into the existing road surface by a width of 150 mm to a depth of 50 mm where the new surface is to be tied longitudinally into the adjacent existing pavement. The position of the joint shall be indicated by the Engineer on site. After cutting / milling the joint shall be swept of all loose material and painted with a tack coat.

Cutting of the joints shall only take place immediately prior to the laying of the wearing course.

The unit of measurement shall be linear meter (m). The rate tendered shall cover the neat cutting of the joint, the cutting of the additional 150 mm step into the existing adjacent asphalt base layers and the removal of all the old asphalt to tip off site inclusive of haulage.

PS.ED.8 SAW CUT TO LONGITUDINAL AND TRANSVERSE JOINTS

The saw cut shall be cut with a diamond cutter to a neat uniform line 50 mm deep along the edge of the existing road where directed by the Engineer.

The unit of measurement for the saw cut shall be linear meter (m) and the rate shall cover the overall depth of cut.

PS.ED.9 PLANING OF EXISTING ASPHALT ROAD SURFACE

Where required, so as to achieve the correct design road levels, the existing asphalt road surface is to be planned to varying depths between 0 mm and 100 mm to allow correct placing of the new asphalt surface.

The unit of measurement shall be square meter (m^2). The rate tendered is to include for the establishment of the rig on site, planning, sweeping, disposal of the planed material, traffic accommodation and the neat cutting of the joint adjacent to the existing road surface**.**

PS.ED.10 MILLING OF ROAD SURFACE

Milling of the existing road surface shall be carried out to either reduce levels, to remove unsuitable asphalt layers or to salvage the existing asphalt, as shall be directed by the Engineer.

PS.ED.10.1 METHOD OF WORK

The areas to be milled and the depths of asphalt to be removed shall be indicated either on the drawings or by the Engineer on site. Where it is necessary to maintain traffic over the milled areas the planning shall be programmed to take place immediately prior to the asphalting operation.

The milled material shall be spoiled at the Phoenix Depot or Malaca Road Depot in Durban North. This shall be directed by the Engineer.

After milling, the area shall be swept of all loose material and a tack coat applied at a rate of 0,3 l/m² following which the replacement asphalt shall be laid. On no account shall traffic be permitted to run on the milled surface.

In areas where the existing road base is disturbed by the milling operation, the surface of the base shall be recompacted with static compactive equipment. These areas shall then be primed with MC 30 or MSP 1 applied at a rate of 0,6 l/m². Only after the curing period shall the asphalt be laid.

In certain instances, the Engineer may direct that the disturbed road base be removed and replaced with graded crushed stone or cement treated graded crushed stone.

PS.ED.10.2 MEASUREMENT AND PAYMENT

(1) Milling

The unit of measurement shall be square meter (m^2). The rates shall include the hire of the milling machine, loading and transporting the milled material to a Municipal Depot and sweeping of the surface. In addition, allowance shall be made for working around manhole and valve covers.

(2) Recompacting and Priming of Road Base

The unit of measurement shall be the square meter (m^2) and shall be measured extra over to the above item. The rate shall cover the plant and labour required to complete the operation as specified and shall include the supply and application of the prime coat.

PS.ED.11 ASPHALT REINFORCEMENT

The contractor shall install asphalt reinforcement geofabrics where directed by the engineer. **The unit of measurement shall be the square meter (m^2).** The rates shall include the supply and installation of the geofabrics. Tack coat shall be excluded from this item.

PS.ED.12 CRACK SEALING

PLANT AND EQUIPMENT

(a) Equipment for crack sealing

"The contractor shall inter alia provide the following equipment for crack seal

(i) Blowing out cracks

A mobile compressor capable of discharging at least 3 m^3/min compressed air at 650 kPa pressure. The compressed air shall be free of deleterious matter that may adversely affect the bond between the sealant and the cracks. The compressor shall be free of oil and diesel leaks.

A lance shall be used to direct the force of the air into the cracks and must be maneuverable enough to follow the path of the crack accurately.

(ii) Sealant applicator

The sealant shall be applied through an applicator manufactured specifically for this purpose. Essentially the equipment for the hot sealant shall consist of a mobile vessel

capable of heating the sealant to the required application temperature by indirect heat, controlled by a thermostat to prevent overheating. A calibrated thermometer shall be fitted in an accessible position to accurately measure the sealant temperature in the tank. Only pumps which can deliver the sealant to the crack in a controlled fashion shall be used.

The sealant shall only be applied with pressure type application equipment to ensure that the cracks are filled rather than covered.

The contractor shall ensure that all equipment is kept clean so as to prevent blockages and resultant poor workmanship.

PS.4804 CONSTRUCTION

Sealing cracks

(ii) Preparation

"The cracks shall be blown out with compressed air. All dirt, grit and other base or foreign matter shall be blown out and be removed from the cracks and road surface

(iii) Cracks smaller than 3mm

Add the following:

"No cracks smaller than 3 mm width shall be sealed unless so ordered by the Employer's Agent Representative"

(iv) Cracks of 3mm and wider

Replace the first four paragraphs with the following:

"Cracks shall first be cleaned before the crack is sealed. The sealant shall be forced into the cracks by means of the specified sealant applicator. The contractor shall ensure that the sealant mixture actually penetrates the crack and does not merely cover the crack in the form of a bandage. All excess sealant on the road surface wider than 30mm on each side of the crack and 1mm thick shall be removed, and will not be paid for

(v) Restrictions

Add the following at the end of the second paragraph:

"This re-application forms part of the measured meter of crack completed and will not be measured separately."

"Crack sealing shall not take place when the conditions are excessively windy or dusty as determined by the Employer's Agent Representative."

PS.4807 MEASUREMENT AND PAYMENT

Item		Unit
"PS.ED.12	Cleaning, Applying of Herbicide, Supplying Sealant and Sealing cracks Cleaning crack with compressed air, applying a herbicide/weed-killing, and sealing the cracks using Class CH-E1 modified binder crack sealant	**meter (m)**

The unit of measurement for sealing of cracks shall be the meter of crack sealed as specified.

The tendered rates shall include full compensation for blowing/cleaning the cracks, supply and application of herbicide and mixing, heating (where required) and applying all the materials as specified, and for all equipment, labour, supervision and incidentals for completing the work. No additional payment will be made for multiple applications of material, and payment will not distinguish between the various types, widths or lengths of cracks.

PS.ED.13. TECHNICAL SPECIFICATION FOR ASPHALT

The following technical specifications shall replace **only the Material Specifications of Part ED.**

Table of Contents

1. SCOPE

This specification covers the manufacture of hot/warm mix asphalt. There are a total of 15 hot/warm asphalt mixes covered in this specification:-

- 9 sand skeleton mixes
  - Designated “Sa”
  - 3 NMAS mix sizes
    - “10”, “14” mm and “20” mm
  - For use in :-
    - Standard traffic loading and speed conditions (“S”)
    - Heavy traffic loading and speed conditions (“H”)
    - Very Heavy traffic loading and speed conditions (“V”)
    - Extreme traffic loading and speed conditions (“E”)
- 4 SMA (stone skeleton) mixes
  - Designated “SMA”
  - 2 NMAS mix sizes
    - “10” mm and “14” mm
  - For use in :-
    - Very Heavy traffic loading and speed conditions (“V”)
    - Extreme traffic loading and speed conditions (“E”)
- 2 EME mixes
  - Designated “EME”
  - 2 NMAS mix sizes
    - “14” mm and “20” mm
  - For use in :-
    - Extreme traffic loading and speed conditions (“E”)

(A “Sa-H14” mix is thus a Sand Skeleton mix of Nominal Maximum Aggregate Size 14.0mm to be used in Heavy traffic loading and speed conditions. A description of every mix required can be found in Table 5).

2. REFERENCES AND STANDARD SPECIFICATIONS

Reference to the following standard specifications, guideline documents and codes of practice (Table 1) shall be deemed to be references to the latest issues of the relevant documents:-

SANS 9001	Quality management systems – Requirements
SANS 4001-BT1	Penetration grade bitumen
SANS 4001-BT3	Anionic bitumen road emulsions
SANS 4001-BT4	Cationic bitumen road emulsions
SANS 1083	Aggregates from natural sources
SANS 824	Lime for soil stabilization

SANS 50197-1	Cement – Part 1:Composition, specification and conformity criteria for common cements
SANS 1491:Part 1	Portland cement extenders - Part 1:Ground granulated blast-furnace slag
SANS 1491:Part 2	Portland cement extenders - Part 2:Fly ash
Act 85 of 1993	Occupational health and safety act
Act 39 of 2004	National environmental management : Air quality act
Sabita Manual 5	Guidelines for the manufacture and construction of hot mix asphalt
Sabita Manual 27	Guidelines for thin hot mix asphalt wearing courses on residential streets
Sabita Manual 32	Best practice guideline for warm mix asphalt
Sabita Manual 33	Interim design procedure for high modulus asphalt
Sabita Manual 35	Design and use of asphalt in road pavements
Sabita TG1	The use of modified bituminous binder in road construction
TRH 21	Hot mix recycled asphalt

Table 1 Reference and Standard Specifications

3. MATERIAL

3.1. Bituminous Binder

Binder selection shall be guided by both the asphalt mix requirements outlined in section 4 and the South African PG Binder Classification System.

Straight run bituminous binders shall conform to SANS 4001-BT1 and shall be selected from penetration grades 10/20, 15/25, 35/50 or 50/70.

Modified binders shall be selected from A-E1, A-E2, A-P1 A-H1 or A-H2 and shall comply with the requirements of Tables 7 and 9 respectively from the Sabita Technical Guideline TG1.

The binder penetration grade, the type of modifier used (as applicable) and the SA PG Binder Classification shall be indicated in the mix design report.

3.2. Aggregates

3.2.1. Coarse Aggregate

Coarse aggregate shall comprise single sized, clean, unweathered material and shall be free from organic matter and other deleterious substances. The aggregate shall conform to the requirements of Table 2 “Aggregate Quality Requirements”. The grading and dust content of the aggregate shall comply with the

requirements of Table 4302/8 of the COLTO Standard Specifications for Road and Bridge Works for State Road Authorities (1998).

3.2.2. Fine Aggregate

Fine aggregate shall consist of the mineral matter passing the 5,00 mm sieve and retained on the 0,075 mm sieve and shall consist predominantly of freshly crushed aggregate or clean, natural hard sand. Fine aggregate shall conform to the requirements of Table 2 “Aggregate Quality Requirements”. Material derived from the mechanical crushing or milling of rock shall be well graded between 5.0mm and 0.075mm. The grading and dust content of material derived from the natural disintegration of rock shall comply with the requirements of SANS 1083 Table 1 (Column 2).

The use of natural sands is limited or prohibited in certain asphalt mixes. These limitations are quantified under section 3.2.5 “Aggregate Blends”.

3.2.3. Filler

Filler shall comprise the material predominantly passing the 0.075 mm sieve and shall consist of either inert material (crushed rock fines) or an approved active filler or a combination thereof.

Active filler shall consist of either milled blast furnace slag, hydrated lime, portland cement, fly-ash or a combination of these materials. Active fillers shall conform to the relevant SANS specification for the particular material. Filler shall also conform to the requirements of Table 2 “Aggregate Quality Requirements”.

The permissible active filler content in any asphalt mix shall be no more than 2% by mass of mix aggregates.

3.2.4. Reclaimed Asphalt

Fragments of asphalt obtained from the road or from stockpiles of discarded asphalt may be used in the manufacture of asphalt mixes. Reclaimed asphalt (RA) shall be characterized and processed in accordance with the recommendations set out in TRH 21 “Hot mix recycled asphalt”.

The RA content of asphalt mixes shall be limited as noted in Table 3.

Mix Type	Maximum RA Content
Sand Skeleton Mixes	50%
SMA	0%
EME	20%

Table 3 Permissible RA Content

3.2.5. Aggregate Blends

Aggregates shall be blended in such a manner so as to produce an asphalt mix conforming to the requirements of each particular mix type and nominal maximum particle size. The required aggregate blending will be achieved through the mix design process.

3.2.5.1. Sand Skeleton Mixes

Aggregate gradings are required for 3 nominal maximum particle size (NMPS) mixes (ie. 10mm, 14mm and 20mm). The aggregate grading for these mixes shall be guided by the control points in Table 4.

Sieve Size (mm)	Percent Passing					
	Nominal Maximum Particle Size (NMPS)					
	10mm		14mm		20mm	
	Min.	Min.	Min.	Max.	Min.	Max.
37.5						
28					100	
20			100		80	100
14	100		80	100		85
10	80	100		85		
7.1		85				
5						
2	32	67	28	58	23	49
1						
0.6						
0.3						
0.15						
0.075	2	10	2	10	2	8

Table 4 Sand Skeleton Asphalt Mix Grading Control Points

A maximum of 10% natural sand (by mass of mix aggregates) may be used in sand skeleton mix types Sa-H, Sa-V and Sa-E.

The reclaimed asphalt (RA) content of sand skeleton mixes shall be limited to 50% maximum as noted in Table 3.

3.2.5.2. Stone Mastic Asphalt (SMA) Mixes

Stone Mastic Asphalt is a stone skeleton mix type. The aggregate grading for SMA mixes shall be guided by the requirement that the stone skeleton coarse aggregate structure is not dilated by the mastic in the voids of the stone skeleton structure.

The use of “natural” sand shall not be permitted in SMA mixes.

The use of reclaimed asphalt (RA) shall not be permitted in SMA mixes.

SMA grading blends are required for two SMA NMPS mixes :-

- 10mm
- 14mm

3.2.5.3. Enrobé à Module Élevé (EME) Mixes

EME aggregate gradings shall be guided by the requirements outlined in Sabita Manual 33 “Interim design procedure for high modulus asphalt”.

The use of “natural” sand shall not be permitted in EME mixes.

The reclaimed asphalt (RA) content of EME mixes shall be limited to 20% maximum as noted in Table 3.

EME grading blends are required for two EME NMPS mixes :-

- 14mm
- 20mm

3.3 Warm Mix Asphalt Technologies/Additives

Warm Mix Asphalt (WMA) technologies/additives shall conform to the appropriate requirements outlined in SABITA Manual 32 “Best practice guideline for warm mix asphalt” and shall be approved prior to use. The contractor shall provide the Roads Provision Department with the name and type of technology/additive to be used together with any other technical information pertinent to its use in the asphalt

Aggregate Property		**Coarse Aggregate**		**Fine Aggregate (Crushed Rock)**	**Fine Aggregate (Natural Sand)[1]**	**Combined Total Fine Aggregate**	**Inert Filler**	**Active Filler**
Parent Material		Clean unweathered crushed rock		Clean unweathered crushed rock	Clean natural fines not obtained from crushed parent rock	-	Unweathered rock dust	Approved commercial non-plastic material
		Sand Skeleton Mixes (Sa, EME)	Stone Skeleton Mixes (SMA)					
Grading		COLTO Standard Speciofications for Road and Bridge Works for State Road Authorities (1998) Table 4302/8		Well graded between 5.0mm and 0.075mm sieves	SANS 1083 Table 1 (Column 2)	Passing 5.0mm sieve	$P_{0.075}$ > 75%	$P_{0.075}$ > 75%
ACV (%) (max.)		25	21	25 (Parent rock)	-	-	-	-
10% FACT (Dry) (Min.)		160 kN	210 kN	-	-	-	-	-
10%FACT (Wet) (Min.)		75% of 10% FACT (Dry) Value	75% of 10% FACT (Dry) Value	-	-	-	-	-
Flakiness Index	20mm & 14mm Aggregate	25		-	-	-	-	-
	10mm & 7.1mm Aggregate	30		-	-	-	-	-
	SMA Mixes	20		-	-	-	-	-
Polished Stone Value (Min.)		50		-	-	-	-	-
Water Absorption (%) (Max.)		1.0		1.5	1.5	1.5	-	-

Aggregate Property	Coarse Aggregate	Fine Aggregate (Crushed Rock)	Fine Aggregate (Natural Sand)[1]		Combined Total Fine Aggregate	Inert Filler	Active Filler
Sand Equivalent (%) (Min.)	-	40	River	Pit	50	-	-
			80	50			
Methylene Blue Adsorption Value (Max.)	-	0.7	0.7		0.7	-	-
Permissible Content (% by Mass of Mix Aggregates)	-	-	0 - 10	-	-	-	0 – 2

1. Natural sand is not permitted in SMA mixes.

Table 2 Aggregate Quality Requirements

4. HOT/WARM MIX ASPHALT MIXES AND DESIGN

4.1. Asphalt Mix Requirements

There are a total of 15 mixes required:-

- 9 sand skeleton mixes (i.e. continuously graded mixes)
- 4 SMA (stone skeleton) mixes
- 2 EME mixes

The required asphalt mixes are depicted in Table 5. However, traffic condition risk profiles require additional higher levels of design for particular mixes (Table 6).

Sand Skeleton Mixes (Sa)		Nominal Maximum Particle Size		
Traffic Condition Category		10.0	14.0	20.0
S	Standard Conditions	Sa-S10	Sa-S14	
H	Heavy Conditions	Sa-H10	Sa-H14	Sa-H20
V	Very Heavy Conditions		Sa-V14	Sa-V20
E	Extreme Conditions		Sa-E14	Sa-E20
Design Level	Mix Types			
Level I	Sa-S10, Sa-S14			
Level II	Sa-H10, Sa-H14, Sa-H20, Sa-V14, Sa-V20			
Level III	Sa-E14, Sa-E20			

Stone Mastic Asphalt (SMA)		Nominal Maximum Particle Size		
Traffic Condition Category		10.0	14.0	20.0
S	Standard Conditions			
H	Heavy Conditions			
V	Very Heavy Conditions	SMA-V10	SMA-V14	
E	Extreme Conditions	SMA-E10	SMA-E14	

Enrobé à Module Élevé (EME)		Nominal Maximum Particle Size		
Traffic Condition Category		10.0	14.0	20.0
S	Standard Conditions			
H	Heavy Conditions			
V	Very Heavy Conditions			
E	Extreme Conditions		EME-E14	EME-E20

Table 5 Asphalt Mix Requirements

Traffic Volume (million E80's)	Traffic Condition Category
	Traffic Speed (km/h)

	< 20	20 - 70	> 70
< 3	H	S	S
3 to 10	V	H	H
10 to 30	E	V	V
> 30	E	E	E

Table 6 Traffic Condition Risk Profiles

The typical use of various mix types and mix NMPS is portrayed in Table 7.

Asphalt Mix Use			Mix Type
Mix Nominal Maximum Particle Size (NMPS)			
10.0	14.0	20.0	
Patching/ Handwork			Sa
Wearing Course (Paved)			Sa, SMA
	Base Course (Paved)		Sa, EME

Table 7 Typical Mix Use

4.2. Asphalt Mix Design

Asphalt mix designs are required for every mix supplied. Mix designs for each mix type are to be conducted in accordance with the guidelines noted in Table 8.

Sand Skeleton Mixes	Sabita Manual 35	Design and use of asphalt in road pavements
Stone Mastic Asphalt (SMA)	Sabita Manual 35	Design and use of asphalt in road pavements (Appendix B)
Enrobé à Module Élevé (EME)	Sabita Manual 33	Interim design procedure for high modulus asphalt

Table 8 Asphalt Mix Design Guideline Documents

The mix design process shall consist of a laboratory design, a plant trial and (if required) a paved trial. Once satisfied that the laboratory design and plant and paved trials meet the specified mix requirements, the contractor is to document the final mix parameters (i.e. the Job Mix Formula (JMF)). These parameters will be used for production quality control and acceptance purposes (see Table 9).

Grading
Voids in the Mix (@ design compaction)
Binder Content

Table 9 Mix Parameters for the Job Mix Formula

The contractor shall also include the following “mix characteristics” as a part of his mix design submission :-

- A unique identification number for every mix design
- The binder storage constraints (e.g. maximum storage times, etc.)
- The type of modifier used and the modified binder characteristics to TG1 (if applicable)
- Binder classification in terms of the SA PG Binder Classification System
- Whether the asphalt mix is using a Warm Mix Asphalt technology/additive. The contractor shall comment on any modifications to the "standard" mix design process consequential to the use of the Warm Mix Asphalt technology/additive.
- The maximum mix temperature in the truck at the exit from the plant (in line with industry norms)
- The minimum mix temperature in the truck on delivery (in line with industry norms)
- The minimum recommended mix temperature for compaction of the mix on site (in line with industry norms)
- Comment on any asphalt mix characteristics that should be brought to the attention of the asphalt paving/laying team on site (e.g. EME asphalt mix longitudinal joint construction)

Should substantial changes to material types and properties occur, the asphalt mix designs for affected mixes shall be reviewed and where necessary re-constituted and re-submitted for approval.

4.2.1. Sand Skeleton Mixes

Designs of sand skeleton asphalt mixes are to be conducted in accordance with the guidelines set out in Sabita Manual 35 "Design and use of asphalt in road pavements". Designs are to be conducted in accordance with the appropriate level (i.e. I, II and III) as indicated in Table 5.

4.2.1.1. Level I Design

The Level I design is aimed primarily at verification of the mix volumetric. However, a Level I design is a pre-requisite for the Level II and III designs.

Asphalt mixes shall achieve the volumetric criteria noted in Table 11 at the compaction effort noted in Table 10 (or Tables 14 or 17 as applicable) with a design air void content of 4%.

	Marshall	Gyratory
Traffic Condition Category	SANS 3001 AS1	AASHTO T 312
	No. Blows	N_{design}
Standard (S)	75+45	75

Table 10 Volumetric Compaction Requirements (Level I)

NMPS

	10	14	20
VMA (min.)	15	14	13
VFB	65 - 75	65 - 75	65 - 75

Table 11 Mix Design Requirements (Level I)

Asphalt mixes designed at Level I shall meet the requirements for the empirical performance tests noted in Table 12.

Test	Requirement	Test Method
Modified Lottman (TSR)	0.8 min.	ASTM D 4867 M
Indirect tensile strength (@ 25°C)	900 kPa - 1 650 kPa	ASTM D 6931-07
Dynamic creep (@ 40°C)	10 MPa min.	CSIR RMT 004
Water permeability	0.1mm/s - 4 mm/s	EN 12697-19
Air Permeability (@ 7% Voids) (x $10^{-8}cm^2$)	1.0 max.	TRH 8 App C
Marshall Stability, Flow and Quotient	Report	SANS 3001-AS2

Table 12 Empirical Performance Tests (Level I)

4.2.1.1.1. Particular Mix Requirements – Mix Sa-S10

Mix Sa-S10 is to be utilized for lightly trafficked residential streets and patching (handwork). Due attention should be paid to the recommendations of Sabita Manual 27 “Guidelines for thin hot mix asphalt wearing courses on residential streets “ in the design of mix “Sa-S10”. The additional mix characteristics noted in Table 13 are also required.

