



UNIVERSITY OF VENDA

CIDB Class Grading 8CE or Higher

TENDER NO : IN/09/2022

FOR

ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)

PROCUREMENT DOCUMENT: SECTION 1

JUNE 2022

NAME OF TENDERER:

TENDER PRICE:

ISSUED BY:

**UNIVERSITY OF VENDA
Private Bag X5050
Thohoyandou
0950**

Email: tenders.univen@univen.ac.za



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BOOK 2 OF 2

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THE TENDER

PART T1: TENDERING PROCEDURES

PART T2: RETURNABLE DOCUMENTS

UNIVERSITY OF VENDA

**CONTRACT No: IN/09/2022
FOR UNIVERSITY OF VENDA
ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)**

PART T1: TENDERING PROCEDURES

T1.1	TENDER NOTICE AND INVITATION TO TENDER	T.3
T1.2	TENDER DATA	T.4

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FOR UNIVERSITY OF VENDA

ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD (R524)

T1.1 TENDER NOTICE AND INVITATION TO TENDER



UNIVERSITY OF VENDA

TENDER NOTICE AND INVITATION TO TENDER

BID NO: IN/09/2022 – ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)

The University of Venda invites experienced service providers to bid for the following services.

TENDER NO.	DESCRIPTION	MIN.REQ.	BID PRICE	COMPULSORY BRIEFING SESSION	CLOSING DATE & TIME
BID No: IN/09/2022	Roads Infrastructure: Univen to Punda Maria Road (R524)	8CE or Higher	R1377.00	Via Zoom Meeting As Advertised	Refer to Advertisement

Tender documents can be downloaded from www.univen.ac.za as of the 21 June 2022.

A non-refundable tender deposit is a mandatory/eligibility requirement and deposit slip must be attached with the tender document. **Banking details:** are ABSA Bank, Branch Code 632005, Account number 1000000538, with beneficiary reference number 00015615 and company name.

Tender opening registers will be uploaded on the University website www.univen.ac.za.

Bids sealed in two envelopes clearly indicating the bid number and the project name one envelope indicating pricing offer and another technical offer should be deposited in **the tender box located at the University of**

Venda, Main Gate not later than 12h00 midday as per the table above.

Univen is not compelled to accept the lowest or any bid. No late, faxed or telephonic bids will be accepted. Univen discloses to bidders that all contracts shall be rotated amongst suppliers. Bids submitted shall remain valid for a period of 120(One hundred and twenty day) after the closing date.

For Grade 8 CE or higher, only tenderers who undertake to subcontract a minimum of 30% of the contract value to EME or QSE which is at least 51% owned by black people living in rural or underdeveloped areas within premises of Vhembe Region of Limpopo Province are eligible to submit tenders.

Administrative and procurement enquiries can be directed to
univentenders@univen.ac.za

No enquiries will be entertained after 08/07/2022 at 16h30.

T1.2 TENDER DATA

The conditions of tender are the Standard Conditions of Tender as contained in Annex F of SANS 294:2004.

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 of inconsistency between it and the Standard Conditions of Tender.

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

Subclause	Data
F.1.1	The employer is the University of Venda
F.1.2	<p>The Project Document issued by the employer consists of the following:</p> <p>THE TENDER</p> <p>Part T1: Tendering procedures:</p> <p style="padding-left: 40px;">T1.1 Tender notice and invitation to tender</p> <p style="padding-left: 40px;">T1.2 Tender Data</p> <p>Part T2: Returnable documents</p> <p style="padding-left: 40px;">T2.1 Returnable Schedules required for Tender Evaluation</p> <p style="padding-left: 40px;">T2.2 Other Documents required for Tender Evaluation</p> <p style="padding-left: 40px;">T2.3 Returnable Schedules that will be incorporated into the Contract</p> <p style="padding-left: 40px;">T2.4 Other Schedules and Documents that will be Incorporated into the Contract</p> <p>THE CONTRACT</p> <p>Part C1: Agreements and contract data</p> <p style="padding-left: 40px;">C1.1 Form of Offer and Acceptance</p> <p style="padding-left: 40px;">C1.2 Agreement in Terms of the Occupational Health & Safety Act</p> <p style="padding-left: 40px;">C1.3 Guarantee</p> <p style="padding-left: 40px;">C1.4 Form Agreement in terms of the Mine Health and Safety Act</p> <p style="padding-left: 40px;">C1.5 Appointment in terms of Section 3(1) of the Mine Health and Safety Act</p> <p style="padding-left: 40px;">C1.6 Abstracts of the Mine Health and Safety Act No 29</p> <p style="padding-left: 40px;">C1.7 Contract Data</p> <p>Part C2: Pricing data</p> <p style="padding-left: 40px;">C2.1 Pricing instructions</p> <p style="padding-left: 40px;">C2.2 Bills of quantities</p> <p style="padding-left: 40px;">C2.3 Summary of Bills of Quantities</p> <p style="padding-left: 40px;">C2.4 Calculation of Tender Sum</p> <p>Part C3: Scope of work</p> <p style="padding-left: 40px;">C3.1 Description of Works</p> <p style="padding-left: 40px;">C3.2 Engineering</p> <p style="padding-left: 40px;">C3.3 Procurement</p> <p style="padding-left: 40px;">C3.4 Construction</p>

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Subclause	Data
	<p>C4.5 Management</p> <p>Part C4: Site information</p> <p>C4.1 Site Information</p> <p>C4.2 Locality Plan</p> <p>Part C5: Annexures</p> <p>C5.1 : Proforma Documents</p> <p>C5.2 : Guidelines for the Implementation of Labour Intensive Infrastructure Projects under the Expanded Public Works Programme (EPWP)</p> <p>C5.3 : Contract Drawings</p>
F.1.4	<p>The employer's agent is:</p> <p>Name: Nyeleti Consulting (Pty) Ltd.</p> <p>Address: 25 Rhodesdrift Street</p> <p>Rhodesdrift Office Park 2B, Bendor</p> <p>POLOKWANE, 0700</p>
F.2.1	<p>Only those tenderers who can demonstrate that they will have in their employ management and supervisory staff satisfying the requirement of the scope of work for labour-intensive competencies for supervisory and management staff during the validity of the contract are eligible to submit tenders.</p> <p>Only those tenderers who are registered with the CIDB, or can provide proof of having applied for registration, in a contractor grading designation equal to or higher than a contractor grading designation determined in accordance with the sum tendered for a 8CE class of construction work, or by a contractor who is registered as a potentially emerging enterprise in terms of these Regulations at a contractor grading designation, one level lower than the contractor's registered grading designation, provided that the client</p> <p>(a) is satisfied that such a contractor has the potential to develop and qualify to be registered in that higher grade; and</p> <p>(b) ensures that financial, management or other support is provided to that contractor to enable the contractor to successfully execute that contract are eligible to submit tenders.</p> <p>Joint ventures are eligible to submit tenders provided that:</p> <ol style="list-style-type: none"> every member of the joint venture is registered with the CIDB or can provide proof of having registered; the lead partner can be one contractor grading designation lower in the 8CE class of construction work; but <p>the combined contractor grading designation calculated in accordance with the Construction Industry Development Regulations must be equal to or</p>

Subclause	Data
	higher than a contractor grading designation determined in accordance with the sum tendered for an 8CE or HIGHER class of construction work.
F.2.7	<p>The arrangements for a compulsory clarification meeting are as stated in the Tender Notice and are: Location: via Zoom Meeting Date: As Advertised Starting time: As Advertised</p> <p>The Virtual Briefing Meeting attendance/participants records shall be used to provide a record of tenderers who attended the briefing meeting and therefore accepted as proof of the compulsory briefing attendance replacing the traditional attendance register or Site Clarification Meeting Attendance Certificate, Form T2.1B in Section T2.1. Considering the current Covid -19 restrictions, all participants are expected introduce themselves including the organisations represented. It remains the tenderer's responsibility to ensure that a valid email or email used to participate in the meeting is official to be used for future tender related communications.</p> <p>Failure to honour the above will invalidate the Tender.</p> <p>NO DOCUMENTS WILL BE AVAILABLE FOR ISSUE AT THE CLARIFICATION MEETING.</p>
F.2.12	<p>If a tenderer wishes to submit an alternative tender offer, the only criteria permitted for such alternative tender offer is that it demonstrably satisfies the employer's standards and requirements, the details of which may be obtained from the employer's Agent.</p> <p>Calculations, drawings and all other pertinent technical information and characteristics as well as modified or proposed Pricing Data must be submitted with the alternative tender offer to enable the employer to evaluate the efficacy of the alternative and its principal elements, to take a view on the degree to which the alternative complies with the employer's standards and requirements and to evaluate the acceptability of the pricing proposals. Calculations must be set out in a clear and logical sequence and must clearly reflect all design assumptions. Pricing Data must reflect all assumptions in the development of the pricing proposal.</p> <p>Acceptance of an alternative tender offer will mean acceptance in principle of the offer. It will be an obligation of the contractor for the tenderer, in the event that the alternative is accepted, to accept full responsibility and liability that the alternative offer complies in all respects with the employer's standards and requirements.</p> <p>The modified Pricing Data must include an amount equal to 5% of the amount tendered for the alternative offer to cover the employer's costs of confirming the acceptability of the detailed design before it is constructed.</p>
F2.13.1	No tenderer may submit more than one tender as set out in this clause in the Standard Conditions of tender
F2.13.2	Tender documents do not have to be returned should the purchaser of the document not wish to tender.
F.2.13.3	a) Submit original tender, no copies of tenders will be accepted.

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Subclause	Data
	b) The submitted tender document must contain all pages, as indicated, in specified colour, page sequence (incl. double sided) and binding method. The binding method must be staples plus an adhesive tape binding.
F.2.13.5	<p>The employer's address for delivery of tender offers and identification details to be shown on each tender offer package are:</p> <p>Location of tender box: University of Venda, Main Gate</p> <p>Physical address: University of Venda, Thohoyandou, 0950</p> <p>Identification details: <i>"Tender No.: IN/09/2022 : ROADS INFRASTRUCTURE UNIVEN TO PUNDA MARIA ROAD (R524)."</i></p>
F.2.13. & F.3.5	A two-envelope procedure will not be followed.
F.2.15	<p>Closing time for submission of tender offers is:</p> <p>12h00 hours on: (As Advertised). Telephonic, telegraphic, telex, facsimile, e-mailed or postal tender offers will not be accepted.</p>
F.2.16	<p>2. 16.1a) Tenders shall remain valid for a period of One hundred and twenty (120) days from the time set for the opening of Tenders and no Tender may be withdrawn during this period.</p> <p>2.16.1b) Should a Tenderer amend (other than according to F 3.9) or withdraw his Tender after the time set for the receipt and opening of Tenders and during the period of its validity, but prior to his being notified of the acceptance of his original Tender, or should a Tenderer, after having been notified that his Tender has been accepted</p> <ul style="list-style-type: none"> a) give notice of his inability to execute the Consultancy Agreement / Contract in terms of his tender; or b) fail to sign a Consultancy Agreement / Contract or furnish the security within the period fixed in the conditions reflected in the form of Tender or any extended period fixed by the Employer; or c) fail to execute the Consultancy Agreement / Contract according to the documents; <p>He shall pay either the difference between his Tender and a less favourable Tender accepted in terms of the provisions of Tender sub Condition 3.1(d), or if the Employer decides to invite fresh Tenders, all additional expenses which the Employer has to incur in this regard, as well as any difference between his Tender and the accepted new Tender; provided that the Employer may fully or partly exempt a Tenderer from the provisions of this sub condition if he is of the opinion that the circumstances justify the exemption.</p> <p>2.16.1c) When, in the circumstances mentioned in Tender sub Condition 3.10(c) it is not deemed desirable to invite fresh Tenders, the Employer may accept another Tender from those already received.</p>

Subclause	Data						
F.2.1.7	The tendered lump sums and rates shall be final and binding irrespective of the total tender price (See C2.1.11).						
F.2.18	The tenderer must submit to the Employer, names of all management and supervisory staff that will be employed to supervise the labour-intensive portion of the works together with satisfactory evidence that such staff members satisfy eligibility requirements.						
F.2.23	The tenderer is required to submit with his tender a valid tax compliance status letter or tax compliance status pin. <u>This must be submitted with the Tender in order to be considered. The tenderer must also submit with the tender a letter of good standing from Compensation Commissioner and any other documents mentioned in these tender data.</u>						
F2.24	<p>TENDER WITHDRAWAL OR MODIFICATION PRIOR TO CLOSING DATE</p> <p>Any Tenderer has the right to withdraw, modify or correct his Tender after it has been delivered, provided that written request for such withdrawal, modification or correction, together with full details of such modification or correction is received at the address given for the submission of Tenders before the closing date and set for the receipt of Tenders. The original Tender as amended by such written or facsimile communication shall be considered Tenderer's offer.</p>						
F.3.11	<p>Standard tender evaluation methods.</p> <table> <tr> <th>Method</th><th>Procedure</th></tr> <tr> <td>Method 1: Financial offer</td><td> <ol style="list-style-type: none"> 1) Rank tender offers from the most favourable to the least favourable comparative offer. 2) Recommend highest ranked tenderer for the award of the contract. </td></tr> <tr> <td>Method 2: Financial offer and quality</td><td> <ol style="list-style-type: none"> 1) Score quality, rejecting all tender offers that fail to score the minimum number of points for quality stated in the tender data, if any. 2) Score tender evaluation points for financial offer. 3) Calculate total tender evaluation points. 4) Rank tender offers from the highest number of tender evaluation points to the lowest. 5) Recommend tenderer with the highest number of tender evaluation points for the award of the contract. </td></tr> </table>	Method	Procedure	Method 1: Financial offer	<ol style="list-style-type: none"> 1) Rank tender offers from the most favourable to the least favourable comparative offer. 2) Recommend highest ranked tenderer for the award of the contract. 	Method 2: Financial offer and quality	<ol style="list-style-type: none"> 1) Score quality, rejecting all tender offers that fail to score the minimum number of points for quality stated in the tender data, if any. 2) Score tender evaluation points for financial offer. 3) Calculate total tender evaluation points. 4) Rank tender offers from the highest number of tender evaluation points to the lowest. 5) Recommend tenderer with the highest number of tender evaluation points for the award of the contract.
Method	Procedure						
Method 1: Financial offer	<ol style="list-style-type: none"> 1) Rank tender offers from the most favourable to the least favourable comparative offer. 2) Recommend highest ranked tenderer for the award of the contract. 						
Method 2: Financial offer and quality	<ol style="list-style-type: none"> 1) Score quality, rejecting all tender offers that fail to score the minimum number of points for quality stated in the tender data, if any. 2) Score tender evaluation points for financial offer. 3) Calculate total tender evaluation points. 4) Rank tender offers from the highest number of tender evaluation points to the lowest. 5) Recommend tenderer with the highest number of tender evaluation points for the award of the contract. 						

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Subclause	Data	
	<p>Method 3: Financial offer and preferences</p> <ol style="list-style-type: none"> 1) Score tender evaluation points for financial offer. 2) Confirm that tenderers are eligible for the preferences claimed and if so, score tender evaluation points for preferencing. 3) Calculate total tender evaluation points. 4) Rank tender offers from the highest number of tender evaluation points to the lowest. 5) Recommend tenderer with the highest number of tender evaluation points for the award of the contract. 	
	<p>Method 4: Financial offer, quality and preferences</p> <ol style="list-style-type: none"> 1) Score quality, rejecting all tender offers that fail to score the minimum number of points for quality stated in the tender data, if any. 2) Score tender evaluation points for financial offer. 3) Confirm that tenderers are eligible for the preferences claimed and if so, score tender evaluation points for preferencing. 4) Calculate total tender evaluation points. 5) Rank tender offers from the highest number of tender evaluation points to the lowest. 6) Recommend tenderer with the highest number of tender evaluation points for the award of the contract. 	
F.3.11	<p>Evaluation Methodology: METHOD 4 APPLIES ON THIS PROJECT.</p> <p>Tenders will be evaluated on quality, price and preference. It is important that the relevant information is included to enable the Technical Proposal to be evaluated in accordance with the procedure outlined below.</p> <p>All information must be submitted in a separate file. Tampering with the original tender document will render the tender non-responsive. Failure to comply with the above requirements will result in the Tender being disqualified.</p> <p>The Tender evaluation will be conducted as follows:</p> <p>1(a) First</p> <p>Tender documents that have been disassembled and copies of the tender documents will be disqualified outright.</p> <p>1(b) Second</p> <p>Tenders will be checked for compliance with Tender Conditions and administrative responsiveness. Non-compliance with any of the requirements will render the tender non-responsive and it will not be carried forward to the next stage. (refer to 2(a) below)</p>	

Subclause	Data
	<p>1(c) Third</p> <p>The Tenderer's experience, staffing and methodology will be evaluated. Each tender will be assessed and awarded points for Functionality.</p> <p>Failure to achieve 70 points out of the 100 for Functionality will render the tender non-responsive.</p> <p>Only tenders that score the specified minimum number of points for Functionality will be deemed to be acceptable and carried forward to the next stage. The rest will be disqualified.</p> <p>The points for functionality will not be carried forward to the remainder of the evaluation. (refer to 2(b) below)</p> <p>1(d) Fourth</p> <p>Points will be calculated for price on the relevant prices in accordance with the preference point system , 90/10 or 80/20. (refer to 2(c) below)</p> <p>1(e) Fifth</p> <p>Points for BBBEE will be awarded in accordance with the status level of contribution. refer to 2(d) below)</p> <p>1(f) Final</p> <p>The Tender will be awarded to the short-listed Tenderer who has scored the highest points for price and BBBEE status, unless there are justifiable, objective reasons to award the tender to another Tenderer.</p> <p>However, the Employer retains the right not to accept any Tender. Refer to (2e) below)</p> <p>2(a) Compliance with Tender Conditions and other Requirements</p> <p>The tender will be checked to ensure that they comply with the Tender Conditions and all other requirements of the project document. In particular, the following documentation must be included in the tender:</p> <ul style="list-style-type: none"> a) Form T2.1 A - Certificate of Authority for Signature. For JV's a JV Agreement shall be provided (if applicable). b) Signature on-site inspection attendance register(Virtual meeting record). c) Form T2.1 F - Record of addenda to tender documents. d) Form T2.1 I - Certificate of non- collusive tender. e) Form T2.1 J – Proof of registration for COIDA (Compensation for Occupational Injuries and Diseases Act). f) Form T2.2 A – Declaration of good standing regarding tax. Tax Compliance Status Letter OR Tax Compliance status PIN. g) FormT2.2 B – Financial details, recent 2 years Audited financial statements and bank references. If the company is required by law to be audited, we need audited annual financial statements for the past

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Subclause	Data
	<p>2 years or audited financial statements since the establishment of the company if the company was established during the past 3 years. If the company is not required by law to be audited, please provide us with a letter from a registered accountant stating that you are not required to be audited and the reasons thereof.</p> <p>h) Form T2.2 C – Construction industries development board registration.</p> <p>i) Form T2.2 D – Compulsory enterprise questionnaire. In the event of a tendering as a JV/Consortium, separate Enterprise Questionnaires in respect of each partner must be completed and submitted.</p> <p>j) Form T2.2 E– Declaration of bidder's past supply chain management practices.</p> <p>k) Form T2.2 F – Declaration of interest.</p> <p>l) The successful tenderer must subcontract a minimum of 30% of the value of the contract to an EME or QSE in line with BBBEE preference points</p> <p>m) Form C1.1 – Form of Offer and Acceptance.</p> <p>n) Company registration documents (e.g. CK).</p> <p>o) Organogram of key personnel, CVs of proposed project team members including certified qualifications not older than 3 months. (Site Agent, etc.)</p> <p>p) Proof of address of the company(municipal rates and taxes or municipal services, SLA or other acceptable proof) by the bidder or any of its directors, not in arrears for more than 3 months (the proof of municipal rates and taxes or municipal service charges to be submitted must not be older than 3 months from the closing date of the bid).</p> <p>q) Form T2.1 E - List of similar successful executed projects with client contact details and contract values.</p> <p>r) CSD report. (NB: Please note that the University will only do business with service providers who are registered on the CSD)</p> <p>s) Certified BBBEE verification certificate from verification agency accredited by South African accreditation system (SANAS) or a registered auditor approved by the Independent Regulatory Board (IRBA) or an Accounting Officer as contemplated in the corporation and</p>

Subclause	Data
	<p>BEE Rating certificate.</p> <p>t) The submitted tender document must contain all pages, as indicated, in specified colour, page sequence (incl. double sided) and binding method. The binding method must be of paper binders based on the document thickness plus an adhesive tape. Failure to comply with this request will result in disqualification.</p> <p>Failure to comply with the Tender Conditions or to supply the necessary information at tender closure WILL result in the tender being rejected.</p> <p>Non-submission of any of the forms listed above will result in the Tender being rejected as non-responsive.</p> <p>2(b)Second Stage in Evaluation: Quality or Functionality: Points System</p> <p>A brief description of the scoring system is given below. A tabulated score sheet which will be used in the evaluation is as shown below.</p> <p>The Bidder must be able to demonstrate that he understands the project and the various tasks required. Innovative solutions will be viewed favourably. For a definition of all terms, refer to Scope of Works.</p> <p>Bidders' submissions will be evaluated based on compliance with the following criteria to determine the responsiveness to the bid requirements:</p> <ol style="list-style-type: none"> I. Organogram and CV's for key personnel II. Project programme, indicating the work to be done, how it will be executed and managed. It is a requirement that the same personnel provided during tender stage be provided during construction. Where the identified personnel is no longer in the employ of the tenderer, UNIVERSITY OF VENDA reserves the right to request personnel with similar experience or more. In case of failure to provide, UNIVERSITY OF VENDA reserves the right to terminate the contract. III. Schedule of estimated monthly expenditure. The cash –flow must be realistic taking into consideration the programme works and to determine whether the cash flow meets the standard norms of the industry, e.g. S-curve, etc. IV. Bidder's quality management plan for the services to be rendered. The bidder shall describe his quality management plan to ensure successful execution of the project. V. Capability statement of the company with regard to this type of work in general, and the specifications of this bid in particular. Provide project descriptions of similar completed projects, highlighting similarities between the completed projects and the specifications of this project. Highlight experience with similar projects in South Africa for similar roads authorities in the past 10 years. Provide contact details of employers for these projects. Points will be awarded for each project completed that is at least one grading lower than the CIDB grading called for this project. Four/Six (4/6) points will be allocated for each qualifying project to a maximum of twenty/thirty (20/30) VI. Plant and equipment: Indicate own and hired equipment, clearly indicating equipment to be used specifically for this project. Maximum points will be allocated to complying and proven tenderer's owned

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Subclause	Data														
	<p>plant. Maximum of 50% points will be awarded to complying hired plant in the event that the tenderer does not have own plant. A letter of intent to hire must be submitted with details of the hiring company for verification.</p> <p>VII. Bank rating: Tenderer's bank to complete Form T2.2 C</p> <p>VIII. Locality: Will only apply for tenders of CIDB grading 7CEPE and lower.</p> <p>It is important that the tenderer provides information as requested as this information will be used for functionality in which a minimum of 70 points must be scored to move to the next stage of evaluation. The scoring will be according to the table below:</p> <p>Tenders equal or higher than 8CE or Higher</p> <table><tr><th>EVALUATING CRITERIA</th><th>SCORING CRITERIA</th><th>WEIGHT</th></tr><tr><td rowspan="5">Company Experience</td><td>Detailed Organogram</td><td>2.5</td></tr><tr><td>CV's for Key Personnel including certified qualifications not older than 3 months.:<ul style="list-style-type: none">Site agent – minimum 5 years relevant experience as Site Agent in the tender scope of work</td><td>2.5</td></tr><tr><td>Project Programme Understanding the scope and giving a clear methodology of the tasks as well as adequacy of the work plan (programme): 5 points maximum</td><td>5</td></tr><tr><td>Schedule of estimated monthly expenditure. Realistic cash-flow based on estimated construction. 5 points maximum</td><td>5</td></tr><tr><td>Bidder's Quality Management Plan. The bidder shall describe his quality management plan to ensure successful execution of the project. Highlight all work activities and inputs that may pose a threat or risk to the successful execution of the project: 5 points maximum</td><td>5</td></tr></table>	EVALUATING CRITERIA	SCORING CRITERIA	WEIGHT	Company Experience	Detailed Organogram	2.5	CV's for Key Personnel including certified qualifications not older than 3 months.: <ul style="list-style-type: none">Site agent – minimum 5 years relevant experience as Site Agent in the tender scope of work	2.5	Project Programme Understanding the scope and giving a clear methodology of the tasks as well as adequacy of the work plan (programme): 5 points maximum	5	Schedule of estimated monthly expenditure. Realistic cash-flow based on estimated construction. 5 points maximum	5	Bidder's Quality Management Plan. The bidder shall describe his quality management plan to ensure successful execution of the project. Highlight all work activities and inputs that may pose a threat or risk to the successful execution of the project: 5 points maximum	5
EVALUATING CRITERIA	SCORING CRITERIA	WEIGHT													
Company Experience	Detailed Organogram	2.5													
	CV's for Key Personnel including certified qualifications not older than 3 months.: <ul style="list-style-type: none">Site agent – minimum 5 years relevant experience as Site Agent in the tender scope of work	2.5													
	Project Programme Understanding the scope and giving a clear methodology of the tasks as well as adequacy of the work plan (programme): 5 points maximum	5													
	Schedule of estimated monthly expenditure. Realistic cash-flow based on estimated construction. 5 points maximum	5													
	Bidder's Quality Management Plan. The bidder shall describe his quality management plan to ensure successful execution of the project. Highlight all work activities and inputs that may pose a threat or risk to the successful execution of the project: 5 points maximum	5													

Subclause	Data			
		<p>Project descriptions of similar completed projects maximum one grading lower than required CIDB grading completed in the past 10 years.</p> <p>Highlight similarities between the completed projects and the specifications of this project.</p> <p>Provide details of employers for these projects: 6 points will be awarded for each project completed to a maximum of 30 points.</p>	30	

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Plant & Equipment				
1.Tenderer's own plant				
Targeted Goals:				Weight
	Plant & Equipment Required	Size/Capacity OR Model etc.	Min. Number Required	
1	Dozer	CAT D7H OR Equivalent	1	2.0
2	Excavator	CAT 350 OR Equivalent	2	4.0
3	TLB	CAT 480 OR Equivalent	1	2.0
4	Watercart	5000 to 10 000L	At least 1	2.0
5	Grader	CAT 140G OR Equivalent	At least 2	4.0
6	Vibratory Roller	8 to 10 Tonnes	1	2.0
7	Crane	160 Tonnes Mobile Crane	1	2.0
8	Concrete Vibrator		1	2.0
9	Tipper	Min. 5m ³	4	8.0
10	Concrete Mixer		1	2.0
SUB- TOTAL: OWNED PLANT AND EQUIPMENT (Maximum 30 Points)				30.0
NB: Please provide Proof of ownership for all the plant owned by the bidder.				