	NMPS
	10
Filler/Binder Ratio (Max.)	1.3
Binder Film Thickness (Min.)	7.5

Table 13 Mix Design Requirements

4.2.1.2. Level II Design

The compaction requirements for the Level I design as a precursor to the Level II performance design shall be as noted in Table 14. The design air void content shall be 4%.

	Marshall	Gyratory
Traffic Condition Category	SANS 3001 AS1	AASHTO T 312
	No. Blows	N_{design}
Heavy (H) & Very Heavy (V)	-	100

Table 14 Volumetrics Compaction Requirements (Level II)

In addition to meeting the mix requirements outlined in the Level I design, the mix design at Level II shall meet the performance characteristics noted in Tables 15 and 16.

Property	Test conditions	Specification	Test method
Workability	Superpave gyratory compactor - air voids after 25 gyrations (max.)	7%	ASTM D 6925
Durability	Modified Lottman test conditions (min.)	0.8	ASTM D 4867M
Stiffness/ (dynamic modulus)	Dynamic modulus @ 20°C Loading frequencies of 0.1, 0.5, 1, 5, 10, 25 Hz	Report	AASHTO TP 79
Permanent deformation	HWTT at relevant number of passes	See Table 16	AASHTO T 324
Fatigue	Four-point beam fatigue test @ 10°C, 10Hz to 50% stiffness reduction Strain levels 200, 400, 600με	Report	AASHTO T 321

Table 15 Performance Tests (Level II)

Temperature Zone	6mm Rut	Stripping Point
	No. of Passes (Min.)	
PG 58 Zone	16 000	10 000
PG 64 Zone	20 000	10 000

Table 16 Hamburg Wheel Tracking Test Specifications

4.2.1.3. Level III Design

The compaction requirements for the Level I design as a precursor to the Level III performance design shall be as noted in Table 17. The design air void content shall be 4%.

Traffic Condition Category	Marshall SANS 3001 AS1	Gyratory AASHTO T 312
	No. Blows	N_{design}
Extreme (E)	-	125

Table 17 Volumetric Compaction Requirements (Level III)

In addition to meeting the mix requirements outlined in the Level I design, the mix design at Level III shall meet the performance characteristics noted in Tables 15 and 16 with the additional test temperatures for Stiffness and Fatigue as indicated in Table 18.

Property	Test conditions	Specification	Test method
Stiffness (dynamic modulus)	Dynamic modulus @ -5, 5, 20, 40, 55°C Loading frequencies of 0.1, 0.5, 1, 5, 10, 25 Hz	Report	AASHTO TP 79
Fatigue	Four-point beam fatigue test @ 5, 10 and 20°C, 10Hz to 50% stiffness reduction Strain levels 200, 400, 600με	Report	AASHTO T 321

Table 18 Additional Temperatures for Stiffness and Fatigue Tests (Level III)

4.2.2. Stone Mastic Asphalt Mixes

Stone Mastic Asphalt (SMA) mix designs are to be conducted in accordance with the guidelines set out in Sabita Manual 35 “Design and use of asphalt in road pavements – Appendix B”.

SMA mixes are required for two NMPS:-

- 10mm
- 14mm

The mix design should ensure that the fine aggregate mortar should not induce dilation of the coarse aggregate stone skeleton mix after compaction on site thereby ensuring coarse aggregate interlock. Coarse aggregate for both NMPS will be defined as all material retained on the 5mm sieve.

The stability of the fine aggregate mortar will require enhancement with either cellulose fibre or through modification of the binder or both.

The compacted mix should form an impervious surfacing meeting the water permeability and air permeability requirements noted in Table 12.

The SMA mix shall also conform to the requirements in Table 19.

Design Air Void Content (%)	4.0
Bitumen Content (Min.)	6.0
Voids in Mineral Aggregate (VMA) (Min.)	17
Modified Lottman (TSR) (Min.)	0.7
Schellenberg Drainage Test (%) (Max.)	0.3
VCA_{mix}[1] (%)	< VCA_{drc}[2]

Note 1. VCAmix is the voids in coarse aggregate (>5mm) of the compacted mix.

Note 2. VCAdrc is the voids in coarse aggregate (>5mm) of the dry rodded coarse aggregate.

Table 19 SMA Mix Specifications

SMA type "V" and "E" mixes shall be subjected to and shall conform with the performance test requirements noted in Table 15. SMA type "E" mixes shall be subjected to the additional temperature test requirements noted in Table 18.

The SMA-E10 and SMA-E14 mixes shall conform to the Dynamic Modulus and Fatigue testing requirements noted in Table 20 (EME Performance Criteria).

A mix design is required for each SMA mix. The mix design document should clearly document the process followed to meet the desired SMA characteristics.

4.2.3. Enrobé à Module Élevé (EME) Asphalt Mixes

EME mix design are to be conducted in accordance with the guidelines set out in Sabita Manual 33 "Interim design procedure for high modulus asphalt".

EME mixes are required for two NMPS:-

- 14mm
- 20mm

Performance criteria should conform to the requirements for a Class 2 EME as depicted in Table 20.

Property	Test	Method	**Requirement (Class 2)**
Workability[1]	Gyratory compactor (angle 1.25°), air voids after 45 gyrations	ASTM D6926	≤ 6%
Durability	Modified Lottmann, TSR	ASTM D4867	≥ 0.80

Property	Test	Method	**Requirement (Class 2)**
Resistance to permanent deformation	RSST-CH, 55°C, 5000 reps	ASTM T320	≤ 1.1% strain
Dynamic Modulus	Dynamic modulus at 10 Hz, 15°C	ASTM TP62	> 16 GPa
Fatigue	Beam fatigue test at 10 Hz, 10°C, to 50% stiffness reduction Strain levels 200, 400, 600με	ASTM T321	≥ $1x10^6$ reps @ 260 με

Table 20 EME Performance Criteria

EME type "E" mixes shall further be subjected to and shall conform with the performance test requirements for Stiffness (dynamic modulus), Permanent Deformation and Fatigue noted in Table 15 with the additional temperature test requirements noted in Table 18.

A mix design is required for each EME mix. The mix design document should clearly document the process followed to meet the desired EME characteristics.

4.2.4.Warm Mix Asphalt

Should a Warm Mix Asphalt be used in the mix, the mix design shall incorporate the use of such a technology/additive in the mix design process. Any consequential deviations from the guidelines set out in Sabita Manual 35 "Design and use of asphalt in road pavements – Appendix B", Sabita Manual 33 "Interim design procedure for high modulus asphalt" or standard industry practice shall be brought to the attention of the Roads Provision Department and shall be documented in the mix design report.

4.2.5.Mix Design Approval

No mixes may be supplied without approval of the mix design by the Senior Manager : Pavement & Geotechnical Engineering, Roads Provision Department.
The contractor shall label every mix design with a unique identification number to facilitate traceability of mixes using the mix design.

4.2.5.1. Mix Design Approval Process

The contractor shall submit his proposed mix design to the Roads Provision Department for acceptance of the mix design at least 2 weeks prior to initial supply of any particular mix.

Upon request by the Roads Provision Department, the contractor shall also supply samples of raw materials. The minimum sample sizes shall be 50 kg for each aggregate type/size and 5 litres of bitumen/binder. The contractor shall also supply any other relevant information as may be requested.
Once satisfied with the content of the mix design, the Senior Manager : Pavement & Geotechnical Engineering (or his nominee) will give signed approval for the mix.

4.2.6. Mix Design Review

Every mix design is to be reviewed at least annually. The review should include verification of the asphalt mix through testing of at least the following characteristics:-

- Binder compliance with SANS 4001-BT1
- Modified binder compliance with TG1
- Binder classification in terms of the SA PG Binder Classification System
- Aggregate and filler compliance with Table 2
- Aggregate BRD, ARD and water absorption
- Mix BRD (@ N_{design}) and MTRD
- Particular mix type characteristics
    - Sand skeleton mixes
        - Level I design mix volumetric and performance characteristics
            - All requirements in Tables 11, 12 and 13 (as applicable) at the appropriate compaction (Table 10 for Level I designs and Table 14 for Level II and III designs.
        - Level II design mix performance characteristics (Table 15)
            - Workability
            - Durability
        - Level III design mix performance characteristics (Table 15)
            - Workability
            - Durability
    - SMA mixes
        - All requirements in Table 19
        - SMA mix performance characteristics (Table 15)
            - Durability
    - EME mixes
        - Mix performance characteristics (Table 20)
            - Workability
            - Durability

Should the binder, aggregate or mix characteristics of any particular mix differ significantly from the characteristics obtained in the initial mix design, then the mix shall be re-designed to meet the relevant volumetric and performance characteristics. In the event of a dispute over the significance of a particular characteristic, the contractor shall undertake the appropriate performance test to prove compliance with the specification.

5. ASPHALT PRODUCTION

5.1. Mixing Plant

Asphalt shall be manufactured through a batch-mixing or drum-mixing plant (approved by the Roads Provision Department) such that the requirements of this specification can be met in full. The plant shall be operated and kept in a well maintained condition as directed by the Quality Management System. Records of such maintenance shall be made available on request.

All cold aggregates shall be stockpiled in a manner that precludes the possibility of aggregate contamination. At the very least aggregate stockpiles shall be physically separated on concrete slabs. Undue wetting/saturation of (particularly fine) aggregates shall also be prevented through covering (particularly fine) aggregate stockpiles with reinforced waterproof covers at all times when mixing is not in progress. Natural sand aggregates shall be pre-screened through a 13 mm screen before being fed into the cold feed hoppers.

Sufficient binder storage tanks shall be provided to ensure that adequate reserves are maintained for each binder type held without risk of contamination of binders. Binder storage tanks shall be heated in such a manner that the binder is not degraded during heating. The tanks shall also incorporate a circulating system for the binder.

The plant control panel shall enable the plant operator to have simultaneous view of the critical components of the plant inclusive of :-

- Binder storage temperature
- Cold hopper feed settings
- Hot aggregate bin masses (as appropriate)
- Binder feed rate
- Plant speed (as appropriate)
- Mixing temperature

The plant and its operation shall also conform to the requirements of the following legislation:-

- Occupational Health and Safety Act
- National Environmental Management : Air Quality Act

5.2. Quality Control

The quality of mix produced shall be monitored as directed in the contractor's Quality Management System. The asphalt mix constituents (i.e. binder and aggregates), and the asphalt mix produced shall be checked for compliance and consistency on a regular bases through routine process control testing. The results of such testing shall be available for review by the Roads Provision Department at all times.

5.2.1. Quality Management System

The Quality Management System (QMS) should include documentation outlining the asphalt mix design process, the annual mix review process and processes pertaining to delivery of the asphalt mix.

The QMS shall also include any agreed frequency of split sampling of either raw mix constituents or asphalt mixes (prepared as agreed) with the Roads Provision Department. Such samples are to be delivered to the eThekwini Municipality's Bitumen and Asphalt Laboratory located at the Roads Provision Asphalt Plant in uMhlathuzana Road. All samples shall be adequately and uniquely labeled so that the location of any related mix is readily traceable.

The QMS shall also document the processes to be followed whenever a deviation from specifications is identified. The Contractor shall provide full rectification of any work undertaken with such asphalt mix or materials.

Where applicable, testing is to be conducted using the SANS 3001 series of test methods.

The plant laboratory should be SANAS accredited for the tests undertaken. However, should the laboratory not be SANAS accredited, the Roads Provision Department will need to approve the laboratory for any test result to be considered valid.

In line with these processes, the QMS should include as a minimum per mix design, the material characterization tests included in Table 21.

Quality Control Tests			Minimum Test Frequency
Binder	Penetration		Every batch delivered
	Softening Point		Every batch delivered
	SA PG Binder Classification		1 per 6 months
Aggregate	Coarse Aggregate	Aggregate Grading	Every batch delivered
		Flakiness Index (Max.)	1 per month
		Aggregates BRD, ARD and Water Absorption	1 per month
		ACV, 10%FACT	1 per month
		Polished Stone Value (Coarse Aggregates)	1 every year per stone type and source
	Fine Aggregate	Aggregate Grading	Every batch delivered
		Aggregates BRD, ARD and Water Absorption	1 per month
		Sand Equivalent (Fine Aggregates)	Every batch delivered
		Methylene Blue Adsorption Value	1 per month
Asphalt Mix	Temperature of Mix	In the truck at the exit weighbridge	Every load
		In the truck at the point of delivery	Every load
	Bitumen Content		1 test per 200 tons of output or part thereof per day
	Extracted Mix Aggregate Grading Analysis		1 test per 200 tons of output or part thereof per day
	Voids Analysis (Bulk Relative Density and Maximum Theoretical Relative Density)		1 test per 200 tons of output or part thereof per day

Table 21 Test Frequencies

5.2.2. Process Control

The mix temperature of the mix taken in the truck at the exit to the plant shall not exceed the value stated in the mix design. Furthermore, the temperature of the mix taken in the truck on delivery shall not be less than the value stated in the mix design.

Quality checks on mix production will be based on the Job Mix Formula (JMF) for the approved mix design. Tolerances on variation from the JMF are given in Table 22.

			Permissible Deviation from JMF (%)	
			Individual Results	Average of 3 Consecutive Results
Aggregate Fraction - Grading	Sieve Size (mm)	28	± 5.0	± 3.0
		20	± 5.0	± 3.0
		14	± 5.0	± 3.0
		10	± 5.0	± 3.0
		7.1	± 5.0	± 3.0
		5	± 4.0	± 2.5
		2	± 4.0	± 2.5
		1	± 4.0	± 2.5
		0.6	± 4.0	± 2.5
		0.3	± 3.0	± 2.0
		0.15	± 2.0	± 1.5
		0.075	± 1.0	± 1.0
Voids in the Mix (@ design compaction)			± 1.5	± 1.0
Binder Content			± 0.3	± 0.2

Table 22 Mix Production Property Limits

All process control testing undertaken by the contractor shall be signed off by the responsible person identified in the QMS and shall be made available to the Roads Provision Department.

- All process control test results shall be referenced back to the unique Mix Design reference number.
- Mix extraction grading shall be made available within 48 hours of the asphalt being manufactured.
- Binder content and void content shall be made available by 08:00am on the day following manufacture of the asphalt.

Should the test results not be provided as required or should the results fall outside the applicable specifications, the Roads Provision Department reserves the right to suspend any supply until the results are produced and the mix is accepted.

The Contractor shall be responsible for rectification of any work completed (or partially completed) with asphalt mix that does not meet the specification to the satisfaction of the Roads Provision Department. The processes related to the rectification of such work shall be outlined in the QMS.

5.2.3. Acceptance Testing

After reviewing the results of the process control testing, the Roads Provision Department may elect to conduct their own testing of the binder, aggregates or asphalt mix produced. A copy of test results will be submitted to the Contractor as soon as they are available.

Should the acceptance tests indicate that the mix (or any part thereof) is not to specification, the cost of any re-test by the Council shall be to the Contractor's account and shall be deducted from any payments owed to the Contractor.

5.2.4. On Site Mix Problems

The contractor shall also make himself available on site should the workability and compaction of the mix during the paving/laying operation be problematic in order to assist in trouble-shooting the cause of such problems. If the root cause of the problem is related to the asphalt mix design, the contractor shall re-evaluate his mix design to correct such issues and re-submit his mix design for approval.

PS.EF KERBS AND HAUNCHES

Clause	Description
PS.EF.1	KERB AND CHANNEL
PS.EF.2	ADDITIONAL CONCRETE TO KERB FOUNDATION
PS.EF.3	EXCAVATION FOR KERB AND CHANNEL / FILLET IN EXISTING ASPHALT LAYERS
PS.EF.4	SPECIAL TYPE A BARRIER KERB
PS.EF.5	FIGURE 12 KERBS – EDGE RESTRAINTS

PS.EF.1 KERB AND CHANNEL/FILLET

The kerbing to be used for this contract shall be as follows:

i) Type A Barrier Kerb and Channel/Fillet,

ii) The Special Type A Barrier Kerb and channel / fillet as detailed in section C4.3. ,

iii) Type A Barrier Kerb and Channel / Fillet – Mini Kerbs for radius less than 2m

iv) Scoop Kerbs and Transition Kerbs, and

v) Figure 12 Edge restraint Kerbs.

PS.EF.2 ADDITIONAL CONCRETE TO KERB FOUNDATION

The rates tendered for kerbs Type A shall be based on the minimum dimensions indicated section C3.5. Where the base or sub-base layers necessitate an increase in the kerb foundation thickness, the supply of this additional concrete shall be paid for separately. The unit of measurement shall be the cubic meter (m^3) and shall cover the supply and placing of the concrete, compaction and any formwork that may be required.

PS.EF.3 EXCAVATION FOR KERB AND CHANNEL/FILLET IN EXISTING ASPHALT LAYERS

The unit of measurement shall be the cubic meter (m^3). The rate shall include all the materials, labour and plant necessary to cut two parallel joints in the existing asphalt the width of the kerb base to be laid, the excavating, loading and transporting of surplus material to the approved tip.

PS.EF.4 SPECIAL TYPE A BARRIER KERB

A non-standard kerb is be used on the contract for the separation of the Right of Way from the Mixed Use carriageways. This non-standard kerb shall hereafter be referred to as the Special Type A Kerb. This kerb is similar in dimension and specification to the Figure 6 Barrier Kerb with the difference being that it has two sloping faces whereas the standard Figure 6 Barrier Kerb has only sloping face.

The special Type A Barrier has a 150mm Channel and 150mm Fillet on either side of the kerb. It has an 80mm thick concrete base to support the kerb with a 20mm thick mortar in between the kerb and base.

Refer to Drawing 48554, Sheet 17 detailing kerb details. The unit of measurement shall be the linear meter (m). The rate shall include all the materials, labour and plant.

PS.EG SIDEWALK/MEDIAN AREAS

INDEX

P.S.EG.1 SCOPE

This specification covers the construction of asphalt, precast concrete slabbed and brick sidewalks, footpaths and median areas, vehicular and pedestrian scoops and vehicular access hardening.

P.S.EG.2 INTERPRETATIONS

EG.2.1 Definitions

"Sidewalk" means that portion of a verge intended for the exclusive use of pedestrians;

"Footpath" means a pedestrian way remote from a roadway.

Other definitions for this specification are included in part "AB" : General Specifications.

EG.2.2 Supporting Specifications

The following standards are referred to in the specification:

S.A.B.S.110 of 1973 - Sealing compounds for the building industry, two component, polysulphide base

S.A.B.S 307 of 1972 - Penetration grade bitumen

S.A.B.S 541 of 1971 - Precast concrete paving slabs

S.A.B.S 1305 of 1980 - Sealing compounds for the building industry, one component, silicone - rubber base.

S.A.B.S 0145 of 1978 - Concrete masonry construction all as published in General Notice 463 dated 9 July 1982

S.A.B.S. 1077 of 1984 - Sealing compounds for the building and construction industry, two component

polyurethane – base as published in General Notice 148 dated 1 February 1985

P.S.EG.3 MATERIALS

EG.3.1 Asphalt

Supply or Asphalt for Sidewalk/Median Areas shall be a Sand Skeleton Mix (Sa) and shall meet the specification of **SA-S10 mix design.**

ED. 3.4.1. Bitumen Content:

5,7% ± 0,3% by mass of 40/50 pen. bitumen complying with S.A.B.S. 307

EG.3.2 Graded Crushed Stone

Graded crushed stone shall be as specified in Part EB: Graded Crushed Stone G4 or better.

P.S.EG.4 PLANT

Not applicable to this specification.

P.S.EG.5 CONSTRUCTION

For all types of construction the formation to be surfaced shall first be trimmed and compacted to the required tolerance and density.

EG.5.1 Asphalt Areas

These shall consist of a compacted 100 mm thick layer of graded crushed stone (G4 or better) overlaid by a compacted 25 mm thick layer of asphalt (SA-S10 mix design). After the crushed stone has been compacted and tested, a weed killer approved by the Director : Parks shall be applied in accordance with the manufacturer's instructions. The asphalt shall be manufactured in an approved hot-mix plant and the maximum mixing temperature shall be 170/C. The asphalt shall not be laid if its temperature falls below 130/C in the supply trucks.

EG.5.4 Asphalt Access Hardening and Scoops

The specification shall comply with the requirements of clause EG.5.1 with the exception that the pavement layer shall be as follows:

(a) Pedestrian : Graded crushed stone 100 mm thick with an asphalt layer 25 mm thick.

(b) Residential : Graded crushed stone 150 mm thick with an asphalt layer 50 mm thick.

(c) Commercial : Graded crushed stone 150 mm thick with an asphalt layer 80 mm thick.

(d) Industrial : Graded crushed stone 150 mm thick.

EG.5.5 Concrete Access Hardening and Scoops

Concrete access hardening and scoops shall consist of cast insitu grade 20/13 concrete laid either directly onto the compacted subgrade or onto a graded crushed stone base. The concrete mix, mixing, batching, transporting, placing compaction and curing shall comply with the requirements of part C Concrete Work. The surface of the concrete shall have a wood float finish. Pavement layer for the various scoop types shall be:

(a) Pedestrian and Residential : Concrete 100 mm thick.

(b) Commercial : Graded crushed stone 150 mm thick with concrete 100 mm thick.

(c) Industrial : Concrete 225 mm thick.

P.S.EG.6 TOLERANCES

In all cases formation levels shall be within ± 10 mm of the design levels.

EG.6.1 Asphalt Areas

The average thickness of graded crushed stone shall not be less than 100 mm with a tolerance for any single reading of ± 10 mm. The average thickness of the asphalt shall not be less than 25

mm with a tolerance for any single reading of ± 5 mm. The finished surface levels shall be within ± 7 mm of the design levels.

EG.6.4 Asphalt Access Hardening and Scoops

The average thickness of graded crushed stone shall not be less than that specified with a tolerance for any single reading of ± 10 mm. The average thickness of the asphalt shall not be less that specified with a tolerance for any single reading of ± 5 mm. The finished surface levels shall be within ± 7 mm of the design levels.

EG.6.5 Concrete Access Hardening and Scoops

The average thickness of the concrete shall not be less than that specified with a tolerance for any single reading of ± 10 mm. The finished surface levels shall be within ± 5 mm of the design levels.

P.S.EG.7 TESTING

The Contractor shall supply samples of the precast units, free of charge to the Physical Environment Service Unit, Materials Laboratory, KE Masinga Road, Durban for testing. The degree of compaction shall be not less that 95% Mod. A.A.S.H.T.O. for the formation, not less that 96% Mod. A.A.S.H.T.O. density for crusher run and not less that 96% of the Marshall density for asphalt.

P.S.EG.8 MEASUREMENT AND PAYMENT

P.S.EG.8.1 Asphalt Areas

The unit of measurement shall be square metres (m²) of completed area and the rate shall cover formation preparation, all necessary compaction, supply and application of weed killer, graded crushed stone, protection of adjacent areas and asphalt laid and compacted.

PS.EG.9 160 mm DIAMETER P.V.C. SIGN SLEEVE

The 160 mm diameter P.V.C. sign sleeve shall be 700 mm deep and have 25 mm show above finished paved area. The unit of measure shall be number (No.) and the rate shall include for excavation, supply and placing of the sleeve and backfilling.

PS.EG.10 APPROVED WEED KILLER

Wherever mentioned, the approved weed killer shall be “OUTPACE 100GR” or approved equivalent.

PS.EG.11 SCOOP AND ACCESS HARDENING CONSTRUCTION

The Tenderer's attention is drawn to the various types of pavement construction for the various types of access. The type of construction applicable to a particular scoop shall either be indicated on the relevant drawings or shall be indicated in writing by the Engineer on site.

PS.EL DUMPROCK SUBGRADE IMPROVEMENT

INDEX

PS.EL.1 DUMPROCK

Clause EL.3 shall be amended to read as follows :

The dumprock shall consist of fresh to slightly weathered ungraded waste rock from mining activities, blasting or rock excavation. Shales, slates or other laminated mudrocks shall **not** be accepted.

Dumprock shall have a maximum size not more than two-thirds of the compacted thickness of the layer. The rock shall otherwise be ungraded but shall contain less than 10% passing the 37,5 mm sieve when spread on site.

Dumprock shall have a minimum 10% FACT value of 100 KN when dry and 40 KN when tested drained after 24 hours soaking.

Notwithstanding Clause EL, after vibratory techniques are used on the dump rock, a thickness of varying thickness between 300mm to 1000mm, as directed by the Engineer on site, must be achieved. A G5 graded crushed stone material must then be used to fill the voids between the dump rock. This layer must be vibrated into the dump rock and the contractor will stop when the layer of dump rock will not accept any more stone. The measurement of the G5 graded crushed stone will be per tally slip from the weighbridge and will be paid per tonne. A separate item will be scheduled for this item in the BOQ.

Careful consideration must be used when choosing the type of compaction equipment required, as any damage to the surrounding buildings will be to the contractor's account.

Dump rock as defined below is to be used as sub-grade improvement at the discretion of the Engineer after assessment of the prevailing ground conditions.

PS.EL.2 METHOD STATEMENT

The Contractor must provide a Method Statement of the manner in which the Dump Rock layer will be constructed and the precautions to be taken during construction which must then be approved by the by Senior Manager of the Pavement & Geotechnical Engineering eThekwini Municipality Roads Provision Department : Pavement & Geotechnical Engineering Branch, Presently Eric Lathleiff.

After the method statement has been approved, a trial layer must be constructed to demonstrate the Contractor's competence with regards to the construction of the Dump Rock layer, (*Refer to PS.EL.3*)

PS.EL.3 TRIAL LAYER

Prior to the commencement of the compaction and layering and filling of the layer the Contractor shall construct a section of trial layer to demonstrate his capability of constructing the layer in accordance with the specifications. The trial layer shall be constructed with the same materials, mix proportions and equipment as the Contractor intends using for the main layer.

A trial section of approximately 50 m² shall be submitted for approval. The Engineer shall also have the right to call for a new trial section at any stage of the contract when, in his opinion, changes by the Contractor in the approved equipment, materials, mix or plant warrant such a procedure.

The Contractor may, unless advised of any deficiencies in the trial layer, proceed with the main layer from a time two days after the completion of the trial section or such earlier time as the Engineer may allow. In the event of deficiencies in the trial layer, the Engineer may order the Contractor to construct further trial sections until a satisfactory section is achieved. The Contractor may then proceed with the main layer from a time two days after the successful completion of the satisfactory trial section.

PS.PG.1 CONCRETE SEWER/STORMWATER PIPES

Concrete pipes shall be class 100D or 75D, as detailed in the drawings and schedules. No independent design is required. These pipes shall comply with Departmental Specification Part PG.3.4.2 and shall in addition to this sewer pipes shall have a 19mm thick calcium alumina cement (C.A.C) Lining.

The concrete pipes shall be jointed by means of a spigot and socket joint with a rubber sealing ring.

In addition to a rubber sealing ring the inside face of the joint shall be sealed with a Bitu- joint sealant or an approved equivalent.

Failed joints will be redone to the satisfaction of the Engineer.

PS.PG.2 MEASUREMENT AND PAYMENT (PIPELINES)

The unit of measurement shall be linear meters (m). The unit rate for supply shall include for:

- The supply of all pipes complete with couplings and joint material.
- Their inspection, transport to and about site and all handling costs.

The laying, jointing, building pipes into manholes including extrusion welding of water stop/building up where applicable, all cutting preparation and wastage of materials.

Testing as per Clause PG.7 and cleaning of pipe lines.

PS.PG.3 BUILDING PIPES INTO MANHOLES (Clause PG 5.5)

The joints on pipes built into manholes for the sewer reticulation shall be located in accordance with the provisions of Clause PG 5.5 and not Clause PG 5.3.1 (d).

The new pipes will have to be connected to the existing trunk sewer in the connection chambers which are to be constructed over the existing trunk sewer. The benching operation of these chambers is to carried out between the hours 23h00 and 06h00 to minimise sewage flow control.

The unit of measurement for building pipes into manholes shall be number (no). The rate is to include for the supply of all labour, equipment and materials required for setting the new pipe to the correct level, making good manhole wall and the disposal of all unsuitable or surplus material as well as flow diversions.

PS.PG.4 SUBSOIL PIPES

The following clause shall replace Clause PG.3.5.

"These shall be "Netlon" plastic subsoil pipes complying with SABS 791 as amended.

Hole Size : 5 ∀ 1 mm Diameter
Diameter of Pipe: 100 ∀ 10 mm.
Pipe Invert : 25% of the circumference of the pipe is to be free from slots or holes to form an invert to the pipe."

PS.PG.5 SUBSOIL DRAINS AND OUTLETS

Subsoil drains shall be type B or C as detailed on standard drawing No. 38575.

Subsoil pipes shall be "Netlon" plastic pipes conforming to SABS 791 or the new Flo Drain system. The outfall end of each run of subsoil drain shall be built into the nearest inlet/manhole or headwall in accordance with Clause PG 5.5, or into a special outlet structure as detailed on the project drawings and measured under part PH.

PS.PG.5.1 CONNECTION OF SUBSOIL DRAINS TO EXISTING STORMWATER SYSTEM

Where subsoil pipes require to be built into an existing stormwater inlet/manhole or headwall, the unit of measurement shall be number (No.)

The rate tendered shall include for all labour and materials to construct the connection in accordance with Clause PG.5.5. and for trimming the geofabric at the connection.

PS.PG.5.2 SUBSOIL TERMINATION STUB

The final 1 meter length of the subsoil drain before the manhole/catchpit shall be 100 mm diameter non-perforated U.P.V.C. pipe. The unit of measurement shall be number (No.). The rate shall include for the supply and laying of the pipe, and for all work necessary to tie into the stormwater manhole/catchpit.

PS.PG.6 STONE FOR SUBSOIL DRAIN FILTER

The following clause shall replace Clause PG.3.10.

"The stone aggregate used for the subsoil drain filter shall consist of 9,5 mm crushed stone conforming to the following grading :

Sieve size mm	132	95	67	475	236
% Passing	100	85 - 100	0 - 55	0 - 25	0 - 5

"

PS.PG.7 RIVER SAND BACKFILL FOR SUBSOIL DRAIN FILTER

The following clause shall replace Clause PG.3.11.

"River sand for subsoil drain filter shall consist of clean river sand conforming to the following grading :-

Sieve size mm	67	475	150	75
% Passing	100	90 -100	0 - 15	0 – 3

and having a Fineness Modulus of 2,0 - 3,5."

PS.PG.8 GEOFABRIC BLANKET

The geofabric shall comply with Clause PG.3.8 and the rate tendered shall include for wrapping the geofabric around either the subsoil pipe, subsoil drain or stone bedding.

PS.PG.9 CONCRETE ENCASEMENT OF DUCTS UNDER CARRIAGEWAYS

Further to Clause PG.8.11.2 the Contractor shall note that concrete grade 20 / 26 shall be used for all duct encasement.

PS.PG.10 BRICK HEADWALLS TO DUCTS

Ducts shall have brick headwalls constructed at each end of the ducts, as shown on standard Drawing No. 38581. Bricks for these headwalls shall be selected good quality clay commons. Mortar shall conform to mix Class A as defined in the latest edition of the Standard Building Regulations. Construction of brickwork shall be as specified in Clause F.5.6.3.

PS.PG.11 SAND / CEMENT MIX BACKFILL TO DUCTS

Rate is per cubic meter (m□) of backfill, (payable up to pay trench width). The rate shall include for the supply of clean coarse granular sand, including all haulage, supply and mixing of cement to the sand in a 1 cement : 10 sand ratio, placing and compacting of the backfill.

PS.PG.12 CABLE DUCT MANHOLES

Cable duct manholes shall consist of 230mm thick brickwork to an external plan dimension of 790x790 on a 200mm thick class 20/26 concrete base. Manhole lid and frame shall be heavy duty concrete – 150mm thick.

PS.PG.13 ALTERNATIVE ROUTING OF SEWER AND STORMWATER LINES

Due to the high number of services that exist in the vicinity of works, it may not be possible to install new services in the positions or sizes indicated on drawings, at all times. Therefore possible re-designs will be required on-site which the contractor needs to take cognisance of in his programming.

PS.PG.14 KAY-TECH FLO-DRAIN OR SIMILAR APPROVED

The Kaytech Flo-Drain or similar approved subsoil drain may be used as an alternative to the conventional subsoil drain system. The Flo-Drain comprises of three elements, ie. geofabric, Flo-net and Flo-drain pipe.

The contractor is to combine these elements to make up the Flo-drain. The rate of measurement will be per linear meter (m) and will be for the supply and installation of the system. The excavation and backfill to the Flo-Drain will be paid elsewhere

.

PS.PH MANHOLES AND APPURTENANT DRAINAGE WORKS

Clause	Description
PS.PH.1	MANHOLES AND INLETS
PS.PH.2	MANHOLES AND APPURTENANT WORKS : REVISED DRAWING NUMBERS
PS.PH.3	BRICKS
PS.PH.4	INLET AND OUTLET HEADWALLS
PS.PH.5	CONSTRUCTION OF MANHOLE / INLET OVER EXISTING STORMWATER PIPE
PS.PH.6	BREAK INTO EXISTING BRICK MANHOLE/INLET FOR STORMWATER PIPE
PS.PH.7	CONVERT EXISTING MANHOLES TO INLETS
PS.PH.8	CONVERT EXISTING INLETS TO MANHOLES
PS.PH.9	BREAK INTO EXISTING BRICK MANHOLE / INLET FOR STORMWATER PIPE
PS.PH.10	BRICK HEAD WALLS TO DUCTS
PS.PH.11	ALTERATIONS TO EXISTING MANHOLES AND STORMWATER INLETS INCLUDING RAISING AND LOWERING THE COVERS
PS.PH.12	CABLE DUCT MARKERS FOR ALL SERVICES
PS.PH.13	MANHOLES WITH TYPE S1, S2 AND D3 INLET COVERS
PS.PH.14	ABANDONED SEWER AND STORMWATER MANHOLES
PS.PH.15	REPLACE EXISTING CONCRETE MANHOLE COVER SLAB AND FRAM WITH HEAVY DUTY CAST IRON TYPE
PS.PH.16	BREAK INTO EXISTING CULVERT WALL FOR (200 - 400) mm DIA. STORMWATER PIPE
PS.PH.17	RING MANHOLES
PS.PH.18	TIE INTO EXISTING TRUNK SEWER
PS.PH.19	CONNECTING PIPES INTO THE REINFORCED CONCRETE STRUCTURE
PS.PH.20	GALVANISED METAL GRIDS/GRATINGS
PS.PH.21	GRID INLETS
PS.PH.22	POLYMER CONCRETE INLET COVER AND FRAME

PS.PH.1 MANHOLES AND INLETS

Tenderers are to note that manholes and inlets shall be measured according to type and varying depth only. The rate tendered for the manholes/inlets shall include for the different pipe sizes and benching configurations.

The Contractor shall note that the rate for inlets shall include the cost of the graded channel in front of the inlet and / or splay and the cost of the transition kerb and channel upstream and downstream from each inlet. This will not form part of the payment for kerb and channel.

PS.PH.2 MANHOLES AND APPURTENANT WORKS : REVISED DRAWING NUMBERS

Clause PH.3.2.1.1 second paragraph is replaced by the following:

Details of the precast concrete components of standard manholes are shown on standard drawings in section C3.5 for both foul-water sewers and stormwater drains.

Clause PH.5.11 first paragraph:

Standard drawing 21701 is replaced by drawing 38574.

PS.PH.3 BRICKS

Clause PH.3.1 first paragraph shall be replaced by the following:

"Burnt clay masonry units for foul-water and stormwater sewer manholes, stormwater inlets and inspection chambers shall be Non-Facing Extra (NFX) with a nominal compressive strength of 14 MPa to S.A.B.S. 227:1986.

PS.PH.4 INLET AND OUTLET HEADWALLS

Details of outlet headwalls are indicated in section C3.5. The unit of measure for these headwalls shall be Number (No.) and shall include for all labour, plant and materials required for the construction of the headwall inclusive of the base and cut-off walls.

The construction of brickwork shall be as specified in Clause F.5.6.3. Mortar shall conform to mix Class A as defined in the latest edition of the Standard Building Regulations.

PS.PH.5 CONSTRUCTION OF MANHOLE / INLET OVER EXISTING STORMWATER PIPE

The unit of measurement shall be Number (No.).
Further to Clauses PH.8.2 and PH.8.3 the rate shall include for :

(a) Breaking into the existing pipe.
(b) Cutting and reinstating the ends of the existing pipe.
(c) The restricted working around the existing pipe.
(d) Disposal of any spoil etc., to the tip.

PS.PH.6 BREAK INTO EXISTING BRICK MANHOLE/INLET FOR STORMWATER PIPE

The unit of measurement shall be Number (No.). Separate items have not been scheduled for each diameter of pipe to be connected to a manhole. The unit rate for breaking into a brick manhole to connect a stormwater pipe shall include for all the materials, labour and plant necessary for:

(a) The breaking into the existing manhole, including the demolition of the benching necessary to accommodate the pipe.
(b) The building in of the stormwater pipe, including the re-shaping and making good of benching and the disposal of all resultant rubble to approved tip.

PS.PH.7 CONVERT EXISTING MANHOLES TO INLETS

Where indicated, existing manholes shall be converted to standard inlets as shown in section C3.5. The unit of measurement shall be number (No.) and in addition to the plant, labour and materials required to alter the manhole, the rate shall include for :

(a) removing the existing cover and frame to site for storage;
(b) disposal of any spoil / rubble to tip,
(c) raising/lowering of the inlet cover by 0-300 mm from the original level,
(d) supply and setting of the new inlet covers to the new levels.

Separate items have been included in the Bill of Quantities to cover the different manhole and inlet types.

PS.PH.8 CONVERT EXISTING INLETS TO MANHOLES

Where indicated, existing inlets shall be converted to standard manholes as shown in section C3.5. The unit of measurement shall be number (No.) and in addition to the plant, labour and materials required to alter the inlet, the rate shall include for:

(a) Disposal of any spoil/rubble to tip,
(b) raising/lowering of the manhole cover by 0-300 mm from the original level,
(c) supply and setting of the new manhole covers and frames to the new levels.

Separate items have been included in the Bill of Quantities to cover the different manhole types.

PS.PH.9 BREAK INTO EXISTING BRICK MANHOLE / INLET FOR STORMWATER PIPE

The unit of measurement shall be Number (No.). Separate items have not been scheduled for each diameter of pipe to be connected to a manhole. The unit rate for breaking into a brick manhole to connect a stormwater pipe shall include for all the materials, labour and plant necessary for :

(a) The breaking into the existing manhole, including the demolition of the benching necessary to accommodate the pipe.
(b) The building in of the stormwater pipe, including the re-shaping and making good of benching and the disposal of all resultant rubble to approved tip.

PS.PH.10 BRICK HEAD WALLS TO DUCTS

Ducts shall have brick head walls constructed at each end of the ducts, as shown in Standard Dwg. 38581. Bricks for these head walls shall be selected good quality commons. Mortar shall conform to mix Class A as defined in the latest edition of the Standard Building Regulations. Construction of brickwork shall be as specified in Clause F.5.6.3.

PS.PH.11 ALTERATIONS TO EXISTING MANHOLES AND STORMWATER INLETS INCLUDING RAISING AND LOWERING THE COVERS

Alterations to stormwater structures for this contract may be divided into two categories.

(i) Where the cover is to be raised/lowered and set back less than 300 mm.
(ii) Where the cover is to be raised/lowered and set back a distance of more than 300 mm but less than 800 mm.

In (i) above the Contractor shall be required to demolish a portion of the stormwater structure and corbel the brickwork to support the cover in its new position.

In (ii) above the Contractor shall be required to demolish a portion of the stormwater structure, cast an extension to the base, slab over as required and re-do the brickwork to support the cover in its new position. Details of this work are shown in section C3.5.

PS.PH.12 CABLE DUCT MARKERS FOR ALL SERVICES

Further to the fourth paragraph of Clause PG.5.2.3, and to Clause PG.8.11.3, the Tenderer shall note that the cable duct markers will not be delivered by the Council to site free of charge.

The Tenderer shall make allowance in the rates tendered for both the supply and installation of the cable duct markers; i.e. it will be expected of the Contractor to make suitable arrangements with a commercial supplier in advance of the cable duct markers being required on site.

PS.PH.13 MANHOLES WITH TYPE S1, S2, S3, D3, D4, D5 AND V2 INLET COVERS

A number of Type "A" and "B" stormwater manholes with various types of inlet covers have been scheduled on this contract. The manholes are schedule by type and in depth increments of 0.5m after the first 1.5m depth from top of manhole.

The unit of measurement shall be number (No.) and the tendered rate for each type shall include for the supply of all labour, plant and materials required to construct the manhole complete in accordance with the Standard Drawings and Specification, and inlet type cover as is specified in the contract drawings.

PS.PH.14 ABANDONED SEWER AND STORMWATER MANHOLES

The existing manholes shall only be abandoned after the new sewer and all connections are completed and operational.

The manholes are to be broken down 1 m below the existing surface level and the void backfilled with suitable material after the incoming and outgoing sewers have been sealed with concrete. Items for this work have been included in the Bill of quantities.

PS.PH.15 REPLACE EXISTING CONCRETE MANHOLE COVER SLAB AND FRAME WITH HEAVY DUTY CAST IRON/ POLYMER CONCRETE TYPE

The unit of measurement shall be number (No.) and the rate shall include for labour, plant and materials necessary for :

- The removal of the existing concrete manhole cover slab and frame.
- Loading and transporting to the approved tip site for dumping.
- Replacing the existing concrete manhole cover slab and frame with the heavy duty cast iron / polymer concrete type.

PS.PH.16 BREAK INTO EXISTING CULVERT FOR STORMWATER PIPE

The unit of measurement shall be Number (No.). Separate items have not been scheduled for each diameter of pipe to be connected to a culvert. The unit rate for breaking into a culvert wall to connect a stormwater pipe shall include for all the materials, labour and plant necessary for :

(a) The breaking into the existing culvert wall to accommodate the pipe.
(b) The building in of the stormwater pipe, including the re-shaping and making good of the culvert wall and the disposal of all resultant rubble to approved tip.

P.S.PH.17 RING MANHOLES (Part PH)

1. 1000 - 1500 mm diameter precast concrete ring manholes shall be constructed in accordance with Departmental Specification Part PH : Manholes and Appurtenant Drainage Works. The Unit for measurement will be number (No.) and the tendered rate shall include for :

a) The supply of all labour and materials to construct and complete in accordance with the contract drawings, the specifications and the type and size of the manhole specified in the schedule of quantities.

b) The forming of the invert based on a 1100 mm diameter straight channel with benching as shown on Drawing No 38570.

c) Additional excavation in excess of the width and bottom of the trench. Disposal of surplus material and compaction of the excavated bottom to 96 % Mod AASHTO as well as all backfill and compaction.

All concrete work, in situ as well as precast, inclusive of formwork, steel reinforcing materials labour etc. NB. In situ concrete work is to be carried out in accordance with Departmental Engineering Specification Part C.

1. Supply and install Type 2A heavy duty cast iron cover and frame, heavy duty concrete adaptor slab. Payment for the following items will be extra over the payment of the manhole:
   a) forming channel and benching including any change in direction .

PS.PH.18 CONNECTIONS TO EXISTING SEWERS MANHOLES

Where new sewer pipes have to be connected to existing manholes, the existing manhole walls are to be broken out and the new sewer pipe built in at the correct line and level. The unit of measurement shall be "**sum**". The rate is to include for the supply of all labour, equipment and materials required for the breaking out of the manhole wall, any modification to the benching of the existing manhole, setting the new pipe to the correct level, making good the manhole wall and benching and the disposal of all unsuitable or surplus material, as well as flow diversions.

PS.PH.19 CONNECTING PIPES INTO THE REINFORCED CONCRETE STRUCTURE

The unit of measurement shall be number (No.) Separate items will be scheduled for each diameter of pipe to be connected to the structure. The unit rate for altering a concrete structure to connect a stormwater pipe shall include for all the materials, labour and plant necessary for:

(a) The boxing out of the structure, including the bending and cutting back of reinforcing to accommodate the pipe.