30

2.Plant to be hired.

Targeted Goals:				Weight
	Plant & Equipment Required	Size/Capacity OR Model etc.	Min. Number Required	
1	Dozer	CAT D7H OR Equivalent	1	1.0
2	Excavator	CAT 350 OR Equivalent	2	2.0
3	TLB	CAT 480 OR Equivalent	1	1.0
4	Watercart	5000 to 10 000L	At least 1	1.0
5	Grader	CAT 140G OR Equivalent	At least 2	2.0
6	Vibratory Roller	8 to 10 Tonnes	1	1.0
7	Crane	160 Tonnes Mobile Crane	1	1.0
8	Concrete Vibrator		1	1.0
9	Tipper	Min. 5m ³	4	4.0
10	Concrete Mixer		1	1.0
SUB- TOTAL: HIRED PLANT AND EQUIPMENT (Maximum 15 Points)				15.0

**NB: Please provide letter of intent for all the plant to be hired.
Only 50% points will be allocated to all hired plant.**

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Subclause	Data		
	Company's Financial Standing	Bank Rating	Points
		A	15
		B	12
		C	9
		D	6
		E	3
		F - G	0
		Original stamped bank reference letter OR Bank stamped tender document(form T2.2.B)	5
	Maximum Points		20
	TOTAL POINTS		100
<p>In the case of JV / Consortium the lead partner's bank rating will be used for evaluation. The lead partner must have the highest rating. Tenderers should note the following: Functionality will be scored out of 100 and the minimum threshold to qualify is 70. Tenderers who fail to meet the minimum threshold will not be considered for further evaluation.</p> <p>2(c)Fourth Stage in Evaluation: Price</p> <p>The following must be completed in full</p> <ul style="list-style-type: none"> * The pricing schedule * The form of offer. No alterations, subtractions or additions may be made to the items in the pricing schedule. All items must be priced or calculated. <p>A total of 90 points will be awarded to the tender with the lowest balanced price. The other tenders will be awarded points based on the ratio of the price under consideration to the lowest price.</p> $P_s = 90 \left(1 - \frac{P_t - P_{\min}}{P_{\min}} \right)$			

Subclause	Data																														
	<p>where</p> <p>P_s = Points scored for comparative price of bid under consideration</p> <p>P_t = Comparative price of bid under consideration</p> <p>P_{min} = Comparative price of lowest acceptable bid</p> <p>2(d)Fifth Stage in Evaluation: BBBEE (Ph)</p> <p>The tenders will then be evaluated in terms of the Construction industry scorecard and PPPFA Act of 2017 the values of Ph indicated as the number of points shown below.</p> <table><tr><th>B-BBEE Status level of contributor</th><th>Number of Points (90/10 system)</th><th>Number of Points (80/20 system)</th></tr><tr><td>1</td><td>10</td><td>20</td></tr><tr><td>2</td><td>9</td><td>18</td></tr><tr><td>3</td><td>8</td><td>16</td></tr><tr><td>4</td><td>5</td><td>12</td></tr><tr><td>5</td><td>4</td><td>8</td></tr><tr><td>6</td><td>3</td><td>6</td></tr><tr><td>7</td><td>2</td><td>4</td></tr><tr><td>8</td><td>1</td><td>2</td></tr><tr><td>Non-compliant contributor</td><td>0</td><td>0</td></tr></table> <p>Tenderers shall provide a certified copy of their BBBEE certificate to facilitate evaluation.</p> <p>2(e)Final Stage in Evaluation : Calculation of Final Total Points</p> <p>The final score or final total points for each tender will be calculated by adding the scores from the; calculations.</p> <p>$P = P_s + Ph$</p>	B-BBEE Status level of contributor	Number of Points (90/10 system)	Number of Points (80/20 system)	1	10	20	2	9	18	3	8	16	4	5	12	5	4	8	6	3	6	7	2	4	8	1	2	Non-compliant contributor	0	0
B-BBEE Status level of contributor	Number of Points (90/10 system)	Number of Points (80/20 system)																													
1	10	20																													
2	9	18																													
3	8	16																													
4	5	12																													
5	4	8																													
6	3	6																													
7	2	4																													
8	1	2																													
Non-compliant contributor	0	0																													
F3.13.1	<p>Tender offers will only be accepted on condition that:</p> <p>a) Tender documents have not been disassembled and they are not copies of the original document.(refer to Clause F3.11 (1a))</p> <p>b) The tenders have met all Tender conditions and administrative responsiveness requirements. (refer Clause F3.11 2(b).)</p> <p>c) Tenderer has obtained at least seventy (70) points for Functionality.(refer to Clause F3.11. 2(c))</p>																														
F.3.18	<p>The number of paper copies of signed contract to be provided by the Engineer is the original contract plus three signed copies.</p>																														

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Subclause	Data
UNIVERSITY OF VENDA Special No.1	<p>EME's (Exempt Micro Enterprises)/QSE's (Qualifying Small Enterprises):</p> <p>It is a requirement of this contract that the successful tenderer must subcontract a minimum of 30% of the value of the contract to:</p> <ul style="list-style-type: none"> (a) an EME or QSE; (b) an EME or QSE which is at least 51% owned by black people; (c) an EME or QSE which is at least 51% owned by black people who are youth; (d) an EME or QSE which is at least 51% owned by black people who are women; (e) an EME or QSE which is at least 51% owned by black people with disabilities; (f) an EME or QSE which is 51% owned by black people living in rural or underdeveloped areas or townships; (g) a cooperative which is at least 51% owned by black people; (h) an EME or QSE which is at least 51% owned by black people who are military veterans; or (i) more than one of the categories referred to in paragraphs (a) to (h). <p>University of Venda will make available the list of all suppliers registered on a database approved by the National Treasury to provide the required goods or services in respect of the applicable designated groups mentioned above from which the tenderer must select a supplier.</p> <p>The minimum target for participation is thirty percent (30%) of the total contract value. This can be achieved through either one or more sub-contractors.</p> <p>Information in this regard needs to be provided by the contractor on Forms RDP 2 (E), RDP 2 (E1), RDP 2 (E2), etc. Commitment to these goals will be a condition of award.</p>
UNIVERSITY OF VENDA Special No.2	<p>Labour Content:</p> <p>The minimum Labour content for this project shall be 10% of the works.</p> <p>Note: At least 60% of this labour content shall be from the LOCAL COMMUNITY where LOCAL COMMUNITY means those in the immediate vicinity of the project. The contractor's own skilled personnel will not be counted towards the said 60%.</p>



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PART T2: LIST OF RETURNABLE DOCUMENTS

The tenderer must complete the following returnable documents:

T2.1	LIST OF RETURNABLE SCHEDULES.....	T.21
T2.2	OTHER DOCUMENTS REQUIRED FOR TENDER EVALUATION	T.56
T2.3	RETURNABLE SCHEDULES THAT WILL BE INCORPORATED INTO THE CONTRACT.....	T.77



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T2.1 LIST OF RETURNABLE SCHEDULES

T2.1 A	CERTIFICATE OF AUTHORITY	T.22
T2.1 B	CERTIFICATE OF ATTENDANCE AT CLARIFICATION MEETING	T.25
T2.1 C	SCHEDULE OF PROPOSED SUBCONTRACTORS (EXCL EME'S/QSE'S (30%))	T.26
T2.1 D	SCHEDULE OF PLANT AND EQUIPMENT.....	T.27
T2.1 E	SCHEDULE OF THE TENDERER'S EXPERIENCE	T.28
T2.1 F	RECORD OF ADDENDA TO TENDER DOCUMENTS.....	T.29
T2.1 G	DEVIATIONS OR QUALIFICATIONS BY THE TENDERER	T.30
T2.1 H	CONTRACTOR'S ESTABLISHMENT ON SITE.....	T.31
T2.1 I	CERTIFICATE OF NON-COLLUSIVE TENDER	T.32
T2.1 J	COMPLIANCE WITH OCCUPATIONAL HEALTH AND SAFETY ACT, 1993 AND CONSTRUCTION REGULATIONS, 2003.....	T.34
T2.1 K	REQUIREMENTS IN TERMS OF GOVERNMENT'S RECONSTRUCTION AND DEVELOPMENT PROGRAMME	T.35
RDP1(E)	SCHEDULE OF LOCAL LABOUR CONTENT	T.39
RDP2(E)	EMPLOYMENT OF EMES/QSES	T.40
RDP2 (E1):	EME/QSE NO. 1	T.41
RDP2 (E2):	EME/QSE NO. 2	T.42
RDP2(E3):	EME/QSE NO. 3	T.43
RDP2 (E4):	EME/QSE NO. 4	T.44
RDP2 (E5):	EME/QSE NO. 5	T.45
RDP3(E)	BROAD BASED BLACK ECONOMIC EMPOWERMENT	T.46

NB. Additional documentation including certificates shall be submitted in a separate, properly bound, document.



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T2.1 A CERTIFICATE OF AUTHORITY

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

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

A. Certificate for company

I,....., chairperson of the board of directors of hereby confirm that by resolution of the board (copy attached) taken on20...., Mr/Ms.....acting in the capacity of.....,was authorised to sign all documents in connection with this tender and any contract resulting from it on behalf of the company.

As witness

1.....
.....
Chairman
2.....
.....
Date

B. Certificate of partnership

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

hereby authorise Mr/Ms....., acting in the capacity of.....to sign all documents in connection with the tender for Contract.....and any contract resulting from it on our behalf.

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NAME	ADDRESS	SIGNATURE	DATE

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

C. Certificate for Joint Venture

We, the undersigned, are submitting this tender offer in Joint Venture and hereby authorise Mr/Ms....., authorised signatory of the company, acting in the capacity of lead partner, to sign all documents in connection with the tender offer for Contract.....and any other contract resulting from it on our behalf.

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

NAME OF FIRM	ADDRESS	AUTHORISING SIGNATURE, NAME & CAPACITY
Lead partner		

D. Certificate for sole proprietor

I,, hereby confirm that I am the sole owner of the business trading as.....

As Witness:

1.....

.....
Signature: Sole owner

2.....

.....
Date

E. Certificate for Close Corporation

We, the undersigned, being the key members in the business trading as.....hereby authorise Mr/Mrs.....

Acting in the capacity of....., to sign all documents in connection with the tender for Contract.....and any contract resulting from it on our behalf.

NAME	ADDRESS	SIGNATURE	DATE

NOTE: This certificate is to be completed and signed by all the key members upon whom rests the direction of the affairs of the Close Corporation as a whole

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T2.1 B CERTIFICATE OF ATTENDANCE AT CLARIFICATION MEETING(SCM)

This is to certify that

.....(Tenderer)

of

.....(address)

.....

was represented by the person(s) named below at the compulsory meeting held for all tenderers at
(location) on.....(date), starting at.....

We acknowledge that the purpose of the meeting was to acquaint ourselves with the site of the works
 and / or matters incidental to doing the work specified in the tender documents in order for 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 Signature.....

Capacity.....

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

Capacity.....

Attendance of the above persons at the meeting is confirmed by the employer's representative/
 engineer, namely:

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

Capacity..... Date & Time.....



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T2.1 C SCHEDULE OF PROPOSED SUBCONTRACTORS (EXCL EME'S/QSE'S (30%))

NOTE: This table is **NOT TO BE USED** to capture EMEs/QSEs Subcontractors/Suppliers contributing towards the EMEs/QSEs project goal

**EMES/QSES TO BE USED AS SUB-CONTRACTORS / SUPPLIERS MUST BE CAPTURED
UNDER FORM: RDP 2 (E) EMPLOYMENT OF EMES/QSES**

We notify you that it is our intention to employ the following subcontractors for work in this contract.

If we are awarded a contract we agree that this notification does not change the requirement for us to submit the name of proposed subcontractors in accordance with requirements in the contract for such appointments.

	Name and address of proposed Subcontractor	Company Registration Number & CIDB Classification	Description of Work to be executed by Subcontractor
1.			
2.			
3.			
4.			
5.			

Signed.....

Date.....

Name.....

Position.....

Tenderer.....



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T2.1 D SCHEDULE OF PLANT AND EQUIPMENT

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

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

Quantity	Description, size, capacity, etc.

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 acceptable

Quantity	Description, size, capacity, etc.

Hired plant will be allocated 50% of the maximum points

Attach additional pages if more space is required

Signed..... Date.....

Name..... Position.....

Tenderer.....



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T2.1 E SCHEDULE OF THE TENDERER'S EXPERIENCE

The following is a statement of similar work successfully executed by myself/ourselves in the last ten years:

Employer, contact person and telephone number	Description of contract	Value of work Inclusive of VAT (Rand)	CIDB Classification	Date Completed

NB.: Completion certificates and recommendation letters to be attached for points to be scored.

Signed..... Date

Name..... Position.....

Tenderer.....



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T2.1 F RECORD OF ADDENDA TO TENDER DOCUMENTS

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

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

Attach additional pages if more space is required.

Signed..... Date

Name..... Position.....

Tenderer.....



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T2.1 G DEVIATIONS OR QUALIFICATIONS BY THE TENDERER

Note: Tenderers will be declared to be non-responsive should any proposed deviation or qualification, in the employer's opinion:

- a) detrimentally affect the scope, quality, or performance of the works, services or supply identified in the Scope of Work,
- b) change the employer's or the tenderer's risks and responsibilities under the contract, or
- c) affect the competitive position of other tenderers presenting responsive tenders, if it were to be rectified.

PAGE	DESCRIPTION

SIGNED ON BEHALF OF TENDERER:



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T2.1 H CONTRACTOR'S ESTABLISHMENT ON SITE

The combined extended total tendered for Item 13.01 for the contractor's General obligations;
i.e.

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

shall not exceed a maximum of **15 %** of the tender sum (excluding VAT).

Total tendered for Item B13.01 expressed as a percentage of the tender sum (excluding VAT):
.....% (insert percentage).

SIGNED ON BEHALF OF TENDERER



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T2.1 I CERTIFICATE OF NON-COLLUSIVE TENDER

1 IN THE CASE OF A SINGLE CONSTRUCTION CONCERN:

I/We certify that this is a bona fide tender.

I/We also certify that I/We have not done and I/We undertake not to do any of the following at any time before the hour and date specified for the closure of submission of tenders for this contract.

- a) Fix or adjust the amount of this tender by or under or in accordance with any agreement or arrangement with any other person;
- b) communicate to a person other than the person calling for these tenders the amount or approximate amount of the proposed tender, except when the confidential disclosure of the approximate amount of the tender is necessary to obtain the insurance-premium quotations required for preparation of the tender;
- c) cause or induce any other person to communicate to me/us the amount or approximate amount of any rival tender for this contract;
- d) enter into any agreement or arrangement with any other person to induce him to refrain from tendering for this contract, or to influence the amount of any tender or the conditions of any tender to be submitted, nor cause or induce any other person to enter into any such agreement or arrangement;
- e) offer or pay or give or agree to pay or to give any sum of money or valuable consideration directly or indirectly to any person for doing or having done or causing or having caused to be done in relation to any tender or proposed tender for this contract, any action similar to those described above.

In this certificate the term "person" includes juristic or natural University of Venda persons , body of persons or association, whether corporate or not, and the term "agreement or arrangement" includes any agreement or arrangement, whether formal or informal and whether legally binding or not.

SIGNED ON BEHALF OF TENDERER:

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I: CERTIFICATE OF NON-COLLUSIVE TENDER (continued)

2 IN THE CASE OF A CONSORTIUM OF CONSTRUCTION CONCERNS:

We certify that this is a bona fide tender.

We also certify that we have not done and we undertake not to do any of the following at any time before the hour and date specified for the closure of submission of tenders for this contract:

- a) Fix or adjust the amount of this tender by or under or in accordance with any agreement or arrangement with any person outside this consortium;
- b) communicate to a person outside this consortium other than the person calling for these tenders, the amount or approximate amount of the proposed tender, except when the confidential disclosure of the approximate amount of the tender is necessary to obtain insurance premium quotations required for preparation of the tender;
- c) Cause or induce any person outside this consortium to communicate to us the amount or approximate amount of any rival tender for this contract.
- d) enter into any agreement or arrangement with any person outside this consortium to induce him to refrain from tendering for this contract, or to influence the amount of any tender or the conditions of any tender to be submitted, nor cause or induce any person outside this consortium to enter into any such agreement or arrangement;
- e) offer or pay or give or agree to give any sum of money or valuable consideration directly or indirectly to any person outside this consortium for doing or having done or causing or having caused to be done in relation to any tender or proposed tender for this contract, any action similar to those described above.

In this certificate the term "person" includes juristic or natural University of Venda persons , body of persons or association, whether corporate or not, the term "agreement or arrangement" includes any agreement or arrangement, whether formal or informal and whether legally binding or not, and the term "person outside this consortium" means, when the consortium is a partnership, a person other than a partner or an employee of a partner or the partnership, or when the consortium is a company, a person other than a person or company holdings shares in the consortium, or any employee of such a person, company or the consortium.

SIGNED ON BEHALF OF TENDERER:

T2.1 J COMPLIANCE WITH OCCUPATIONAL HEALTH AND SAFETY ACT, 1993 AND CONSTRUCTION REGULATIONS, 2003

The tenderer shall attach evidence that he is registered and in good standing with a compensation insurer who is approved by Department of Labour in terms of section 80 of the Compensation for Injury and Disease Act (COID)(Act 130 of 1993).

The tenderer is required to disclose, by also attaching documentary evidence, all inspections, investigations and their outcomes conducted by the Department of Labour into the conduct of the tenderer at any time during the 36 months preceding the date of this tender.

Attach a valid letter of good standing from the Compensation Commissioner

SIGNED ON BEHALF OF THE TENDERER:

Note to tenderer:

Discovery that the tenderer has failed to make proper disclosure may result in UNIVERSITY OF VENDA terminating a contract that flows from this tender on the ground that it has been rendered invalid by the tenderer's misrepresentation.

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ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)

T2.1 K REQUIREMENTS IN TERMS OF GOVERNMENT'S RECONSTRUCTION AND DEVELOPMENT PROGRAMME

K1 General

The employer requires the active participation of the contractor in this aspect of the contract.

Forms RDP 1 (E) to RDP 4 (E) applies to this section and must be completed and submitted with the tender.

The tenderer's submissions under this item will be taken into consideration when evaluating tenders received.

K2 Definitions

K2.1 Contract Participation Goal (CPG)

The value of goods, services and works, including VAT, for which the contractor proposes to engage labour and EMEs/QSEs.

K2.2 Labour Maximisation

It is a requirement of this contract that participation in the contract must be granted to labour in order to maximize job creation as well as to maximize expenditure towards the unemployed.

The specified target value for labour expenditure is **10%** of the contract value. At least 60% of this labour content shall be from the LOCAL COMMUNITY where Local Community means those in the immediate vicinity of the project. The contractor's own skilled personnel will not be counted towards the said 60%. Labour is defined as hourly paid personnel including the CLO.

It is a requirement that the Contractor plan for achieving these targets and that a planned programme for achieving each of the targets is submitted at the start of the project together with the clause 12 programme of construction.

Penalties: The penalties for not reaching the required labour target values will be calculated at **300%** of the difference between the set target values and the actual target values achieved by the contractor at completion of the works. Penalties will be applied monthly, when the actual figures are less than **75%** of the planned accumulative monthly figures. No bonuses for achieving the set target values are applicable. In the

event that penalties are reversed, no interest will be claimable on the value of the penalty.

K2.3 **EME/QSE** in line with PPPFA act of 2017

Definition: companies are classified as Exempt Micro Enterprises (EMEs), Qualifying Small Enterprises (QSEs), or Generic Enterprises (GENs) according to their annual turnover. EMEs are the smallest entities, with an annual turnover of R10 million or less. QSEs are those with an annual turnover of between R10 million and R50 million, and GENs are the largest entities, with an annual turnover in excess of R50 million. These figures were adjusted in 2013, when the BBBEE Codes of Good Practice were revised

It is a requirement of this contract that the successful tenderer must subcontract a minimum of 30% of the value of the contract approved EMEs or QSEs. EMEs is defined as Exempt Micro Enterprises and QSEs is defined as Qualifying Small Enterprises. **The minimum target for participation is thirty percent (30%)** of the total contract value and this can be achieved through one or more sub-contractors. UNIVERSITY OF VENDA reserves the right **to apply penalties to the value of 300% of the difference between the set target values and the actual values achieved when the contractor does not honour the commitment as stipulated by the contractor on this page**

Information in this regard needs to be provided by the contractor on Forms RDP 2 (E), RDP 2 (E1), RDP 2 (E2), etc. Commitment to these goals will be a condition of award.

It is a requirement that the Contractor plan for achieving these targets and that a planned programme for achieving each of the targets is submitted at the start of the project together with the clause 12 programme of construction.

Penalties: The penalties for not reaching the required EME/QSE target values will be calculated at **300%** of the difference between the set target values and the actual target values achieved by the contractor at completion of the works. Penalties will be applied monthly, when the actual figures are less than **75%** of the planned monthly accumulative figures. No bonuses for achieving the set target values are applicable. In the event that penalties are reversed, no interest will be claimable on the value of the penalty.

K2.4 Broad-Based Black Economic Empowerment (B-BBEE)

As assigned in the Codes of Good Practice, B-BBEE means the economic empowerment of all Black People through diverse but integrated socio-economic strategies that include, but not limited to:

- increasing the number of Black People that manage, own and control enterprises and productive assets;
- facilitating ownership and management of enterprises and productive assets by communities, workers, co-operatives and other collective enterprises;
- human resources and skills development;
- achieving equitable representation in all occupational categories and levels in the workforce;
- preferential procurement; and

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- Investment in enterprises that are owned or managed by Black People.

As part of this tender, preference will be given to B-BBEE Level Contribution.

The B-BBEE Level Contributor, meaning the B-BBEE Status received by a measured entity based on its performance using the generic scorecard contained in the Codes of Good Practice, will be used during tender evaluation to allocate points to the tenderer. A maximum of 10 points (90/10 evaluation) or a maximum of 20 points (80/20 evaluation) may be awarded to a bidder for attaining their B-BBEE status level contemplated in the Codes of Good Practice.

The Act governing the B-BBEE is the Broad-Based Black Economic Empowerment Act, No. 53 of 2003

K2.5 Target values

The values of the targets (including VAT) are expressed as follows:

- At Tender stage: As a percentage of the Tender Sum (i.e. excluding Contingencies, CPA and Rise and Fall, but inclusive of VAT) as proposed by the tenderer in his tender
- After Award: As a percentage of the certified work done (i.e. excluding savings, but inclusive of variation orders and VAT)

The monetary total of these values shall be the CPG.

In this project the minimum target values (as percentage of contract value) shall be as follows:

Labour Maximisation (wages)	:	10%
EMEs/QSEs	:	30%

The tender of a tenderer whose proposed target values are below the minimum set by the employer may be disqualified.

K3 Contract Participation Performance (CPP)

K3.1 The Contractor's Participation Performance will be measured monthly in order to monitor the extent to which he is striving to reach the Contract Participation Goal (CPG) he proposed in his tender. Failure to reach the CPG will make the Contractor liable for penalties as described above.

K3.2 Monitoring of CPG

Regular returns will be required from the contractor, to be submitted with each payment certificate. The format should be confirmed with the Social Division of UNIVERSITY OF VENDA at the time of site handover.

K4 Training

Provision is made in the SCHEDULE OF QUANTITIES for structured training to be provided by the contractor.

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RDP1(E) SCHEDULE OF LOCAL LABOUR CONTENT

The Tenderer must complete the table below to reflect the labour force anticipated to be employed on this contract, including labour employed by sub-contractors.

The specified target value is **10%**.

Note: At least 60% of this labour content shall be from the LOCAL COMMUNITY where Local Community means those in the immediate vicinity of the project. The contractor's own skilled personnel will not be counted towards the said 60%.

Type of Labour	Man-hours	Minimum Wage Rate per Unit	Total Wage Cost (Excl VAT)
Temporary Labour (skilled and unskilled)			
TOTAL PROJECT COST PERCENTAGE			

Notes to Tenderer:

- (1) Labour is defined as hourly paid personnel including the CLO.
- (2) The penalty for non-compliance during the contract or for fraudulent disclosure is discussed in Section C3.3.6.5.

SIGNED ON BEHALF OF THE TENDERER:

T.40

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RDP2(E) EMPLOYMENT OF EME'S OR QSE'S

It is a requirement of this contract that the successful tenderer must subcontract a minimum of 30% of the value of the contract approved EMEs or QSEs. EMEs is defined as Exempt Micro Enterprises and QSEs is defined as Qualifying Small Enterprises. **The minimum target for participation is thirty percent (30%)** of the total contract value and this can be achieved through one or more sub-contractors. UNIVERSITY OF VENDA reserves the right **to apply penalties to the value of 300% of the difference between the set target values and the actual values achieved when the contractor does not honour the commitment as stipulated by the contractor on this page**

ONLY EMEs/QSEs should be employed to do the work listed in the table below. For other subcontractors, refer to T2.1C SCHEDULE OF PROPOSED SUBCONTRACTORS (EXCL EMEs/QSEs (30%))

We notify you that it is our intention to employ EMEs/QSEs for work in this contract to comply with the stipulated **30% requirement**.

If we are awarded a contract we agree that this notification does not change the requirement for us to submit the name of proposed subcontractors in accordance with requirements in the contract for such appointments.

Item No.	Description of Work to be executed by EMEs/QSEs	Value of the work
1.		R
2.		R
3.		R
4.		R
5.		R
Total value of work committed to EMEs/QSEs		R
Percentage of total contract value		%

Note: Forms RDP2 (E1), RDP2 (E2) etc should be completed for each contractor listed above and contributing towards the **30% goal**

Signed.....

Date.....

Name.....

Position.....