(b) The building in of the stormwater pipe, including the re-shaping and making good the structure, and the neat cutting back of the pipes flush with the structure.

(c) Pipes shall be measured separately.

PS.PH.20 GALVANISED METAL GRIDS / GRATINGS

Galvanised metal grids shall consist of 8mm round bar (150mm long) welded to 75x4mm plate (800mm long) at 50mm c/c bolted onto underside of inlet cover. There shall be one (1) No. metal grid per inlet cover or inlet splay. The unit of measurement shall be number (No.) and the tendered rate for each type shall include for the supply of all labour, plant and materials required to manufacture and install the grid.

PS.PH.21 GRID INLETS

A number of inlets with Polymer Concrete Grids are be constructed into the works. The varying configuration of the inlets will be specified in the BOQ and will be paid per number (No.). In addition to pay item PH 8.2, the rate shall include for the supply and lay of the Inlet and polymer grid. The rate shall also include for the excavation of the inlet and the backfill and compaction around the inlet. The rate shall also allow for the connection of the pipe to the inlet at the entry and exit of the inlet.

The unit of measurement shall be number (No.) and the tendered rate for each type shall include for the supply of all labour, plant and materials required to undertake the works

PS.TA ROAD SIGNS

Clause	Description
PS.TA.1	GENERAL
PS.TA.2	ROAD SIGN BOARDS
PS.TA.3	RE-ERECT ROAD SIGNS
PS.TA.4	TEMPORARY ROAD SIGNS
PS.TA.4.1	MATERIALS
PS.TA.4.2	ERECTION
PS.TA.5	TIMBER POSTS
PS.TA.6	DRUMS
PS.TA.7	PROTECTION AND MAINTENANCE

PS.TA.1 GENERAL

The Tenderer shall make allowance in the time related rates under Section 1.AB in the Bill of Quantities rates, repositioning, covering/uncovering, relocating or removing temporary signs and other forms of road furniture as required during the progress of the works.

For the new signs, the "Sign Detailing" Activity for this section of road will only be completed during construction of the works. As such, the BOQ Item, Section 4, Part TA : ROAD SIGNS, has a Provisional Sum Item to carry out this works

PS.TA.2 ROAD SIGN BOARDS

Further to Item TA.8.1, tenderers are to note that the signs measured under this item are the various types of standard regulatory signs (e.g. stop, yield, keep left etc.).
Notwithstanding the requirements of Clause TA.8.1 the unit of measure shall be number (No.).

PS.TA.3 RE-ERECT ROAD SIGNS

The unit of measurement is number (No.) which shall consist of one pole and one sign.
The rate shall cover the cost of collecting the pole and sign from the site yard and planting of the pole in the PVC sign sleeve or ground, together with compacting the soil around the pole.

PS.TA.4 TEMPORARY ROAD SIGNS

PS.TA.4.1 MATERIALS

All temporary signs shall be manufactured from Chromadek steel plate as detailed under Clause TA.3.3 and retroflective material as follows:

Black	semi-matt finish
Yellow background (with no red material)	Class I
Yellow background (if red material used)	Class II
Red	Class I

With the exception of signs R1, R2, R3, R1.5A and R1.5B, the temporary road signs shall be in accordance with the colour code for temporary road signs.

PS.TA.4.2 ERECTION

The temporary road signs shall be erected in a manner such that the face of the sign is not defaced, obscured or deflected in any way.

Where necessary, for high visibility, the temporary signs shall be erected on 100 mm creosoted gum posts such that the underside of the sign is not less than 2,2 m above ground level. The post/s shall be supported in a drum/s which shall be ballasted and braced or stayed so that the sign cannot be blown over. In all other instances, the temporary signs shall be adequately secured to a drum.

PS.TA.5 TIMBER POSTS

The timber posts for the temporary sign supports shall be 100 mm diameter creosote gum posts.

PS.TA.6 DRUMS

All drums shall be white painted, 200 litre drums or similar approved by the Engineer. Drums shall not be used for delineation purposes.

PS.TA.7 PROTECTION AND MAINTENANCE

The Contractor shall protect and maintain all road furniture (road signs, delineators, drums, barriers, barricades etc.) throughout the course of the contract and shall be responsible for the cost of replacing any road furniture that may be damaged or stolen.

PS.TB ROAD MARKING

Clause	Description
PS.TB.1	PLASTIC ROAD MARKING MATERIAL
PS.TB.2	LETTERING, SYMBOLS AND TRAFFIC ISLAND MARKING
PS.TB.3	TEMPORARY ROADMARKING
PS.TB.4	SANDBLASTING
PS.TB.5.	PAINTED PRECAST CONCRETE KERBS
PS.TB.6	ROAD STUDS
PS.TB.7	GUARD RAIL REFLECTORS

PS.TB.1 PLASTIC ROAD MARKING MATERIAL

Further to Clause TB.3.1(c) the plastic road marking material shall comply with the requirements of Specification BS.3262, 1987 Part 3.

(a) The material shall consist of a light-coloured aggregate, pigment and extender, bound together with a thermoplastic resin, plasticised as necessary.

The approximate composition of the material as laid is dependent on the appropriate specification, but for example shall be:

Aggregate	40 parts
Solid Glass Beads	20 parts
Pigment and Extender	20 parts
Binder	20 parts

The proportioning of the various ingredients shall be such that the material, when in a molten state, can be sprayed readily onto the road surface to give an even line of good definition.

(b) Aggregate

The aggregate shall consist of white silica sand, crushed calcite calcined flint, quartz, or other approved aggregate.

(c) Reflectorisation

The solid glass beads incorporated in the mixture shall comply with the Class A category of BS 6088 (1981) that is:

Sieve	% Retained
0,18 mm	0 - 3
0,850 mm	5 - 20
0,425 mm	65 - 95
Below 0,425 mm	0 - 10

Minimum of spherical beads by number 70%

(d) Luminance

The luminance factor of white SPRAYPLASTIC shall be not less than 70.

(e) Flow resistance

The percentage decrease in the height of the cone of SPRAYPLASTIC shall not be more than 25 after testing for 48 hours at 23 C (temperate grade) or 40 C (semi-tropical or tropical grades).

(f) Low Temperature Impact Resistance

SPRAYPLASTIC shall pass the impact test when tested at -10 C (temperate grade) or -1 C (semi-tropical or tropical grades).

(a) Abrasion resistance

The abrasive wear of SPRAYPLASTIC shall typically be less than 0,5 g per 100 revolutions.

PS.TB.2 LETTERING, SYMBOLS AND TRAFFIC ISLAND MARKING

Notwithstanding the requirements of Clause TB.8.1.2, traffic island marking shall be measured under Clause TB.8.1.1 lines.

PS.TB.3 TEMPORARY ROADMARKING

Items have been included in the Bill of Quantities for the provision of temporary road marking using P.V.A. paint.

PS.TB.4 SANDBLASTING

Where directed, the Contractor shall remove existing lane lines and painted islands by sandblasting. The Contractor shall ensure that the method of sandblasting used will not damage the road surface permanently.

The Contractor shall take all necessary precautions to avoid damage to the public traffic during the removal of existing markings.

All loose material remaining on the road after obliteration of markings shall be suitably disposed of to avoid clogging the drainage systems.

The unit of measurement shall be the square meter (m²). The rate shall include for the successful removal of the paint on the road surface, the continual sweeping and removal of grit and the screening of the sand blasting apparatus to ensure that the dust from the operation does not become a hazard.

PS.TB. 5 PAINTED PRECAST CONCRETE KERBS

The unit of measurement shall be linear meter (m). Separate items have been scheduled for each specified colour and the quantity paid for shall be the actual painted kerb of the exposed front face and the top of the Figure 6 type precast concrete kerb. The kerbs shall be painted alternately in black and white colours where required.

The rate shall include for procuring and furnishing all material, including PVA Road Paint and the necessary equipment, and for painting, protecting, and maintenance as specified.

PS.TB. 6 ROAD STUDS

Five (5) types of road studs / markers will be used on this contract, ie.

i) Solar rechargeable roadstuds,

ii) Uni-directional road studs- Stimsonite or similar approved,

iii) Bi-directional road studs- Stimsonite or similar approved,

iv) Tempered Glass 360 degrees, and

v) Temporary Roads Marker.

The Temporary Road Markers will be used for all temporary works, ie.deviations / detours. The unit of measurement shall be number (No.). The rate shall include for the installation and removal of the markers. They shall be amber and red in colour.

The Permanent Road Studs will be used in the permanent works. They will be of type (i) to (vi) as detailed above. The unit of measurement shall be number (No.). The rate shall include for the supply and installation of the studs. They shall be white, yellow and red in colour.

PS.TB. 7 GUARD RAIL REFLECTORS

The contractor shall supply and install V-Type Guard Rail Reflectors on the guard rails.

The unit of measurement shall be number and shall include for the contractor's cost to supply and install.

C3.3.3 AMENDMENTS TO THE STANDARD SPECIFICATIONS – COLTO

SECTION 1100: DEFINITIONS AND TERMS

In all cases where "Directorate Land Transport" appears in the text or in drawings contained in this document it shall be read as "eThekwini Municipality".

B1115 GENERAL CONDITIONS OF CONTRACT

Replace clause 1115 with the following:

"The General Conditions of Contract for Construction Works 3rd edition 2015 (abbreviated elsewhere in C3.2 Project Specifications and C3.3 Particular Specifications as "GCC 2015" or as "General Conditions of Contract 2015") published by the South African Institution of Civil Engineering (SAICE), together with the Special Conditions of Contract form part of the contract.

All references in the COLTO Standard Specifications for Road and Bridge Works are to the COLTO General Conditions of Contract for Road and Bridge Works for State Road Authorities. Consequently all references in the COLTO Standard Specifications have to be amended accordingly to reflect the appropriate General Conditions of Contract relevant to the Contract. The COLTO Standard Specifications have been scrutinized and the clauses, which refer to the COLTO General Conditions of Contract, identified. Each COLTO clause reference is tabulated in Table B1115 below (context of reference is also given) together with the relevant equivalent clause in the SAICE General Conditions of Contract for Construction Works 3rd edition 2015 applicable for this contract.

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 SAICE General Conditions of Contract for Construction Works 3rd edition 2015 reference, as amended by the Special Conditions of Contract in the Contract Data, shall apply and the Contractor shall be responsible for interpretation of the equivalent clause.

TABLE B1115: REFERENCES IN COLTO STANDARD SPECIFICATIONS TO THE COLTO GENERAL CONDITIONS OF CONTRACT AND RELEVANT SAICE GENERAL CONDITIONS OF CONTRACT FOR CONSTRUCTION WORKS 3rd EDITION 201

COLTO Standard Specification		COLTO General Conditions of Contract 1998		SAICE General Conditions of Contract for Construction Works 3rd edition 2015	
Clause No	**Page No**	**Clause No**	**Description or Reference**	**Clause No**	**Description or Reference**
1202	1200-2	15	Programme	5.6	Programme
1209(e)	1200-5	52: 52(1)(e) 52(2)	 Monthly payments (documentary evidence of ownership of materials) Valuation of material brought onto Site	6.9 & 6.10: 6.9 6.10.2	 Vesting of plant and materials Valuation of material brought onto Site
1210	1200-5	54: 54(1) 54(2) 54(3)	 Certificate of practical completion	5.14: 5.14.1 5.14.2 5.14.3	 Certificate of Practical Completion
1212(l)	1200-7	49: 49(2)	 Contract Price Adjustment Factor	6.8: 6.8.2	 Contract Price Adjustment Factor
1215	1200-9	45	Extension of time for completion	5.12	Extension of time for practical completion
1217	1200-10	35	Care of the Works	8.2	Care of the Works
1303	1300-1 and 1300-2	49 & 53: 49(2)		6.8 & 6.11: 6.8.2	

COLTO Standard Specification		COLTO General Conditions of Contract 1998		SAICE General Conditions of Contract for Construction Works 3rd edition 2015	
Clause No	**Page No**	**Clause No**	**Description or Reference**	**Clause No**	**Description or Reference**
		and 49(3) 53	Contract Price Adjustment Factor and special materials Variations exceeding 20%	and 6.8.3 6.11	Contract Price Adjustment Factor and variation in costs of special materials Variations exceeding 15%
1303	1300-2	12 &45: 12 45	 Commencement of Works and Commencement Date Extension of time for completion	5.3 & 5.12: 5.3 5.12	 Commencement of the Works Extension of time for practical completion
1403 (c)(ii)	1400-4	40(1)	Valuation of variations	6.4.1	Value of variations
1505	1500-3	40: 40(1)	 Valuation of variations	6.4: 6.4.1	 Value of variations
1507 Items: 15.08 15.09 15.11	1500-8	48: 48.1	 Provisional Sums	6.6: 6.6.1	 Provisional Sums
3108 Note (2)	3100-4	40: 40(1)	 Valuation of variations	6.4: 6.4.1	 Value of variations
3204 (b)(iii)	3200-2	40: 40(1)	 Valuation of variations	6.4: 6.4.1	 Value of variations
3303(b)	3300-2	2	Engineer and Engineer's Representative	3	Engineer
5803(c)	5800-3	40: 40(1)	 Valuation of variations	6.4: 6.4.1	 Value of variations
5805(d)	5800-4	40: 40(1)	 Valuation of variations	6.4: 6.4.1	 Value of variations
5809 Item 58.10	5800-10	48: 48.1	 Provisional Sums	6.6: 6.6.1	 Provisional Sums
8103(c)	8100-1	40: 40(1)	 Valuation of variations	6.4: 6.4.1	 Value of variations
8117 Item 81.03	8100-26	22	Clearance of site on completion	5.15	Clearance of site

B1156 COMMERCIAL SOURCE

Add the following new definitions:

"A source of supply of materials chosen by the Contractor and for which he takes full responsibility for the quality of the materials".

SECTION 1200: GENERAL REQUIREMENTS AND PROVISIONS

B1205 WORKMANSHIP AND QUALITY CONTROL

Add the following paragraph to the end of clause 1205:

"Testing for quality control shall be conducted in accordance with the requirements of Section 8300 for Quality Control (Scheme 2)."

B1206 THE SETTING-OUT OF WORK AND PROTECTION OF BEACONS

Delete the first paragraph of clause 1206 in its entirety and replace it with the following:

The Contractor shall comply with all legal provisions in regard to surveying and setting out work.

B1209 PAYMENT

Replace the following in subclause (e):

“Clause 52” with “Clauses 6.9 and 6.10.2”

B1210 CERTIFICATE OF PRACTICAL COMPLETION

Replace the following:

“Clause 54” with “Clause 5.14”

B1212 ALTERNATIVE DESIGNS AND OFFERS

Replace the following in subclause (l)

“Clause 49” with “Clause 6.8”

Add the following to the end of subclause (m):

"The provision for contract price adjustment in the original tender summary must not under any circumstances be altered in an alternative tender"

B1215 EXTENSION OF TIME RESULTING FROM ABNORMAL RAINFALL

Extension of time resulting from abnormal rainfall shall be calculated according to the requirements of Method (ii) (Critical-path method).

Method(ii) (Critical-path method)

Delete the words "(based on a five-day working week)" in the fifth and sixth lines of the second paragraph of Method (ii).

Add the following to the end of Method (ii):

"The value of “n” working days expected delay caused by normal rainy weather as referred to in Method (ii) shall be as given in 5.12.2.2 of the Contract Data.

Each "n"-value in the table applies only to the calendar month immediately to the left of the number, and the "n"-values as specified shall not be taken as being carried forward so as to accumulate over the contract period. If no abnormal rainfall occurs during a particular calendar month in a particular year, then no extension of time for abnormal rainfall shall be granted with respect to that calendar month for that year, and no further consideration shall be given to that "n"-value in respect of that year.

Similarly, if the "n" working days expected delay caused by normal rainy weather during a particular calendar month in a particular year (for which the Contractor shall have made provision in his programme of work in accordance with Method (ii)) are not taken up (either in whole or in part) by standing time due to normal rainy weather during that month of that year, then no further consideration shall be given to those "n" working days (or portion thereof), which effectively have been gained, when any subsequent extension of time claims which may arise later during the contract period are assessed by the Employer."

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

Replace the following:

"Clause 35" with "Clause 8.1"

B1219 WATER

Add the following paragraph to the end of clause 1219:

"The Contractor shall arrange for chemical tests to be carried out to confirm the suitability of his proposed water sources for use as drinking water and for use in the concrete construction. The Contractor shall ensure that these tests also include testing for salinity and sugar content levels.

The Contractor shall note that the necessary permission must be obtained from the Department of Water Affairs for the abstraction of water from streams and rivers."

B1229 SANS CEMENT SPECIFICATIONS

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

B1233 ENVIRONMENTAL IMPACT CONTROL

In addition to aspects of the design which are intended to avoid or reduce environmental impact, and in addition to normal good construction practice expected of the Contractor, the following requirements shall also be observed:

(a) The Contractor shall comply with the requirements of the Environmental Management Specification contained in section C3.3 Particular Specifications.

(b) Clearing shall be limited to the servitude.

(c) No littering by construction workers shall be allowed. A refuse control system shall be established for the collection and removal of refuse to the satisfaction of the Engineer.

(d) Adequate provision shall be made for temporary toilet requirements in construction areas. Use of the veld for this purpose shall not be allowed under any circumstances.

(e) Streams, rivers and dams shall be protected from direct or indirect spillage of pollutants, such as refuse, garbage, cement, concrete, sewage, chemicals, fuels, oils, aggregate tailings, wash water, organic materials and bituminous products. In the event of spillage, prompt action shall be taken to clear the affected area. Emergency measures in the event of spillage shall be set out and the responsible person shall be made aware of the required action.

(f) Bituminous and / or other hazardous products shall not be spoiled on site and shall only be disposed of at licensed authorised disposal facilities.

(g) Provision shall be made to prevent excessive erosion and siltation throughout the Contract and in particular on adjacent land. Should excessive erosion and / or siltation take place outside

the road reserve as a direct result of the Contractor's construction activities, the Contractor shall be responsible for making good the erosion / siltation to the satisfaction of the landowner and the Engineer.

(h) Invader species of plants shall be controlled.

(i) As the works are located in a per-urban business and residential environment, dust and noise pollution shall be monitored and restricted to acceptable levels.

No separate payment shall be made for observing these requirements as such payment shall be deemed to be included in the amount tendered for item 13.01(c) (The Contractor's general obligations: Time-related obligations). Any avoidable non-compliance with these requirements shall be considered sufficient grounds for withholding payment of part or all of the amounts to be paid for the above item in order to pay for the repairs to any damages.

Add the following new payment items:

SECTION 1500: ACCOMMODATION OF TRAFFIC

B1501 SCOPE

Add to Clause 1501 the following:

The scope of this section shall also include the preparation and submission to the Engineer for approval of traffic management plans. The traffic management plans shall demonstrate how the Contractor intends accommodating and controlling traffic through the site. The plans must incorporate all the requirements of the specifications in respect of the accommodation of traffic, including the traffic control devices and the personnel involved. A traffic safety officer shall be specifically named in the Plan together with 24 hour contact details. Copies of the plans shall be made available to the Engineer, the Employer, Local Authorities, the Police and Emergency Services.

The accommodation of traffic shall generally be undertaken in the following manner:

(a) Via gravel diversions, where practical in terms of space and the terrain.
(b) By dealing with traffic under construction where no diversions are possible.
(c) By diverting traffic along the existing road where the route is being realigned

Add the following to the end of clause 1501:

“Throughout the course of the contract the contractor shall ensure that the works do not prevent service owners or the employer’s other contractors from gaining access through the site.

The contractor shall be required to accommodate traffic in the vicinity of the points at which he accesses the site from the existing road network. All movements of the contractor’s plant to and from the existing access road at these intersections shall be strictly controlled by means of appropriate signage, delineators, stop / go facilities and flagmen.”

B1502 GENERAL REQUIREMENTS

(a) Safety

Add to Sub-clause 1502(a) the following:

Information in respect of intersections, accesses, bus stops, traffic volumes, pedestrians etc is given in Part B of these Project Specifications.

(b) Providing Temporary Deviations

Add to Sub-clause 1502(b) the following:

The contractor shall keep the provincial traffic police, the municipal traffic departments and the engineer fully informed with regard to any changes in the normal traffic flow and obtain their approval for these changes.

During the non-working hours, all unnecessary obstructions to the traffic shall be removed and all signs no longer applicable to the situation shall be removed or effectively covered.

It is a condition of this contract that not more than 10 km of deviation should be open to public traffic at any one time, and that not more than three separate deviations should be open at any one time. No additional payments will be made where situations arise that the contractor has deviations cross over the roadway under construction.

(i) Traffic Safety Officer

Add to Sub-clause 1502(i) the following:

The Contractor shall submit a CV of the candidate to the Engineer for approval before the Traffic Safety Officer is appointed. The Traffic Safety Officer shall be made available to discuss road safety and traffic accommodation matters whenever required by the Engineer.

Delete Sub-clause 1502(i), sub-sub-clauses (ii) and (iii) and replace with the following:

(ii) Record on neat and dimensioned sketches and submit to the Engineer the position and sign reference number where applicable of each sign, barricade, delineator, cone, amber flicker light, guardrail and permanent or temporary painted road marking feature.

The position of each unit shall be adequately referenced to identifiable permanent features located along the site of the works.

These records shall also show the date and time at which the recorded traffic accommodation features are certified correct by the Traffic Safety Officer, and shall be signed by the Traffic Safety Officer before being submitted to the Engineer.

The records shall be amended whenever changes are made in the field and the revised detailed sketches shall be submitted to the Engineer. This shall include the recording of the position of flagmen and stop/go control men and their associated traffic accommodation equipment wherever they are used."

(iii) Personally inspect the position and condition of each traffic accommodation feature on the whole site of works twice each day by 9:30 and by 16:30, to record all irregularities discovered and the remedial action taken, and to sign off as correct and submit to the Engineer such record sheets by 10:00 and by 17:00 each day. The traffic Safety Officer shall keep a duplicate book for this specific purpose.

The Traffic Safety Officer shall also submit to the Engineer by 10:00 each morning, a record of all matters pertinent to site safety and traffic accommodation throughout the site of works the previous day. He shall also record the daily labour returns of flagmen, stop/go and traffic signal control men employed.

The traffic safety officer shall be equipped with a cellular telephone and shall have a vehicle and 2 labourers at his disposal 24 hours a day, including public holidays and the shutdown period as instructed by the engineer. He shall also be directly answerable to the Contractor's Site Agent. The Traffic Safety vehicle shall be a truck with a capacity of 1 ton and shall be equipped with a high visibility rear panel. The traffic Safety Officer shall have a direct line of communication at all times with the police and traffic officers responsible for the area within limits of the Contract.

Add to Sub-clause 1502(i) the following new sub-sub-clauses:

(ix) Ensure that all obstructions, soil and gravel heaps, related to the Contractors activities be removed before nightfall where applicable and as instructed by the Engineer and that the roads are safe for night traffic.

(x) The Traffic Safety Officer shall, in addition to the duties listed in Clause 1502 (i), also be responsible for removal of broken down vehicles off the roadway and implementing actions requested by the traffic authorities with regard to the work to be carried out, and shall be responsible for the erection and maintenance of all traffic signs necessary for the accommodation of traffic."

Add the following new Sub-clauses to Clause 1502:

(j) Public traffic

The contractor must plan and conduct his activities so as to bring about the least possible disruption to the traffic on the road. All halting of traffic will require the prior approval of the engineer and must be pre-arranged with the appropriate traffic authorities. In all dealings with the public the Contractor shall bear in mind the public's right to enjoy the use of the road, and the Employer's desire to interfere as little as possible with this right. At all points of contact with the public, the Contractor shall deal with deliberate courtesy and understanding in any discussions or disputes.

(a) Failure to comply with provisions

The failure or refusal of the Contractor to provide barricades or traffic signs at the proper time, or to take the necessary precautions for the safety and convenience of public traffic as specified or instructed by the Engineer, shall be sufficient cause for the suspension of all work under this Contract without any additional compensation to the Contractor until the required accommodation of traffic has been completed to the satisfaction of the Engineer. The above shall be sufficient cause for the Engineer to deduct penalties as follows:

- A fixed penalty of R5 000,00 per occurrence shall be deducted for each and every occurrence of non-compliance with any of the requirements of Section 1500 of the standard specifications and section B1500 of the Project Specifications.

- In addition a time-related penalty of R500,00 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 the time in hours for reinstatement of the defects. Should the Contractor fail to adhere to this instruction, the time-related penalty shall be applied from the time the instruction was given.

- Furthermore, failure to comply with the provisions of clause B1502(i) will also result in a pro-rata penalty to be deducted from payment item B15.14 by the engineer.

The penalties shall be deducted from the payment certificate for the month in which the non-compliance occurs.

(b) Access to work area

Construction traffic will only be permitted to enter or leave the work area at points approved by the Engineer and as clearly indicated on the traffic management plans. When any access point is in use, flagmen shall be provided for each such point. At least two flagmen shall be stationed at the access point to control the movement of construction traffic, and to warn public traffic on both lanes of the existing road. It is not the purpose of these flagmen to stop public traffic flow.

(c) Extension of time for completion

Accommodation of public traffic on the works or any delays caused thereby, as well as any suspensions due to failure by the Contractor to comply with the provisions for the accommodation of traffic, will not be regarded as special circumstances for an extension of time.

B1503 TEMPORARY TRAFFIC-CONTROL FACILITIES

Replace the first sentence of the first paragraph of clause 1503 with the following:

"The contractor shall provide, erect and maintain the necessary traffic-control devices, road signs, channelisation devices, barricades, warning devices and road markings (hereinafter referred to as traffic-control facilities) in accordance with these project specifications and as shown on the drawings and in the South African Road Traffic Signs Manual in conjunction with the latest edition of Road Signs Note No.13 - Roadworks, and shall remove them when no longer required.

The contractor shall replace at his own cost any traffic-control facilities that have been damaged, lost or stolen. The contractor shall also remove all bituminous or other foreign material from the traffic-control facilities in order to keep them clean and visible at all times. Traffic-control facilities that can no longer be cleaned effectively shall be replaced with new ones at the cost of the contractor."

Replace the first sentence of the third paragraph of clause 1503 with the following:

"The type of construction, spacing and placement of traffic-control facilities shall be in accordance with the latest edition of Road Signs Note No.13 - Roadworks, these project specifications, the drawings and the South African Road Traffic Signs Manual.

The details shown for spacing and placement of traffic-control facilities may, however, be revised at the discretion of the engineer where deemed necessary to accommodate local site geometry and traffic conditions."

(a) Traffic-control devices

Add the following new paragraph after the end of the second paragraph of subclause 1503(a):

“The reduction of the road width to a single lane carrying one-way traffic and controlled by “Stop / Go” boards shall be allowed only during daylight hours in clear weather conditions when work is actively taking place on the road, and such reduction of the road width shall always be accompanied by sufficient on-going watering to keep the dust down at all times on any trafficked gravel surfaces in order to maintain good visibility along the deviation. At least two lanes carrying two-way traffic shall be provided at all other times."

(b) Road signs and barricades

Add the following to the end of subclause 1503(b):

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

The temporary road signs required for this contract shall generally be mounted on poles installed in the ground. Where temporary signs such as delineators are mounted on portable supports, the only permitted method of ballasting such sign supports shall consist of durable sandbags filled with sand of adequate mass to prevent the signs from being blown over by wind. The cost of the sandbags shall be included in the tendered rates for the applicable types of temporary road signs.

The traffic-control devices, temporary signs and devices required in the contract are those designated in Road Signs Note No.13 - Roadworks.

The covering of permanent road signs, if applicable, shall be carried out by utilising a hessian bag which shall be pulled over the sign in the form of a hood and fastened to the sign posts using wire ties. Plastic bags or other materials, and fastening by means of adhesive tape, shall not be permitted for this purpose. The cost of covering permanent road signs shall be deemed to be covered by the tendered rates for items B15.01.

No work may proceed on any section where accommodation of traffic is required until such time as the relevant requirements with regard to signposting are met and the written approval of the engineer has been obtained. The contractor shall keep sufficient surplus signs, delineators and barricades on the site to allow for the replacement of damaged or missing items immediately upon discovery, or within three hours of instructions to such effect having been given by the engineer. Delineators shall be of the flexible plastic / rubber reversible variety and not of the rigid metal variety.”

(c) Channelization devices and barricades

Add the following paragraphs at the end of subclause 1503(c):

"Delineators shall be manufactured from plastic / rubber materials and shall be adequately ballasted with sand bags to prevent the signs from being blown over by wind or wind turbulence from moving traffic.

Traffic cones shall be manufactured from fluorescent orange or red plastic material, and shall be used only at short term lane deviations during daylight hours. All traffic cones used on deviations shall be 750mm high. Lane closures which continue into the night time shall be demarcated by delineators only.

The use of steel drums as channelization devices shall not be allowed on this Contract. Channelization shall be effected by the use of delineators or cones as detailed in Road Signs Note No. 13 - Roadworks.”

(e) Warning devices

Add the following to subclause 1503(e):

"All construction vehicles and plant used on the works shall be equipped with 200mm diameter rotating amber flashing lights and with "Construction Vehicle" warning signs. All vehicles and plant shall obtain a clearance permit from the engineer before being allowed onto the site.

Rotating lights shall have an amber lens of minimum height of 200mm and shall be mounted to ensure clear visibility from all directions. The lights on construction vehicles shall be switched on as the vehicles decelerate to enter a construction area, while construction vehicles are operating within the accommodation of traffic area, and as the vehicles accelerate to the general speed when entering the road from a construction area. Lights on plant shall operate continuously while the plant is working alongside sections of road open to public traffic.
All LDVs and cars operating on site shall also be equipped with rotating amber flashing lights which shall be placed so as to be clearly visible and shall be operated continuously while the vehicles are manoeuvring in or out of traffic or while the vehicles are travelling alongside or parked alongside roads open to public traffic.

Rotating lights and the "Construction Vehicle" warning signs on the contractor's vehicles and plant shall not be paid for separately but shall be included in the rates covering the use of the vehicles.

The contractor shall apply and maintain to the approval of the engineer such rotating amber lights and warning signs, together with any temporary mounting brackets. Vehicles and plant that do not comply with these requirements shall be removed from the site."

Add the following new subclauses to clause 1503:

(g) Other signs and facilities

The engineer may instruct the contractor to provide any other road sign, reflective tape, etc. not measured in the standard pay items. Such other road signs, reflective tape, etc. shall conform to the requirements of the South African Road Traffic Signs Manual and any other specification provided by the engineer.

The Contractor shall inform the general public of the intended road works, construction period and accommodation of traffic proposal through press releases in local and provincial newspapers. Cones shall be manufactured and positioned in accordance with the details specified on the drawings. All traffic cones and road signs shall be kept clean and visible at all times. All bituminous or other foreign material shall be removed by the Contractor, or the dirty traffic cones and road signs shall be replaced with new ones at the cost of the Contractor, as directed by and to the satisfaction of the Engineer.

(h) High visibility safety vests

The contractor shall ensure that all his own personnel, excluding those who are permanently office bound, all other construction workers on the site, staff of the engineer and visitors are equipped with high visibility reflective safety vests. High visibility reflective safety vests shall be worn at all times when working on or near to the travelled way. High visibility reflective safety vests shall be kept in good condition and any such safety vests that are, in the opinion of the engineer, ineffective shall be replaced immediately by the contractor.

(i) Flagmen

Flagmen shall be provided where shown in SARTSM or required by the specification. During the daytime, at least two flagmen shall be provided at each traffic control point in addition to the STOP/GO sign operator, one flagman at the 80 km/h sign and a second roving flagman to indicate to the traffic at the end of the queue to stop. At night time when traffic signals are used only one roving flagman equipped with an approved xenon strobe unit and a torch is required at each traffic control point as well as the traffic light operator. Where the shoulder of the road is closed to traffic, a flagman shall be provided at the leading end of the closure during daytime. This flagman shall be provided at the 80-km/h sign to warn the traffic about the closure. No flagman shall be on duty for a period of more than 10 hours per day.

Flagmen shall be adequately trained in the standard flagging techniques as described in the SARTSM (refer to figure 13.23 of detail 13.23.1) and be provided with conspicuous clothing such as safety jackets utilizing retro-reflective and / or fluorescent panels in red, yellow and / or white.

Flagmen shall have in their possession, at all times, certification that they have attended and passed an accredited course in flagging techniques before being allowed onto the construction site.

Flags shall be made from bright red or red-orange material and shall be square with a minimum side length of 600 mm. The flag shall be attached to a staff at least 1,0 m in length.

In terms of lateral clearance and safety, flagmen shall stand on the shoulder of the lane of traffic that is being controlled and under no circumstances shall flagmen be permitted to stand within the traffic lane. In order to obtain maximum visual impact for the travelling public, flagmen shall stand-alone."

B1505 TEMPORARY DRAINAGE WORKS

Replace the following:

"Clauses 40 and 53" with "Clause 6.4 and 6.5"

B1511 MAINTENANCE OF GRAVEL TEMPORARY DEVIATIONS AND EXISTING GRAVEL ROADS USED AS TEMPORARY DEVIATIONS

Add to Clause 1511 the following:

Where applicable, all references to gravel roads and/or diversions shall also include gravel shoulders used as diversions.

B1511 NOTICE TO THE RESIDENTS

Should it be necessary to close any part of any road to vehicular traffic, suitable notice shall be given to the affected residents and/or property owners. The duly completed "Notice to Residents" provided in Section C4: Site Information shall be distributed at least 7days prior to the closure, indicating the date on which, and the period of time for which the road will be closed.

B1517 MEASUREMENT AND PAYMENT

Amend the following payment item:

Item Unit

B15.01 Accommodating traffic and maintaining temporary deviations. ..... km

Add the following to Payment Item 15.01 as follows:

The Engineer will advise the Contractor in writing where control traffic is inadequate. Failure to rectify this within 2 hours will result in a penalty being applied and in payment being reduced.

A proportion of the tendered monthly rate will be deducted for each day in any calendar month that traffic control does not meet the requirements of the specifications.

Delete the second sentence of the second paragraph.

The rest of the second paragraph of Payment Item 15.01 shall apply.

Delete the third paragraph and replace with:
The tendered rate shall also include for the preparation of traffic management plans and their submission to the Engineer for approval. The tendered rate shall also include for all costs associated with constructing the road under traffic and for complying with the restricted working conditions

Item Unit

B15.03 Temporary traffic-control facilities

(a) Flagmen .....man-day

(a) Portable STOP and GO-RY signs .....No

(h) Delineators (DTG50J) (1200mm x 250mm):

i. Single .....No
ii. Mounted back to back.....No

(i) Movable barricade/road sign combination (8m wide chevron and road closed types).....No

(j) Traffic cones (750mm).....No

(l) Moveable barriers (Double sided concrete or steel New Jersey or F-shaped type or Single sloped):

i. Provided and returned from / to a commercial source.....m

Add the following to Payment Item B15.03 as follows:

1) Competent staff must be used for controlling traffic, as their actions can affect the safety of both the road users and road workers.

2) Local labour shall be trained during traffic accommodation workshops prior to works being carried out

SECTION 1700: CLEARING AND GRUBBING

B1704 MEASUREMENT AND PAYMENT

Add to Payment Item 17.01 the following:

Item		Unit
B17.01	Clearing and grubbing.....	ha

The tendered rate shall also include full compensation for removal of existing fences, pipe culvert inlet and outlet structures and kilometre marker posts as instructed by the engineer. Clearing and grubbing for the construction of camp sites shall not be measured separately. Payment shall be regarded as included in the rates tendered for the applicable items for the above-mentioned work.

Within the road reserves clearing and grubbing will only be measured and paid for where required for road works. All topsoil removed in this process must be stockpiled in heaps not exceeding 1 m height for later use during rehabilitation and landscaping.

A portion of this work shall include for labour intensive construction. The tenderer shall make allowance for the employment of local labour and/or the labour of local subcontractors, supplemented by the contractor's key personnel for the use of labour intensive construction.

Labour-intensive clearing and grubbing shall be carried out subsequent to the training of local labour. Local labour shall be trained during clearing and grubbing workshops prior to works being carried out.

Team sizes should generally comprise of about five people. Labour-intensive clearing and grubbing shall comprise of the following activities:

1) Bush clearing: Medium to Dense Bush.

2) Grass clearing: Removal of vegetation to ground surface.

3) Destumping: Removal of stumps and major roots.

4) Grubbing: Root removal to 250 mm depth in soft loamy soil.

SECTION 2200: PREFABRICATED CULVERTS

B2218 MEASUREMENT AND PAYMENT

Add the following paragraph at the end of the payment item:

ITEM		UNIT
B22.23	Service ducts: (a) Ordinary pipes (uPVC pipes 110 dia.)	m

The tendered rate shall also include the provision of belled couplings for the pipes as indicated on the drawings.

SECTION 3300: MASS EARTHWORKS

B3301 SCOPE

Add to Clause 3301 the following:

The Contractor shall note the restricted nature of the earthworks in general, and where the widening of existing cuts and fills are required in particular. No extra over rates for widening of cuts, widening of fills or for working in restricted areas shall be applicable to this Contract.

B3303 CLASSIFICATION OF CUT AND BORROW

(a) Classes of excavation

Add to Sub-clause 3303(a) the following:

Cut material for fills will, apart from natural in-situ material, also consist of existing fill and pavement layers from the existing road. Excavation from existing fill and pavement layers varies in depth, but no distinction is made between this excavation and excavation in other materials, except for classification as soft, intermediate and hard materials.

Payment items 33.14 and 33.15 will not apply on this Contract.

B3306 CUT AND BORROW

(a) Dimensions of Cuts

Delete the third paragraph from Clause 3306(a), apart from the first sentence thereof.

Add the following:

Cut and borrow to fill will be measured under Item 33.01. The Contractor shall take note of the nature of the earthworks alongside the existing road. No extra over payments will be made in respect of the nature of the site or due to the dimensions of a particular cutting.

B3312 MEASUREMENT AND PAYMENT

General directions

Delete Note (3) Work in Restricted Areas and replace with the following:

On this Contract, no extra over payment will be made due to the nature of the site or the size of the work area available. All costs associated with carrying out the works are deemed to be included in the tendered rates for the items in the Schedule of Quantities.

Amend the payment items under Clause 3312 as follows:

B33.01 In the description of Item 33.01, delete "free-haul up to 0.5 km" and replace with "free-haul up to 1.0 km."

In the fifth paragraph, referring to the tendered rates, delete the words "free-haul distance of 0.5 km" and replace with "free-haul distance of 1.0 km."

Also in the fifth paragraph, after the words "the cutting of benches" insert the words "including benches in existing fill slopes to be widened."

B33.04 In the description of Item 33.04, delete "free-haul up to 0.5 km" and replace with "free-haul up to 1.0 km." In the fourth paragraph delete "free-haul distance of 0.5 km" and replace with "free-distance of 1.0 km."

B33.07 In the description of Item 33.07, delete "free-haul up to 0.5 km" and replace with "free-haul up to 1.0 km." In the fourth paragraph delete "free-haul distance of 0.5 km" and replace with "free-haul distance of 1.0 km."

SECTION 3400: PAVEMENT LAYERS OF GRAVEL MATERIAL

B3402 MATERIALS

(a) General

Add to Clause 3402(a) the following:

The pavement for the road shall consist of:

Base	150mm C4 (G5 material) material, from commercial sources
Subbase	150mm G6 material, from commercial sources
Selected Subgrade	150mm G9 material, from road prism/stockpile/borrow/commercial sources

All layers shall comply with the requirements of Tables 3402/1, 3402/2, 3402/4 and 3402/5 of the Standard Specification. The requirements of Section 3500: Stabilization shall also apply to the relevant layers.

(b) Compaction Requirements

Add to Clause 3402(b) the following:

The compaction requirements of the pavement layers shall be:

Base	97% of modified AASHTO density
Subbase	95% of modified AASHTO density
Selected Subgrade	93% of modified AASHTO density

B3406 QUALITY OF MATERIALS AND WORKMANSHIP

Add to Clause 3406 the following:

Test results and re-measurements shall be assessed in accordance with the provisions of Section 8200: Quality Control (Scheme 1), Judgement Plan B of the Standard Specifications, as amended in these project specifications.

B3407 MEASUREMENT AND PAYMENT

Delete the note at the start of the measurement and payment clause dealing with work in restricted areas. On this Contract, no extra over payment will be made due to the nature of the site or the size of the work area available. All costs associated with carrying out the works are deemed to be included in the tendered rates for the items in the Schedule of Quantities.

Add the following new payment item:

Item		Unit
B34.14	Pavement layers constructed from gravel obtained from commercial sources:	
(a)	Gravel selected layer compacted to:	
	(i) 93% of modified AASHTO density (150mm G9).	m3
(b)	Gravel subbase compacted to:	
	(i) 95% of modified AASHTO density (150mm G6).	m3
(c)	Gravel base (chemically stabilized material) compacted to::	
	(i) 97% of modified AASHTO density (150mm G5)	m3

The tendered rate shall include full compensation for procuring, breaking down, placing and compacting the material, including transporting the material and its removal, disposal and transporting for a distance of 1km and up to 5% of volume of oversize material and the protection and maintenance of the layer and the conducting of tests, all as specified. Overhaul shall not be measured separately for payment of materials obtained from commercial sources, and the rates tendered for such materials shall be fully inclusive of all haul required. Special reference is made to clause B1156 “Commercial Source”.

SECTION 3500: STABILISATION

B3502 MATERIALS

(a) Chemical stabilizing agents

Delete sub-clauses (ii) Ordinary Portland cement and (iii) Portland blast-furnace cement and replace with the following:

"Cement shall comply with the relevant requirements of SANS 50197-1:2000. The use of strength classes greater than 32,5 shall not be permitted."

B3503 CHEMICAL STABILIZATION

(i) Construction limitations

Add to Sub-clause 3503(i) the following:

Cement stabilization shall not be carried out during falling temperatures when the ambient air temperature falls below 7°C or during rising temperatures when the ambient 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 measures necessary in this regard and shall especially refrain from stabilizing when such night temperatures are probable.

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 expense unless agreed otherwise by the Engineer. The Contractor shall make due allowance for these requirements in his construction programme, and no claims in this regard will be considered.

B3509 QUALITY OF MATERIALS AND WORKMANSHIP

Add to Clause 3509 the following:

Test results and re-measurements shall be assessed in accordance with the provisions of Section 8200: Quality Control (Scheme 1), Judgement Plan B of the standard specifications, as amended in these project specifications.

The Contractor shall advise the Engineer at least 24 hours in advance of any stabilization work to enable him to organise and conduct his own control tests.

Where the stabilising agent is to be spread by hand, the pockets of stabilising agent shall be placed on the layer at regular intervals. However, spreading shall not be carried out before the engineer is satisfied that the correct quantity of stabilising agent can be spread.

Stabilised layers shall be covered for curing within 24 hours, as specified. If the stabilised layer is found to have failed, the cover material shall be removed and the layer rectified if instructed by the engineer. No additional payment shall be made for such removal and remedial work.

B3510 MEASUREMENT AND PAYMENT

Delete the note at the start of the measurement and payment clause dealing with work in restricted areas. On this Contract, no extra over payment will be made due to the nature of the site or the size of the work area available. All costs associated with carrying out the works are deemed to be included in the tendered rates for the items in the Bill of Quantities.

Add the following note to this payment item:

Item Unit

B35.02 Chemical stabilizing agent:

(a) Ordinary Portland Cement (SANS 50197-1:2000) .....t

The notation used for Portland cement and Portland blast-furnace cement corresponds with the notation specified in SANS 50197-1:2000.

Add the following new Clause after the last paragraph of item 35.02:

A portion of this work shall include for labour intensive construction. The tenderer shall make allowance for the employment of local labour and/or the labour of local subcontractors, supplemented by the contractor's key personnel for the use of labour intensive construction.

Labour intensive construction specific to these activities shall be carried out subsequent to the training of local labour. Local labour shall be trained during workshops prior to works being carried out.

The labour intensive activities shall comprise of the following:

a) Placing pockets of the stabilizing agent at regular intervals along the road.
b) Spreading by hand, under supervision.