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SECTION	ITEM	SPECIFY SUB-ITEMS	AMOUNT
1200	General requirements and provisions		R
1300	Contractor's establishment on site		R
1400	Housing, offices and laboratories		R
1500	Accommodation of traffic		R
1600	Overhaul		R
1700	Clearing and grubbing		R
1800	Dayworks		R
2100	Drains		R
2200	Pre-Fabricated Culverts		R
2300	Concrete kerbing, concrete channelling...		R
3100	Borrow Materials		R
3200	Selection, stockpiling...		R
3300	Mass Earthworks		R
3400	Pavement Layers of Gravel Material		R
3500	Stabilization		R
3600	Crushed-stone Base		R
4100	Prime Coat		R
4200	Asphalt Base and Surfacing		R
5100	Pitching, Stonework and Protection...		R
5200	Gabions		R
5400	Guardrails		R
5500	Fencing		R
5600	Road signs		R
5700	Road Markings		R
5800	Landscaping and Planting Plants		R
5900	Finishing the Road and Road Reserve...		R
6100	Foundations for Structures		R
6200	Falsework, Formwork and Concrete Finish		R
6300	Steel Reinforcement for Structures		R
6400	Concrete for Structures		R
6600	No-fines concrete, joints, bearings...		R
7100	Concrete Pavement		R
8100	Testing Materials and Workmanship		R
TOTAL FOR THIS EME/QSE			R
TOTAL EXPRESSED AS A PERCENTAGE OF TOTAL CONTRACT VALUE			%

RDP2 (E2): EME/QSE No. 2

SECTION	ITEM	SPECIFY SUB-ITEMS	AMOUNT
1200	General requirements and provisions		R
1300	Contractor's establishment on site		R
1400	Housing, offices and laboratories		R
1500	Accommodation of traffic		R
1600	Overhaul		R
1700	Clearing and grubbing		R
1800	Dayworks		R
2100	Drains		R
2200	Pre-Fabricated Culverts		R
2300	Concrete kerbing, concrete channelling...		R
3100	Borrow Materials		R
3200	Selection, stockpiling...		R
3300	Mass Earthworks		R
3400	Pavement Layers of Gravel Material		R
3500	Stabilization		R
3600	Crushed-stone Base		R
4100	Prime Coat		R
4200	Asphalt Base and Surfacing		R
5100	Pitching, Stonework and Protection...		R
5200	Gabions		R
5400	Guardrails		R
5500	Fencing		R
5600	Road signs		R
5700	Road Markings		R
5800	Landscaping and Planting Plants		R
5900	Finishing the Road and Road Reserve...		R
6100	Foundations for Structures		R
6200	Falsework, Formwork and Concrete Finish		R
6300	Steel Reinforcement for Structures		R
6400	Concrete for Structures		R
6600	No-fines concrete, joints, bearings...		R
7100	Concrete Pavement		R
8100	Testing Materials and Workmanship		R
TOTAL FOR THIS EME/QSE			R
TOTAL EXPRESSED AS A PERCENTAGE OF TOTAL CONTRACT VALUE			%

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RDP2 (E3): EME/QSE No. 3

SECTION	ITEM	SPECIFY SUB-ITEMS	AMOUNT
1200	General requirements and provisions		R
1300	Contractor's establishment on site		R
1400	Housing, offices and laboratories		R
1500	Accommodation of traffic		R
1600	Overhaul		R
1700	Clearing and grubbing		R
1800	Dayworks		R
2100	Drains		R
2200	Pre-Fabricated Culverts		R
2300	Concrete kerbing, concrete channelling...		R
3100	Borrow Materials		R
3200	Selection, stockpiling...		R
3300	Mass Earthworks		R
3400	Pavement Layers of Gravel Material		R
3500	Stabilization		R
3600	Crushed-stone Base		R
4100	Prime Coat		R
4200	Asphalt Base and Surfacing		R
5100	Pitching, Stonework and Protection...		R
5200	Gabions		R
5400	Guardrails		R
5500	Fencing		R
5600	Road signs		R
5700	Road Markings		R
5800	Landscaping and Planting Plants		R
5900	Finishing the Road and Road Reserve...		R
6100	Foundations for Structures		R
6200	Falsework, Formwork and Concrete Finish		R
6300	Steel Reinforcement for Structures		R
6400	Concrete for Structures		R
6600	No-fines concrete, joints, bearings...		R
7100	Concrete Pavement		R
8100	Testing Materials and Workmanship		R
TOTAL FOR THIS EME/QSE			R
TOTAL EXPRESSED AS A PERCENTAGE OF TOTAL CONTRACT VALUE			%

RDP2 (E4): EME/QSE No. 4

SECTION	ITEM	SPECIFY SUB-ITEMS	AMOUNT
1200	General requirements and provisions		R
1300	Contractor's establishment on site		R
1400	Housing, offices and laboratories		R
1500	Accommodation of traffic		R
1600	Overhaul		R
1700	Clearing and grubbing		R
1800	Dayworks		R
2100	Drains		R
2200	Pre-Fabricated Culverts		R
2300	Concrete kerbing, concrete channelling...		R
3100	Borrow Materials		R
3200	Selection, stockpiling...		R
3300	Mass Earthworks		R
3400	Pavement Layers of Gravel Material		R
3500	Stabilization		R
3600	Crushed-stone Base		R
4100	Prime Coat		R
4200	Asphalt Base and Surfacing		R
5100	Pitching, Stonework and Protection...		R
5200	Gabions		R
5400	Guardrails		R
5500	Fencing		R
5600	Road signs		R
5700	Road Markings		R
5800	Landscaping and Planting Plants		R
5900	Finishing the Road and Road Reserve...		R
6100	Foundations for Structures		R
6200	Falsework, Formwork and Concrete Finish		R
6300	Steel Reinforcement for Structures		R
6400	Concrete for Structures		R
6600	No-fines concrete, joints, bearings...		R
7100	Concrete Pavement		R
8100	Testing Materials and Workmanship		R
TOTAL FOR THIS EME/QSE			R
TOTAL EXPRESSED AS A PERCENTAGE OF TOTAL CONTRACT VALUE			%

No: IN/09/2022**FOR UNIVERSITY OF VENDA****ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD (R524)****RDP2 (E5): EME/QSE No. 5**

SECTION	ITEM	SPECIFY SUB-ITEMS	AMOUNT
1200	General requirements and provisions		R
1300	Contractor's establishment on site		R
1400	Housing, offices and laboratories		R
1500	Accommodation of traffic		R
1600	Overhaul		R
1700	Clearing and grubbing		R
1800	Dayworks		R
2100	Drains		R
2200	Pre-Fabricated Culverts		R
2300	Concrete kerbing, concrete channelling...		R
3100	Borrow Materials		R
3200	Selection, stockpiling...		R
3300	Mass Earthworks		R
3400	Pavement Layers of Gravel Material		R
3500	Stabilization		R
3600	Crushed-stone Base		R
4100	Prime Coat		R
4200	Asphalt Base and Surfacing		R
5100	Pitching, Stonework and Protection...		R
5200	Gabions		R
5400	Guardrails		R
5500	Fencing		R
5600	Roadsigns		R
5700	Road Markings		R
5800	Landscaping and Planting Plants		R
5900	Finishing the Road and Road Reserve...		R
6100	Foundations for Structures		R
6200	Falsework, Formwork and Concrete Finish		R
6300	Steel Reinforcement for Structures		R
6400	Concrete for Structures		R
6600	No-fines concrete, joints, bearings...		R
7100	Concrete Pavement		R
8100	Testing Materials and Workmanship		R
TOTAL FOR THIS EME/QSE			R
TOTAL EXPRESSED AS A PERCENTAGE OF TOTAL CONTRACT VALUE			%



T.46

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RDP3(E) BROAD BASED BLACK ECONOMIC EMPOWERMENT

The tenderer shall furnish UNIVERSITY OF VENDA with the necessary information to enable UNIVERSITY OF VENDA to evaluate the submission for B-BBEE Level Contribution.

It is a requirement to attach a Broad Based Black Empowerment Verification Certificate (issued by a service provider accredited to SANAS), indicating amongst others the following information:

- Company name
- Company Registration Number
- VAT Number
- Issue Date
- Expiry Date
- Level Contributor
- Name of Accredited Service Provider

NOTE: If the Service Provider is not accredited by a Registered Auditor approved by IRBA or a Verification Agency accredited by SANAS, no points will be given for BBEE Level Contributor.

SIGNED ON BEHALF OF THE TENDERER

T.47

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SBD 6

T2.1: L PREFERENCE POINTS CLAIM

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

NB: BEFORE COMPLETING THIS FORM, BIDDERS MUST STUDY THE GENERAL CONDITIONS, DEFINED BELOW

1. GENERAL CONDITIONS

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

- the 80/20 Preference Point System for bids with a Rand value of more than R30,000-00 but not exceeding R50,000,000-00 (all applicable taxes included); and
- the 90/10 Preference Point System for bids with a Rand value above R50,000,000-00 (all applicable taxes included).

1.2 The value of this bid is estimated to exceed/not exceed R50 000 000 (all applicable taxes included) and therefore the 90/10 system shall be applicable.

1.3 Preference points for this bid shall be awarded for:

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

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

POINTS

1.3.1.1 PRICE

1.3.1.2 B-BBEE STATUS LEVEL OF CONTRIBUTION

Total points for Price and B-BBEE must not exceed 100

- 1.4 Failure on the part of a bidder to fill in and/or to sign this form and submit a B-BBEE Verification Certificate from a Verification Agency accredited by the South African Accreditation System (SANAS) or a Registered Auditor approved by the Independent Regulatory Board of Auditors (IRBA) or an Accounting Officer as contemplated in the Close Corporation Act (CCA) together with the bid, will be interpreted to mean that preference points for B-BBEE status level of contribution are not claimed.
- 1.5 The purchaser reserves the right to require of a bidder, either before a bid is adjudicated or at any time subsequently, to substantiate any claim in regard to preferences, in any manner required by the purchaser.

2. DEFINITIONS

- 2.1 **“all applicable taxes”** includes value-added tax, pay as you earn, income tax, unemployment insurance fund contributions and skills development levies;
- 2.2 **“B-BBEE”** means broad-based black economic empowerment as defined in section 1 of the Broad -Based Black Economic Empowerment Act;
- 2.3 **“B-BBEE status level of contributor”** means the B-BBEE status received by a measured entity based on its overall performance using the relevant scorecard contained in the Codes of Good Practice on Black Economic Empowerment, issued in terms of section 9(1) of the Broad-Based Black Economic Empowerment Act;
- 2.4 **“bid”** means a written offer in a prescribed or stipulated form in response to an invitation by an organ of state for the provision of services, works or goods, through price quotations, advertised competitive bidding processes or proposals;
- 2.5 **“Broad-Based Black Economic Empowerment Act”** means the Broad-Based Black Economic Empowerment Act, 2003 (Act No. 53 of 2003);
- 2.6 **“comparative price”** means the price after the factors of a non-firm price and all unconditional discounts that can be utilized have been taken into consideration;
- 2.7 **“consortium or joint venture”** means an association of persons for the purpose of

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combining their expertise, property, capital, efforts, skill and knowledge in an activity for the execution of a contract;

- 2.8 **“contract”** means the agreement that results from the acceptance of a bid by an organ of state;
- 2.9 **“EME”** means any enterprise with an annual total revenue of R5 million or less.
- 2.10 **“Firm price”** means the price that is only subject to adjustments in accordance with the actual increase or decrease resulting from the change, imposition, or abolition of customs or excise duty and any other duty, levy, or tax, which, in terms of the law or regulation, is binding on the contractor and demonstrably has an influence on the price of any supplies, or the rendering costs of any service, for the execution of the contract;
- 2.11 **“functionality”** means the measurement according to predetermined norms, as set out in the bid documents, of a service or commodity that is designed to be practical and useful, working or

operating, taking into account, among other factors, the quality, reliability, viability and durability of a service and the technical capacity and ability of a bidder;
- 2.12 **“non-firm prices”** means all prices other than “firm” prices;
- 2.13 **“person”** includes a juristic person;
- 2.14 **“rand value”** means the total estimated value of a contract in South African currency, calculated at the time of bid invitations, and includes all applicable taxes and excise duties;
- 2.15 **“sub-contract”** means the primary contractor’s assigning, leasing, making out work to, or employing, another person to support such primary contractor in the execution of part of a project in terms of the contract;
- 2.16 **“total revenue”** bears the same meaning assigned to this expression in the Codes of Good Practice on Black Economic Empowerment, issued in terms of section 9(1) of the Broad-Based Black Economic Empowerment Act and promulgated in the *Government Gazette* on 9 February 2007;
- 2.17 **“trust”** means the arrangement through which the property of one person is made over or bequeathed to a trustee to administer such property for the benefit of another person; and
- 2.18 **“trustee”** means any person, including the founder of a trust, to whom property is bequeathed in order for such property to be administered for the benefit of another person.

3. ADJUDICATION USING A POINT SYSTEM

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

4. POINTS AWARDED FOR PRICE

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

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

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

Where

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

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5. Points awarded for B-BBEE Status Level of Contribution

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

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

- 5.2 Bidders who qualify as EMEs in terms of the B-BBEE Act must submit a certificate issued by an Accounting Officer as contemplated in the CCA or a Verification Agency accredited by SANAS or a Registered Auditor. Registered auditors do not need to meet the prerequisite for IRBA's approval for the purpose of conducting verification and issuing EMEs with B-BBEE Status Level Certificates.
- 5.3 Bidders other than EMEs must submit their original and valid B-BBEE status level verification certificate or a certified copy thereof, substantiating their B-BBEE rating issued by a Registered Auditor approved by IRBA or a Verification Agency accredited by SANAS.
- 5.4 A trust, consortium or joint venture, will qualify for points for their B-BBEE status level as a legal entity, provided that the entity submits their B-BBEE status level certificate.

- 5.5 A trust, consortium or joint venture will qualify for points for their B-BBEE status level as an unincorporated entity, provided that the entity submits their consolidated B-BBEE scorecard as if they were a group structure and that such a consolidated B-BBEE scorecard is prepared for every separate bid.
- 5.6 Tertiary institutions and public entities will be required to submit their B-BBEE status level certificates in terms of the specialized scorecard contained in the B-BBEE Codes of Good Practice.
- 5.7 A person will not be awarded points for B-BBEE status level if it is indicated in the bid documents that such a bidder intends sub-contracting more than 25% of the value of the contract to any other enterprise that does not qualify for at least the points that such a bidder qualifies for, unless the intended sub-contractor is an EME that has the capability and ability to execute the sub-contract.
- 5.8 A person awarded a contract may not sub-contract more than 25% of the value of the contract to any other enterprise that does not have an equal or higher B-BBEE status level than the person concerned, unless the contract is sub-contracted to an EME that has the capability and ability to execute the sub-contract.

6. BID DECLARATION

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

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

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

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

8 SUB-CONTRACTING

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

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8.1.1 If yes, indicate:

- (i) what percentage of the contract will be subcontracted%
- (ii) the name of the sub-contractor?
- (iii) the B-BBEE status level of the sub-contractor?
- (iv) whether the sub-contractor is an EME? YES / NO (delete which is not applicable)

9 DECLARATION WITH REGARD TO COMPANY/FIRM

9.1 Name of company/firm :

9.2 VAT registration number :

9.3 Company registration number :

9.4 TYPE OF COMPANY/ FIRM

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

[TICK APPLICABLE BOX]

9.5 DESCRIBE PRINCIPAL BUSINESS ACTIVITIES

.....

.....

.....

.....

.....

9.6 COMPANY CLASSIFICATION

- ☐ Manufacturer
- ☐ Supplier
- ☐ Professional service provider
- ☐ Other service providers, e.g. transporter, etc.

[TICK APPLICABLE BOX]

9.7 Total number of years the company/firm has been in business?

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

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

WITNESSES:

TE

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FOR UNIVERSITY OF VENDA

ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD (R524)

1.

SIGNATURE(S) OF BIDDER(S)

2.

DATE:.....

ADDRESS:.....

.....

.....

T.56

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T2.2 OTHER DOCUMENTS REQUIRED FOR TENDER EVALUATION

T2.2 A	DECLARATION OF GOOD STANDING REGARDING TAX	T.57
T2.2 B	FINANCIAL DETAILS, STATEMENTS AND BANK REFERENCES	T.60
T2.2 C	CONSTRUCTION INDUSTRIES DEVELOPMENT BOARD REGISTRATION.	T.61
T2.2 D	COMPULSORY ENTERPRISE QUESTIONNAIRE	T.61
T2.2 E	DECLARATION OF INTEREST.....	ERROR! BOOKMARK NOT DEFINED.
T2.2 F	THE NATIONAL INDUSTRIAL PARTICIPATION PROGRAMME	ERROR! BOOKMARK NOT DEFINED.
T2.2 G	DECLARATION OF BIDDER'S PAST SUPPLY CHAIN MANAGEMENT PRACTICES SBD 8	T.71

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T2.2 A DECLARATION OF GOOD STANDING REGARDING TAX

SBD 2

TAX CLEARANCE CERTIFICATE REQUIREMENTS

It is a condition of bid that the taxes of the successful bidder must be in order, or that satisfactory arrangements have been made with South African Revenue Service (SARS) to meet the bidder's tax obligations.

- 1 In order to meet this requirement bidders are required to complete in full the attached form TCC 001 "Application for a Tax Clearance Certificate" and submit it to any SARS branch office nationally. The Tax Clearance Certificate Requirements are also applicable to foreign bidders / individuals who wish to submit bids.
- 2 SARS will then furnish the bidder with a Tax Clearance Certificate that will be valid for a period of 1 (one) year from the date of approval.
- 3 The original Tax Clearance Certificate must be submitted together with the bid. Failure to submit the original and valid Tax Clearance Certificate will result in the invalidation of the bid. Certified copies of the Tax Clearance Certificate will not be acceptable.
- 4 In bids where Consortia / Joint Ventures / Sub-contractors are involved, each party must submit a separate Tax Clearance Certificate.
- 5 Copies of the TCC 001 "Application for a Tax Clearance Certificate" form are available from any SARS branch office nationally or on the website www.sars.gov.za.
- 6 Applications for the Tax Clearance Certificates may also be made via eFiling. In order to use this provision, taxpayers will need to register with SARS as eFilers through the website www.sars.gov.za.

The following shall apply in terms of MFMA Circular No 90:

Where the recommended bidder is not tax compliant, the bidder should be notified of their non-compliant status and the bidder must be requested to submit to the University or municipal entity, within 7 working days, written proof from SARS of their tax compliance status or proof from SARS that they have made an arrangement to meet their outstanding tax obligations.



TAX CLEARANCE

TCC 001

Application for a Tax Clearance Certificate

Purpose

Select the applicable optionTenders ☐ Good standing ☐

If "Good standing", please state the purpose of this application

Particulars of applicant

Name/Legal name (Initials & Surname or registered name)																	
Trading name (if applicable)																	
ID/Passport no						Company/Close Corp. registered no											
Income Tax ref no						PAYE ref no	7										
VAT registration no	4					SDL ref no	L										
Customs code						UIF ref no	U										
Telephone no	C O D E				N U M B E R				Fax no	C O D E				N U M B E R			
E-mail address																	
Physical address																	
Postal address																	

Particulars of representative (Public Officer/Trustee/Partner)

Surname																	
First names																	
ID/Passport no						Income Tax ref no											
Telephone no	C O D E				N U M B E R				Fax no	C O D E				N U M B E R			
E-mail address																	
Physical address																	

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Particulars of tender (If applicable)

Tender number

Estimated Tender amount R ,

Expected duration of the tender year(s)

Particulars of the 3 largest contracts previously awarded

Date started	Date finalised	Principal	Contact person	Telephone number	Amount

Audit

Are you currently aware of any Audit investigation against you/the company?.....

If "YES" provide details

Appointment of representative/agent (Power of Attorney)

I the undersigned confirm that I require a Tax Clearance Certificate in respect of Tenders or Goodstanding.

I hereby authorise and instruct _____ to apply to and receive from SARS the applicable Tax Clearance Certificate on my/our behalf.

Signature of representative/agent

Name of
representative/
agent

Date

Declaration

I declare that the information furnished in this application as well as any supporting documents is true and correct in every respect.

Signature of applicant/Public Officer

C

C

Y

Y

—

M

M

—

D

D

Date

Name of applicant/
Public Officer

Notes:

1. It is a serious offence to make a false declaration.
2. Section 75 of the Income Tax Act, 1962, states: Any person who
 - (a) fails or neglects to furnish, file or submit any return or document as and when required by or under this Act; or
 - (b) without just cause shown by him, refuses or neglects to-
 - (i) furnish, produce or make available any information, documents or things;
 - (ii) reply to or answer truly and fully, any questions put to him ...As and when required in terms of this Act ... shall be guilty of an offence ...
3. **SARS will, under no circumstances, issue a Tax Clearance Certificate unless this form is completed in full.**
4. Your Tax Clearance Certificate will only be issued on presentation of your South African Identity Document or Passport (Foreigners only) as applicable.

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T2.2 B FINANCIAL DETAILS, STATEMENTS AND BANK REFERENCES

1. FINANCIAL STATEMENTS

I/We agree, to furnish a copy of the latest **2** years (**2019-20 & 2020-21**) audited set of financial statement together with my/our Director's and Auditor's report for consideration by the UNIVERSITY OF VENDA with this tender.

**2. DETAILS OF TENDERER'S BANK ACCOUNT
MUST BE COMPLETED BY TENDERER'S BANK**

- a) Account Holder Name:.....
- b) Name of Bank:
- c) Branch of Bank
- d) Town/city/suburb where bank is situated.....
- e) Contact Person at the Bank:
- f) Telephone number of Bank: Code: Number:
- g) Account Number:
- h) Bank rating:.....

SIGNED ON BEHALF OF THE BANK

NAME OF BANK OFFICIAL:.....

DESIGNATION:.....

SIGNATURE:.....

DATE:.....



BANK STAMP

- 3.** I/We hereby authorise the Employer to approach the above Bank for confirmation.

SIGNED ON BEHALF OF THE TENDERER:.....

DATE:.....

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ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD (R524)

T2.2 C CONSTRUCTION INDUSTRIES DEVELOPMENT BOARD REGISTRATION

The tenderer is to attach either:

- Written proof of his registration with the CIDB with the relevant grade as indicated/specified in the tender document

Or

- Written proof of his application to the CIDB for registration as a contractor in the category listed above.

Note:

1. Failure to attach such documentation as prescribed to this page shall result in this tender not being further considered for the award of the contract.
2. Should this tender be considered for award of the contract, based on proof of submission of application for registration in the appropriate category with the CIDB, and should proof of such subsequent registration not be forthcoming to the employer by the time of award of the contract, then this tender will no longer be considered for the award of the contract.



**FOR UNIVERSITY OF VENDA
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T2.2 D COMPULSORY ENTERPRISE QUESTIONNAIRE

THE FOLLOWING PARTICULARS **MUST** BE FURNISHED IN THE CASE OF A JOINT VENTURE, SEPARATE ENTERPRISE QUESTIONNAIRES IN RESPECT OF EACH PARTNER **MUST** BE COMPLETED AND SUBMITTED OTHERWISE THE TENDER WILL BE DECLARED NON-RESPONSIVE

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

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

Section 3: CIDB registration number, if any:

Section 4: Particulars of sole proprietors and partners in partnerships

Name*	Identity Number *	Personal income tax number*

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

Section 5: Particulars of companies and close corporations

Company registration number

Close corporation number

Tax reference number

Section 6: Record in the service of the state

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

- | | |
|--|---|
| <input type="checkbox"/> a member of any municipal council | <input type="checkbox"/> An employee of any provincial department |
| <input type="checkbox"/> A member of any provincial legislature | <input type="checkbox"/> national or provincial public entity or constitutional institution within the meaning of the Public Finance Management Act, 1999 (Act 1 of 1999) |
| <input type="checkbox"/> A member of the National Assembly or the National Council of Province | <input type="checkbox"/> A member of an accounting authority of a national or provincial public entity |
| <input type="checkbox"/> A member of the board of directors of any municipal entity | <input type="checkbox"/> An employee of Parliament or a provincial legislature |
| <input type="checkbox"/> An official of any municipal or municipal entity | |

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

Name of sole proprietor, partner, director, manager,	Status of service (tick appropriate column)

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principal shareholder or stakeholder	Name of institution, public office, board or organ of state and position held	Current	Within last 12 months

* Insert separate page if necessary

Section 7: Record of spouses, children and parents in the service of the state

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

- | | |
|--|---|
| <input type="checkbox"/> a member of any municipal council | <input type="checkbox"/> an employee of any provincial department, national or provincial public entity or constitutional institution within the meeting of the Public Finance Management Act, 1999 (Act 1 of 1999) |
| <input type="checkbox"/> a member of any provincial legislature | <input type="checkbox"/> a member of an accounting authority of a national or provincial public entity |
| <input type="checkbox"/> a member of the National Assembly or the National Council of Province | <input type="checkbox"/> an employee of Parliament or a provincial legislature |
| <input type="checkbox"/> a member of the board of directors of any municipal entity | |
| <input type="checkbox"/> an official of any municipal or municipal entity | |

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

* Insert separate page if necessary

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

- i) authorizes the Employer to obtain a tax clearance certificate from the South African Revenue Services that my/our tax matters are in order;
- ii) confirms that 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; and
- 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.



**FOR UNIVERSITY OF VENDA
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Signed Date

Name Position

Enterprise name

No: IN/09/2022**FOR UNIVERSITY OF VENDA****ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD (R524)****SBD4****BIDDER'S DISCLOSURE****1. PURPOSE OF THE FORM**

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

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

2. Bidder's declaration

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

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

Full Name	Identity Number	Name of State institution

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



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SBD4

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

YES/NO

2.2.1 If so, furnish particulars:

.....
.....

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

YES/NO

2.3.1 If so, furnish particulars:

.....
.....

3 DECLARATION

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

3.1 I have read and I understand the contents of this disclosure;

3.2 I understand that the accompanying bid will be disqualified if this disclosure is found not to be true and complete in every respect;

3.3 The bidder has arrived at the accompanying bid independently from, and without consultation, communication, agreement or arrangement with any competitor. However, communication between partners in a joint venture or consortium² will not be construed as collusive bidding.

3.4 In addition, there have been no consultations, communications,agreements or arrangements with any competitor regarding the quality,quantity, specifications, prices, including methods, factors or formulas used to calculate prices, market allocation, the intention or decision to submit or not to submit the bid, bidding with the intention not to win the bid and conditions or delivery particulars of the products or services to which this bid invitation relates.

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

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SBD4

3.6 There have been no consultations, communications, agreements or arrangements made by the bidder with any official of the procuring institution in relation to this procurement process prior to and during the bidding process except to provide clarification on the bid submitted where so required by the institution; and the bidder was not involved in the drafting of the specifications or terms of reference for this bid.

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

I CERTIFY THAT THE INFORMATION FURNISHED IN PARAGRAPHS 1, 2 and 3 ABOVE IS CORRECT.I ACCEPT THAT THE STATE MAY REJECT THE BID OR ACT AGAINST ME IN TERMS OF PARAGRAPH 6 OF PFMA SCM INSTRUCTION 03 OF 2021/22 ON PREVENTING AND COMBATING ABUSE IN THE SUPPLY CHAIN MANAGEMENT SYSTEM SHOULD THIS DECLARATION PROVE TO BE FALSE.

.....
Signature

.....
Position

.....
Date

.....
Name of bidder



**FOR UNIVERSITY OF VENDA
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SBD 5

T.2.2 F THE NATIONAL INDUSTRIAL PARTICIPATION PROGRAMME

INTRODUCTION

The National Industrial Participation (NIP) Programme, which is applicable to all government procurement contracts that have an imported content, became effective on the 1 September 1996. The NIP policy and guidelines were fully endorsed by Cabinet on 30 April 1997. In terms of the Cabinet decision, all state and parastatal purchases / lease contracts (for goods, works and services) entered into after this date, are subject to the NIP requirements. NIP is obligatory and therefore must be complied with. The Industrial Participation Secretariat (IPS) of the Department of Trade and Industry (DTI) is charged with the responsibility of administering the programme.

1 PILLARS OF THE PROGRAMME

1.1 The NIP obligation is benchmarked on the imported content of the contract. Any contract having an imported content equal to or exceeding US\$ 10 million or other currency equivalent to US\$ 10 million will have a NIP obligation. This threshold of US\$ 10 million can be reached as follows:

- (a) Any single contract with imported content exceeding US\$10 million.
- or
- (b) Multiple contracts for the same goods, works or services each with imported content exceeding US\$3 million awarded to one seller over a 2-year period which in total exceeds US\$10 million.
- or
- (c) A contract with a renewable option clause, where should the option be exercised the total value of the imported content will exceed US\$10 million.
- or
- (d) Multiple suppliers of the same goods, works or services under the same contract, where the value of the imported content of each allocation is equal to or exceeds US\$ 3 million worth of goods, works or services to the same government institution, which in total over a two (2) year period exceeds US\$10 million.

1.2 The NIP obligation applicable to suppliers in respect of sub-paragraphs 1.1 (a) to 1.1 (c) above will amount to 30 % of the imported content whilst suppliers in respect of paragraph 1.1 (d) shall incur 30% of the total NIP obligation on a *pro-rata* basis.

1.3 To satisfy the NIP obligation, the DTI would negotiate and conclude agreements such as

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Investments, joint ventures, sub-contracting, licensee production, export promotion, sourcing arrangements and research and development (R&D) with partners or suppliers.

1.4 A period of seven years has been identified as the time frame within which to discharge the obligation.

2 REQUIREMENTS OF THE DEPARTMENT OF TRADE AND INDUSTRY

2.1 In order to ensure effective implementation of the programme, successful bidders (contractors) are required to, immediately after the award of a contract that is in excess of **R10 million** (ten million Rands), submit details of such a contract to the DTI for reporting purposes.

2.2 The purpose for reporting details of contracts in excess of the amount of R10 million (ten million Rands) is to cater for multiple contracts for the same goods, works or services; renewable contracts and multiple suppliers for the same goods, works or services under the same contract as provided for in paragraphs 1.1.(b) to 1.1. (d) above.

3 BID SUBMISSION AND CONTRACT REPORTING REQUIREMENTS OF BIDDERS AND SUCCESSFUL BIDDERS (CONTRACTORS)

3.1 Bidders are required to sign and submit this Standard Bidding Document (SBD 5) together with the bid on the closing date and time.

3.2 In order to accommodate multiple contracts for the same goods, works or services; renewable contracts and multiple suppliers for the same goods, works or services under the same contract as indicated in sub-paragraphs 1.1 (b) to 1.1 (d) above and to enable the DTI in determining the NIP obligation, successful bidders (contractors) are required, immediately after being officially notified about any successful bid with a value in excess of R10 million (ten million Rands), to contact and furnish the DTI with the following information:

- Bid / contract number.
- Description of the goods, works or services.
- Date on which the contract was accepted.
- Name, address and contact details of the government institution.
- Value of the contract.
- Imported content of the contract, if possible.

3.3 The information required in paragraph 3.2 above must be sent to the Department of Trade and Industry, Private Bag X 84, Pretoria, 0001 for the attention of Mr Elias Malapane within five (5) working days after award of the contract. Mr Elias Malapane may be contacted on telephone (012) 394 1401, facsimile (012) 394 2401 or e-mail at Elias@thedti.gov.za for further details about the programme.

4 PROCESS TO SATISFY THE NIP OBLIGATION

4.1 Once the successful bidder (contractor) has made contact with and furnished the DTI with the information required, the following steps will be followed:

- a. the contractor and the DTI will determine the NIP obligation;
- b. the contractor and the DTI will sign the NIP obligation agreement;



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- c. the contractor will submit a performance guarantee to the DTI;
- d. the contractor will submit a business concept for consideration and approval by the DTI;
- e. upon approval of the business concept by the DTI, the contractor will submit detailed business plans outlining the business concepts;
- f. the contractor will implement the business plans; and
- g. the contractor will submit bi-annual progress reports on approved plans to the DTI.

4.2 The NIP obligation agreement is between the DTI and the successful bidder (contractor) and, therefore, does not involve the purchasing institution.

Bid number Closing date:.....

Name of bidder.....

Postal address
.....

Signature..... Name (in print).....

Date.....

T.71

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T2.2 G DECLARATION OF BIDDER'S PAST SUPPLY CHAIN MANAGEMENT PRACTICES

SBD 8

(Note that in this document, the words bid and tender, bidder and tenderer, bidder's and tenderer's should be used interchangeably)

1. The bid of any bidder may be disregarded if the bidder, or any of its directors have-
 - a. abused the UNIVERSITY OF VENDA's supply chain management system;
 - b. committed fraud or any other improper conduct in relation to such system, or
 - c. failed to perform on any previous contract.
2. In order to give effect to the above, the following questionnaire must be completed and submitted with the bid.

Item	Question	Yes	No
2.1	Is the bidder or any of its directors listed on the National Treasury's database 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 National Treasury after the <i>audi alteram partem</i> rule was applied).		
2.1.1	If so, furnish particulars:		
2.2	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 (No12 of 2004?) To assess this Register enter the National Treasury's website, www.treasury.gov.za, click on the icon "Register for Tender Defaulters" or submit your written request for a hard copy of the Register to facsimile number (012) 326 5445		



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2.2.1	If so, furnish particulars:		
2.3	Was the bidder or any of its directors convicted by a court of law (including a court outside of the Republic of South Africa) for fraud or corruption during the past five years?		
2.3.1	If so, furnish particulars:		
2.4	Was any contract between the bidder and any organ of state terminated during the past five years on account of failure to perform on or comply with the contract?		
2.4.1	If so, furnish particulars:		

CERTIFICATION

I, THE UNDERSIGNED (FULL NAME) -----
CERTIFY THAT THE INFORMATION FURNISHED ON THIS DECLARATION FORM IS 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.

Signature

Date

Position

Name of Bidder

T.73

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SBD 9

T.2.2 H CERTIFICATE OF INDEPENDENT BID DETERMINATION

- 1 This Standard Bidding Document (SBD) must form part of all bids¹ invited.
- 2 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 Treasury Regulation 16A9 prescribes that accounting officers and accounting authorities must take all reasonable steps to prevent abuse of the supply chain management system and authorizes accounting officers and accounting authorities to:
 - a. disregard the bid of any bidder if that bidder, or any of its directors have abused the institution's supply chain management system and or committed fraud or any other improper conduct in relation to such system.
 - b. cancel a contract awarded to a supplier of goods and services if the supplier committed any corrupt or fraudulent act during the bidding process or the execution of that contract.
- 4 This SBD 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 In order to give effect to the above, the attached Certificate of Bid Determination (SBD 9) must be completed and submitted with the bid:

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.



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SBD 9

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 Institution)

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

I certify, on behalf of :

that:

(Name of Bidder)

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; and
 - (c) provides the same goods and services as the bidder and/or is in the same line of business as the bidder

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SBD 9

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 consortium³ 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; or
 - (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.

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.

SBD 9

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,



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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.

.....
Signature

.....
Date

.....
Position

.....
Name of Bidder

T.77

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**T2.3 RETURNABLE SCHEDULES THAT WILL BE INCORPORATED INTO
 THE CONTRACT**

T2.3 A	ORGANOGRAM AND CURRICULUM VITAE OF KEY PERSONNEL	T.78
T2.3 B	PROJECT PROGRAMME	T.79
T2.3 C	SCHEDULE OF ESTIMATED MONTHLY EXPENDITURE	T.80
T2.3 D	RATES FOR SPECIAL MATERIALS	T.81
T2.3 E	QUALITY MANAGEMENT PLAN AND METHOD STATEMENT	C.1



T.78

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T2.3 A ORGANOGRAM AND CURRICULUM VITAE OF KEY PERSONNEL

Tenderer to supply an organogram for the management of the contract and include curricula vitae of key personnel. These curricula vitae shall provide evidence of relevant experience of the key staff in the organogram. The personnel included here shall be used on the project unless otherwise agreed to by the engineer.



T.79

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T2.3 B PROJECT PROGRAMME

Tenderer to supply project programme, using acceptable software, in sufficient detail to cover the various facets of the work.

SIGNED ON BEHALF OF TENDERER:.....

Note to Tenderer

If a tenderer wishes to submit an alternative tender then this form, appropriately completed, shall be attached to the bill of quantities for the alternative proposal.

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T2.3 C SCHEDULE OF ESTIMATED MONTHLY EXPENDITURE

The tenderer shall state his estimated value of the work to be completed every month, based on his preliminary programme and his tendered unit rates, in the table below. The amounts for contingencies and contract price adjustment shall not be included.

MONTH	VALUE (INCLUDING VAT)	MONTH	VALUE (INCLUDING VAT)
1	R	10	R
2	R	11	R
3	R	12	R
4	R	13	R
5	R	14	R
6	R	15	R
7	R	16	R
8	R	17	R
9	R	18(FINAL)	R
TOTAL: R..... (EXCLUDING CONTINGENCIES AND CONTRACT PRICE ADJUSTMENT (CPA))			

SIGNED ON BEHALF OF TENDERER:

T.81

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T2.3 D RATES FOR SPECIAL MATERIALS

Only bitumen products will be dealt with as a special material in terms of subclause 6.8.3 of the General conditions of Contract. All bitumen products, as indicated in the contract data must be stated in the list below.

The rates and prices for the special materials shall be furnished by the contractor, which rates and prices shall exclude VAT but shall include all other obligatory taxes and levies.

The Base Month is August 2018.

SPECIAL MATERIALS	UNIT *	RATE OR PRICE FOR THE BASE MONTH

* Indicate whether the material will be delivered in bulk or in containers.

When called upon to do so, the contractor shall substantiate the above rates or prices with acceptable documentary evidence from the applicable refinery supplying the bitumen.

SIGNED ON BEHALF OF TENDERER:.....

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T2.3 E QUALITY MANAGEMENT PLAN AND METHOD STATEMENT

Tenderer shall provide his quality management plan and method statement describing how he will ensure successful execution of the project. Highlight all work activities and inputs that may pose a threat or risk to the successful execution of the project:

SIGNED ON BEHALF OF TENDERER:.....

Note to Tenderer

If a tenderer wishes to submit an alternative tender then this form, appropriately completed, shall be attached to the bill of quantities for the alternative proposal.

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THE CONTRACT

PART C1	AGREEMENT AND CONTRACT DATA
PART C2	PRICING DATA
PART C3	SCOPE OF WORKS
PART C4	SITE INFORMATION

UNIVERSITY OF VENDA

**CONTRACT No: IN/09/2022
FOR UNIVERSITY OF VENDA
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PART C1: AGREEMENT AND CONTRACT DATA

C1.1	FORM OF OFFER AND ACCEPTANCE.....	C.3
C1.2	AGREEMENT IN TERMS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT 85 OF 1993 AND APPOINTMENT AS MINE MANAGER IN TERMS OF SECTION 3(1)(A) OF MINE HEALTH AND SAFETY ACT 29 OF 1996.	C.9
C1.3	PERFORMANCE GUARANTEE	C.13
C1.4	ABSTRACTS OF THE MINE HEALTH AND SAFETY ACT NO. 29 OF 1996 AND AMENDMENT ACT NO. 72 OF 1997.....	C.19
C1.5	CONTRACT DATA	C.21

UNIVERSITY OF VENDA

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FOR UNIVERSITY OF VENDA
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C1.1 FORM OF OFFER AND ACCEPTANCE**Offer**

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

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The tenderer, identified in the offer signature block, has examined the documents listed in the tender data and addenda thereto as listed in the tender schedules, and by submitting this offer has accepted the conditions of tender.

By the representative of the tenderer, deemed to be duly authorized, signing this part of the 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 PRICE INCLUSIVE OF VALUE ADDED TAX IS
(CONTRACT PRICE)**

.....
.....

Rand (in words); R (in figures)

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



**FOR UNIVERSITY OF VENDA
ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)**

For the Tenderer:

Signature(s)
Name(s)
Capacity

Name and address of organization

.....
.....

Signature and Name of Witness:

Signature.....

Name.....

Date.....

No: IN/09/2022

FOR UNIVERSITY OF VENDA

ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD (R524)

Acceptance

By signing this part of this form of offer and acceptance, the employer identified below accepts the tenderer's offer. In consideration thereof, the employer shall pay the contractor the amount due in accordance with the conditions of contract identified in the contract data. Acceptance of the tenderer's offer shall form an agreement between the employer and the tenderer upon the terms and conditions contained in this agreement and in the contract that is the subject of this agreement.

The terms of the contract are contained in:

PART C1 Agreements and contract data, (which includes this agreement)

PART C2 Pricing data

PART C3 Scope of work

PART C4 Site information

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

Deviations from and amendments to the documents listed in the tender data and any addenda thereto as 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 signed by the authorised representative(s) 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 fulfil any of these obligations in accordance with those terms shall constitute a repudiation of this agreement.

Notwithstanding anything contained herein, this agreement comes into effect on the date when the tenderer receives one copy of the fully signed original document, including the schedule of deviations (if any). Unless the tenderer (now contractor) within five days of the date of such receipt notifies the employer in writing of any reason why he cannot accept the contents of this agreement, this agreement shall constitute a binding contract between the parties.



**FOR UNIVERSITY OF VENDA
ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)**

For the Employer

Signature

Name

Capacity

Name and address of organization

.....

.....

.....

Signature and Name of Witness

Signature

Name

Capacity

Schedule of Deviations

Notes:

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

No: IN/09/2022**FOR UNIVERSITY OF VENDA****ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD (R524)**

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 changes to the terms of the offer agreed by the tenderer and the employer during this process of offer and acceptance.

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

For the Tenderer:**For the Employer**

..... Signature

..... Name

..... Capacity

Name and address of organisation:

Name and address of organisation

.....

.....

.....

..... Witness Signature

..... Witness Name

..... Date



**FOR UNIVERSITY OF VENDA
ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)**

Confirmation of Receipt

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

the (day) of (month) 20..... (year)

at (place)

For the Contractor:

.....
Signature

.....
Name

.....
Capacity

Signature and name of witness:

.....
Signature

.....
Name

UNIVERSITY OF VENDA**CONTRACT No: IN/09/2022****FOR UNIVERSITY OF VENDA****ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)****C1.2 AGREEMENT IN TERMS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT 85 of 1993 AND APPOINTMENT AS MINE MANAGER IN TERMS OF SECTION 3(1)(a) OF MINE HEALTH AND SAFETY ACT 29 of 1996.**

This AGREEMENT made at on this day of in the year between THE UNIVERSITY OF VENDA (hereinafter called "the Employer" on the one part, herein represented by in his capacity as and delegate of the Employer and (hereinafter called "the Principal Contractor") of the other part, herein represented by in his capacity as

WHEREAS the Employer is desirous that certain works be constructed, as stated for in Contract No UNIVERSITY OF VENDA/.....For (description of contract).....

..... in the District of Limpopo Province and has accepted a tender by the Principal Contractor for the construction, completion and maintenance of such works and whereas the Employer and the Principal Contractor have agreed to certain arrangements and procedures to be followed in order to ensure compliance by the Principal Contractor with the provisions of the Occupational Health and Safety Act 1993(Act 85 of 1993 and the Construction Regulation, July 2003):

NOW THEREFORE THIS AGREEMENT WITNESSETH AS FOLLOWS:

1. The Principal Contractor shall execute the work in accordance with the contract documents pertaining to this contract.
2. This Agreement shall hold good from its commencement date, which shall be the date of a written notice from the employer or engineer requiring him to commence the execution of the Works, to either:
 - a) the date of the final certificate issued in terms of clause 49 of the General Conditions of Contract for Construction Works 2015 (Second Edition) as issued by the South African Institution of Civil Engineering (hereinafter referred to as "the GCC 2015"), as contained in the contract documents pertaining to this contract, or
 - b) the date of termination of the contract in terms of clause 9.1 9.2 or 9.3 of the GCC 2015.
3. The Principal Contractor declares himself to be conversant with the following:-
 - a) All requirements, regulations and standards of the Occupational Health and Safety Act (Act 85 of 1993), hereinafter referred to as "The Act", together with its amendments and with special reference to the following Sections of The Act.



**FOR UNIVERSITY OF VENDA
ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)**

- i. Section 8: General duties of employers to their employees.
 - ii. Section 9: General duties of employers and self-employed persons to persons other than employees
 - iii. Section 37: Acts or omissions by employees or mandatories and
 - iv. Sub-section 37(2) relating to the purpose and meaning of this Agreement.
 - v. Construction Regulations 2003, and other safety regulations, as applicable.
 - b) The procedures and safety rules of the employer as pertaining to the Principal Contractor and to his subcontractors.
4. The Principal Contractor is responsible for the compliance with the Act by his sub-contractors, whether or not selected and/or approved by the employer.
5. The Principal Contractor warrants that all his and his sub-contractors' employees (permanent and temporary) are covered in terms of the Compensation for Occupational Injuries and Diseases Act 1993 which cover shall remain in force whilst any such employees are present on site. The Principal Contractor shall submit a written report to this effect at each Progress Site Meeting.
6. The Principal Contractor undertakes to ensure that he and/or his sub-contractors and/or their respective employees will at all times comply with the following conditions:
- a) The Principal Contractor shall assume the responsibility in terms of Section 16.1 of the Occupational Health and Safety Act. The Principal contractor shall not delegate any duty in terms of Section 16.2 of this Act without the prior written approval of the Employer. If the Principal contractor obtains such approval and delegates any duty in terms of Section 16.2 a copy of such written delegation shall immediately be forwarded to the Employer.
 - b) All incidents referred to in the Occupational Health and Safety Act shall be reported by the Principal Contractor to the Department of Labour as well as to the Employer. The Employer will further be provided with copies of all written documentation relating to any incident.
 - c) The Employer hereby obtains an interest in the issues of any formal enquiry conducted in terms of Section 32 of the Occupational Health and Safety Act into any incident involving the Principal Contractor and/or his employees and/or his sub-contractors.

Further to the abovementioned, where contracts involve quarries or borrow pits, the following shall be applicable:-

No: IN/09/2022

FOR UNIVERSITY OF VENDA

ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD (R524)

In terms of Section 3(1)(a) of the Mine Health and Safety Act of 1996, The University of Venda shall appoint a manager for its mine/s.

You are hereby appointed as the mine manager for, with effect from until further notice.

In terms of this appointment you are charged with the functions, duties and responsibilities imposed by the aforementioned Act and its regulations. Without derogating from the duties, functions and responsibilities imposed by this legislation, you are to:

- i) Control, manage and direct employees at the Mine (borrow pit or quarry).
- ii) Take all reasonable measures to ensure the health and safety of employees and proper discipline at the Mine.
- iii) Take all reasonable measures to ensure that the provisions of the Mine Health and Safety Act and its regulations (as may be amended from time to time) are implemented and adhered to at the Mine.
- iv) Ensure and maintain a healthy and safe mine environment for all persons.
- v) Ensure an adequate supply of health and safety equipment and facilities.
- vi) Staff the Mine, with due regard to health and safety.
- vii) Provide health and safety training as far as reasonably practicable to all employees.
- viii) Initiate, prepare and implement codes of practice, relating to health and safety.
- ix) Maintain an effective risk identification and management system.
- x) Ensure the effective maintenance of hazard identification and medical monitoring records.
- xi) Prepare and or review the Health and Safety Policy for the Mine.
- xii) Ensure that an annual medical report is compiled at the Mine, and forwarded to the owner or the appointed owner representative of the Mine.
- xiii) Ensure compliance with relevant environmental legislation.
- xiv) Assist with implementation and maintenance of the University of Venda SHE Management Standards, the Contractor's Compliance Pack and operational procedures.
- xv) Enhance a culture of high performance in safety and health.

You are to appoint the prescribed persons to assist you in your duties and functions, and you are hereby authorised and obliged to take all reasonable measures to comply with legislative requirements. You are to ensure that an acting mine manager is appointed when you are to be absent, or on leave for a period longer than five (5) days.

Instructions and procedures are from time to time issued by the board of University of Venda, and it will be your responsibility to ensure the implementation and adherence to these instructions and procedures at the Mine.



**FOR UNIVERSITY OF VENDA
ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)**

You are further responsible to ensure that relevant environmental legislative requirements are complied with, including the implementation of all internal procedures and systems to ensure compliance with such legislation.

It would be the responsibility of yourself to report any shortcomings, in relation to the implementation of applicable legislation which you are unable to rectify, immediately in writing to the appointed owner representative.

In witness thereof the parties have set their signatures heron in the presence of the subscribing witnesses:

SIGNED FOR ON BEHALF OF THE EMPLOYER/SECTION

4.1 APPOINTEE

.....

WITNESS: 1..... 2.....

NAME

(IN CAPITALS) 1..... 2.....

DATE:

SIGNED FOR AND ON BEHALF OF THE PRINCIPAL CONTRACTOR/MINE MANAGER

.....

WITNESS: 1..... 2.....

NAME

(IN CAPITALS) 1..... 2.....

DATE:

Copy to: **The Chief Inspector - Department of Minerals and Energy**

UNIVERSITY OF VENDA**CONTRACT No: IN/09/2022****FOR UNIVERSITY OF VENDA****ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)****C1.3 PERFORMANCE GUARANTEE**

“Guarantor” means:

Physical address:

“Employer” means:

“Contractor” means:

“Engineer” means:

“Works” means:

“Site” means:

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

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

Amount in words:

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

Amount in words:

“Expiry Date” means:

CONTRACT DETAILS

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

PERFORMANCE GUARANTEE

1. The Guarantor’s liability shall be limited to the amount of the Guaranteed Sum.
2. The Guarantor’s period of liability shall be from and including the date of issue of this Performance Guarantee and up to and including the Expiry Date or the date of issue by the Engineer of the Certificate of Completion of the Works or the date of payment in full of the Guaranteed Sum, whichever occurs first. The Engineer and/or the Employer shall advise the Guarantor in writing of the date on which the Certificate of Completion of the Works has been issued.



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3. The Guarantor hereby acknowledges that:
 - 3.1 any reference in this Performance Guarantee to the Contract is made for the purpose of convenience and shall not be construed as any intention whatsoever to create an accessory obligation or any intention whatsoever to create a suretyship;
 - 3.2 its obligation under this Performance Guarantee is restricted to the payment of money.
4. Subject to the Guarantor's maximum liability referred to in 1, the Guarantor hereby undertakes to pay the Employer the sum certified upon receipt of the documents identified in 4.1 to 4.3:
 - 4.1 A copy of a first written demand issued by the Employer to the Contractor stating that payment of a sum certified by the Engineer in an Interim or Final Payment Certificate has not been made in terms of the Contract and failing such payment within seven (7) calendar days, the Employer intends to call upon the Guarantor to make payment in terms of 4.2;
 - 4.2 A first written demand issued by the Employer to the Guarantor at the Guarantor's physical address with a copy to the Contractor stating that a period of seven (7) days has elapsed since the first written demand in terms of 4.1 and the sum certified has still not been paid;
 - 4.3 A copy of the aforesaid payment certificate which entitles the Employer to receive payment in terms of the Contract of the sum certified in 4.
5. Subject to the Guarantor's maximum liability referred to in 1, the Guarantor undertakes to pay to the Employer the Guaranteed Sum or the full outstanding balance upon receipt of a first written demand from the Employer to the Guarantor at the Guarantor's physical address calling up this Performance Guarantee, such demand stating that:
 - 5.1 the Contract has been terminated due to the Contractor's default and that this Performance Guarantee is called up in terms of 5; or
 - 5.2 a provisional or final sequestration or liquidation court order has been granted against the Contractor and that the Performance Guarantee is called up in terms of 5; and
 - 5.3 the aforesaid written demand is accompanied by a copy of the notice of termination and/or the provisional/final sequestration and/or the provisional liquidation court order.
6. It is recorded that the aggregate amount of payments required to be made by the Guarantor in terms of 4 and 5 shall not exceed the Guarantor's maximum liability in terms of 1.
7. Where the Guarantor has made payment in terms of 5, the Employer shall upon the date of issue of the Final Payment Certificate submit an expense account to the Guarantor showing how all monies received in terms of this Performance Guarantee have been expended and shall refund to the Guarantor any resulting surplus. All monies refunded to the Guarantor in terms of this Performance Guarantee shall bear interest at the prime overdraft rate of the Employer's bank compounded monthly and calculated from the date payment was made by the Guarantor to the Employer until the date of refund.

C.15

8. Payment by the Guarantor in terms of 4 or 5 shall be made within seven (7) calendar days upon receipt of the first written demand to the Guarantor.
9. Payment by the Guarantor in terms of 5 will only be made against the return of the original Performance Guarantee by the Employer.
10. The Employer shall have the absolute right to arrange his affairs with the Contractor in any manner which the Employer may deem fit and the Guarantor shall not have the right to claim his release from this Performance Guarantee on account of any conduct alleged to be prejudicial to the Guarantor.
11. The Guarantor chooses the physical address as stated above for the service of all notices for all purposes in connection herewith.
12. This Performance Guarantee is neither negotiable nor transferable and shall expire in terms of 2, where after no claims will be considered by the Guarantor. The original of this Guarantee shall be returned to the Guarantor after it has expired.
13. This Performance Guarantee, with the required demand notices in terms of 4 or 5, shall be regarded as a liquid document for the purposes of obtaining a court order.
14. Where this Performance Guarantee is issued in the Republic of South Africa the Guarantor hereby consents in terms of Section 45 of the Magistrate's Courts Act No 32 of 1944, as amended, to the jurisdiction of the Magistrate's Court of any district having jurisdiction in terms of Section 28 of the said Act, notwithstanding that the amount of the claim may exceed the jurisdiction of the Magistrate's Court.

Signed at

Date

Guarantor's signatory (1)

Capacity.....

Guarantor's signatory (2)

Capacity

Witness signatory (1)

Witness signatory (2)

TENDER NO: IN/09/2022

FOR UNIVERSITY OF VENDA

ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)

**EXAMPLE FOR USE BY CONTRACTOR WHEN APPOINTING SUB-ORDINATES IN
TERMS OF THE MINE HEALTH AND SAFETY ACT (1996) AS AMENDED.**

(To be printed on Contractors letter head)

**APPOINTMENT IN TERMS OF SUB-ORDINATE MANAGER: REGULATION 2.6.1 IN
FORCE IN TERMS OF SCHEDULE 4 OF THE MINE HEALTH AND SAFETY ACT (ACT NO.
29 OF 1996) AS AMENDED BY THE HEALTH SAFETY AMEDEMMENT ACT (ACT NO. 72
OF 1997)**

I, in my capacity as, having been appointed in terms of **Section 3(1)** of the Act (as amended), by the Executive Manager: Roads Management who is our client, 'UNIVERSITY OF VENDA' and owner of the Mine(s) to be worked under the requirements of the above mentioned Acts hereby, in terms of **Regulation 2.6.1** of the Act as amended, appoint as Sub-Ordinate Manager of the Contractor,

..... of address,
..... and contact number, on contract no.:

IN/010/2019RE for the UNIVEN TO PUNDA MARIA ROAD(R524).