SECTION 4200: ASPHALT BASE AND SURFACING

B4215 MEASUREMENT AND PAYMENT

Add the following new pay item at the end of clause 4215:

Item		Unit
B42.02	**Asphalt surfacing**	
(a)	Constructed with new asphalt and compacted to the required thickness commercially obtained:	
(i)	Sa-S14 50mm thick compacted to min 93% MTRD, max 96% MTRD (Level IB)	t

Amend the following payment items:

Item		Unit
B42.08	**100 mm cores in asphalt paving.....**	**No**

Add the following to the first sentence of the first paragraph of item 42.08 after the word “drilled:”
“(irrespective of the depth of the core)”

Add the following new pay item at the end of clause 4215:

Rate tendered for sub item B42.21(b) per ton

= [(2 x rate tendered per ton for item 42.09) x (-1)]

SECTION 6100: FOUNDATIONS FOR STRUCTURES

B6101 SCOPE

Add the following paragraph to the end of clause 6101:

"This section shall also cover the provision of a temporary access to the site."

B6104 ACCESS AND DRAINAGE

(a) Drainage

Add the following after the end of the third paragraph of subclause 6104(c):

"The Contractor shall be required to provide and maintain such sumps, pumping equipment and temporary stream diversion works as may be necessary, in order to keep the works dry during the construction period. Immediately after concreting has taken place, the Contractor shall continue to keep the excavations dry for a sufficiently long period to ensure that the constituent concrete materials are not washed out from the freshly cast member.

Temporary access and platforms shall be designed to cater for a minimum flood return period of 1 in 1 years. "

B6105 EXCAVATION

g) The safety of excavations

Add the following paragraph:

"The design for shoring, signing of the drawings and inspection prior to construction of the permanent works of excavations to ensure it is safe shall be undertaken by the contractor's competent person, who shall be a professional engineer with the relevant experience. The contractor shall ensure that all temporary works undertaken shall comply with the relevant sections of the Occupational Health and Safety Act and the Construction Regulations".

B6106 FOUNDING

Add the following clause at the end of the last paragraph:

"Where foundation slabs are cast directly against the face of the excavations, the volume of concrete measured for payment shall be the total volume of concrete placed or the volume based on the plan dimensions detailed on the drawings plus a 100mm allowance for over break on each applicable side whichever is the lesser. No formwork to the footing shall be measured when the concrete is cast against the face of the excavations".

B6108 BACKFILL AND FILL NEAR STRUCTURES

(d) Fill within restricted area

In the second paragraph replace "93%" with "95%".

Add the following:

In narrow widths where it is difficult or impossible for appropriate mechanical compaction equipment to be used, the fill material may be substituted with soil Crete with the approval of the Engineer.

B6109 FOUNDATION FILL

In the 5th paragraph, 7th line delete "60" *substitute* "45".

Add the following after the 6th paragraph:

"Concrete blinding shall extend 100mm all round beyond the horizontal dimensions of all formed footings to facilitate placing of the formwork, unless otherwise directed by the engineer.

In the case of structures where excessive ground water is encountered, the blinding layer may extend over the full plan area of the base of the excavation and beyond the edge of the foundation where required. Payment shall be made for the quantity of concrete calculated as the product of the specified thickness of blinding layer and the actual area of blinding placed subject to a maximum distance of 500mm beyond the edge of the foundation."

B6113 FOUNDATION PILING

x) Nuclear integrity testing

Delete this subclause and replace it with the following:

"**(x) Pile integrity testing (PIT)**

(i) Pile integrity test method

The purpose of integrity testing is to prove that the construction techniques employed to create a bored or augured pile is satisfactory in terms of quality assurance with respect to aspects such as necking of concrete in the pile shafts, checking concrete cover to reinforcement, checking for honeycombing or grout loss, segregation of aggregate inclusion and for large cracks or voids.

(1) Cross-Hole Sonic Logging (CSL)

(aa) Overview

This method is used to verify the integrity of the pile shaft particularly in the case of larger diameter piles.

By sending ultrasonic pulses through concrete from one probe to another (probes located in parallel tubes), the CSL procedure inspects the drilled shaft structural integrity and extent and location of defects, if any. At the receiver probe, pulse arrival-time and signal strength are both affected by the concrete. For equidistant tubes, uniform concrete yields consistent arrival times with reasonable pulse wave speed and signal strengths. Non-uniformities such as contamination, soft concrete, honeycombing, voids, or inclusion exhibit delayed arrival times with reduced signal strength.

(bb) Personnel Requirements

The CSL consultant shall have a registered professional engineer supervising the testing and interpretation of results. The CSL consultant shall be an independent testing agency with at least 3 years' experience in CSL testing. The consultant's qualifications and the specifications for the equipment used shall be submitted to the engineer for approval prior to beginning bored or augured pile shaft installation.

(cc) Equipment requirements

A Cross Hole Analyser (CHA) that meets the following minimum requirements:

(1) Computer based CSL data acquisition system for display of signals during data acquisition, with a minimum 12 bit A/D converter with a sampling frequency of at least 500 000Hz, and recording of all pulse signals for full analysis and individual inspection.
Note: Converting signals with low noise using high A/D resolution and sampling rates is important to obtain quality data and allow proper full data interpretation.

(2) Ultrasonic transmitter and receiver probes capable of producing records at a minimum frequency of 50 000Hz with good signal amplitude and energy through good quality concrete. The probes shall be less than 28mm in diameter and shall freely descend through the full depth of properly installed access tubes in the drilled shafts.

(3) Two depth sensors to independently determine transmitter and receiver probe depths.

(4) Triggering of the recording system time base with transmitted ultrasonic pulse.

(dd) Access tube preparation

The access tubes in each drilled shaft are indicated on the drawings. Every drilled shaft shall be equipped with access tubes to permit inspection by CSL. All permanent drilled shafts are to be tested by CSL. 50mm (minimum) nominal diameter 3mm wall thickness mild steel tubes are specified for access for the probes in each drilled shaft. Typically 3 to 4 tubes are used, although up to 6 may be used in larger piles. Round tubes with regular internal diameter free of defects and obstructions, including any tubes joints, to permit the free, unobstructed passage of the probes shall be used. Tubes shall be watertight and free from corrosion with clean internal and external faces to ensure a good bond between the concrete and tubes. Tubes may be extended with mechanical couplings. Duct tape or other wrapping materials to seal the joints and butt welding of joints are prohibited. Tubes shall be installed by the contractor such that the CSL probes will pass through the entire length of the tube without binding. Ensure that the access tubes are plumb and verify that unobstructed passage of the probes is achievable before the CSL consultant arrives.

Note: If an existing pile does not contain access tubes, access holes can be installed by coring a borehole in the concrete. Locate cored holes about 150mm inside the reinforcement cage. Log core holes and include descriptions of any inclusions or voids. For pile drilled shafts with access tubes that do not allow the probe to pass through the entire length of the tube due to poor workmanship, replacement access holes may be provided by core drilling.

Fit the tubes with watertight shoe in the bottom and a removable cap on the top. Secure the tubes at regular intervals not to exceed 1,0m to the interior of the reinforcement cage. Install the tubes uniformly and equidistantly around the circumference such that each tube is spaced parallel for the full length and at the maximum distance possible from each adjacent tube. Tubes should be spaced as far as possible from the main axial reinforcing steel. Extend the tubes to within 300mm of the bottom of the pile, and at least 1,0m above the drilled shaft tops, and at least 0,6m, but no more than 1,5m above the ground surface. Do not damage the tubes during installation of the reinforcement cage.

Note: Do not allow the tube to rest on the bottom of the drilled shaft excavation.

After placement of the reinforcement cage, fill the access tubes with clean fresh water as soon as possible but within at the latest one hour of concrete placement. Cap the tube tops to prevent debris from entering the access tubes. Do not apply excessive torque, hammering or other stresses that could break the bond between the tube and concrete when removing caps from the tubes.

Note: The tubes should preferably be filled with water prior to concrete placement, but MUST be filled with water within at most 4 hours after placing concrete to prevent debonding of the access tubes due to differential temperatures.

(ee) Test sequence

Test the drilled shaft no sooner than 3 calendar days after placement of all concrete in any drilled shaft, but within 10 days after placement and prior to loading for test drilled shafts, or within 45 days after placement on production drilled shafts.

Note: CSL testing can be performed any time after concrete installation, although 2 days is usually the minimum acceptable wait. Because the concrete strength and quality generally increases as the concrete cures, longer wait times are usually desirable, particularly if minimum pulse wave speeds are specified or to reduce result variability between drilled shafts or even as a function of depth in a single drilled shaft. However, if PVC tubes are used, long wait times increase the tube debonding, which is detrimental to the test. Production of drilled shaft installation and subsequent construction influence the dates of CSL testing.

After all CSL testing has been completed, and after acceptance of the drilled shaft by the engineer, the contractor shall remove the water in the tubes, place grout tubes extending to the bottom of the access tube, and fill all access tubes in the drilled shafts with grout.

(ff) Test procedures

Prior to CSL testing, the contractor shall provide the engineer and CSL consultant with a record of all drilled shaft lengths with elevations of the top and bottom, and installation dates of all drilled shafts. The access tubes shall be clearly labelled for identification by the CSL consultant.

The CSL testing shall be performed with the transmitter and receiver probes in the same horizontal plane in parallel tubes unless test results indicate potential defects, in which case the questionable zone may be further evaluated with angled tests (source and receiver vertically offset in the tubes). Using the labelling established for the tubes, perform CSL testing between all adjacent perimeter access tube pairs and across at least two major diagonals within the drilled shafts with more than four tubes, additional logs in other diagonal tube pairs may be required to estimate the extent of the defect.

Lower the probes from the top, effectively measuring the access tube lengths. Pull the probes simultaneously, taking CSL measurements at intervals of 50mm or less from the bottom to the top of the drilled shaft. Defects indicated by late pulse arrival

times and significantly lower amplitude/energy signals shall be immediately reported to the engineer. Additional tests such as the offset elevation CSL testing may be required by the engineer to further evaluate the extent of such defects. If debonding between the access tube and the concrete is indicated by the CSL results, an alternative test method will be required to determine the integrity of the concrete in the debonded region.

Note: In case defects are detected, additional tests or analysis options may include CSL tomography, Gamma-gamma nuclear density logging, sonic echo or impact response tests, high strain dynamic pile testing, static load testing, or concrete coring. If the drilled shaft is cored, an accurate log of the cores that include depth and core recovery shall be kept, and core and coring logs shall be properly identified and given to the engineer.

(gg) Results

Present the results of the CSL in a written report within five (5) working days of completion of testing. The report shall include presentation of CSL logs for all tested tube pairs including:

(1) Presentation of the traditional signal peak diagram as a function of time plotted versus depth.
(2) Computed initial pulse arrival time or pulse wave speed versus depth.
(3) Computed relative pulse energy or amplitude versus depth.

A CSL log shall be presented for each tube pair. Defect zones, if any, shall be indicated on the logs and their extent and location discussed in the report text. Defect zones are normally (see Note below also) defined by an increase in arrival time of more than 20% relative to the arrival time in a nearby zone of good concrete, indicating a slower pulse velocity.

Note: Because the tubes might not be perfectly straight or even parallel, a fixed absolute limit of a wave speed value cannot be used for evaluation. It should also be noted that if the referenced good concrete exceeds the specifications, then a concrete with a local 20% wave speed reduction might still exceed the specifications.

The log for each tube pair shall be clearly identified and oriented relative to the structure. The engineer shall have five (5) working days to evaluate the results and determine whether the drilled shaft construction is acceptable or not. The contractor shall not perform any load testing or other construction associated with these drilled shafts until after acceptance by the engineer. If the drilled shaft is accepted by the engineer, the contractor may then proceed with construction. If the engineer determines the drilled shaft is not acceptable, the drilled shaft must be cored, repaired or replaced by the contractor at the contractor's expense and with no increase in contract time.

B6115 MEASUREMENT AND PAYMENT

Amend sub item (a) as follows:

ITEM		UNIT
B61.03	Access and drainage:	
	(a) Access	Lump Sum

Add the following to the end of item B61.03:

"The tendered rate shall include for the provision of access to the site and for the construction of all temporary roads and platforms required for the delivery of all material, erection of structural members, piling and access for plant for the construction of the works. The rate shall include for the maintenance of the access for the duration of the contract and the subsequent removal thereof on completion of the works. The final payment for item 13.01(a) will be made once the contractor has completed the removal of the temporary road to the satisfaction of the engineer."

ITEM		UNIT
B61.08	Foundation fill consisting of:	
	(d) Mass concrete (Class 15/19)	m^3
	(e) Concrete screed (75mm minimum thickness, Class 15/19)	m^3
	(f) G7 material compacted to 93% MOD AASHTO for footpaths	m^3

Add the following to the end of item B61.08:

"Formwork will not be measured for payment for any mass concrete foundation fill, irrespective of depth, or for concrete blinding screed. The cost of forming these items shall therefore be included in the rates tendered for the mass concrete or concrete screed."

Delete pay item 61.50 and replace it with the following items for Pile Integrity Testing (PIT):

ITEM		UNIT
B61.50	Pile Integrity Testing on bored/augured piles	
	(a) Providing and installing 50mm diameter mild steel tubes used for "Cross Hole Sonic Logging" in all designated piles (per pile construction site)	m
	(b) Cross-Hole Sonic Logging tests and interpreted results (per pile diameter and per pile construction site)	m

"The tendered rate shall include full compensation for the grout, equipment and all labour used to fill the tubes and cores. The grout shall have a compressive strength of at least 30MPa.

The unit of measurement for sub item (a) for the 50mm nominal diameter mild steel tubes shall be the metre of approved 3mm thick tubes provided and installed into all designated piles of various diameters in accordance with the specification.

The unit of measurement for sub item (b), i.e. the CSL tests, shall be the metre of pile shaft fully tested (for all designated piles) using the Cross-Hole Sonic Logging method, and shall include full compensation for establishment and removal of all specialised equipment and expert personnel as well as for all materials, for the preparation and conducting and supervising the tests as well as full compensation for the proper evaluation and reporting of the results as well as the interpreted findings/conclusions/recommendations to the engineer by the CSL consultant."

ITEM		**UNIT**
B61.51	Lateral support to excavations	
	(a) Location : (description of location indicated):	
	(i) 0 to 5m depth	m^2
	(ii) 5 to 10m depth	m^2

The unit of measurement shall be the square metre of excavated face supported over the successive depth ranges, measured down from the existing road levels.

The tendered rate shall include full compensation for procuring and installing the lateral support system, as well as for removal, if required. It shall include for all materials, labour, plant, equipment and incidentals to provide support to the excavated faces for the duration of substructure construction.

The work will be paid for in.three instalments. The first instalment of 50% shall become payable when all equipment and material is on site and the first element of the lateral support system has been installed. The second instalment of 40% shall become payable after the lateral support system has been completed, and the final instalment of 10% shall be paid after the system has been removed from the site.

The cost of excavating the material shall not be included, but paid for under items B61.02 and 61.03."

SECTION 6200: FALSEWORK, FORMWORK AND CONCRETE FINISH

B6203 GENERAL

Add the following to the end of the first paragraph of clause 6203:

"The Contractor shall also comply with his obligations for ensuring the safety of all falsework and formwork in terms of the Occupational Health and Safety Act and Regulations.

The design of the entire falsework and formwork infrastructure used to access and temporarily support the bridge structure (including the piers, the abutment walls and the bridge deck), shall be carried out by specialists in the design of falsework and formwork and signed by a Professionally Registered Engineer with ECSA. The same specialists shall inspect and approve the falsework and formwork as erected."

B6204 DESIGN

a) General

Add the following:

"The Contractor shall submit to the Engineer at least 4 weeks before the structure is scheduled for construction a detailed analysis showing the effect of the stresses that will be induced by the Contractor's chosen method of construction. The cost of any additional prestressing, reinforcing steel, concrete, etc. required as a result of the Contractor's chosen method of construction shall be to the Contractor's account. No construction shall commence until the Engineer has given his written approval."

b) Falsework

"Unless instructed otherwise by the Engineer, the Contractor shall submit his design criteria and detailed drawings of the staging to the formwork. The design, signing of the drawings and inspection of the falsework prior to construction of the permanent works shall be undertaken by the contractor's competent person, who shall be a professional engineer with the relevant experience."

B6205 CONSTRUCTION

b) Formwork

(i) <u>General</u>

Add the following:

"Formwork to faces of structures with a gradient equal to or greater than ten vertical to one horizontal shall be classified as vertical formwork.

Formwork to faces of structures with a gradient less than ten vertical to one horizontal, or equal to or greater than one vertical to ten horizontals, shall be classified as inclined formwork.

Formwork to faces of structures with a gradient of less than one vertical to ten horizontal shall be classified as horizontal formwork."

(ii) <u>Formwork to exposed surfaces</u>

Add the following:

"The formwork at construction joints shall have moulding strips 25mm x 25mm neatly butted and set at the position of the construction joint".

B6210 MEASUREMENT AND PAYMENT

Add the following pay item to 62.05:

ITEM		UNIT
B62.05	Permanent formwork	
	(c) Horizontal formwork designed by the contractor to deck soffit between precast slabs	m^2

The unit of measurement shall be the square metre.

The tendered rate shall include full compensation for the Contractor's obligations to supply an design the permanent horizontal formwork required for to deck soffit between precast slabs, ensuring the safety of all falsework and formwork in terms of the Occupational Health and Safety Act and Regulations.

The contractor shall prepare fully annotated design drawings which shall be submitted to the engineer for approval at least 4 weeks prior to commencement of fabrication of the formwork. The formwork shall be designed (in accordance with TMH7 Parts 1, 2 -1981 (as amended in 1988) and Part 3 – 1989.), approved and signed by a professionally registered engineer prior to submission.

Add the following new pay items at the end of clause 6210:

ITEM		UNIT
B62.10	Contractor's Health and Safety obligations with regard to falsework and formwork	Lump Sum

The unit of measurement shall be the lump sum.

The tendered rate shall include full compensation for the Contractor's obligations with regard to ensuring the safety of all falsework and formwork in terms of the Occupational Health and Safety Act and Regulations.

The tendered rate shall also include for the design and all inspections by the specialist Professional Engineer (refer to Clause B6203 above) of the entire falsework and formwork infrastructure used to access and temporarily support the structure".

SECTION 6300: STEEL REINFORCEMENT FOR STRUCTURES

B6303 STORING THE MATERIALS

Add the following at the end of the first paragraph of clause 6303:

"The Contractor shall set aside areas cleared of vegetation for storing reinforcing steel. The reinforcement shall be kept at least 300mm above ground level at all times."

B6305 SURFACE CONDITION

Add the following new paragraph to the end of clause 6305:

"After placing concrete, the Contractor shall have cleaned off all concrete splatter from the protruding starter bars and clips and any other affected reinforcement, and shall present the resulting product to the Engineer for approval before he will be permitted to commence fixing the shuttering and reinforcement to the next section."

B6306 PLACING AND FIXING

Delete the second paragraph and replace with the following:

Prior to fixing the steel, samples of the proposed spacers shall be submitted to the Engineer along with a written statement for in-situ manufacture, if applicable, for approval.

Overlap of steel reinforcement bars shall be such that the bars lie in a plane parallel to the nearest side of the concrete element and not perpendicular to it.

B6307 COVER AND SUPPORT

Add the following to the end of the fifth paragraph:

"Concrete cover blocks shall be made using the same cement and aggregate type as the main concrete with the same water/ cement ratio so that differences in colour, shrinkage, thermal movements and strain are minimised. Cover blocks shall be cured by submersion in water for a minimum of 7 days and thereafter kept submerged in water until immediately before fixing onto reinforcing steel. Where cover blocks, subsequent to fixing, have visually dried out they shall be remoistened by an appropriate method so that they are damp before the placing of concrete."

SECTION 6400: CONCRETE FOR STRUCTURES

B6402 MATERIALS

(a) Cement

Remove the colon at the end of the first paragraph, replace it with a comma, and add the following:

"taking into account the adaption of the new SANS 50197-1 and SANS 50197-2 code for cements:"

Add the following new paragraph:

The type of cement to be used in any concrete element shall take into account the environmental conditions and durability requirements at the location of the site of the Works and shall be selected according to Table B6402/1.

Table B6402/1: Selection of Cement Type

Condition of Exposure	Placing Temperature of Concrete	Type of Cement*
1. MODERATE Concrete surfaces above ground level and protected against alternately wet and dry conditions caused by water, rain and sea-water spray	< 20ºC	CEM II A – S CEM II B – S
	20ºC - 30ºC	CEM II A – S CEM II B – S CEM II A – V (or W) CEM II B – V (or W) CEM III A
2. SEVERE Concrete surfaces exposed to hard rain and alternatively wet and dry conditions	< 20ºC	CEM II A – S CEM II B – S
	20ºC - 30ºC	CEM II A – S CEM II B – S CEM II A – V (or W) CEM II B – V (or W) CEM III A
3. VERY SEVERE Concrete surfaces exposed to aggressive water, sea-water spray or a saline atmosphere	< 20ºC	CEM II B – S 42.5 CEM III A CEM II B – V 32.5
	20ºC - 30ºC	CEM II B – S CEM III A CEM II B – V
4. EXTREME Concrete surfaces exposed to the abrasive action of sea water or very aggressive water	< 20ºC	CEM II B – S CEM III A
	20ºC - 30ºC	CEM II B – S CEM III A

Notes*

1. CEM I cements shall only be used in environments where concrete is not prone to chloride attack i.e. in inland drier environments.
2. Where a strength class of 42,5 or greater is required, and the placing temperature of concrete is between 20ºC to 30ºC, a set and hydration retarding admixture shall be used where required so as not to exacerbate bleeding.

   Cement types CEMII and III may be blended, provided that the final product conforms to the requirements of SANS 50197-1 for the proportion of extender used and provided that the proportion of extender in the original unblended cement is known.

The Environmental Condition of Exposure for this site is SEVERE.

(b) Aggregates

Add the following new subclause:

(vi) The maximum chloride ion content of fine aggregate shall be 0,03% by mass of aggregate as measured by SANS 1083:2002. Where concrete is situated in a chloride environment the value shall be reduced from 0,03% to 0,01%.