In accordance with the provisions of the Mine Health and Safety Act, 1996 (Act 29 of 1996), you are also appointed in terms of Section 7(2) of the Mine Health and Safety Act, 1996 to perform the following functions, assigned to the Mine Manager in terms of Section 7(1), 10(2) (b) and (c) and 11 (1) in so far as your area of responsibilities are concerned:-

1. You must identify the hazards, assess the risk and record the hazards to health and safety to which employees may be exposed while they are at work, and
2. To the extent that is reasonable, you must ensure that every employee is properly trained:
 - a. In the measures necessary to eliminate, control and minimise those risks to health and safety.
 - b. In the procedures to be followed to perform the employee's work.
3. To the extent that is reasonably practical, you must:-

Ensure that every employee becomes familiar with the work-related hazards and risk and the measures that must be taken to eliminate, control and minimise those hazards and risks.
4. To the extent that is reasonably practical, you must:-

Ensure that every employee under your control complies with the requirements of the Act.

Institutes the measures necessary to secure, maintain and enhance health and safety.

Considers and employees training and capabilities in respect of health and safety before assigning a task to that employee.

Ensure that work is performed under the General supervision of a person trained to understand the hazards associated with the work, and who has the authority to ensure that the precautionary measures laid down by the Manager are implemented.

You will be responsible for the control, management and direction of all the activities and employees connected with work and you are required to ensure that all such activities take place in accordance with the provisions of the Mine Health and Safety Act and the Regulations are complied with.

You are further required to inform the Manager, as soon as practicable, of any breach of any provision of these Regulation, to enable him to inform the Principal Inspector of Mines, Department of Minerals and Energy, or take such steps as may be necessary.

Please acquaint yourself with the relevant Regulations, Standards and Procedures, which have a bearing on your appointment. You must ensure that you are fully conversant with the requirements of the Procedures for Reporting Accidents.

SIGNED:

DATE:

WITNESS: 1. 2.

NAME(Print):1. 2.

I,, having been appointed in terms of Regulation 2.6.1 of the act (as amended) to perform all functions entrusted to.....In terms of the Act (as amended) hereby accept the above appointment.

SIGNED:

DATE:

WITNESS: 1. 2.

NAME(Print):1. 2.

**EXAMPLE FOR USE BY CONTRACTOR WHEN APPOINTING SUB-ORDINATES IN
TERMS OF THE MINE HEALTH AND SAFETY ACT (1996) AS AMENDED.**

(To be printed on Contractors letter head)

**APPOINTMENT AS COMPETANT PERSON IN CHARGE OF MACHINERY IN TERMS OF
REGULATION 2.13.2 IN FORCE IN TERMS OF SCHEDULE 4 OF THE MINE HEALTH AND
SAFETY ACT (ACT NO. 29 OF 1996) AS AMENDED BY THE HEALTH AND SAFETY
AMENDEMENT ACT (ACT NO. 72 OF 1997)**

I, in my capacity as, having been appointed in terms of **Section 3(1)** of the Act (as amended), by the Executive Manger: Roads Management, who is our client, 'UNIVERSITY OF VENDA' and owner of the Mine(s) to be worked under the requirements of the above mentioned Acts hereby, in terms of **Regulations 2.13.2** of the Act as amended, appoint as Competent Person in charge of machinery for the Contractor, of address and contact number, on all contracts in the Limpopo Province that are undertaken by the contractor.

You are to report any accident to the mine manager immediately and personally visit the scene of the accident without delay.

You must familiarise yourself with the Mine Health and Safety Act and the Minerals Act and the Regulations and ensure that you have a copy in your possession and you must take all reasonable measures to ensure that the provisions of this Act are complied with.

Your attention are further drawn to Regulation 2.13.4.1 as well as the requirements of Chapter 18,20 and 21.

Please confirm this appointment by signing at the bottom.

SIGNED: DATE:.....

NAME:

SIGNED: DATE:.....

NAME:

UNIVERSITY OF VENDA

TENDER NO: IN/010/2019RE

FOR UNIVERSITY OF VENDA

ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD (R524)

C1.4 ABSTRACTS OF THE MINE HEALTH AND SAFETY ACT No. 29 OF 1996 AND AMENDMENT ACT No. 72 OF 1997

DEFINITIONS:

Section 102 of the Mine Health and Safety Act refers.

“mine” means, when –

- (a) “used as a noun-
 - (i) any borehole, or excavation, in any tailing or in the earth, including the portion of the earth that is under the sea or other water, made for the purpose of searching for or winning a Mineral, whether is being worked or not, or
 - (ii) any other place where a Mineral deposit is being exploited, including the mining area and all buildings, structures, machinery, mine dumps, access roads or objects situated on or in that area that are used or intended to be used in connection with searching, winning, exploiting or processing of a Mineral, or for health and safety purposes. But, if two or more excavations, boreholes or places are being worked in conjunction with one another
 - (iii) a works; and
- b) used as a verb, the making of any excavation or borehole referred to in paragraph (a) (i), or the exploitation of any Mineral deposit in any other manner, for the purpose of winning a Mineral including prospecting in connection with the winning of a Mineral.
 - a) whether that substance is in solid, liquid or gaseous form;
 - b) that occurs natural University of Venda in or on the earth, in or under water or in tailings, and
 - c) that has been formed by or subjected to a geological process.

“processing” means the recovering, extracting, concentrating, refining, calcimining, classifying, crushing, milling, screening, washing, reduction, smelting or gasification or any Mineral, and “process” has a similar meaning

“works” means any place, excluding a mine, where any person carries out-

 - a) The transmitting and distributing to another consumer of any form of

power from a mine, by the owner thereof, to the terminal point of bulk, to the power supply meter on any such other consumer's premises, or

- b) Training at any central rescue station, or
- c) The making, repairing, re-opening or closing of any subterranean tunnel, or
- d) Any operations necessary in connection with any of the operational listed in this paragraph.

**TENDER No. IN/09/2022
FOR UNIVERSITY OF VENDA
ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)**

C1.5 CONTRACT DATA

C1.5.1 Contract Specific Data

The Conditions of Contract are the General conditions of Contract for Construction Works (2015) published by the South African Institution of Civil Engineering (GCC) and JBCC Series 2000 Principal Building Agreement (Edition 4.1 March 2005) published by the Joint Building Contracts Committee for the New Access gate building works.

Section 1: Data provided by the Employer

Clause	
1.1.1.5	Clause 1.1.1.5 of the GCC is replaced by the following: The “Commencement date” shall be the date the site is handed over to the Contractor.
1.1.1.15	The employer is the UNIVERSITY OF VENDA .
1.1.1.15	
1.2.1	The employer’s address for receipt of communication is: The University of Venda Private Bag X5050 THOHOYANDOU 0950 E-mail: tenders@univen.ac.za
3.2.3	The engineer is required in terms of his appointment with the employer to obtain the following specific approvals from the employer: 1. Approval of extension of time; 2. Approval of additional costs; 3. Approval of variation orders; 4. Approval from UNIVERSITY OF VENDA for the utilization of any Contingencies 5. Approval of penalties
4.3	The Health and Safety Plan shall be delivered and approved before the site hand-over/commencement date.

Clause	
5.3.1.	The Works are to be commenced within fourteen (14) Days of the Commencement Date taken as Date of Site Hand-over.
5.5.1	The Works shall be completed within 12 months as envisaged by the employer, measured from commencement/site hand-over date to due completion date.
5.6	The Works programme is to be delivered within fourteen (14) days of the Commencement Date taken as Date of Site Hand-over
5.8.1	The special non-working days are all designated public holidays (including all foreseeable statutory declared election days), Saturdays and Sundays.
5.13.1	The penalty for delay is R4000.00 per working day or part thereof.
5.14.5.2	The Defects Liability Period is twelve (12) calendar months after the date of the final certificate of completion .
5.16.3	The latent defect liability period is 10 years after the date of the final approval certificate
6.2.1.	The Guarantee is to contain the same wording as indicated in the document included as C1.3 under returnable documents
6.2.1.	The amount of the Guarantee is to be 10% surety of the Contract Price.
6.2.1.	The Guarantee is to be delivered twenty-one (21) days after the Letter of Acceptance. In the event of failure to submit the guarantee within the stipulated 21 days, the University reserves the right to cancel the contract and award the Bid to the tenderer who scored the second highest points.
6.5.1.2.3	Daywork allowances as tendered in Section 1800 of the Bill of Quantities: Materials at cost plus 15%.
6.8.2	<p>The value of payment certificates is to be adjusted in accordance with the Contract Price Adjustment Schedule, where</p> <p>The value of “x” is 0,150</p> <p>The values of the co-efficients are:</p> $(1-x) \left[\frac{aLt}{Lo} + \frac{bPt}{Po} + \frac{cMt}{Mo} + \frac{dFt}{Fo} - 1 \right]$ <p>CPA : Estimate more than R10 000 000 or a contract period of more than 6 months.</p>

Clause																
	<p>Projects predominantly:</p> <table><tr><th>New Road Construction</th><th>Rehabilitation</th><th>Concrete Work (major structures only)</th></tr><tr><td>a = 0,20</td><td>0,20</td><td>0,15</td></tr><tr><td>b = 0,40</td><td>0,35</td><td>0,20</td></tr><tr><td>c = 0,25</td><td>0,35</td><td>0,55</td></tr><tr><td>d = 0,15</td><td>0,10</td><td>0,10</td></tr></table> <p>“L” is the “Labour Index” and shall be the “Consumer Price Index” for the urban area nearest to the Site as specified by the Engineer in the Appendix to the Tender and as published in the Statistical News Release, P0141, Table 7.1 (previously P0141.1 Table 21) of Statistics South Africa.</p> <p>“P” is the “Plant Index” and shall be the “Civil Engineering Plant Index” as published in the Statistical News Release P0142.1, Table 12 (previously P0142.1 Table 16) of Statistics South Africa.</p> <p>“M” is the “Materials Index” and shall be the “Civil Engineering Materials Index” as published in the Statistical News Release P0142.1, Table 11 (previously P0142.1 Table 15) of Statistics South Africa.</p> <p>“F” is the “Fuel Index” and shall be the “Diesel at wholesale level – Coast/Witwatersrand Index” as published in the Statistical News Release P0142.1, Table 12 (previously P0142.1 Table 16) of Statistics South Africa.</p> <p>The suffix “o” denotes the basic indices applicable to the base month, which shall be the month prior to the month in which the closing date for the tender falls.</p> <p>The suffix “t” denotes the current indices applicable to the month in which the last day of the period falls to which the relevant payment certificate relates.</p> <p>If any index relevant to any particular certificate is not known at the time when the certificate is prepared, the Engineer shall estimate the value of such index. Any correction, which may be necessary when the correct indices become known, shall be made by the Engineer in subsequent payment certificates.</p> <p>The urban area nearest the site is Thohoyandou.</p> <p>The base month is June 2022. <i>(the month prior to the month in which the closing date of the tender falls)</i></p>	New Road Construction	Rehabilitation	Concrete Work (major structures only)	a = 0,20	0,20	0,15	b = 0,40	0,35	0,20	c = 0,25	0,35	0,55	d = 0,15	0,10	0,10
New Road Construction	Rehabilitation	Concrete Work (major structures only)														
a = 0,20	0,20	0,15														
b = 0,40	0,35	0,20														
c = 0,25	0,35	0,55														
d = 0,15	0,10	0,10														
6.8.3	<p>The following are special materials:</p> <p>Bitumen binder extracted from petroleum based products and used on site, including that used in asphalt, irrespective of whether it is produced and/or placed by the Contractor or an approved subcontractor.</p> <p>The rates and prices for the special materials shall be furnished by the contractor, which rates and prices ex refinery with the base date specified under 6.8.2 and shall exclude VAT but shall include all other obligatory taxes and levies on the basis specified in the contract price adjustment schedule (paragraph 4(i) and 4(ii)).</p>															

Clause	
6.10.1.5	The percentage limit on materials not yet built into the Permanent Works is 80%.
6.10.3	The percentage retention is 10% of the certified work done (including VAT).
6.10.3	The limit of retention money is 10% of the certified work done (including VAT).
6.10.3	A Retention Money Guarantee is not permitted .
8.6.1.	The amount to be included in the sum insured to cover the value of:
8.6.1.1.2	a) Materials supplied by the employer for incorporation into the works is R nil.
8.6.1.1.3	b) Professional fees not included in the Contract Price is R nil.
8.6.1.2	The following additional and varied insurances are required: CAR & SASRIA.
8.6.1.3	The Limit of the liability insurance required should not be less than the contract amount.
9.2.1.3.2	Clause 9.2.1.3.2 is replaced by the following "Has failed to submit documentation or to commence the Works in terms of Clause 5.3, or has suspended the progress of the Works for fourteen (14) consecutive days after receiving from the Engineer written notice to proceed,"
10.5.1/2	Disputes are to be referred to a standing ad-hoc adjudication
10.5.3	The number of adjudication board members shall be 1 or 3.
10.7	Disputes are to be referred for final settlement to arbitration .
Special Clause in terms of RDP	<p>Requirements in terms of government's reconstruction and development programme.</p> <p>Target values: In this project the minimum target values shall be as follows:</p> <ul style="list-style-type: none"> • Labour Maximisation (Wages) :10% • EME's / QSE's :30%

Clause	
	<p>It is a requirement that the Contractor plan for achieving these targets and that a planned programme for achieving each of the targets is submitted at the start of the project together with the clause 12 programme of construction.</p> <p><u>Penalties:</u></p> <p>The penalties for not reaching the required labour and EME/QSE target values will be calculated at 300% of the difference between the set target values and the actual target values achieved by the contractor at completion of the works. Penalties will be applied monthly, when the actual figures are less than 75% of the planned monthly figures. No bonuses for achieving the set target values are applicable.</p>

Payment for labour-intensive component of the works

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

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

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

Section 2: Data provided by the Contractor

Clause	
1.1.1.9	The contractor is
1.2.1.2	<p>The contractor's address for receipt of communication is:</p> <p>Telephone: Facsimile:.....</p> <p>e-mail:.....</p> <p>Address:.....</p> <p>.</p>
5.5.1	The Works shall be completed within months as proposed by the contractor.

Clause	
6.5.1.2.3	The percentage allowances to cover all charges for the contractor's and subcontractor's profits, timekeeping, clerical work, insurance, establishment, superintendence and the use of hand tools is% (Maximum 15%).
6.8.3	The rate for special materials, exclusive of Value Added Tax is to be completed in Schedule T2.3 C.

C1.5.2 Variations to the General Conditions of Contract

The following amendments of the General Conditions of Contract 2015 apply to this contract. The headings in these Special Conditions of Contract shall not be deemed to be part thereof nor be taken into consideration in the interpretation or construction thereof or of the Contract.

4. CONTRACTOR'S GENERAL OBLIGATIONS

4.1 EXTENT OF OBLIGATIONS AND LIABILITY

Change the number of clauses 4.1.1 to 4.1.2 to read 4.1.2 and 4.1.3.

Add the following:

“4.1.1 Contractor deemed to have inspected the Site

The Contractor shall be deemed to have inspected and examined the Site and its surroundings and information available in connection therewith and to have satisfied himself before submitting his tender (as far as practicable) as to

- (a) the form and nature of the Site and its surroundings, including subsurface conditions,
- (b) the hydrological and climatic conditions.
- (c) the extent and nature of work and materials necessary for the execution and completion of the Works,
- (d) the means of access to the Site and the Accommodation he may require

and, in general, shall be deemed to have obtained all information (as far as is practicable) as to risks, contingencies and all other circumstances which may influence or affect his tender.

No subsequent claims by the Contractor arising from his lack of knowledge of perceptible conditions on the site or its surroundings or of information available in connection therewith shall be entertained.”

4.1.2 Extent of Contractor' obligations

Add the following to this sub-clause:

The Contractor shall, save in so far as it is legally or physically impossible,

- (a) design (to the extent provided in the Contract), execute and complete the Works and remedy any defects therein in accordance with the provisions of the Contract, and
- (b) provide all superintendence, labour, materials, Construction Equipment, Temporary Works, including the design thereof, all requisite transport and all other things, whether of a temporary or permanent nature, required in and for such design, execution and completion of the Works and for the remedying of any defects, so far as the necessity for providing the same is specified in or reasonably to be inferred from the Contract.
- (c) After award of the Contract, the Contractor shall be obligated to ensure that at least the Construction Equipment stated on the prescribed form in the Tender Documents, or Construction Equipment equivalent thereto, are on the site when required.”

4.3 LEGAL PROVISIONS

Add the following sub-sub clauses:

4.3.1.1 Mine Health and Safety Act, number 29 of 1996

The Employer shall obtain the Mining Authorisation for all sites where mining activities, as defined in the Mine Health and Safety Act, number 29 of 1996 as amended, are to be conducted.

4.3.1.2 Mineral Resources Petroleum Development Act, number 28 of 2002

The Contractor shall assume responsibility for the Environmental Management Programme (EMPR) in respect of the sites and shall ensure that the sites are rehabilitated at the conclusion of the contract.”

4.4. SUBCONTRACTING

Add the following sub-clauses:

“4.4.4 Nominated subcontractor

In terms of these special conditions of contract, the Contractor must use a nominated subcontractor for the following scope of work that forms part of this Contract:

- New gravel to surfaced of the upgrading of the existing intersection to a new roundabout at the University of Venda’s new main access road to improve the traffic flow on the R524 (Punda Maria) road. The upgrading will include the installation of new street lighting and installation of new traffic signal infrastructure.

In terms of these special conditions, a Contractor is not under any obligation to employ a nominated subcontractor against whom he raises reasonable objection by written notice to the Engineer which may include:

- The subcontractor has insufficient competence, resources or financial strength; and
- The subcontract does not:
 - Require the subcontractor to indemnify the Contractor against negligence or misuse of goods; or
 - Specify that the nominated subcontractor undertake all obligations and liabilities to discharge the Contractor from obligations under the contract and indemnify the Contractor from all the consequences of any failure of the subcontractor to perform his obligations or fulfill his liabilities.

The conditions of contract empower the Engineer to request reasonable evidence before issuing a payment certificate that the nominated subcontractor has received all monies due in previous certificates. In the event that no reasonable evidence is provided, the Employer is permitted to pay the nominated subcontractor directly.

The consent or participation in the nominated subcontractor does not imply any

contract between the employer and the subcontractor.

The Employer is however liable for all expense and loss suffered by the Contractor where the nominated subcontract is cancelled due to default or insolvency.

The Contractor may decide to cancel a subcontract where the nominated subcontractor is in default for whatever reason, but is responsible for the cost of carrying out and completing the selected subcontract works unless it was cancelled due to default by the Employer or his agents.

“4.4.7 Continuing obligation extending beyond date of completion of the work

In the event of a Selected Subcontractor having undertaken to the Contractor, in respect of work executed or goods or materials supplied by such Selected Subcontractor, any continuing obligation extending beyond the date of completion of the work or the end of the Defects Liability Period, and Latent Defect Liability Period as the case may be, the Contractor shall at any time after such date cede to the Employer, at the Employer's request and cost, the benefit of such obligation for the unexpired duration thereof, whereupon the Employer shall have no further claim against the Contractor in respect of the said continuing obligation.

4.4.8 Convert the subcontract

If the contract shall have been cancelled in terms of clause 9.2, the Employer shall have the right, by written notice given to any Selected Subcontractor not later than 28 days after the said cancellation, to convert the subcontract concerned to a direct contract between the Employer and the Subcontractor.

Provided that:

- (a) the terms of the said direct contract shall mutatis mutandis be those of the subcontract concerned, and
- (b) the Employer shall have the said right, notwithstanding any breach of the subcontract by the Contractor, subject to his forthwith paying to the Subcontractor all amounts then owing to the Subcontractor by the Contractor and perform any obligation which the Contractor has failed to perform.”

4.9 CONSTRUCTION EQUIPMENT

Add the following: sub clauses:

“4.9.2 Preclude seizure of construction equipment

In order to preclude seizure by the owner of any constructional plant being held by the Contractor on a hire or hire-purchase agreement for the purposes of the contract, the Employer shall be entitled to pay any such owner the amount of any outstanding instalment or other sum owing under any hire or hire-purchase agreement and in the event of his doing so, any amount thus paid by him shall be a debt payable to the Employer by the Contractor and may be deducted by the Employer from any moneys owing or that may become owing to the Contractor in terms of the contract, or be recovered at law from the Contractor by the Employer.

4.9.3 Constructional plant brought to the site by the subcontractor

When entering into any subcontract agreement for the execution of any part of the works, the Contractor shall incorporate in such subcontract agreement, by reference or otherwise, the provisions of this clause in respect of construction equipment brought to the site by the subcontractor.”

5. TIME AND RELATED MATTERS

5.4 ACCESS TO THE SITE

Add the following sub-clause:

- 5.4.4** “If the site is insufficient for the needs and requirements of the work, the Contractor shall arrange with the owners or tenants for the additional land required and pay all rent and costs in connection therewith. The Contractor shall be responsible for all damage to such land and property, and he shall indemnify the Employer and hold him harmless in respect of all claims, demands proceedings, damages, costs, including attorneys and client costs, charges and expenses arising in respect thereof.”

5.14 COMPLETION

Delete the following:

“5.14.5.3 The retention shall be reduced to half in terms of Clause 6.10.5”

5.16 APPROVAL

5.16.1 Final Approval Certificate

Delete the last sentence of this clause and replace with:

The payment of the retention money or the release of the retention money guarantee shall only be permitted after the Engineer has issued the Final Approval Certificate.

6. PAYMENT AND RELATED MATTERS

6.6 PROVISIONAL SUMS AND PRIME COST SUMS

6.6.1.2.1 In the first line after the word "sums" insert “excluding VAT”

6.6.1.2.2 In the fourth line after the word "amount" insert “excluding VAT”

6.10.5 Payment of retention money

Delete the first four lines where reference is made to the first half of retention. The paragraph should read:”

“Retention money shall become due when the Engineer shall have certified payment thereof within 14 days after the expiration of the Defects Liability Period, extended if necessary in terms of Clauses 5.14.4 or 7.8.1. No retention, or part thereof, will hence be payable upon the issue of a Certificate of Completion as indicated in Clause 5.14.5.3.

6.11 VARIATIONS EXCEEDING 15 PER CENT

6.11.1 Second paragraph:

Change “15%” to “30%”.

Add the following sub-clause:

“6.11.2 Variations exceeding 30% per cent

Where the decrease or increase in the quantity of work has not resulted from a written variation order (or an additional agreement) in terms of clause 5.11 but from the fact that the quantities are less or more than those given in the bill of quantities, the tendered rates or sums shall still apply, except in the case of a sub-item (or an item not subdivided into sub-items) in the bill of quantities, which covers work the value of which during the tender stage exceeds 7,5% of the value of the tender sum, and where the quantity of such sub-item or item, upon completion of the contract, deviates by more than 30% from the quantity given in the bill of quantities so that the scale of activities or the method of construction consequently changes to such an extent that the tendered rate or sum no longer applies. In such case the Engineer, should he deem it to be in the interest of the Employer or should the Contractor enter a claim, shall, considering the extent by which the deviation in respect of the quantity of the sub-item or item concerned exceeds 30%, determine a sum which will be equitable in the circumstances, and shall certify that such sum shall be deducted from or added to the sums owing to the Contractor.”

TENDER No: IN/09/2022
FOR UNIVERSITY OF VENDA
ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)

PART C2: PRICING DATA

C2.1	PRICING INSTRUCTIONS	C.33
C2.2	BILL OF QUANTITIES	C.37
C2.3	SUMMARY OF BILL OF QUANTITIES	C.107
C2.4	CALCULATION OF TENDER SUM	C.204



**TENDER NO: IN/09/2022
FOR UNIVERSITY OF VENDA
UNIVEN TO PUNDA MARIA ROAD (R524)**

C2.1 PRICING INSTRUCTIONS

- 1 For the purposes of this bill of quantities, the following words shall have the meanings hereby assigned to them:

Unit: The unit of measurement for each item of work as defined in the standard specifications or the project specifications.

Quantity: The number of units of work for each item.

Rate: The payment per unit of work for which the tenderer tenders to do the work.

Amount: The product of the quantity and the rate tendered for an item.

Lump Sum: An amount tendered for an item, the extent of which is described in the bill of quantities, the specifications or elsewhere, but of which the quantity of work is not measured in units.

- 2 This bill of quantities forms part of the contract documents and must be read in conjunction with all the other documents comprising the contract documents.

- 3 The quantities set out in the bill of quantities are only approximate quantities. The quantities of work finally accepted and certified for payment, and not the quantities given in the bill of quantities, will be used to determine payments to the contractor.

The validity of the contract shall in no way be affected by differences between the quantities in the bill of quantities and the quantities finally certified for payment. Work is valued at the rates or lump sums tendered, subject only to the provisions of sub-clause 1209 (a) of the standard specifications.

- 4 Rates and lump sums shall include full compensation for overheads, profits, incidentals, tax (other than VAT), etc, and for the completed items of work as specified, all in accordance with sub-clause 1209 (b) of the standard specifications. Full compensation for completing and maintaining, during the defects liability period, all the work shown on the drawings and specified in the standard specifications and project specifications and for all the risks, obligations and responsibilities specified in the General conditions of contract, special conditions of contract, standard specifications and project specifications shall be considered as provided for collectively in the items of payment given in the bill of quantities, except in so far as the quantities given in the bill of quantities are only approximate.

- 5 The tenderer shall fill in a rate or a lump sum for each item where provision is made for it even where no quantities are given. Items against which no rate or lump sum has been entered in the tender will not be paid for when the work is executed, as payment for such work will be regarded as being covered by other rates or lump sums in the bill of quantities.

The tenderer shall fill in a rate against all items where the words "rate only" appear in the amount column. Although no work is foreseen under such item and no quantities are consequently given in

the quantity column, the tendered rate shall apply should work under this item actually be required. Tenders should note the provisions of paragraph 12 of this preamble.

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

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

- 6 The works executed are measured for payment in accordance with the methods described in the contract documents under the various payment items, notwithstanding any custom to the contrary. Attention is directed to the provisions of clause 1220 of the standard specifications regarding the measurements of quantities for payment. Except where specified otherwise than in clause 1220, the nett measurement or mass of the finished work in place shall be taken for payment, and any volume or mass of work in excess of that prescribed, shall be excluded.
- 7 The amount of work or the quantities of material stated in the bill of quantities shall not be considered as restricting or extending the amount of work to be done or quantity of material to be supplied by the contractor.
- 8 The statement of quantities of material or the amount of work in the bill of quantities shall not be regarded as authorisation for the contractor to order material or to execute work. The contractor shall obtain the engineer's detailed instructions for all work before ordering any materials or executing work or making arrangements in this regard.
- 9 The short descriptions of the payment items in the bill of quantities are only given to identify the items and to provide specific details. Reference shall, inter alia, be made to the drawings, standard specifications, project specifications, General conditions of contract and special conditions of contract for more detailed information regarding the extent of work entailed under each item.
- 10 The provisions of clause 6.6 of the General conditions of contract shall apply to provisional sums and prime cost sums.
- 11 Subject to the conditions stated in paragraph 12 below, the rates and lump sums filled in by the tenderer in the bill of quantities shall be final and binding with regard to submitting the tender, and may not be adjusted should there be any mistakes in the extensions thereof and in the total sums appearing in the tender. Should there be any discrepancies between the tender sum and the correctly extended and totalled bill of quantities, the rates will be regarded as being correct, and the employer shall have the right to make adjustments to the tender sum to reconcile the tender sum with the total of the bill of quantities. In such an event the contractor will be consulted but, failing agreement between the parties, the decision of the employer shall be final and binding. Adjustment of the tender sum will take place prior to the signing of the contract. In their own interest tenderers must make

doubly sure of the correctness of their tendered rates, the extensions and the tender sum.

- 12 A tender may be rejected if the unit rates or lump sums for some of the items in the bill of quantities are, in the opinion of the employer, unreasonable or out of proportion, and if the tenderer fails, within a period of seven (7) days of having been notified in writing by the employer to adjust the unit rates or lump sums for such items, to make such adjustments.

- 13 The units of measurement indicated in the bill of quantities are metric units

The following abbreviations are used in the bill of quantities:

mm	=	millimetre
m	=	metre
km	=	kilometre
km-pass	=	kilometre-pass
m ²	=	square metre
m ² -pass	=	square metre pass
ha	=	hectare
m ³	=	cubic metre
m ³ km	=	cubic metre kilometre
l	=	litre
kl	=	kilolitre
kg	=	kilogram
t	=	ton (1000 kg)
No	=	number
mn	=	meganewton
mn-m	=	meganewton-metre
%	=	per cent
kW	=	kilowatt
Kn	=	kilonewton
PC sum	=	prime cost sum
Prov sum	=	provisional sum

- 14 All rates and sums of money quoted in the bill of quantities shall be in rands and whole cents. Fractions of a cent shall be discarded.

- 15 The item numbers appearing in the bill of quantities refer to the corresponding item numbers in the standard specifications. Item numbers prefixed by the letter B refer to payment items described under part B of the project specifications, those with C to payment items described under part C, and so on for further parts of the project specifications.

Item numbers in schedule B of the bill of quantities are, in addition, preceded by the number of each separate part of schedule B of the bill of quantities, e.g. payment item 62.02 described in the standard specifications (clause 6210), when used in part 3 of schedule B of the bill of quantities, would be numbered 3/62.02, and if this payment item had been amended in part B of the project specifications, the payment item would be indicated as 3/B62.02.

16. Labour intensive items are highlighted in the bills of quantities for the payment items relating to labour intensive works.

16.1 Those parts of the contract to be constructed using labour intensive methods have been marked in the bills of quantities with the letters LI in a separate column filled in against every item so designated. The works or part of the works so designated are to be constructed using labour intensive methods only. The use of plant to provide such works, other than plant specifically provided for in the scope of work, is a variation to the contract. The letters marked with LI are **not necessarily an exhaustive list** of all items which must be done by hand, and this clause does not override any of the requirements in the generic labour intensive specification in the Scope of Works.

16.2 Payment for items which are designated to be constructed using labour intensively (either in this schedule or in the Scope of Works) will not be made unless they are constructed using labour intensive methods. Any unauthorised use of plant to carry out work which was to be done labour intensively will not be condoned and any work so constructed will not be certified for payment. If a contractor, through innovation on other activities, achieved the set LI requirement, but he did not perform all LI-marked activities through labour, he will not be penalized. However, if a contractor did not achieve the set LI target and constructed a LI-marked activity through other means, he **will not be paid** for that activity.

17. All cost for formal training to the targeted workforce (amongst others: allowances, wages, administration, transport, etc) shall be deemed to be included in the rates for Labour Intensive items.
18. **Those parts of the contract to be constructed using labour-intensive methods have been marked in the bill of quantities with the letters LI in a separate column or as a prefix or suffix against every item so designated. The works, or parts of the works so designated are to be constructed using labour-intensive methods only. The use of plant to provide such works, other than plant specifically provided for in the scope of works, is a deviation from the contract. The items marked with the letters 'LI' are not necessarily an exhaustive list of all the activities, which must be done by hand, and this clause does not over-ride any of the requirements in the generic labour-intensive specification in the Scope of Works.**
19. **Where minimum labour intensity is specified by the design the contractor is expected to use their initiative to identify additional activities that can be done labour-intensively in order to comply with the set minimum labour intensity target.**
20. **Payment for items which are designated to be constructed labour-intensively (either in this schedule or in the scope of works) will not be made unless they are constructed using labour-intensive methods. Any unauthorised use of plant to carry out work, which was to be done labour-intensively will not be condoned, and any works so constructed will not be certified for payment.**

C2.2 BILL OF QUANTITIES



FOR UNIVERSITY OF VENDA

SCHEDULE A: GENERAL REQUIREMENTS AND PROVISIONS

[illegible]

CONTRACT NO: IN/010/2019RE

FOR UNIVERSITY OF VENDA

ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)

SCHEDULE A: GENERAL REQUIREMENTS AND PROVISIONS

SECTION 1200

ITEM	LIC	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
Brought Forward						
B12.05		Mine Health and Safety Obligation				
		(a) Mine health and safety obligations	month	12.00		
		(b) Special Information Signs	PC sum	1.00	R25 000.00	R 25 000.00
		(c) Provision of Security Guards	PC sum	1.00	R75 000.00	R 75 000.00
		(d) Handling cost and profit in respect of subitems B12.05 (b) and (c)	%	R100000		
B12.06		Provision of computer facilities for the Resident Engineer				
		(a) Computer	Lump Sum	1.00		
		(b) Printer	Lump Sum	1.00		
B12.07		Additional Survey as requested by the engineer	Prov sum	1.00	R 50 000.00	R 50 000.00
		(i) Handling cost and profit in respect of subitems B12.07	%	R50 000		
B12.08		Project launch after completion of works	Prov sum	1.00	R 50 000.00	R 50 000.00
		(i) Handling cost and profit in respect of subitems B12.08	%	R50 000		
B12.09		Provision for compensation of land owners	Prov sum	1.00	R 50 000.00	R 50 000.00
		(i) Handling cost and profit in respect of subitems B12.09	%	R50 000		
Total Carried Forward to Summary						

C.40

CONTRACT NO: IN/010/2022

FOR UNIVERSITY OF VENDA

ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)

SCHEDULE A: GENERAL REQUIREMENTS AND PROVISIONS

SECTION 1300

ITEM	LIC	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
13.00		CONTRACTOR'S ESTABLISHMENT ON SITE AND GENERAL OBLIGATIONS				
		(a) Fixed obligations	L/sum	1.00		
		(b) Value-related obligations	L/sum	1.00		
		(c) Time-related obligations	month	12.00		
Total Carried Forward To Summary						

CONTRACT NO: IN/010/2022
FOR UNIVERSITY OF VENDA
ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)
SCHEDULE A: GENERAL REQUIREMENTS AND PROVISIONS

SECTION 1400

ITEM	LIC	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
14.00		HOUSING, OFFICES AND LABORATORY FOR THE ENGINEER'S SITE PERSONNEL				
14.01		Office and laboratory accommodation				
		(a) Offices (interior floor space only)	m ²	30.00		
		(b) Laboratories (interior floor space only)	m ²	0.00		
		(c) Open concrete working floors, 150 mm thick	m ²	0.00		
		(d) Roofs over open concrete working floors	m ²	0.00		
		(e) Ablution units	m ²	4.00		
		(f) Stores	m ²	25.00		
14.02		Office and laboratory furniture				
		(a) Chairs	No	10.00		
		(b) Draughtsman's stools	No	1.00		
		(c) High chairs for laboratory	No	0.00		
		(d) Desks, complete with drawers and locks	No	2.00		
		(e) Drawing tables	No	1.00		
		(f) Conference tables	No	1.00		
B14.03		Office and laboratory fittings installations and equipment				
		(a) Items measured by number				
		(i) 220/250-volt power points	No	5.00		
		(iii) Double 80 watt fluorescent light fittings complete with ballast and tubes	No	4.00		
		(vi) Hand wash basins complete with taps and drains	No	2.00		
		(vii) Laboratory basins complete with swanneck taps and drains	No	0.00		
		(viii) Extractor fans installed complete with own power connection	No	0.00		
		(ix) Fire extinguishers, 9,0 kg,all-purpose dry powder type, complete, mounted on wall with brackets	No	2.00		
Total Carried Forward						

CONTRACT NO: IN/010/2019RE

FOR UNIVERSITY OF VENDA

ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)

SCHEDULE A: GENERAL REQUIREMENTS AND PROVISIONS

SECTION 1400

ITEM	LIC	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
Brought Forward						
		(xii) Curing chamber for UCS specimens, complete with water connection, including the provision of brick partitions, plaster, paint and shelving, all complete according to the drawings	No	0.00		
		(xiv) General-purpose steel cupboards with shelves	No	2.00		
		(xv) Steel filing cabinets with drawers	No	2.00		
		(xvi) Refrigerators	No	2.00		
		(xvii) Bookcases	No	2.00		
		(xviii) Voltage stabilizers	No	1.00		
		(xix) Plan Holders	No	1.00		
		(xx) Floodlights complete with poles and 500-Watt minimum globes	No	3.00		
		(b) Prime-cost items and items paid for in a lump sum:				
		(i) Provision of telephone service including the cost of calls in connection with contract administration and telephone rental	Prov sum	1.00	R10 000	R 10 000.00
		(ii) Handling costs and profit in respect of sub item 14.03(b)(1) above	%	10 000		
		(iii) The provision of a direct independent telephone line for the engineer, including the cost of calls in connection with contract administration and telephone rental	Prov sum			Rate Only
		(iv) Handling costs and profit in respect of sub item 14.03(b)(3) above	%			Rate Only
		(v) The provision of a fax apparatus as specified	Prov sum			Rate Only
		(vi) Handling costs and profit in respect of sub item 14.03(b)(5) above	%			Rate Only
		(i) Shelving as specified, complete with brackets	m ²	10.00		
		(v) Foundations for laboratory equipment	m ²	0.00		
Total Carried Forward						

CONTRACT NO: IN/010/2022

FOR UNIVERSITY OF VENDA

ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)

SCHEDULE A: GENERAL REQUIREMENTS AND PROVISIONS

SECTION 1400

ITEM	LIC	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
Brought Forward						
		(ii) Work-benches complete with concrete slab top, minimum thickness 75mm	m ²	0.00		
		(iv) Constant temperature baths and/or plastered brick	m ²	0.00		
		(ix) Cell phones costs, including pro-rata rentals, for calls in connection with contract administration	Prov sum	1.00	R18 000	R 18 000.00
		(c) Items measured by area				
		(i) Shelving as specified, complete with brackets	m ²	0.00		
		(ii) Work-benches complete with concrete slab top, minimum thickness 75mm	m ²	0.00		
		(iv) Constant temperature baths and/or plastered brick	m ²	0.00		
		(v) Foundations for laboratory equipment	m ²	0.00		
		(vii) Venetian blinds	m ²	10.00		
		(viii) Notice boards as specified	m ²	2.00		
14.04		Car ports				
		(a) Car ports, as specified, at offices and laboratory buildings	No	4.00		
14.05		Housing for labourers				
		(a) Housing as specified, including beds, mattresses, bedside chest, chairs, tables, lockers, electricity, plug points, electrical light fittings and burglar proofing	No pers	6.00		
		(b) Ablution unit, as specified, including latrines, wash basins, showers and taps	No	2.00		
		(c) Cooking unit, complete with stove, basin, concrete working table, shelving, sink and fuel (where applicable)	No	2.00		
		(d) Latrine unit as specified	No	2.00		
Total Carried Forward						

CONTRACT NO: IN/010/2022

FOR UNIVERSITY OF VENDA

ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)

SCHEDULE A: GENERAL REQUIREMENTS AND PROVISIONS

SECTION 1400

ITEM	LIC	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
Brought Forward						
14.07		Rented, hotel and other accommodation (a) Provisional sum for providing rented housing, hotel or other accommodation as described in sub subclauses 14.03(c)(2) (b) Handling costs and profit in respect of subitem 14.07(a)	Prov sum %	1.00 150 000	R150 000	R 150 000.00
14.08		Services (i) Fixed costs (ii) Running costs (c) Services for rented houses (d) Services for labourers' accommodation on site: (i) Fixed costs (ii) Running costs	L/sum month month L/sum month	1.00 12.00 12.00 1.00 12.00		
B14.10		Provision of copying facilities	month	12.00		
B14.11		Provision and erecting of security fencing (including Gate)	m	400.00		
Total Carried Forward to Summary						

CONTRACT NO: IN/010/2022

FOR UNIVERSITY OF VENDA

ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)

SCHEDULE A: GENERAL REQUIREMENTS AND PROVISIONS

SUMMARY OF SECTIONS

SECTION		DESCRIPTION				AMOUNT R
1200		GENERAL REQUIREMENTS AND PROVISIONS				
1300		CONTRACTOR'S ESTABLISHMENT ON SITE AND GENERAL OBLIGATIONS				
1400		HOUSING, OFFICES AND LABORATORY FOR THE ENGINEER'S SITE PERSONNEL				
Total Carried Forward to Summary of Schedules						

CONTRACT NO: IN/010/2022

FOR UNIVERSITY OF VENDA
ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)

SCHEDULE B: ROADWORKS

SECTION
1500

Number	Item Description	Unit	Quantity	Rate	Amount R
15.00	ACCOMMODATION OF TRAFFIC				
15.01	Accommodating traffic and maintaining temporary deviations	km	0.39		
15.02	Earthworks for temporary deviations				
	(a) Shaping of temporary deviations	km	0.40		
	(b) Cut and borrow to fill	m ³	276.20		
	(c) Cut to spoil	m ³	2 727.70		
B15.03	Temporary traffic-control facilities				
	(a) Flagmen	man-day	2.00		
	(b) Portable STOP and GO-RY signs	No			Rate Only
	(d) Amber flicker lights	No			Rate Only
	(e) Road signs, R- and TR-series, (1200mm dia.)	No	6.00		
	(f) Road signs, TW-series, (1500mm sides)	No			Rate Only
	(g) Road signs, STW-, DTG-, TGS- AND TG-series (excluding delineators and barricades)	m ²	4.00		
	(h) Delineators (TW 401 and TW402):				
	(i) Single (TW 401 and TW402) (250mm x 1000mm)	No	40.00		
	(ii) Mounted back to back (TW 401 and TW402) (250mm x 1000mm)	No	250.00		
	(i) Single (TW 401 and TW402) (250mm x 1000mm)	No			Rate Only
	(j) Traffic cones (size indicated)	No	50.00		
	(i) Moveable barricade/road sign combination	No	14.00		
	(m) Two-way communication devices	No	6.00		
	(n) Other traffic control measures ordered by the engineer	No	4.00		
	(i) Provision of other traffic control measures	Prov sum	1.00	150 000	R150 000.00
	(ii) Handling costs and profit in respect of sub-item B15.03(n)(i)	%	150 000		
15.04	Relocation of traffic-control facilities	L/sum	1.00		
Total Carried Forward					

CONTRACT NO: IN/010/2022

FOR UNIVERSITY OF VENDA

ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)

SCHEDULE B: ROADWORKS

SECTION
1500

Number	Item Description	Unit	Quantity	Rate	Amount R
Brought Forward					
15.05	Gravelling and repair of temporary deviations and existing gravel shoulders used as temporary deviations:				Rate Only
	(a) Temporary deviations	m ³	450.00		
	(b) Existing gravel shoulders	m ³			
B15.07	Blading by road grader of:				
	(a) Temporary deviations	km-pass	20.00		
	(b) Existing roads used as temporary deviations	km-pass	20.00		
15.08	Repairs, alterations and/or additions to existing roads used as temporary deviations	Prov sum	1.00		
B15.14	Amber flashing lights mounted on signs	No	12.00		
B15.16	Provision of traffic safety				
	(c) Traffic Safety Officer	month	12.00		
	(d) Traffic Safety Vehicle (s)	month	12.00		
B15.16	Flashing Illuminated Arrow Board	No	3.00		
B15.17	Variable Message Signs mounted on trailers	No - Month	2.00		
Total Carried Forward To Summary					

CONTRACT NO: IN/010/2022

FOR UNIVERSITY OF VENDA

ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)

SCHEDULE B: ROADWORKS

SECTION
1700

Number	Item Description	Unit	Quantity	Rate	Amount R
17.00	CLEARING AND GRUBBING				
17.01	Clearing and grubbing	ha	2.90		
B17.01	Clearing and grubbing				
	(a) Normal Areas				
	(i) Within the road reserve	ha			Rate Only
	(ii) In borrow pits	ha			Rate Only
	(b) Existing fill embankments with slopes steeper than 1:4	ha			Rate Only
17.02	Removal and grubbing of large trees and tree stumps				
	(a) Girth exceeding 1m up to and including 2m	No	25.00		
	(b) Girth exceeding 2m up to and including 3m	No	10.00		
	(c) Girth larger than 3m up to and including 4m	No			Rate Only
17.03	Re-clearing of surfaces (on the written instructions of the Engineer only)	ha	2.00		
B17.07	Removal and temporary stockpiling of topsoil:				
	(a) In temporary stockpiles after loading material into trucks including 1,0km free haul	m ³			Rate Only
	(b) In windrows on the edges of borrow pits or spoil areas	m ³	0.00		Rate Only
Total Carried Forward To Summary					

CONTRACT NO: IN/010/2022

FOR UNIVERSITY OF VENDA

ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)

SCHEDULE B: ROADWORKS

SECTION
1800

Number	Item Description	Unit	Quantity	Rate	Amount R
18.00	DAYWORKS				
B18.01	Ordering of daywork Personnel:				
	(a) Unskilled labour	h			Rate Only
	(b) Semi-skilled labour	h			Rate Only
	(c) Skilled labour	h			Rate Only
	(d) Ganger				
	(e) Foreman				
B18.02	Equipment				
	(a) Tipper trucks				
	(i) 3-5 ton	h			Rate Only
	(ii) 5.1-10 ton	h			Rate Only
	(b) Loader (0.5m3)	h			Rate Only
	(c) Grader (CAT 140G or Similar)	h			Rate Only
	(d) Compaction Rollers				
	(i) Vibrator roller	h			Rate Only
	(ii) Tamping roller	h			Rate Only
	(iii) Grid roller	h			Rate Only
	(e) Hand controlled compactors				
	(i) Pedestrian roller (Bomag BW90)	h			Rate Only
	(ii) Vibratory plate	h			Rate Only
	(iii) Rammers	h			Rate Only
	(f) Water truck (min 10000 l)	h			Rate Only
	(g) Dozer (D7 or similar)	h			Rate Only
Total Carried Forward					

CONTRACT NO: IN/010/2022

FOR UNIVERSITY OF VENDA
ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)

SCHEDULE B: ROADWORKS

SECTION
1800

Number	Item Description	Unit	Quantity	Rate	Amount R
Brought Forward					
B18.03	Materials				
	(a) Procurement of materials	Prov sum	1.00	160 000.00	R160 000.00
	(b) Contractor's handling costs, profit and all other charges in respect of sub-item B1803(a)	%	160 000		
B18.04	Transport				
	(a) LDV	km			Rate Only
	(b) Flatbed truck	km			Rate Only
Total Carried Forward To Summary					

CONTRACT NO: IN/010/2022

FOR UNIVERSITY OF VENDA

ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)

SCHEDULE B: ROADWORKS

SECTION
2100

Number	Item Description	Unit	Quantity	Rate	Amount R
21.00	DRAINS				
B21.01	Excavation for open drains:				
	(a) Excavating soft material situated within the following depth ranges below the surface level:				
	(1) 0 m up to 1,5 m	m ³	97.70		
	(2) Exceeding 1,5 m and up to 3,0 m	m ³			Rate Only
	-				
	(b) Extra over subitem 21.01(a) for excavation in hard material, irrespective of depth	m ³	9.80		
21.03	Excavation for subsoil drainage systems:				
	(a) Excavating soft material situated within the following depth ranges below the surface level:				
	(1) 0 m up to 1,5 m	m ³	327.00		
	(2) Exceeding 1,5 m and up to 3,0 m	m ³			Rate Only
	(3) Etc, in increments of 1,5 m				
	-				
	(b) Extra over subitem 21.03(a) for excavation in hard material irrespective of depth	m ³	81.80		
21.04	Impermeable backfilling to subsoil drainage systems	m ³			Rate Only
-	(b) G5 stabilised with 4% stabilising agent	m ³	202.00		
21.06	Natural permeable material in subsoil drainage systems (crushed stone):				
	(a) Crushed stone obtained from approved sources on the site				
	(i) Fine Grade	m ³			Rate Only
	(ii) Coarse-Grade	m ³	121.00		
21.08	Pipes in subsoil drainage systems:				
	(b) Unplasticized PVC pipes and fittings, normal duty complete with couplings				
-	(3) 150 mm internal dia. perforated or slotted	m	186.55		
B21.09	Polyethylene sheeting 0.25 mm thick, or similar, approved material, for lining subsoil drainage systems				
Total Carried Forward					

CONTRACT NO: IN/010/2019RE

FOR UNIVERSITY OF VENDA

ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)

SCHEDULE B: ROADWORKS

SECTION
2100

Brought Forward					
21.10	Synthetic-fibre filter fabric				
	(a) Grade A3	m ²	2 295.00		
21.12	Concrete outlet structures, manhole boxes, junction boxes and cleaning eyes for subsoil drainage systems:	No			Rate Only
	(a) Outlet structures (refer to standard detail drawing)	No	17.00		
	(c) Junction boxes (refer to standard detail drawing)	No	5.00		
	(d) Cleaning eyes (refer to standard detail drawing)	No	3.00		
21.13	Concrete caps for subsoil drainpipes	No	3.00		
21.15	Overhaul for material hauled in excess of 1,0 km free haul (normal overhaul)	m ³ -km	1 212.00		
21.17	Test flushing of pipe subsoil drains	No	3.00		
21.19	Selected backfill material under concrete-lined side drains compacted to 93% of modified AASHTO density	m ³	12.00		
B21.20	Exposing of existing subsoil drains	No			Rate Only
B21.21	Clearing of subsoil drains	m			Rate Only
B21.22	Subsoil outlet marker board	No			Rate Only
B21.23	Break into existing drainage structures and install subsoil drainpipe	No			Rate Only
Total Carried Forward to Summary					

SCHEDULE B: ROADWORKS

SECTION
2200

Number	Item Description	Unit	Quantity	Rate	Amount R
22.00	PREFABRICATED CULVERTS				
B22.01	Excavation (a) Excavating soft material situated within the following depth ranges below the surface level: (1) 0 m up to 1.5 m (2) Exceeding 1,5 m and up to 3,0 m (b) Extra over subitem 22.01(a) for excavation in hard material, irrespective of depth (c) Extra-over sub-item 22.01(a) for excavation by hand	m³ m³ m³	24.00 6.00		Rate Only Rate Only
B22.02	Backfilling: (a) Using the excavated material (b) Using imported selected material (c) Extra over subitems 22.02(a) and (b) for soil cement backfilling	m³ m³	14.40		Rate Only
B22.03	Concrete pipe culverts: (b) On class B bedding - (1) 600mm dia. Type 100D (2) 600mm dia. Type 75D (3) 900mm dai Type 75D -	m m m	183.66 523.70		Rate Only
22.07	Cast in situ concrete and formwork - (b) In floor slabs for portal or rectangular culverts, including formwork and class U2 surface finish - (1) Class 30/19 - (2) Class 15/38 (c) In inlet and outlet structures, skewed ends, catchpits, manholes, thrust and anchor blocks, excluding formwork but including class U2 surface finish (i) Class 25/19 -	m³ m³ m³			Rate Only Rate Only Rate Only
22.10	Steel reinforcement (a) Mild steel bar	m² t			Rate Only
Total Carried Forward					

CONTRACT NO: IN/010/2022

FOR UNIVERSITY OF VENDA

ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)

SCHEDULE B: ROADWORKS

SECTION
2200

Brought Forward					
	(b) High-tensile steel bars	t			Rate Only
	(c) Welded steel fabric	kg			Rate Only
B22.12	Removing existing concrete				
	(a) Plain concrete	m ³			Rate Only
	(b) Reinforced concrete	m ³			Rate Only
	-				
Total Carried Forward					

CONTRACT NO: IN/010/2022

FOR UNIVERSITY OF VENDA

ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)

SCHEDULE B: ROADWORKS

SECTION
2200

Number	Item Description	Unit	Quantity	Rate	Amount R
Brought Forward					R0.00
22.17	Manholes, catchpits, precast inlet and outlet structures complete				
	(a) Manholes				
	(ii) 1,0 m to 1,5 m deep	No			Rate Only
	(b) Catchpits				
	(1) Type 1K				
	(ii) 1,0 m to 1,5 m deep	No	24.00		
	(e) Extra over or less than subitem 22.17(b) for variations in the depths of catchpits from the standard depth designated for tendering purposes (standard depth and type of catchpit indicated on standard details drawing number: 16746_.....)	m			Rate Only
	(d) Extra over or less than subitem 22.17(a) for variations in the depths of manholes from the standard depth designated for tendering purposes (standard depth and type of manhole indicated on standard details drawing number: 16746_.....)	m			Rate Only
B22.23	Service ducts				
	(a) Ordinary pipes				
	(3) Unplasticized PVC pipes				
	(i) 110 mm dia.	m	200.00		
	(iii) 160 mm dia.	m	100.00		
	(c) Installation (HPDE pipes and 300mm diameter)	m			Rate Only
22.24	Duct marker blocks				
	(a) Concrete as per drawing	No	10.00		
22.26	Hand excavation to determine the positions of existing services	m ³	120.00		
B22.29	Breaking into existing drainage structures and building in pipes or culverts of the following size (pipe diameter 600mm)	No	2.00		
Total Carried Forward To Summary					

CONTRACT NO: IN/010/2022

FOR UNIVERSITY OF VENDA

ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)

SCHEDULE B: ROADWORKS

SECTION
2300

Number	Item Description	Unit	Quantity	Rate	Amount R
23.00	CONCRETE KERBING, CONCRETE CHANNELLING, CHUTES AND DOWNPIPES, AND CONCRETE LININGS FOR OPEN DRAINS				
23.01	Concrete kerbing (12) Figure 12 kerb	m	3 049.35		
23.02	Concrete kerbing-channelling combination (a) Precast kerb				Rate Only Rate Only
	(3) Figure 3 kerb	m	3 049.35		
	(8) Figure 8c kerb	m	114.46		
	(8) Figure 7 kerb	m			Rate Only
	(6) Cast in situ channels concrete class 20/19				
	(ii) Tapered channel (150mm wide)	m			Rate Only
	(ii) Tapered channel (300mm wide)	m	3 049.35		
23.03	Concrete chutes (typical designs): (a) 300 mm precast concrete chute	m	110.00		
23.05	Inlet, outlet, transition and similar structures (typical designs): (b) In situ inlet structures for chutes as shown on drawing 16746-R-03-Sht 03 class 25/19 concrete	No	12.00		
	(c) In situ outlet structures for chutes as shown on drawing 16746-R-03-Sht 03class 25/19 concrete	No	12.00		
	(f) In situ transition sections as shown on drawing 16746-R-03-Sht 03class 25/19 concrete	No	12.00		
23.07	Trimming of excavations for concrete-lined open drains (a) In soft material	m ²	725.04		
	(b) In hard material	m ²	241.68		
23.08	Concrete lining for open drains (a) Cast in situ concrete lining class 25/19 for type F open drain	m ³	96.67		
	(b) Class F2 surface finish to cast in situ concrete	m ²	966.72		
23.09	Formwork to cast in situ concrete lining for open drains (Class F2 surface finish)				
Total Carried Forward					