(vii) The grading of the fine aggregate shall comply with the following table:

Sieve Size	Cumulative % Passing Sieve
4 750µm	90 – 100
2 360µm	75 – 100
1 180µm	60 – 90
600µm	40 – 60
300µm	20 – 40
150µm	10 – 20
75µm	5 – 10

(d) Water

Delete the second sentence and substitute:

Water from rivers or from boreholes may only be used if tests conducted by an approved laboratory prove the suitability of the water for concreting purposes. Tests shall be repeated as often as may be deemed expedient by the Engineer.

(e) Admixtures

Add the following subclauses:

(v) Admixtures, which have a retarding effect on the rate of hydration of the cement, may not be used when the concrete temperature is below 20º C.

(vi) A retarding admixture shall be used if temperatures of concrete mixes using cements of strength class 42.5R or 42.5 are between 20 to 30º C or where the ambient temperature is between 20 to 30º C .

B6404 CONCRETE QUALITY

(e) Bleeding

Delete the existing paragraph and replace with the following:

The concrete shall be proportioned with suitable materials that total bleeding does not exceed 0,3mm/cm² as measured by ASTM C232-92.

B6406 MIXING

(f) Ready-mixed concrete

Add the following:

The concrete batching plant is to be inspected by the Engineer for the compliance with latest SANS tolerances (SANS 878 and SANS 1083) and his approval is to be obtained in writing before commencement of the concrete works.

The maximum delivery period of 90 minutes from the time water is added to the concrete mix to the actual discharge of concrete on site shall be permitted unless an alternative written instruction

is obtained from the Engineer. The discharge period (including placing the concrete) shall not exceed 30 minutes.

The concrete slump of every truck shall be measured on delivery and shall comply with Clause 6404 COLTO 1998 Edition (Table 6404/2) prior to any concrete from that truck is placed. A detailed computer printout of the constituents of the concrete mix from the batching plant is to be handed over to and retained by the Engineer's representative on site on arrival (i.e. truck registration, mix proportions and the time water was added to the mix). The masses of the concrete constituents of each truck shall be checked against that of those submitted on the D2 form with the trial mix, subject to the batching accuracy as specified in SANS 0100-2: 1992. The arrival time of each truck on site and the time that the concrete discharge is completed shall also be recorded by the Engineer's representative.

When required the Contractor shall satisfy the Engineer that acceptable alternative means of supplying concrete have been arranged to be brought into operation in the event of disruption in the supply of concrete. In this connection, the Engineer may require that the alternative means of supply shall commence if the disruption in the supply of ready-mixed concrete has lasted for an elapsed period in time of 1½ hours.

The use of ready-mixed concretes shall in no way relieve the Contractor of any of his responsibilities for providing concrete complying with the specifications. The concrete mixes for the grades of concrete as specified in the Bill of Quantities shall be designed by an approved concrete design laboratory and submitted to the Engineer for approval on a D2 form. At least four weeks before placing any structural concrete on the site, the Contractor shall supply and deliver to the laboratory, at his own cost, samples of the aggregates and the concrete mix design he proposes to use for the works. The Contractor shall include in his tender all fees and charges levied as well as all other costs incurred in designing and testing the required strength concrete mix.

B6408 CONSTRUCTION JOINTS

(a) General

Add the following:

No construction joints other than those indicated on the drawings will be permitted without the written approval of the engineer. In all cases the proposed method of forming the joint shall be discussed and agreed with the engineer.

B6409 CURING AND PROTECTION

Add the following to the end of subclause 6409(f):

Only a curing compound consisting of an approved water based low viscosity clear wax emulsion applied in accordance with the manufacturer's instructions may be used.

Add the following new paragraphs to the end of the clause:

Where curing by retention of formwork is used as the only method of curing the concrete, it must be left in place for the minimum period specified in Table 6206/1 but in no instance shall it be less than 7 days.

The materials used for formwork shall take into account properties such as thermal insulation and moisture absorption when assessing the suitability of the material, to the approval of the Engineer.

If impermeable curing membranes are to be used as a curing method, they shall be installed at the same time as formwork is removed and no portion of a concrete surface may be left unprotected for a period in excess of 2hours. If the surface is an unformed finish e.g. top of deck slab, then the surface must be protected immediately by appropriate methods approved by the Engineer after it is finished, without damage to that surface, since it is vulnerable to plastic shrinkage cracking due to high rates of evaporation while the concrete is still in a plastic state. Plastic shrinkage and settlement shall not be permitted on any of the structural elements since it compromises the durability of the concrete.

All concrete shall be cured for the equivalent moist curing periods as shown in table B6409/1 below:

Table B6409/1
EQUIVALENT MOIST CURING PERIODS

Weather	Minimum moist curing Period (Days)
Normal: 18 to 22ºC, 65% RH, Low wind speeds	5
Hot: With drying winds	7
Cold: 5 to 12º C	9

For all abutments, piers, deck and footpaths, curing shall be excluded from the make-up of rates for measurement under items B64.01 and paid for separately under pay item B64.07. Where the application of a curing compound is instructed by the Engineer, the type and nominal application rate thereof shall be as specified in the bill of quantities or to the manufacturer's nominal specified rates.

B6410 ADVERSE WEATHER

Add the following new sub clause:

(d) Temperature and Hydration of Concrete

Site Batched Concrete:
The temperature of concrete at point of delivery shall be within the range 10º C to 30º C. Concrete which has a temperature outside of this range shall not be placed in the structure.

Ready Mix Concrete:
In the case of ready mix concrete the temperature limits at point of delivery shall be as specified in SANS 878 2004 unless the Engineer has specified other limits due to specific design requirements. If slump loss occurs at concrete temperatures of over 30ºC and more than two hours after mixing, the concrete shall be rejected. Also if after addition of allowed water the concrete begins to stiffen again such as to place in doubt that full compaction and finishing can be achieved, the concrete shall be rejected.

Care must also be taken not to cast concrete onto hot steel shutters as this might induce cracking.

The rate of hydration of the cement in the concrete shall be such that the concrete can be placed and properly compacted within 2 hours after the addition of water to the mix ingredients. The initial set of the concrete shall not be unduly delayed due to inappropriateness of admixtures or cement type, which could promote bleeding.

B6416 MEASUREMENT AND PAYMENT

Amend the following payment items:

ITEM		UNIT
B64.01	Cast in situ concrete:	
	(a) Class 40/19 in abutments	m^3
	(b) Class 40/19 in piers	m^3
	(c) Class 40/19 in transom beams	m^3
	(d) Class 40/19 in deck	m^3
	(e) Class 30/19 in approach slabs	m^3
	(f) Class 40/19 in track slab	m^3
	(g) Class 40/19 in transition slab	m^3
	(i) Class 30/19 in retaining walls	m^3

Add the following to the second paragraph:

In the case of concrete for the abutments, piers, deck and footpath concrete, curing shall not be included in the rate for concrete, but shall be paid for separately under Item B64.07.

ITEM		UNIT
B64.03	Transporting and erecting precast concrete members	
	(a) Prestressed concrete slabs (approximately 26.3 tonnes each)	No.

Add the following to the second paragraph:

The tendered lump sum shall also include all costs associated with transporting the "abnormal loads'' which include but are not limited to, bridge clearance surveys, route clearance surveys, obtaining special road permits, compliance with health and safety regulations, adherence with statutory compliance requirements, utilizing escort vehicles, insuring the abnormal load, etc

ITEM		UNIT
B64.06	Demolishing existing concrete	

Amend the payment paragraph as follows:

"The tendered rate shall include full compensation for all labour, plant (including access and craneage) and equipment (including concrete cutters) required to demolish the existing concrete (irrespective of strength) and the disposal of the product of the demolishing to a borrow pit within a free-haul distance of 15km. The tendered rate shall also include full compensation for any necessary measures to ensure no debris falls into rivers or surfaces where damage is possible and for any debris that has fallen into rivers to be recovered.

Payment shall distinguish between plain and reinforced concrete. For the purposes of this item, reinforced concrete is defined as concrete containing at least 0,2% of steel reinforcement measured by volume."

Add the following payment item:

ITEM		**UNIT**
B64.07	Curing of concrete:	
	(a) Substructure, deck sides and parapets using an approved curing compound	m^2
	(b) Deck top surface using moisture curing	m^2
	(c) Approach and transition slabs using moisture curing	m^2
	(d) Ballast kerbs using moisture curing	m^2

The unit of measurement shall be the square metre of completed concrete element cured using an approved method specified in clause B6409 of the project specifications.

The tendered rate shall include full compensation for providing the curing agent and its application according to the manufacturer's specified nominal rates of application by means of an approved pressure distributor to the fresh concrete surface or other approved methods of application. Partial payment shall be applied in the event that the Engineer allows conditional acceptance.

SECTION 6600: NO-FINES CONCRETE, JOINTS, BEARINGS, PARAPETS AND DRAINAGE FOR STRUCTURES

B6603 JOINTS IN STRUCTURE

a) Materials

(i) General

Add the following after the last paragraph:

"It is a firm requirement that all contracts have full Agreement certification for bridge deck joints, with the target date for new applications for Agreement assessment one year from receipt and acceptance by Agreement South Africa of each application. Proof of original acceptance of application by Agreement is required in such a case.

(1) current Agreement assessments: 1 September 2010.

(2) new applications for Agreement assessment one year from receipt and acceptance by Agreement South Africa of each application. Proof of original acceptance of application by Agreement is required in such a case."

(g) Installing the expansion joints

Delete the first paragraph and replace with the following:

"All deck expansion joints shall be installed by approved specialist subcontractors only. Installed deck expansion joints shall have the following guarantees:

Proprietary joints	- 15 years
Joint sealant	- 5 years

All deck expansion joints will only be considered for use on this contract if the manufacturer has obtained Agreement certification. New applications for Agreement assessment takes up to one year from receipt to acceptance by Agreement South Africa."

B6606 DRAINAGE FOR STRUCTURES

(c) Synthetic-fibre filter fabric:

Replace the last paragraph with the following:

Synthetic-fibre filter fabric shall be:

manufactured from a polymeric material processed into a continuous, permeable, homogeneous, non-woven sheet, which shall be mechanically, heat or chemically bonded;

made from polyester, polypropylene or polyethylene.

It shall show no detectable reduction of the specified properties when subjected to chemical and biochemical conditions found in soils or in saline solution, specifically:

i. soil and ground water with a pH in the range 4 to 12 (pH to be determined by MethodA20, TMH1)

ii. soil (as paste) and ground water containing salts with a conductance of up to 1,0 Siemens per metre (S/m) (conductivity to be determined by Method A20T, TMH1).

It shall not be attractive to rodents or termites, shall be rot-proof, not support the growth of algae and shall maintain at least 80% of the original tensile strength after direct exposure of 1500 hours to sunlight.

Synthetic-fibre fabric shall be classified according to the following:

Grade	Penetration Load (kN)	Elongation At rupture (%)		Permeability (litre/sq.m/s)
	min	min	max	Min
A	4,5	10	50	20
B	3,0	20	50	20
C	2,5	20	--	20
D	2,0	20	--	20
E	1,5	20	--	20

The above properties shall be measured in accordance with the test methods of SABS 0221-1988.

Add the following sub clause:

(d) Synthetic fibre filter fabric backing with Netlon pipes and strips

The drainage shall consist of M65 Netlon drainpipes, DN 1 Netlon drainage strips and Grade B filter fabric placed against the rear faces of the abutments and walls and wrapped around the Netlon pipe as detailed on the drawings.

The filter fabric shall be suitably hung or fixed by approved means to the wall to prevent displacement during backfilling. The drainage pipe shall be placed on a mortar wedge or other impervious material and the bottom of the pipe shall line up with the inverts of the weep holes

B6608 MEASUREMENT AND PAYMENT

ITEM		UNIT
B66.05	Expansion joints:	
	(a) 150 mm x 20 mm expansion joint	m
	(b) 500 mm x 20 mm expansion joint	m

"The joint measured shall be the complete joint shown on the drawings including termination details and recesses at balustrades and cover plates and fixings."

Add the following to the end of the second paragraph:

"The tendered rate for sub items (a) and (b) shall also include for water test required to prove the joint. The water shall be ponded and maintained to a minimum depth of 150mm above the top of the joint for a period of one hour each. Testing should follow the installation of the various sections of joints to take advantage of the existing traffic accommodation and each test shall cover the length of each joint installed (generally half width of bridge)".

ITEM		UNIT
B66.15	Concrete parapets	
	(b) Provision for architectural finish	Prov Sum

The provisional sum provided shall cover the cost of architectural finishes to the exposes faces of the brigde parapets as requested by the Engineer and shall be expended in accordance with clause 6.6 of the General Conditions of Contract 2015.

Add the following payment items:

ITEM		UNIT
B66.29	Additional water tests for joints ordered by the engineer	No

The unit of measurement shall be the number of additional water tests for proving the expansion joints, as ordered by the engineer. The test shall be executed by ponding water to a minimum depth of 150mm deep above the top of the joint for a period of one hour each. Testing should follow the installation of the various sections of joints to take advantage of the existing traffic accommodation and each test shall cover the length of each joint installed (generally half width of bridge).

The tendered rate shall include full compensation for providing the pond of water and maintaining its minimum depth of 150mm for the full one hour period, and clearing away the ponding materials on completion.

ITEM		UNIT
B66.30	Provisional Sums for the Replacement of Existing Buildings	
	(a) Provision for the replacement of an existing car port	Prov Sum
	(b) Provision for the replacement of an existing wash bay	Prov Sum
	(c) Provision for the replacement of an existing guardhouse	Prov Sum

The unit of measurement shall be a Provisional Sum for the replacement of the specified existing buildings. The Provisional Sum provided shall cover the cost of the removal and replacement of the buildings including all equipment, labour and materials required.

SECTION 7500 GROUND ANCHORS

Add the following to 7500 regarding shotcreting specification

B7510 SCOPE

This specification covers the supply and application of shotcrete to cut and soil nail faces and other areas as directed by the Engineer. It shall include the supply and installation/application of the shotcrete and the mesh.

B7511 GROUT

The grout to be used for the dowels shall consist of a colloidal mix of Cem 1 (42.5) or Cem 2 (42.5) and water. The water: cement ratio of the grout shall be 0,4 ± 0,05 and the 28 day cube strength shall not be less than 28 MPa. Certain admixtures that require approval by the Engineer may be used in order to improve the plasticity of the grout, reduce bleeding and induce a certain degree of expansion, but they shall not contain any chlorides, nitrates, sulphides or sulphites. The proportion of an admixture shall be as specified by the manufacturer and approved by the Engineer. The Contractor, shall, when required, provide evidence to the Engineer that admixtures are being used strictly in accordance with the manufacturer's recommendations. The costs of admixtures shall be included in the Contractor's rate for dowels. The mixing equipment shall be of a type capable of producing grout of uniform and colloidal consistency and shall incorporate suitable sieves for retaining lumps or other solid ingredients. The cement shall be added to the measured quantity of water in the mixer drum and high-speed mixing shall be carried out for at least four (4) minutes. Admixtures shall be added 2 to 3 minutes after commencement of mixing. Thereafter and during injection the grout shall be continuously agitated. Dual drum mixers comprising a high-speed mixer drum connected to a slow speed agitator drum from which the pump shall be fed, are preferred. Any grout that has been left standing shall be discarded and the container thoroughly washed before further mixing is carried out.

B7512 SHOTCRETE AND MESH

a) Aggregate

The aggregates employed shall be of such quality as to meet the strength requirements specified and shall comply with the requirements of Section 6400 of the Standard Specifications.

Fine aggregate shall be stored in such a manner that the moisture content is kept constant at all times. The moisture content should not exceed 5% by weight when a dry mix process for shotcrete application is to be used. The aggregate particles shall be spherical or cubical in shape. Natural river aggregates are ideal. Where crushed aggregates are used the crushing process shall be aimed at producing aggregate of the specified size from the outset. Aggregates which are screened off during the manufacture of larger sizes generally contain an excess of flaky and elongated particles and are not acceptable for shotcrete unless otherwise approved by the Engineer.

b) Cement

Cement should be either Cem 1 (42.5) or Cem 2 (42.5) complying with Section 6400 of the Standard Specification.

c) Additives

Proposed additives shall be submitted to the Engineer for approval prior to the commencement of work. The use of additives containing chloride will not be permitted. Additives shall have no deleterious effects on the steel reinforcement or the shotcrete. Once an additive has been approved, its use shall not be discontinued nor the agreed quantities per batch varied, nor another additive substituted without the prior consent of the Engineer. Where different additives are included in the same batch, they shall be chemically compatible. Additives shall be metered into the batch in such a way that uniform dispersal throughout the mix is achieved.

The Engineer may require the Contractor to apply test sections of shotcrete to prove the

adequacy of the proposed additives prior be starting on the specified work. Test sections shall be at Contractor's cost.

d) Mesh

All steel employed shall conform to Section 6300 of the Standard Specification. The mesh to be used in the shotcrete on plane surfaces shall be welded steel mesh R395.

e) Mix Design

The Contractor shall submit details of the mix proportions he proposes to adopt prior to commencing the work. The Contractor shall demonstrate to the Engineer the suitability of the mix proportions and method of application by shotcreting test sections prior to commencing work. Such test sections shall not be carried out on a cut face requiring being shotcreted. Only when the mix suitability and method of application have been demonstrated to the satisfaction of the Engineer shall the Contractor be permitted to commence production.

f) Mixing and Batching

All constituents shall be thoroughly mixed before they are discharged into the shotcrete pump. All constituents for each batch shall be accurately measured each time a fresh batch is prepared. Weight batching is preferred but volume batching will be permitted if accurately made gauge boxes of an approved design are employed. Where volume batching is permitted, the bulking factor of the sand shall be determined and taken into account. Cement shall be measured by weight. Prepared batches shall be discharged through the nozzle within 30 minutes of mixing.

g) Strength Requirement

The required minimum cube strength of test specimens shall be 10; 17 and 25 MPa at 3; 7 and 28 days respectively. Cubes are to be made by blowing shotcrete into cube and mud using the same technique as for application of shotcrete onto the rock face (i.e. the cube mould shall be placed on its side and shotcrete shot into it horizontally). The cube mould itself shall be protected by means of a suitable template. A set of three test cubes shall be required to be made for every 100 m² of shotcrete applied or as directed by the Engineer and at the cost of the Contractor.

h) Thickness required and Measurement

The nominal thickness required is 25; 50 and/or 75mm. The thickness shall be determined by means of random test holes drilled by the Contractor at positions indicated by the Engineer. At least one thickness measurement shall be taken every 10 m². The basis of acceptance shall be that in any area of 100 m², the arithmetic mean thickness at all the points checked shall be equal to or greater than the specified thickness. In addition, at no point checked should the thickness be less than 80% of the specified thicknesses. Where the thickness is not acceptable, the Engineer may order an additional layer of shotcrete to be applied. All test holes shall be filled with mortar after the Engineer has approved the thickness of the shotcrete.

i) Sequence of Applying Shotcrete

All soil or rock to be covered with shotcrete shall be cleaned thoroughly with compressed air as ordered by the Engineer, to remove all loose pieces of rock and soil. Where soft material is to be covered, only obviously loose material shall be removed and boulders shall be thoroughly cleaned with compressed air. Shotcrete shall be applied as an initial layer of approximately 20 to 50mm thick (depending on specified thickness). The steel mesh shall then be fixed over this initial layer and the shotcrete completed to the final specified thickness.

j) Method of Fixing Mesh Reinforcement

The reinforcing mesh shall be securely fixed over the initial shotcrete layer by fastening to

the dowels and, where necessary, with wire ties embedded in the shotcrete, gun nails, "n" bolts or other approved fixings. The mesh shall be fixed so that it lies snugly against the initial shotcrete layer and will not vibrate during application of the second layer of shotcrete. Where sudden concave or convex surfaces preclude this, the mesh may be cut so that smaller pieces of mesh can be formed into the curved surfaces. All sheets of mesh shall overlap at junctions by at least 150mm. No additional payment shall be made for overlaps.

k) Application of Shotcrete

Equipment used for the application of shotcrete shall be of approved manufacture and in good condition. The operating crew shall be skilled in the use of this equipment. Care shall be taken to ensure that the strands of mesh reinforcement are completely covered with the second layer of shotcrete and that voids are not formed between shotcrete layers. The operations shall be carried out in such a manner that rebound material falls clear of future working areas, wherever possible. At all times the Engineer may suspend shotcreting operations if in his opinion either the equipment used becomes defective and results in a deterioration in the quality of the resulting shotcrete work, or if adverse weather conditions preclude the application of good shotcrete.

l) Rebound Material

Rebound material shall not be re-used. Rebound material shall be removed from all future working areas and may not be covered up by subsequent applications of shotcrete. Rebound material shall also be cleaned from the surface of any finished work.

m) Weep holes

Weep holes comprising 40mm nominal diameter PVC piping shall be installed at those positions indicated by the Engineer. The pipe shall protrude 20mm beyond the final shotcrete layer and have its inner end wrapped with a single layer of synthetic-fibre filter fabric (Grade 2). It is required that weep holes be positioned to intersect seepage anticipated from soft zones and the weep holes shall be positioned prior to shotcreting with the geofabric end hard against the face. The outer ends of the tubes shall be adequately protected against shotcrete.

n) Detail of Edge of Shotcrete

Detail of the finishing off of shotcrete at the brow of cuttings is illustrated in the drawings.

Where boulders or outcrop occur on the brow of the cut, no cut off is required and the shotcrete shall be neatly stopped on top of the rock. As an alternative, the contractor may submit details for approval of other proposed methods to terminate the shotcrete at the edge and the top of the cutting so as to prevent surface water from undermining the shotcrete.

o) Curing

The finished shotcrete shall be adequately cured by an approved curing compound applied within half an hour of application of the shotcrete. Where the shotcrete is applied in two layers hanging hessian over the face and keeping the hessian wet for a period of 24 hours shall cure the first layer.

p) Blasting Restriction

In order to reduce damage to the shotcrete no blasting shall be carried out within 50m of a shotcreted section within 72 hours of application of the shotcrete.

q) Procedure in Event of Failure of Shotcrete

In the event that test samples do not achieve the specified minimum strength, the Engineer may order the Contractor to carry out additional tests to determine new mix proportions.