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FOR UNIVERSITY OF VENDA

ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)

SCHEDULE B: ROADWORKS

SECTION
2300

Number	Item Description	Unit	Quantity	Rate	Amount R
Brought Forward					
	(a) To sides with formwork on the internal face only	m ²	96.67		Rate Only
	(c) To ends of slabs	m ²			
23.10	Sealed joints in concrete linings of open drains (as per drawing no 16746J/SD/05)	m	96.67		
23.11	Concrete screed or backfill below chutes				
	(b) Class 20/19	m ³	5.50		
23.12	Steel reinforcement				
	(b) High-tensile steel bars	t	0.00		Rate Only
	(c) Welded steel fabric	kg	0.00		Rate Only
23.13	Polyethylene sheeting (0,15 mm thick) for concrete-lined open drains	m ²	966.72		
23.14	Cutting bituminous surfacing and pavement layers for concrete kerbing, channelling or concrete-lined drains (up to 300mm deep)	m	3 049.35		
23.15	Precast concrete blocks in outlet structures	No	17.00		
B23.16	Demolition and removal of existing kerbs and/or channel, concrete lined drains (300mm maximum size)	m ³			Rate Only
B23.17	Extra over items 23.01 and 23.02 for concrete kerbing or concrete kerbing and channelling on curves				
	(a) On curves of radii more than or equal to 5,0 m but less than 20,0 m	m			Rate Only
	(b) On curves with radii more than or equal to 1,0 m but less than 5,0 m	m			Rate Only
	(c) On curves with radii less than 1,0 m	m			Rate Only
B23.18	Pedestrian ramps at intersections	No	44.00		
Total Carried Forward					

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ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)

SCHEDULE B: ROADWORKS

SECTION
3100

Number	Item Description	Unit	Quantity	Rate	Amount R
31.00	BORROW MATERIALS				
B31.01	Excess overburden	m ³			Rate Only
31.02	Excess overburden in borrow pits for obtaining crushed stone for pavement layers				
	(a) Overburden in soft or intermediate excavation	m ³			Rate Only
	(b) Overburden in hard excavation	m ³			Rate Only
31.03	Finishing-off borrow areas in:				
	(a) Hard material	ha	1.00		
	(b) Intermediate material	ha	2.00		
	(c) Soft material	ha	2.00		
B31.04	Compensation to landowners:				
	a) Prime cost sum for compensation to landowners	PC sum	1.00	296 625	
	b) Handling cost and profit in respect of sub-item B31.04(a) above	%	296 625		
Total Carried Forward To Summary					

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FOR UNIVERSITY OF VENDA

ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)

SCHEDULE B: ROADWORKS

SECTION
3200

Number	Item Description	Unit	Quantity	Rate	Amount R
32.00	SELECTION, STOCKPILING AND BREAKING DOWN THE MATERIAL FROM BORROW PITS, CUTTINGS AND EXISTING PAVEMENT LAYERS, AND PLACING AND COMPACTING THE GRAVEL LAYERS				
-	-				
32.04	Removal of oversize pavement material	m ³			Rate Only
32.05	Additional normal grid rolling	m ³			Rate Only
32.06	Stockpiling of material	m ³			Rate Only
-	-				
Total Carried Forward To Summary					

C-60

Number	Item Description	Unit	Quantity	Rate	Amount R
33.00	MASS EARTHWORKS				
B33.01	Cut and borrow to fill				
	(a) Gravel material in compacted layer thickness of 200 mm and less:				
	(i) Compacted to 90% of modified AASHTO density	m ³	35 000.00		
	(c) Rock fill (as specified in subclause 3209(c))	m ³			Rate Only
	-				
33.03	Extra over item 33.01 for excavating and breaking down material in:				
	(a) Intermediate excavation	m ³	1 677.30		
	(b) Hard excavation	m ³	1 677.30		
	(c) Boulder excavation class A	m ³			Rate Only
	(d) Boulder excavation class B	m ³	223.60		
33.04	Cut to spoil, including free-haul up to 0,5 km. Material obtained from:				
	(a) Soft excavation	m ³	5 788.00		
	(b) Intermediate excavation	m ³	1 565.50		
	(c) Hard excavation	m ³	447.30		
	(d) Boulder excavation class A	m ³			Rate Only
	(e) Boulder excavation class B	m ³	223.60		
33.05	Overbreak in hard and boulder class A excavation	m ²			Rate Only
33.06	Variations in the number of roller passes (applicable to sub subitems 33.01(a)(3) and 33.01(b)(3) and item 33.11):				
	(a) Vibratory rollers	m ² -pass			Rate Only
	(b) Oscillatory rollers	m ² -pass			Rate Only
	(c) Heavy grid rollers	m ² -pass			Rate Only
	(d) Tamping rollers	m ² -pass			Rate Only
33.07	Removal of unsuitable material (including free-haul of 0.5 km):				
	(a) In layer thicknesses of 200 mm and less:				
	2.1.2				
Total Carried Forward					

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SCHEDULE B: ROADWORKS

SECTION 3300

Brought Forward					
	(1) Stable material	m ³	100.00		Rate Only
	(2) Unstable material	m ³			
	(b) In layer thicknesses exceeding 200mm				
	(1) Stable material	m ³	150.00		Rate Only
	(2) Unstable material	m ³			
Total Carried Forward					

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FOR UNIVERSITY OF VENDA

ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)

SCHEDULE B: ROADWORKS

SECTION 3300

Number	Item Description	Unit	Quantity	Rate	Amount R
Brought Forward					
33.09	Material bladed to windrow	m ³			Rate Only
33.10	Roadbed preparation and the compaction of material				
	(a) Compaction to 90% of modified AASHTO density	m ³	1 005.00		
	(b) Compaction to 93% of modified AASHTO density	m ³			Rate Only
	(c) Compaction of sand roadbed to 95% of modified AASHTO density	m ³			Rate Only
	Compaction of sand roadbed to 100% of modified AASHTO density	m ³			Rate Only
	Three-roller-passes compaction:				
	(a) Vibratory roller	m ²			Rate Only
	(b) Oscillatory roller	m ²			Rate Only
	(c) Grid roller	m ²			Rate Only
	(d) Tamping roller	m ²	20 000.00		
33.12	In situ treatment of roadbed:				
	(a) In situ treatment by ripping	m ³	1 005.00		
	(b) In situ treatment by blasting	m ³			Rate Only
33.13	Finishing-off cut and fill slopes, medians and interchange areas:				
	(a) Cut slopes	m ²	1 800.00		
	(b) Fill slopes	m ²	526.00		
33.17	Extra over item 33.04 for spoiling material excavated from benches constructed for widening existing fills	m ³			Rate Only
33/16.01	Overhaul on material hauled in excess of a free-haul distance of 0,5 km for haul up to or through 1,0 km (restricted overhaul)	m ³			Rate Only
33/16.02	Overhaul on material hauled in excess of 1,0 km (ordinary overhaul)	m ³ -km	401780.00		
Total Carried Forward					

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ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)

SCHEDULE B: ROADWORKS

SECTION 3300

Brought Forward					
B33.20	Fill constructed with material obtained from commercial sources or sources provided by the contractor, including all haul (a) Gravel material in compacted layer thicknesses of 200 mm and less: (i) Compacted to 90% of modified AASHTO density (ii) Compacted to 93% of modified AASHTO density (iii) Eight-roller-passes compaction (d) Pioneer layer (as specified in subclause 3307(c))	 m ³ m ³ m ³ m ³			 Rate Only Rate Only Rate Only Rate Only
B33.21	Fill constructed with gravel hauled from designated borrow pits or from designated stockpiles (not made with material excavated on this project), including free haul up to 1 km (a) Gravel material in compacted layer thicknesses of 200 mm and less (i) Compacted to 90% of modified AASHTO density (ii) Compacted to 93% of modified AASHTO density (iii) Eight-roller-passes compaction	 m ³ m ³ m ³	 30 906.00		 Rate Only Rate Only
B33.22	Placement of Triax TX160 geogrid (or similar approved)	m ²	8 800.00		
Total Carried Forward To Summary					

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ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)

SCHEDULE B: ROADWORKS

SECTION 3400

Number	Item Description	Unit	Quantity	Rate	Amount R
34.00	PAVEMENT LAYERS OF GRAVEL MATERIAL				
34.01	Pavement layers constructed from gravel taken from cut or borrow, including free haul up to 1,0 km				
	(a) Gravel selected layer compacted to:				
	(i) 93% of modified AASHTO density (150mm layer thickness)	m ³	4 357.00		
	(c) Gravel subbase (unstabilized gravel) compacted to:	m ³			Rate Only
	(1) 95% of modified AASHTO density (specify compacted layer thickness)	m ³			Rate Only
	(d) Gravel subbase (chemically stabilized material) compacted to:				
	(i) 95% of modified AASHTO density (150mm layer thickness)	m ³	3 286.00		
	(e) Gravel base (unstabilized gravel) compacted to:				
	(i) 98% of modified AASHTO density (150mm compacted layer thickness)	m ³			Rate Only
	(f) Gravel base (stabilized gravel) compacted to:				
	(ii) 98% of modified AASHTO density (150mm layer thickness)	m ³	3 221.00		
	(h) Gravel wearing course compacted to:				
	(ii) 98% of modified AASHTO density (150mm compacted layer thickness) stabilized with Ecobond and SS60	m ³			Rate Only
34.12	Variation in number of roller passes				
	(a) Vibratory rollers	m ² -pass			Rate Only
	(b) Oscillatory rollers	m ² -pass			Rate Only
	(c) Grid rollers	m ² -pass			
	(d) Flat-wheeled rollers	m ² -pass			Rate Only
	(e) Pneumatic-tyred rollers	m ² -pass			Rate Only
Total Carried Forward					

CONTRACT NO: IN/010/2022

FOR UNIVERSITY OF VENDA

ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)

SCHEDULE B: ROADWORKS

SECTION 3400

Number	Item Description	Unit	Quantity	Rate	Amount R
Brought Forward					
34/16.01	Overhaul on material hauled in excess of a free-haul distance of 0,5 km for haul up to or through 1,0 km (restricted overhaul)	m ³			Rate Only
34/16.02	Overhaul on material hauled in excess of 1,0 km (ordinary overhaul)	m ³ -km	141 232		
-	-				
Total Carried Forward To Summary					

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FOR UNIVERSITY OF VENDA

ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)

SCHEDULE B: ROADWORKS

SECTION
3500

Number	Item Description	Unit	Quantity	Rate	Amount R
35.00	STABILIZATION				
B35.01	Chemical stabilization extra over unstabilized compacted layers				
	(b) Sub-base				
	(ii) 150mm thickness	m ³	3 286.00		
	(ii) 200mm thickness	m ³			Rate Only
	(c) Base				
	(ii) 150mm thickness	m ³			Rate Only
	-				
B35.02	Chemical stabilizing agent:				
	(a) CEM II 32.5 B-V	t	190.00		
	(c) Road lime	t			Rate Only
35.07	Bituminous stabilization (extra over the untreated layer)	m ³	3 360.00		
	-				
B35.08	Bituminous stabilizing agent:				
	(a) Anionic stable grade bituminous emulsion (60% net bitumen)	litre	108 262		
	-				
	(d) Ecobond	litre	50 522.00		
	-				
B35.13	Extra over items 35.01, 37.07 and B35.19 for trial sections	m ³			Rate Only
	(b) anionic stable grade bituminous emulsion (60% net bitumen)	litre			Rate Only
B35.14	Sampling of in situ material for mix design procedure	No	2.00		
B35.15	Removal from site of surplus material	m ³			Rate Only
B35.16	Extra over item B35.16 for cross mixing of material	m ²			Rate Only
B35.19	Finishing off of the stabilised layer				
	(a) Slushing with:				
	(i) Water	m ²			Rate Only
	(ii) diluted emulsion	m ²	21 055.00		
	(b) Application of a fog spray	litre			Rate Only
Total Carried Forward To Summary					

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ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)

SCHEDULE B: ROADWORKS

SECTION
3600

Number	Item Description	Unit	Quantity	Rate	Amount R
36.00	CRUSHED - STONE BASE				
36.01	Crushed-stone base				
	(a) Constructed from type G1 material obtained from commercial sources and compacted to 88% of apparent relative density				
	(1) 37mm nominal maximum size stone	m ³	0.00		Rate Only
36.02	Additional compaction:				
	(a) Extra over subitems 36.01(a) and (b) for compaction to 89% of apparent relative density	m ³	0.00		Rate Only
36.10	Extra over payment for placing and compacting or for in situ reconstruction of crushed-stone base in restricted areas:				
	(a) Extra over item 36.04 for placing and compacting material from existing pavement layers	m ³	0.00		Rate Only
Total Carried Forward To Summary					

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SCHEDULE B: ROADWORKS

SECTION
4100

Number	Item Description	Unit	Quantity	Rate	Amount R
41.00	PRIME COAT				
41.01	Prime coat:				
	(a) Eco Prime or inverted Bituminous emulsions	litre	18 080.10		
41.02	Aggregate for blinding	m ²			Rate Only
41.03	Extra over item 41.01 for applying the prime coat in areas accessible only to hand held equipment	litre	1 808.00		
Total Carried Forward To Summary					

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SCHEDULE B: ROADWORKS

SECTION
4200

Number	Item Description	Unit	Quantity	Rate	Amount R
42.00	ASPHALT BASE AND SURFACING				
42.02	Asphalt surfacing (state specified thickness and type of bitumen)				
	(a) Continuously graded				
	(1) Coarse graded (using Class A-E2 modified binder and 14mm NMPS maximum aggregate size)				
	(iii) 30 mm thick	m ²	21 055.00		
	(2) Coarse graded (using Class A-E2 modified binder and 26,5mm maximum aggregate size)				
	(iii) 50 mm thick	m ²			Rate Only
42.04	Tack coat of 30% stable-grade emulsion	litre			Rate Only
42.05	Binder variations				
	(a) Class A-E2 modified binder	t	2.50		
42.06	Variations in active filler content:				
	(a) Cement	t			Rate Only
	(b) Lime	t			Rate Only
42.07	Trial sections				
	(b) 30 mm surfacing	m ²	300.00		
B42.08	100 mm cores in asphalt paving	No	96.00		
B42.21	Aggregate variations from nominal mix ratios in asphalt mixes:	t			Rate Only
Total Carried Forward To Summary					

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ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)

SCHEDULE B: ROADWORKS

SECTION
4700

Number	Item Description	Unit	Quantity	Rate	Amount R
47.00	SURFACING OF BRIDGE DECKS				
47.01	Asphalt surfacing on bridge deck 45mm thick using A-E2 grade bitumen				
	(a) Continuously graded, Course grade	t	0.00		Rate Only
47.02	Rolled in chippings in surfacing				
	(a) 13 mm nominal size	t	0.00		Rate Only
47/42.04	Tack coat of 30% stable-grade emulsion	litre	0.00		Rate Only
47/42.05	Binder variations				
	(a) Penetration grade bitumen	t	0.00		Rate Only
47/42.06	Variations in active filler content:		0.00		Rate Only
	(b) Lime	t	0.00		Rate Only
47/42.08	100 mm cores in asphalt paving irrespective of depth of core	No	0.00		Rate Only
47/43.01	Aggregate variations	t	0.00		Rate Only
Total Carried Forward To Summary					

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SCHEDULE B: ROADWORKS

SECTION
5100

Number	Item Description	Unit	Quantity	Rate	Amount R
51.00	PITCHING, STONEWORK AND PROTECTION AGAINST EROSION				
51.01	Stone pitching:				
	(a) Plain pitching:				
	(1) Method 1	m ²			Rate Only
	(2) Method 2	m ²			Rate Only
	(b) Grouted stone pitching	m ²			Rate Only
51.04	Concrete pitching and block paving				
	(d) Prefabricated concrete paving blocks for sidewalk pavement				
	(1) 60 mm thick	m ²	6 700.00		
51.05	Concrete edge beams				
	(a) Class 15/38	m ³	5.00		
51.06	Provision of vegetation destroyer and ant poison:				
	(a) Provision of materials	PC sum			Rate Only
	(b) Contractor's charges and profit added to the prime cost sum	%			Rate Only
51.07	Foundation trenches	m ³			Rate Only
Total Carried Forward To Summary					

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FOR UNIVERSITY OF VENDA

ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)

SCHEDULE B: ROADWORKS

SECTION
5200

Number	Item Description	Unit	Quantity	Rate	Amount R
5200	GABIONS				
52.01	Foundation trench excavation and backfilling				
	b) in in-situ material	m ³	0.00		Rate Only
52.02	Surface preparation for bedding the gabions	m ²	0.00		Rate Only
52.03	Gabions				
	a) Galvanised gabion boxes				
	i) 1m long x 1m wide x 1m deep boxes, 2,8mm mesh wire, 80mm nominal mesh size	m ³			Rate Only
	ii) 2m long x 1m wide x 1m deep boxes (with 1m diaphragm spacing), 2,8mm mesh wire, 80mm nominal mesh size	m ³			Rate Only
	c) Galvanised gabion mattresses		0.00		Rate Only
	i) 6m long x 2m wide x 0,3m deep mattresses (with 1m diaphragm spacing) 2,8mm mesh wire, 80mm nominal mesh size	m ³	0.00		Rate Only
52.04	Filter fabric, type grade A3 or similar approved	m ²	0.00		Rate Only
Total Carried Forward To Summary					

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SCHEDULE B: ROADWORKS

SECTION
5300

Number	Item Description	Unit	Quantity	Rate	Amount R
53.00	GUIDE BLOCKS				
53.01	Guide blocks	No			Rate Only
Total Carried Forward To Summary					

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SCHEDULE B: ROADWORKS

SECTION
5400

Number	Item Description	Unit	Quantity	Rate	Amount R
54.00	GUARDRAILS				
54.01	Guardrails on 3.81m spaced posts:				
	Note to Tenderer: Select and price either the timber post or steel post system – not both				
	(a) Complete galvanised system on:				
	(i) Timber posts	m	1 252.00		
	(II) Steel posts	m			Rate Only
	(b) Extra over 54.01(a) for the following				
	(i) Flared ends (including end wing)	No			Rate Only
	(ii) End treatments where single guardrail sections are used (including additional posts)	No			Rate Only
	(iii) End treatments where double guardrail sections are used (including additional posts)	No	4.00		
	(iv) Bridge adaptors (including extra rail and posts)	No	4.00		
	(v) Horizontally curved guardrails factory bent to a radius of less than 45m	m	218.40		
54.06	Reflective plates	No	40.00		
B54.07	Removing existing guardrails	m			Rate Only
B54.14	Nailing of gang nail plates on top of timber guardrail posts	No			Rate Only
Total Carried Forward To Summary					

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ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)

SCHEDULE B: ROADWORKS

SECTION
5500

Number	Item Description	Unit	Quantity	Rate	Amount R
55.00	FENCING				
55.01	Clearing the fence line, 2m wide strip	km	0.00		Rate Only
55.02	Supply and erect new fencing material for new fences and for supplementing material in existing fences which are being repaired or removed:				
	(a) Zinc-coats barbed wire (SABS 675)				
	(1) High-tensile-grade, single-strand 3,15mm x 2,50mm oval-shaped wire				
	(i) Galvanised, Class A	km	0.00		Rate Only
	(g) Standards				
	(1) 1,86m x 2,5 kg/m mild steel y section	No	0.00		Rate Only
	(h) Droppers				
	(1) 1,4m x 0,56 kg/m mild steel ridge back section	No	0.00		Rate Only
B55.10	Repairing existing fences	km	0.00		Rate Only
Total Carried Forward To Summary					

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ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)

SCHEDULE B: ROADWORKS

SECTION
5600

Number	Item Description	Unit	Quantity	Rate	Amount R
56.00	ROAD SIGNS				
B56.01	Road sign boards with painted or coloured semi-matt background. Symbols, lettering and borders in semi-matt black or in Class 1 retro-reflective material, where the sign board is constructed from: (c) Prepainted galvanized steel plate (chromadek 1,6mm thick or approved equivalent): (i) Area not exceeding 2 m ² (ii) Area exceeding 2 m ² but not 10 m ² (iii) Area exceeding 10 m ²	m ² m ² m ²	 36.70		Rate Only Rate Only
56.02	Extra over item 56.01 for using: (a) Background of retro-reflective material of: (ii) Class 11 (b) Lettering, symbols, numbers, arrows, emblems and borders of retro-reflective material: (i) Class 11	 m ² m ²	 18.30 		 Rate Only
56.03	Road sign supports (overhead road sign structures excluded): (b) Steel tubing (c) Timber (1) 120mm diameter to 160mm diameter, creosote treated	 t t m	 176.40		Rate Only Rate Only Rate Only
56.04	Kilometre posts (a) Concrete	No			Rate Only Rate Only
56.05	Excavation and backfilling for road sign supports (not applicable to kilometre posts)	m ³	12.00		
56.06	Extra over item 56.05 for cement-treated soil backfill	m ³	12.00		
56.07	Extra over item 56.05 for rock excavation	m ³			Rate Only
B56.10	Danger plates at culverts/structures a) Type A stormwater culverts (150mm x 600mm) b) Type B at Bridges (200mm x 800mm)	No No No			Rate Only Rate Only
B56.11	Replace marker boards on existing kilometre post	No			Rate Only
Total Carried Forward To Summary					

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SCHEDULE B: ROADWORKS

SECTION
5700

Number	Item Description	Unit	Quantity	Rate	Amount R
57.00	ROAD MARKINGS				
57.01	Road marking paint:				
57.02	Retro-reflective road marking paint:				
	(a) White lines (broken or unbroken)				
	(i) 100 mm wide	km	2.40		
	(ii) 150 mm wide	km	0.20		
	(b) Yellow lines (broken or unbroken)				
	(i) 100 mm wide	km	2.80		
	(ii) 150 mm wide	km			Rate Only
	(d) White lettering and symbols	m²	111.30		
	(e) Yellow lettering and symbols	m²			Rate Only
	(f) Transverse lines, painted island and arrestor bed markings (any colour)	m²	307.50		
57.04	Variations in rate of application:				
	(a) White paint	litre			Rate Only
	(b) Yellow paint	litre			Rate Only
B57.05	Road studs (installation and maintenance)				
	(a) Ferro Lynx Steel body with shank (43 element glass reflective lens)	No	48.00		
B57.06	Setting out and premarking the lines (Excluding traffic-island markings, lettering and symbols)	km	7.60		
57.07	Re-establishing the painting unit at the end of the maintenance period	L/sum	1.00		
B57.10	Cold plastic road marking material				
	(a) White lettering and symbols	m²			Rate Only
	(b) Yellow lettering and symbols	m²			Rate Only
	(c) Transverse lines, painted island and arrestor bed markings (any colour)	m²			Rate Only
B57.11	Re-establishing the painting unit on instruction of the Engineer during the construction period	No	1.00		
Total Carried Forward To Summary					

CONTRACT NO: IN/010/2022

FOR UNIVERSITY OF VENDA
ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)

SCHEDULE B: ROADWORKS

SECTION
5800

Number	Item Description	Unit	Quantity	Rate	Amount R
58.00	LANDSCAPING AND PLANTING PLANTS				
58.01	Trimming				
	(a) Machine trimming	m ²			Rate Only
	(b) Hand trimming	m ²			Rate Only
B58.03	Preparing the areas for grassing:				
	(a) Ripping	ha			Rate Only
	(b) Scarifying for loosening topsoil	ha			Rate Only
	(c) Topsoiling within the road reserve, where the following materials are used:				
	(i) Topsoil obtained from within the road reserve or borrow areas (free haul 1,0 km)	m ³			Rate Only
	(ii) Topsoil obtained from other sources by the contractor (including all haul)	m ³			Rate Only
	(d) Topsoiling of borrow pits by using topsoil obtained from borrow areas or from the road reserve (free-haul 1,0 km)	m ³			Rate Only
	(e) Providing and applying chemical fertilisers and/or soil-improvement material:				
	(ii) Superphosphate	t			Rate Only
	(iv) Formula 2:3:2 (22)	t			Rate Only
	(f) Stockpiling topsoil (free haul 1,0km) where the following applies:				
	i) topsoil stored at a stockpile site agreed with by the engineer	m ³			Rate Only
	ii) topsoil pushed or bladed into heaps next to area from which it was taken	m ³			Rate Only
58.04	Grassing:				
	(a) The planting of grass cuttings				Rate Only
	(i) Kweek grass	ha			Rate Only
	(ii) Buffalo grass	ha			Rate Only
	(c) Sodding by using the following types of sods:				Rate Only
Total Carried Forward					

CONTRACT NO: IN/010/2022

FOR UNIVERSITY OF VENDA

ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)

SCHEDULE B: ROADWORKS

SECTION
5800

Number	Item Description	Unit	Quantity	Rate	Amount R
Brought Forward					
	(i) Nursery sods	m ²			Rate Only
	(ii) Veld sods	m ²			Rate Only
	(c) Hydroseeding:				
	(i) Providing an approved seed mixture for hydroseeding	kg			Rate Only
-	-				
-	(iii) Hydroseeding	ha			Rate Only
-	-				
-	(g) Other methods specify Polypropylene Turf reinforcement mat.	m ²			Rate Only
-	-				
58.05	Watering the grass when established by topsoiling only	kℓ			Rate Only
58.06	Watering the already planted grass, trees, and shrubs planted during periods of drought experienced during the growing season	kℓ			Rate Only
58.10	Extra work for landscaping	Prov sum			Rate Only
58.11	Weeding all grass-seeded areas and the grass when established by topsoiling only	ha			Rate Only
B58.12	Removal of undesirable vegetation	km			Rate Only
Total Carried Forward To Summary					

CONTRACT NO: IN/010/2022

FOR UNIVERSITY OF VENDA

ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)

SCHEDULE B: ROADWORKS

SECTION
5900

Number	Item Description	Unit	Quantity	Rate	Amount R
59.00	FINISHING THE ROAD AND ROAD RESERVE AND TREATING OLD ROADS				
59.01	Finishing the road and road reserve:				
	(a) Dual carriageway road	km	1.40		
	(b) Single carriageway road	km	1.00		
B59.02	Treatment of old roads and temporary deviations	km	0.00		
Total Carried Forward To Summary					

CONTRACT NO: IN/010/2022

FOR UNIVERSITY OF VENDA

ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)