If the Engineer considers that the low strengths of the applied shotcrete may reduce the safety of the Works and persons he may order that the following action be taken:

Either
(i) Remove the defective shotcrete in strips or panels in such a way that the safety of the Works and persons is not endangered and replace with shotcrete that is acceptable. This may also require replacement of the mesh; or
(ii) Apply an additional layer of shotcrete not exceeding the specified thickness originally required. In neither case will payment be made for the defective shotcrete already applied, nor for the work involved in removing it from the areas where it has been applied, nor for any mesh that must be replaced, nor for any costs involved in removing the resultant rubble and spoiling it in an approved site.

Any additional laps required for mesh that must be replaced shall be to the Contractor's cost. Payment shall only be made for placed and accepted shotcrete.

B7509 MEASUREMENT AND PAYMENT

Measurement and payment for the mesh shall be based on the square metre of rock slope covered with mesh measured on the plane of the slope. No extra payment shall be made for overlap of the mesh.

Item **Unit**

B75.09 Establishment on Site ..... lump Sum

The unit of measurement shall be a lump sum and shall be payable in two instalments as follows:

(i) 50% of the tendered sum in the Payment Certificate following establishment of the necessary equipment (to the Engineer's satisfaction) on site.
(ii) 50% of the tendered sum after the work has been accepted and the installation team has left the site.

The tendered rate shall include full compensation for the establishment and subsequent removal from site of all the equipment, transport, plant, scaffolding, materials and personnel necessary to carry out the specified work.

Item **Unit**

B75.10 Supply and Installation of reinforcing

(a) Welded steel fabric Mesh Ref. 193..... kilogram (kg)

The unit of measurement shall be the square metre of mesh actually incorporated into the shotcrete. Overlaps shall not be measured.

The tendered rate shall include full compensation for the supply and installation, including all equipment, plant, materials, labour and incidentals necessary to carry out the specified work and including specifically, the supply and installation of pins, wire ties, gun nails and any other approved fastenings for the completion of the work to the satisfaction of the Engineer.

Item **Unit**

B75.11 Shotcrete of specified thickness applied in one, two or more layers as necessary

(i) 25mm thick (unreinforced) flash coat ..... square metre (m²)
(ii) 75mm thick final coat ..... square metre (m²)

The unit of measurement shall be the square metre of face measured in the plane of the cutting face, which is protected by shotcrete of the specified thickness, installed to the satisfaction of the Engineer. No separate allowance shall be made for an uneven surface when measuring the area over which shotcrete has been applied. The tendered rate shall include for everything necessary to carry out the specified work to the satisfaction of the Engineer and shall include the following:

(1) Supplying all materials, including additives (if any), mixing and applying shotcrete including test sections as ordered by the Engineer, either to prove the adequacy of the additives or the shotcrete methods and materials.

(2) Cleaning down the cutting face with air as ordered, and the removal of all resulting soil and rock debris from the site to an approved spoil site, including all loading and transport

(3) Applying the shotcrete in one, two or more layers as directed by the Engineer.

(4) Checking the thickness in the manner specified.

(5) Cleaning off all rebound material and the disposal of same at an approved spoil site.

(6) Making test specimens as specified.

No separate or additional payment shall be made for shotcrete applied to a thickness greater than specified and required, nor shall any additional payment be made for shotcrete whether applied in one or more layers.

Item		Unit
B75.12	**Plastic piping for weep holes 50mm nominal diameter PVC piping**	number (No)

The unit of measurement shall be the number of weep holes installed to the satisfaction of the Engineer.

The tendered rate shall include full compensation for the supply, installation, protection during shotcreting, geofabric wrapping, plant, equipment, labour and all other incidentals necessary to complete the specified work.

Item		Unit
B75.13	**Removal of shotcrete and ground anchor tendons**	Lump Sum

The unit of measurement shall be a lump sum and shall be payable upon completion of the removal to the Engineer approval.

The tendered rate shall include full compensation for the establishment and subsequent removal from site of all the equipment, transport, plant, scaffolding, materials and personnel necessary to carry out the specified work to removal all installed temporary ground anchors and shotcrete.

SECTION 8100: TESTING MATERIALS AND WORKMANSHIP

B8105 TESTING THE AGGREGATES

Add the following subclause:

(g) Determination of Ethylene Glycol Durability Index

The Ethylene Glycol Durability Index shall be determined as follows:

(i) Apparatus

Suitable pans or basins
Ethylene Glycol Solution
Stirring rod

(ii) 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, allow to settle and 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 has elapsed.

(iii) 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.

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 0 15 days

Class 2 : 16 - 30 days

Class 1 : 31 - 60 days

Class 0 : Over 60 days

(iv) 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."

B8110 TESTS RELATING TO CHEMICAL STABILIZATION

Add the following subclause:

(d) The Wet-Dry Durability Test for cement-treated materials using the hand brush method

(i) 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 (v)(3).

(ii) Apparatus

(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) below.

(2) A suitable water bath with thermostatic control capable of maintaining a temperature of 22 to 25°C.

(3) A balance to weigh up to 10 kg, accurate to 0.5 g.

(4) A drying oven capable of maintaining temperatures of 71 ± 3°C and 110 ± 5°C.

(5) A wire scratch brush made of 50 mm by 1.6 mm 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 65 mm wooden block.

(iii) Method

(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 37.5 mm sieve and discard the material remaining on the sieve. Use the apparatus and compaction method as described in TMH 1 method A7 (modified AASHTO).

(2) Curing of specimens

Rapid cure the specimens (see (v)(5)). Alternatively, 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) Wetting, drying and brushing

After curing, remove the specimens from the curing room or plastic bags, allow to cool if necessary, 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 on all areas 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 (v)(2)).

(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.

(iv) Calculations

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

$$L = \frac{W - M}{W} * 100$$

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).

(2) The percentage loss shall be calculated and reported to the nearest 0.1 percent. The results are normally required for designing a mix and are reported graphically against relevant cement contents.

(v) Notes

(1) Mass determination of the specimens before and after brushing are usually made at the end of each cycle during research or special investigations.

(2) 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 lay-over period.

(3) 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.

(4) The pressure is measured 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.

Rapid curing:

Seal each specimen air tight 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)
CEM 11 B-S	70 - 75	24 ± 0.5
CEM 11 1A	70 - 75	24 ± 0.5
Lime	60 ± 2	45 ± 1
Lime/FA	60 ± 2	45 ± 1
Lime/MBFS	60 ± 2	45 ± 1”

B8117 MEASUREMENT AND PAYMENT

Replace item 81.02 with the following sub-items B81.02(a) and (b) which shall be used to cover payments to the commercial laboratories and specialised testing firms carrying out acceptance control testing as directed by the Engineer.

ITEM			UNIT
B81.02	(a)	Other special tests requested by the engineer	Prov Sum
	(b)	Contractor's handling costs, profit and all other charges in respect of sub item B81.02 (a)	%

The provisional sum provided to cover the cost of special tests as requested by the Engineer in terms of clause 8115 shall be expended in accordance with clause 6.6 of the General Conditions of Contract 2015.

The tendered percentage is a percentage of the amount of expenditure approved by the Engineer under the Provisional Sum B81.02(a), and shall include full compensation for the handling costs of the Contractor, and the profit in connection with providing the specified testing service.”

SECTION 8300: QUALITY CONTROL (SCHEME 2)

B8308 PROCESS CONTROL BY THE CONTRACTOR

Add to Clause 8309 the following:

For the purpose of this Contract process or quality control by the Contractor comprises at least the following:

Soil Tests:

Field densities, maximum dry density and optimum moisture content determinations, CBR, UCS, indicator tests (grading and PI), moisture contents, solid densities and chemical tests relating to stabilizing agent contents;

Aggregate tests:

Grading, flakiness index, average least dimension (ALD);

Concrete tests:

Slump and cube crushing strengths.

Add the following item:

MATERIALS INVESTIGATION AND UTILISATION

(i) CONCRETE DURABILITY

(a) General

It is the Engineer's responsibility to approve the component materials and their mix properties. However, it is the Contractor's responsibility to design and blend them and in so doing produce concrete of the specified quality.

(b) Concrete Mix Design

Good mix design is essential and the following criteria ought to be taken into consideration when pricing:

(i) Selection of sands and aggregates to achieve a good grading is important if the correct concrete density is to be achieved.

(ii) The use of the correct cement grade and type for the environmental conditions (and not based solely on costs) is fundamental

(iii) Selection of the correct cement extenders and admixtures are also fundamental to appropriate mix designs.

(iv) Water: cement ratios are critical, dictating both the structural strength and the durability requirements.

Mix proportions for the concrete to be used on site need to be determined by an approved laboratory. Cylindrical specimens, 68mm in diameter must be made or cored from a laboratory trial mix for performance of tests B8106(g)(i), (ii) and (iii).

It will be necessary for the contractor to establish a target mean strength with a margin above the minimum requirement so that small fluctuations due to material changes or workmanship can be accommodated.

C3.3: STANDARD SPECIFICATIONS

C3.3.1 The Specifications on which this contract is based are the eThekiwini Municipality's (City of Durban) Standard Engineering Specifications (hereafter referred to as the Standard Engineering Specifications). This document is obtainable separately, and Tenderers shall obtain their own copies of the applicable Sections.

Part	Description	Date of Issue	
AB	General Specifications	July	1992
B	Site Clearance	March	1990
C	Concrete Work	February	1987
DA	Earthworks: Bulk	January	1985
DB	Earthworks for Pipe Trenches	July	1992
DC	Earthworks for Concrete Lined Canals		
DD	Earthworks for Structures		
EA	Lime Stabilisation		
EB	Graded Crushed Stone	December	1988
EC	Cement Treated Graded Crushed Stone	December	1988
ED	Road Asphalt	July	1992
EE	Pre-coated Stone Chippings		
EF	Kerbs and Haunches	July	1992
EG	Sidewalks, Footpaths and Median Areas	July	1992
EH	Steel Guardrails & Conc. Median Barriers		
EJ	Concrete Interlocking Block Surfaces		
EK	Waterbound Macadam Base		
EL	Dumprock Subgrade Improvement		
EM	Concrete Surface to Roads		
EN	Slurry Sealing		
EP	Single Seal Surface Treatment		
F	Protection Works	July	1992
G	Pre-stressing		
H	Reinforced Earth		
J	Piling		
K	Bearings		
L	Structural Work		
PB	Pavement Layers of Gravel Material		
PC	Stabilisation of Gravel Base		
PD	Surface Treatment: Modified Binder		
PE	Pressure Pipelines: Steel		
PF	Pressure Pipelines: Other Than Steel		
PG	Non Pressure Pipelines and Pc Culverts	July	1992
PH	Manholes and Appurtenant Drainage Works	July	1992
PJ	Pipe Jacking		
PG	Lateral Support Systems		
PS	Pump Stations: Sewage		
S	Reinstatement	March	1993
TA	Road Signs	October	1989
TB	Road Markings	October	1989

C3.3.2 AMENDMENTS TO THE STANDARD SPECIFICATIONS

INTRODUCTION

In certain clauses the standard, standardized and particular 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 alternative or additional requirements applicable to this contract are contained in this part of the project specifications. It also contains additional specifications required for this particular contract.

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

PS AB	General Specifications
PS B	Site Clearance
PS C	Concrete Work
PS DA	Earthworks: Bulk
PS DB	Earthworks for Pipe Trenches
PS DC	Earthworks for Concrete Lined Canals
PS DD	Earthworks for Structures
PS EA	Lime Stabilisation
PS EB	Graded Crushed Stone
PS EC	Cement Treated Graded Crushed Stone
PS ED	Road Asphalt
PS EE	Pre-coated Stone Chippings
PS EF	Kerbs and Haunches
PS EG	Sidewalks, Footpaths and Median Areas
PS EH	Steel Guardrails & Conc. Median Barriers
PS EJ	Concrete Interlocking Block Surfaces
PS EK	Waterbound Macadam Base
PS EL	Dumprock Subgrade Improvement
PS EM	Concrete Surface to Roads
PS EN	Slurry Sealing
PS EP	Single Seal Surface Treatment
PS F	Protection Works
PS G	Pre-stressing
PS H	Reinforced Earth
PS J	Piling
PS K	Bearings
PS L	Structural Work
PS PB	Pavement Layers of Gravel Material

PS PC	Stabilisation of Gravel Base
PS PD	Surface Treatment: Modified Binder
PS PE	Pressure Pipelines: Steel
PS PF	Pressure Pipelines: other than Steel
PS PG	Non Pressure Pipelines and Pc Culverts
PS PH	Manholes and Appurtenant Drainage Works
PS PJ	Pipe Jacking
PS PG	Lateral Support Systems
PS PS	Pump Stations: Sewage
PS S	Reinstatement
PS TA	Road Signs
PS TB	Road Markings

C3.4: PARTICULAR SPECIFICATIONS

In addition to the Standardized and Project Specifications the following Particular Specifications / Policies shall apply to this contract:

C3.4.1 Part AH - OHSA 1993 Safety Specification
(26 Pages)

C3.4.2 Standard Environmental Management Plan for Civil Engineering Construction Works
(24 Pages)

The following Particular Specifications shall also apply to this contract:

C3.4.3 Project-specific Health and Safety Specifications for:
Widening of Sea Cow Lake Road Including the Construction of Overhead Rail Bridges
(56 Pages)

C3.5: CONTRACT AND STANDARD DRAWINGS

C3.5.1 CONTRACT DRAWINGS / DETAILS

Roadworks:

48901	0101	Layout
48901	0201	long section
48901	0202	long section
48901	0301	Layout Setting out Plan
48901	0302	Layout Setting out Co-ordinates
48901	0401	Typical Cross sections and pavement Layers
48901	0402	special manhole, kerb, v-drain
48901	0405	cross sections
48901	0406	cross sections
48901	0501	Stormwater Layout Plan
48901	0502	Stormwater Layout Plan
48901	0507	Stormwater Tables + Details
48901	0601	Services
48901	0602	Services
48901	0603	Services
48901	0604	Services
48901	0605	Services
48901	0606	Services
48901	0607	Services
48901	0610	cable duct sleeves layout 1
48901	0611	cable duct sleeves layout 2
48901	0701	sidewalks, medians, verges and guardrails layout
48901	0702	sidewalks, medians, verges and guardrails layout
48901	0801	road marking and traffic signal layouts
48901	0802	road marking and traffic signal layouts
48901	0805	road sign layouts
48901	0806	road sign layouts
48901	0901	services: ITS layout + ducts
48901	0902	services: ITS layout + ducts

Bridgeworks:

1300042-T-4100 - List of Drawings

1300042-T-4101 - Site Plan

1300042-T-4102 - General Arrangement

1300042-T-4105 - Construction Procedures

1300042-T-4106 - LSection Sh 01

1300042-T-4107 - LSection Sh 02

1300042-T-4108 - XSection Plan

1300042-T-4109 - XSection Sh 01

1300042-T-4110 - XSection Sh 02

1300042-T-4111 - XSection Sh 03

1300042-T-4112 - XSection Sh 04

1300042-T-4200 - Bridge 1 - Abutment A

1300042-T-4201 - Bridge 1 - Abutment A Reinforcement

1300042-T-4202 - Bridge 1 - Abutment B

1300042-T-4203 - Bridge 1 - Abutment B Reinforcement

1300042-T-4204 - Bridge 1 - Pier 1 - Details

1300042-T-4205 - Bridge 1 - Piers 2 and 3 - Details

1300042-T-4206 - Bridge 2 - Abutment A

1300042-T-4207 - Bridge 2 - Abutment A Reinforcement

1300042-T-4208 - Bridge 2 - Abutment B

1300042-T-4209 - Bridge 2 - Abutment B Reinforcement

1300042-T-4210 - Bridge 2 - Pier 1 - Details

1300042-T-4211 - Bridge 2 - Piers 2 and 3 - Details

1300042-T-4212 - Bridge 3 - Abutment A

1300042-T-4213 - Bridge 3 - Abutment A Reinforcement

1300042-T-4214 - Bridge 3 - Abutment B

1300042-T-4215 - Bridge 3 - Abutment B Reinforcement

1300042-T-4216 - Bridge 3 - Piers 1 to 3

1300042-T-4217 - Bridge 3 - Transom Beams

1300042-T-4218 - Bending Schedules - Sheet 01

1300042-T-4219 - Bending Schedules - Sheet 02

1300042-T-4300 - Precast Slab Layout

1300042-T-4301 - Precast Slab

1300042-T-4302 - Precast Slab Reinforcement

1300042-T-4400 - Bridge 1 - Deck and Parapet Dimensions

1300042-T-4401 - Bridge 1 - Deck and Parapet Reinforcement

1300042-T-4402 - Bridge 2 - Deck and Parapet Dimensions

1300042-T-4403 - Bridge 2 - Deck and Parapet Reinforcement

1300042-T-4404 - Bridge 3 - Deck and Parapet Dimensions

1300042-T-4405 - Bridge 3 - Deck and Parapet Reinforcement

1300042-T-4406 - Bending Schedules

1300042-T-4600 - PY Slab Track - GA

1300042-T-4601 - PY Slab Track - Setting-out Data

1300042-T-4602 - Construction Sequence - 25m per day

1300042-T-4603 - Transition Slab (North)

1300042-T-4604 - Transition Slab (South)

1300042-T-4700 - Foundation Layout and Geotechnical Sections

1300042-T-4701 - Pile Details

1300042-T-4702 - Borehole Logs - Bridge 2

1300042-T-4703 - Borehole Logs - Bridge 1

1300042-T-4704 - Borehole Logs - Bridge 3

1300042-T-4800 - Phasing of Work for Bridge 1 Construction - Track and OHTE Layout

1300042-T-4801 - Phasing of Work for Bridge 2 Construction - Track and OHTE Layout

1300042-T-4802 - Phasing of Work for Bridge 3 Construction - Track and OHTE Layout

1300042-T-4803 - Temporary Slew for Bridge 1 Construction - Plan and Long section

D697-6000-T-001 - Bridge 3 Retaining Wall General Arrangement_Rev A

D697-6000-T-002 - Bridge 3 Retaining Wall Sections and Elevation Layout_Rev A

D697-6000-T-003 - Bridge 3 Retaining Wall Reinforcement_Rev A

D697-6000-T-004 - Bridge 3 Retaining Wall Reinforcement Schedules_Rev A

C3.5.2 STANDARD DRAWINGS

The Standard Drawings to which these Standard Engineering Specifications refer are listed below.

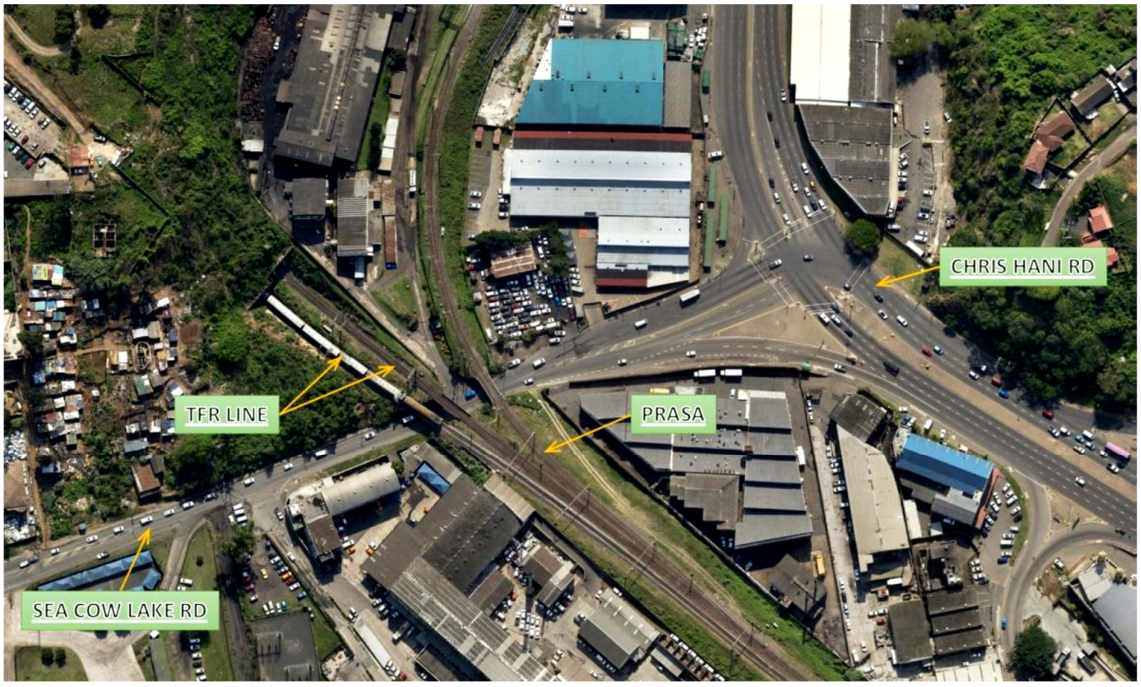
Dwg No	Description	Date of Issue
38570	Ring Manholes	February 1990
38571	Brick Manhole Details	February 1990
38572	Stormwater Inlet Details	February 1990
38573	Stormwater Inlet Special Details	February 1990
38574	Sewer Manholes: Ramp, Backdrop and Channelling Details	February 1990
38575	Sub-Soil Drain, Pipe Bedding and Pipe Protection Details	February 1990
38576	Headwall Details	February 1990
38577	Kerbing Details	February 1990
38578	Concrete Median Barriers	February 1990
38579	Vehicular and Pedestrian Scoops	February 1990
38580	Concrete Bollard and Steel Guard Rail	February 1990
38581	Retaining Wall, PC Steps, Staircase, Cable Ducts and Headwalls	February 1990
38582	Precast Concrete Fencing and Aluminium Gates	February 1990
38583	Wire Mesh Fence and Gate Details	February 1990
38584	Standard Hydrant Thrust Blocks and Trenches	February 1990
38585	Water Connections, Pipework and Fittings	February 1990
38586	DP & TC Manholes - Rectangular	February 1990
38587	DP & TC Manholes - “L” Shaped	February 1990
38588	DP & TC Manholes - “T” Shaped	February 1990
38589	DP & TC Cable Ducts and Junction Box Details	February 1990
43120	Typical Details of Grid Inlets	February 1990

C3.6: ANNEXURES

C3.6.1 Insert as required or "There are no Annexures"

PART C4: SITE INFORMATION

C4.1.1 LOCALITY PLAN



C4.1.2 C1 WARDS

Phase 1: C1 Wards attached.

C4.2 CONDITIONS ON SITE

Refer to appended geotechnical report for details.

C4.3 TEST RESULTS

Refer to appended geotechnical report for details.