SCHEDULE B: ROADWORKS

Section	Description	SUMMARY OF SECTIONS	Amount R
1300	CONTRACTOR'S ESTABLISHMENT ON SITE AND GENERAL OBLIGATIONS		
1400	HOUSING, OFFICES AND LABORATORY FOR THE ENGINEER'S SITE PERSONNEL		
1500	ACCOMMODATION OF TRAFFIC		
1600	OVERHAUL		
1700	CLEARING AND GRUBBING		
1800	DAYWORKS		
2100	DRAINS		
2200	PREFABRICATED CULVERTS		
2300	CONCRETE KERBING, CONCRETE CHANNELLING, CHUTES AND DOWNPIPES, AND CONCRETE LININGS FOR OPEN DRAINS		
3100	BORROW MATERIALS		
3200	SELECTION, STOCKPILING AND BREAKING DOWN THE MATERIAL FROM BORROW PITS, CUTTINGS AND EXISTING PAVEMENT LAYERS, AND PLACING AND COMPACTING OF THE GRAVEL LAYERS		
3300	MASS EARTHWORKS		
3400	PAVEMENT LAYERS OF GRAVEL MATERIAL		
3500	STABILIZATION		
3600	CRUSHED STONE BASE		
4100	PRIME COAT		
4200	ASPHALT BASE AND SURFACING		
4700	SURFACING OF BRIDGE DECKS		
5100	PITCHING, STONEMASONRY AND PROTECTION AGAINST EROSION		
5200	GABIONS		
5300	GUIDE BLOCKS		
5400	GUARDRAILS		
5500	FENCING		
5600	ROAD SIGNS		
5700	ROAD MARKINGS		
5800	LANDSCAPING AND PLANTING PLANTS		
5900	FINISHING THE ROAD AND ROAD RESERVE AND TREATING OLD ROADS		

Total Carried Forward To Summary Of Schedules

CONTRACT NO: IN/010/2022

FOR UNIVERSITY OF VENDA

ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)

SCHEDULE C: BRIDGE

SECTION
4700

[illegible]



ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)

SECTION
5200

University of Venda

CONTRACT NO: IN/010/2022

FOR UNIVERSITY OF VENDA
ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA
ROAD(R524)

SCHEDULE C: BRIDGE

SECTION 6100

Number	Item Description	Unit	Quantity	Rate	Amount R
6100	FOUNDATIONS FOR STRUCTURES				
61.01	Additional foundation investigations (by Design Geotechnical Engineer)	Prov sum	100 000		
61.02	Excavation:				
	(a) Excavating soft material situated within the following successive depth ranges:				
	(i) 0 m up to 2 m	m ³	250.0		
	(b) Extra over subitem 61.02(a) for excavation in hard material irrespective of depth	m ³	50.0		
	(c) Extra over subitem 61.02(a) for additional excavation required by the engineer after the excavation has been completed	m ³	25.0		
	(d) Extra over subitem 61.02(a) for excavation by hand	m ³	25.0		
61.03	Access and drainage:				
	(a) Access	L/sum	1		
	(b) Drainage where no access has been provided	L/sum	1		
61.04	Backfill to excavations utilising:				
	(a) Material from the excavation	m ³	100.0		
	(b) Imported material	m ³	25.0		
61.05	Fill within a restricted area (extra over item 33.01)	m ³	625.0		
61.06	Overhaul in excess of 1,0 km on excavated material and on material imported for backfill, foundation fill and fill for caissons	m ³ -km	3 000.0		
61.07	Overbreak in excavation in hard material	m ²	20.0		
61.08	Foundation fill consisting of:				
	(a) Rock Fill	m ³	10.0		
	(d) Crushed-stone fill	m ³	10.0		
Total Carried Forward					

CONTRACT NO: IN/010/2022

FOR UNIVERSITY OF VENDA
ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA
ROAD(R524)

SCHEDULE C: BRIDGE

SECTION 6100

Number	Item Description	Unit	Quantity	Rate	Amount R
Brought Forward					
	(c) Compacted granular material	m ³	10.0		
	(d) Mass Concrete (Class 25/19)	m ³	320.0		
	(e) Concrete screed (Class 15/19 75 mm thick)	m ³	50.0		
61.10	Moving to and setting up the equipment at each hole to be drilled	No	12.0		
61.15	Establishment on the site for piling	L/sum	1.0		
61.16	Moving to and setting up the equipment at each position for installing the piles	No	12.0		
61.17	Augered or bored holes for piles with a diameter of 900mm through material situated within the following successive depth ranges: (a) Augered holes:				
	(1) Exceeding 0 m and up to 10 m	m	100.0		
61.21	(2) Exceeding 10 m and up to 15 m Extra over item 61.17, irrespective of the depth, to form augered and bored pile holes through identified obstructions consisting of :	m	35.0		
	(b) Boulders (750mm)	m	10.0		
	(c) Rock formation	m	10.0		
61.22	Forming augered and bored pile holes through unidentified obstructions	Prov sum	1.0		
61.27	Socketing piles into rock formation (R2 classification, 1.5m)	No	12.0		
61.28	Installing and removing temporary casings in augered holes for piles of (900mm)	m	135.0		
61.30	Steel reinforcement in cast in situ piles: (b) High yield stress-steel bars	t	22.0		
61.31	Cast in situ concrete in piles, underreams, bulbous bases and socket				
Total Carried Forward					

CONTRACT NO: IN/010/2022

FOR UNIVERSITY OF VENDA
ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA
ROAD(R524)

SCHEDULE C: BRIDGE

SECTION 6100

Number	Item Description	Unit	Quantity	Rate	Amount R
Brought Forward					
	(a) Class 30/19	m ³	130.0		
61.32	Extra over item 61.31 for concrete cast under water	m ³	130.0		
61.35	Establishment on the site for the load testing of piles	L/sum	1.0		
B61.50	Pile Integrity Testing on bored/augured piles				
	(a) Constructing 4.0m long reinforced concrete/ grout calibration bored piles of 900mm diameter inclusive of the required number of 85mm diameter mild steel tubes	No	1		
	(b) Providing and installing 85mm diameter mild steel tubes used for "Cross Hole Sonic Logging" in all piles	m	580.0		
	(d) Cross-Hole Sonic Logging tests and interpreted results (900mm diameter)	m	144.0		
	(e) Base integrity tests				
	(i) Establishment on the site for core Drilling (as per COLTO payitem 61.37)	L/sum	1		
	(ii) Moving equipment and assembling it at each location/pile position where cores are to be drilled (as per COLTO payitem 61.38)	No	12		
	(iii) Drilling the cores (75mm) in:				
	(aa) Concrete	m	120.0		
	(bb) Founding formation:				
	(1) Irrespective of hardness	m	12.0		
Total Carried Forward To Summary					

CONTRACT NO: IN/010/2022

FOR UNIVERSITY OF VENDA
ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA
ROAD(R524)

SCHEDULE C: BRIDGE

SECTION
6200

Number	Item Description	Unit	Quantity	Rate	Amount R
Brought Forward					
	(2) With a hardness of Class R2	m	6.0		
	(iv) Log of cored data	No	12		
	(v) Grouting up all CSL tubes after successful testing (Approved 30MPa non-shrink cementitious grout)	m ³	5.0		
6200	FALSEWORK, FORMWORK AND CONCRETE FINISH				
62.02	Vertical formwork to provide:				
	(a) Class F1 surface finish to concealed surfaces of:				
	(i) Pile caps	m ²	65.0		
	(b) Class F2 surface finish to exposed surfaces of:				
	(i) Abutment	m ²	250.0		
	(ii) Approach slab	m ²	25.0		
	(iii) Longitudinal beams	m ²	175.0		
	(iv) Transverse beams	m ²	120.0		
	(v) Pylons	m ²	220.0		
62.03	Horizontal formwork to provide F2 surface finish to soffit of beams and slab	m ²	650.0		
62.04	Inclined formwork to provide F2 surface finish to transvers and longitudinal edge beams	m ²	125.0		
Total Carried Forward To Summary					

CONTRACT NO: IN/010/2022

FOR UNIVERSITY OF VENDA
ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA
ROAD(R524)

SCHEDULE C: BRIDGE

SECTION
6300

Number	Item Description	Unit	Quantity	Rate	Amount R
63.00	STEEL REINFORCEMENT FOR STRUCTURES				
63.01	Steel reinforcement for:				
	(i) Pile cap				
	(2) High yield stress steel bars	t	15.0		
	(ii) Pylon				
	(2) High yield stress steel bars	t	10.0		
	(iii) Longitudinal beams				
	(2) High yield stress steel bars	t	28.0		
	(iv) Transverse beams				
	(2) High yield stress steel bars	t	18.0		
	(v) Abutments				
	(2) High yield stress steel bars	t	24.0		
	(vi) Deck slab				
	(2) High yield stress steel bars	t	36.0		
	(vii) Apron slabs				
	(2) High yield stress steel bars	t	8.0		
	(viii) Handrail foundation				
	(2) High yield stress steel bars	t	24.0		
	(ix) End blocks				
	(2) High yield stress steel bars	t	3.0		
Total Carried Forward To Summary					

CONTRACT NO: IN/010/2022

FOR UNIVERSITY OF VENDA
ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA
ROAD(R524)

SCHEDULE C: BRIDGE

SECTION
6400

Number	Item Description	Unit	Quantity	Rate	Amount R
6400	CONCRETE FOR STRUCTURES				
B64.01	Cast in situ concrete				
	(a) Durability Concrete (Class W)				
	(i) Pile cap and abutment (W30/19)	m ³	200.0		
	(ii) Pylons (W30/19)	m ³	35.0		
	(iii) Beams and deck slab (W30/19)	m ³	200.0		
	(b) Normal Concrete				
	(i) Apron slab (30MPa)	m ³	50.0		
	(ii) Mass concrete for gabion (20MPa)	m ³	350.0		
	(iii) Mass concrete for sheet piling ground beam (20MPa)	m ³	90.0		
	(iv) Guardrail foundation(20MPa)	m ³	275.0		
B64.07	Curing of concrete (Approved water based low viscosity curing compound on vertical and horizontal face)				
	(i) Pile cap and abutment	m ²	165.0		
	(ii) Pylons	m ²	5.0		
	(iii) Beams and deck slab	m ²	650.0		
	(iv) Apron slab	m ²	120.0		
B64.08	Hot weather concreting	L/sum	1.0		
Total Carried Forward To Summary					

CONTRACT NO: IN/010/2022

FOR UNIVERSITY OF VENDA
ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA
ROAD(R524)

SCHEDULE C: BRIDGE

SECTION
6500

Number	Item Description	Unit	Quantity	Rate	Amount R
65.00	PRESTRESSING				
B65.04	Cable Bars:				
	(a) MeKano4				
	(i) MKT460 M56 carbon steel	m	90.0		
	(ii) MKT460 M64 carbon steel	m	60.0		
B65.05	Anchorage and couplers				
	(a) Anchorages and couplers as per MKT460 M56 fittings				
	(i) Connecting plate	No	12.0		
	(ii) Fork Ends	No	12.0		
	(iii) Turnbuckles	No	6.0		
	(b) Anchorages and couplers as per MKT460 M64 fittings:				
	(i) Connecting plate	No	12.0		
	(ii) Fork Ends	No	12.0		
	(iii) Turnbuckles	No	6.0		
	(iv) Couplers	No	6.0		
B65.06	Tensioning of stress bars				
	(a) Extra over item 65.05 for partially tensioning the M64 cables. Nominal force of 100kN to tension cable.	MN	0.1		
	(b) Extra over item 65.05 for partially tensioning the M56 cables. Nominal force of 100kN to tension cable.	MN	0.1		
Total Caward To Summary					

CONTRACT NO: IN/010/2022

**FOR UNIVERSITY OF VENDA
ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA
ROAD(R524)**

SCHEDULE C: BRIDGE

SECTION
6600

Number	Item Description	Unit	Quantity	Rate	Amount R
66.00	NO-FINES CONCRETE, JOINTS, BEARINGS, BOLT GROUPS FOR ELECTRIFICATION, PARAPETS AND DRAINAGE FOR STRUCTURES				
B66.04	Installation of proprietary expansion joints (a) BSP® 40 Anchorage expansion joint (Total movement allowable of 40mm supplied by DCZ Zendon or similar approved supplier)	m	40.0		
B66.06	Filled joints:				
	(a) Depth greater than 150mm				
	(i) In abutments with 10mm joint filler	m ²	10.0		
66.08	Sealing joints with:				
	(a) Sealant				
	(i) 10mm x 10mm Non sag silicone joint sealant that will have movement capability 100% extension and 50% compression movement capacity	m	35.0		
66.11	Bearings				
	(a) Nova unidirectional type UL little j	No	10.0		
66.17	End blocks				
	a) New precast end blocks, refer to drawing 20737-S-204 for details	No	4.0		
66.18	Numbers for structures:				
	(a) Number plates	No	2.0		
66.19	Drainage pipes and weepholes:				
	(a) Drainage pipes:				
	(i) 50mm dia uPVC	m	50.0		
	(ii) 110 mm dia uPVC	m	50.0		
Total Carried Forward					

CONTRACT NO: IN/010/2022

**FOR UNIVERSITY OF VENDA
ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA
ROAD(R524)**

SCHEDULE C: BRIDGE

SECTION
6200

[illegible]

CONTRACT NO: IN/010/2022

**FOR UNIVERSITY OF VENDA
ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA
ROAD(R524)**

SCHEDULE C: BRIDGE

SECTION
7400

[illegible]

CONTRACT NO: IN/010/2022

**FOR UNIVERSITY OF VENDA
ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA
ROAD(R524)**

SCHEDULE C: BRIDGE

**SUMMARY OF
SECTIONS**

Section	Description	Amount R
	SURFACING OF BRIDGE DECKS	
2	GABIONS	
2	FOUNDATIONS FOR STRUCTURES	
3	FALSEWORK, FORMWORK AND CONCRETE FINISH	
	STEEL REINFORCEMENT FOR STRUCTURES	
5	CONCRETE FOR STRUCTURES	
	PRESTRESSING	
	NO-FINES CONCRETE, JOINTS, BEARINGS, PARAPETS AND DRAINAGE FOR STRUCTURES	
	STRUCTURAL STEELWORK	
	PATENTED EARTH RETAINING SYSTEMS	
Total Carried Forward to Summary of Schedules		

CONTRACT NO: IN/010/2022

FOR UNIVERSITY OF VENDA

ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA
ROAD(R524)

SCHEDULE D: CULVERT - CH 0 + 240

GABIONS

Number	Item Description	Unit	Quantity	Rate	Amount R
5200	GABIONS				
52.01	Foundation trench excavation and backfilling:				
	(b) In all other classes of materials	m ³	250.0		
52.02	Surface preparation for bedding the gabions	m ²	580.0		
52.03	Gabions:				
	(a) Galvanized gabion boxes				
	(1) 1,0 m wide by 1,0 m deep				
	(i) by 1,0 m long class A galvanised 80x100x2.7mm mesh, rock size to vary between 125 mm to 250 mm	m ³	100.0		
	(2) 1,0 m wide by 0,5 m deep				
	(i) by 1,0 m long class A galvanised 80x100x2.7mm mesh, rock size to vary between 125 mm to 250 mm	m ³	5.0		
	(c) Galvanized gabion mattresses				
	(1) 1,0 m diaphragm spacing, 6,0 m long by 1,0 m wide				
	(i) by 0,3 m deep class A galvanised 80x100x2.7mm mesh, rock size to vary between 125 mm to 200 mm	m ³	180.0		
	(2) 1,0 m diaphragm spacing, 3,0 m long by 1,0 m wide				
	(i) by 0,3 m deep class A galvanised 80x100x2.7mm mesh, rock size to vary between 125 mm to 200 mm	m ³	10.0		
52.05	Filter fabric				
	(a) Nonwoven, Needle punched, Continuous Filament, Polyester Geotextile, Type A5, Bidim or similar approved	m ²	30.0		
Total Carried Forward					

CONTRACT NO: IN/010/2022

FOR UNIVERSITY OF VENDA
ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA
ROAD(R524)

SCHEDULE D: CULVERT - CH 0 + 240

FOUNDATIONS FOR STRUCTURES

Number	Item Description	Unit	Quantity	Rate	Amount R
61.00	FOUNDATIONS FOR STRUCTURES				
61.01	Additional foundation investigations	Prov sum	15 000.0		
61.02	Excavation:				
	(a) Excavating soft material situated within the following successive depth ranges:				
	(1) 0 m up to 2 m	m ³	590.0		
	(2) Exceeding 2 m and up to 4 m	m ³	10.0		
	(b) Extra over subitem 61.02(a) for excavation in hard material irrespective of depth	m ³	5.0		
	(c) Extra over subitem 61.02(a) for additional excavation required by the engineer after the excavation has been completed	m ³	5.0		
	(d) Extra over subitem 61.02(a) for excavation by hand	m ³	10.0		
61.03	Access and drainage:				
	(a) Access	L/sum	1.0		
	(b) Drainage where no access has been provided	L/sum	1.0		
61.05	Fill within a restricted area (extra over item 33.01)	m ³	610.0		
61.06	Overhaul in excess of 1,0 km on excavated material and on material imported for backfill, foundation fill and fill for caissons	m ³ -km	1 500.0		
61.08	Foundation fill consisting of:				
	(b) Crushed-stone fill	m ³	180.0		
	(d) Mass concrete Class 15/38	m ³	20.0		
	(e) Concrete screed Class 15/19, 75 mm thick	m ³	15.0		
Total Carried Forward					

C.100

CONTRACT NO: IN/010/2022

FOR UNIVERSITY OF VENDA

ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA
ROAD(R524)

SCHEDULE D: CULVERT - CH 0 + 240

FOUNDATIONS FOR STRUCTURES

Number	Item Description	Unit	Quantity	Rate	Amount R
Brought Forward					
B61.51	Lateral support to excavations				
	(a) Inlet				
	(i) 0 to 5m depth	L/sum	1.0		
	(b) Barrel				
	(i) 0 to 5m depth	L/sum	1.0		
Total Carried Forward To Summary					

CONTRACT NO: DHET/2019/21/01

FOR UNIVERSITY OF VENDA

ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)

SCHEDULE D: CULVERT - CH 0 + 240

FALSEWORK, FORMWORK AND CONCRETE FINISH

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**FOR UNIVERSITY OF VENDA
ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA
ROAD(R524)**

STEEL REINFORCEMENT FOR STRUCTURES

University of Venda

CONTRACT NO: IN/010/2022

FOR UNIVERSITY OF VENDA
ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA
ROAD(R524)

SCHEDULE D: CULVERT - CH 0 + 240

CONCRETE FOR STRUCTURES					
Number	Item Description	Unit	Quantity	Rate	Amount R
64.00	CONCRETE FOR STRUCTURES				
B64.01	Cast in situ concrete				
	(a) Durability Concrete				
	(i) Barrel of culvert (W30/19)	m ³	96.0		
	(ii) Inlet structure, i.e. base slab for gabions (W30/19)	m ³	10.0		
	(iii) Outlet structure, Including wing walls (W30/19)	m ³	6.0		
B64.07	Curing of concrete				
	(a) Barrel of culvert - Top slab with Antisol E or similar approved	m ²	205.0		
	(b) Barrel of culvert - Walls with Antisol E or similar approved	m ²	100.0		
	(c) Barrel of culvert - Floor slab with Antisol E or similar approved	m ²	100.0		
	(d) Inlet structure - Floor slab with Antisol E or similar approved	m ²	32.0		
	(e) Inlet structure - head wall with Antisol E or similar approved	m ²	25.0		
	(f) Outlet structure - Walls with Antisol E or similar approved	m ²	20.0		
	(g) Outlet structure - Floor slab with Antisol E or similar approved	m ²	12.0		
Total Carried Forward To Summary					

CONTRACT NO: IN/010/2022

**FOR UNIVERSITY OF VENDA
ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA
ROAD(R524)**

SCHEDULE D: CULVERT - CH 0 + 240

NO-FINES CONCRETE, JOINTS, BEARINGS, BOLT GROUPS FOR ELECTRIFICATION, PARAPETS AND DRAINAGE FOR STRUCTURES

Number	Item Description	Unit	Quantity	Rate	Amount R
66.00	NO-FINES CONCRETE, JOINTS, BEARINGS, BOLT GROUPS FOR ELECTRIFICATION, PARAPETS AND DRAINAGE FOR STRUCTURES				
B66.05	Expansion joints:				
	(a) Provision of Jointex 10mm thick with 10mm tear off strips, irrespective of width of section	m ²	13.0		
	(b) 10mm x 10mm Dow Corning 888 sealant for 10mm expansion joint	m	65.0		
	(c) Bitumen impregnated burlap strip 200mm wide	m	20.0		
66.18	Numbers for structures:				
	(a) Number plates	No	2.0		
	(c) Numbers formed in concrete, as per mounting block details	No	2.0		
66.19	Drainage pipes and weep holes				
	(a) Drainage pipes				
	(i) 110mm dia uPVC class 34 Drainage discharge pipe to SANS 791	m	0.0		
B66.28	Drainage strips (a) Pre-manufactured composite vertical band drain system comprising a heavy duty, extruded HDPE geospacer 250mm flat cylinder, wrapped in a filter jacket to be Bidim A4 or similar approved. Rate shall be inclusive of securing with 25 x 25mm hoop iron washers at 1m c/c, as well as any returns required in the geotextile fabric. Refer to detail on drawing.	m	140.0		
B66.29	Perforated drainage pipe				
Total Carried Forward					

CONTRACT NO: IN/010/2022

FOR UNIVERSITY OF VENDA

ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)

SCHEDULE D: CULVERT - CH 0 + 240

NO-FINES CONCRETE, JOINTS, BEARINGS, BOLT GROUPS FOR ELECTRIFICATION, PARAPETS AND DRAINAGE FOR STRUCTURES

[illegible]

CONTRACT NO: IN/010/2022

**FOR UNIVERSITY OF VENDA
ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA
ROAD(R524)**

SCHEDULE D: CULVERT - CH 0 + 240

SUMMARY OF SECTIONS

Section	Description	Amount R
1	GABIONS	
2	FOUNDATIONS FOR STRUCTURES	
3	FALSEWORK, FORMWORK AND CONCRETE FINISH	
4	STEEL REINFORCEMENT FOR STRUCTURES	
5	CONCRETE FOR STRUCTURES	
6	NO-FINES CONCRETE, JOINTS, BEARINGS, BOLT GROUPS FOR ELECTRIFICATION, PARAPETS AND DRAINAGE FOR STRUCTURES	
Total Carried Forward To Summary Of Schedules		

CONTRACT NO: IN/010/2022

FOR UNIVERSITY OF VENDA

ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)

SCHEDULE E: ELECTRICAL WORKS

Item No	Item Description	Unit	Quantity	Rate	Amount R
	8M STREETLIGHTS AT UNIVEN				
1	LOW VOLTAGE CABLE For the Supply, delivery to Site and Installation of the following Low Voltage Cable: (600/1000V PVC SWA Copper)				
	25mm x 4 core	m	3100		
2	BARE COPPER EARTH WIRE (STRANDED) For the Supply and Installation of the following BCE Wire to run with LV Cables: 16mm sq (With 25mm sq Cable)	m	2100		
3	LOW VOLTAGE CABLE TERMINATIONS For the supply of Indoor terminations including suitable Lugs and Glands for the Low Voltage Cable and BCE Wire:				
	25mm x 4 core	e.a	124		
	BCEW 16mm sq	e.a	124		
4	LOW VOLTAGE CABLE JOINTS For the Supply, delivery to Site and Installation of the following Low Voltage Cable Joints:				
	25mm x 4 core	e.a	50		
5	LOW VOLTAGE STREETLIGHT CONTROL KIOSKS For the Supply, delivery to Site and Installation of the following Low Voltage Streetlight Control Kiosks as specified in the schedule in this document:				
	Streetlight Control kiosk as per drawing specified	e.a	6		
	Supply and install 2.5m earth rod at each Kiosks	e.a	6		
	Supply and install labels (External & Internal) on all kiosks	e.a	6		
Total Carried Forward					

CONTRACT NO: IN/010/2019RE

FOR UNIVERSITY OF VENDA

ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)

SCHEDULE E: ELECTRICAL WORKS

Brought Forward					
6	EXCAVATION AND TRENCHING For the Supply and Labour of the following: Trenching for LV Cable 1000mm x 450mm wide (Including Backfill) Soft Ground Pickable ground Hard Rock Danger Tape installed in Trenches Concrete cable markers 110mm PVC Cable sleeve	m	1000		
		m	1000		
		m	100		
		m	2100		
		e.a	45		
		m	120		
7	STREETLIGHTS For the Supply, delivery to Site and Installation of the following Streetlight Units complete as per Specification: Street Light Luminaire 27W LED Lume Double BRKT Piano Type, complete with base plates and Circuit Breaker MCB Including connection to the 25mm ² Cable/ or complete wiring of Street Light. Street Light Luminaire 27W LED Lume Double BRKT Piano Type, complete with base plates and Circuit Breaker MCB Including connection to the 25mm ² Cable/ or complete wiring of Street Light.	e.a	37		
		e.a	13		
8	WIRING ON THE POLE 600/1000V grade PVC insulated stranded copper conductors compete with terminations and accessories 2,5mm ² PVC insulated stranded copper conductors 1.5mm ² Stranded bare copper earth wire	m	2600		
		m	1300		
9	TESTING AND COMMISSIONING Supply all Test equipment and Labour for Testing, Commissioning and Adjustment at Completion, as well as being in attendance for any Inspections and Tests that the Engineer may call for. All Eskom Standards and specifications will apply	Prov sum	1	R R20 000	R20 000.00
Total Carried Forward					

CONTRACT NO: IN/010/2019RE

FOR UNIVERSITY OF VENDA

ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)

SCHEDULE E: ELECTRICAL WORKS

Brought Forward					
10	MV RETICULATION Includes Supply and delivery to site of 315KVA Mini-Sub, Medium Voltage (MV) Underground Cable 95mm ² , Termination of MV Cable to the Mini-Sub and MV Cable joints. Eskom via Minor Retic Application Process will also have to confirm proposed T-Off Poles and Capacity required, i.e. Total power in KVA value.(3 off)	Prov sum	2	R 498 000.00	R996 000.00
Total Carried Forward To Summary					

CONTRACT NO: IN/010/2022

FOR UNIVERSITY OF VENDA
ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA
ROAD(R524)

SCHEDULE F: NEW ACCESS GATEHOUSE AND GATEHOUSE

Item No	Description	Unit	Quantity	Rate	Amount
	<p>SCHEDULE F</p> <p>BUILDING WORK</p> <p>Bill No 1</p> <p>EARTHWORKS</p> <p>PREAMBLES</p> <p>For preambles see "Model Preambles for Trades (2008 Edition)"</p> <p>SUPPLEMENTARY PREAMBLES</p> <p>Nature of ground</p> <p>"Hard rock" shall mean granite, quartzitic sandstone or other rock of similar hardness, the removal of which requires drilling, wedging and splitting or the use of explosives "Soft rock" shall mean hard material, the removal of which warrants the use of pneumatic tools and includes hard shale, ferricite, compact oukclip and material of similar hardness "Earth" shall mean all ground other than that classified as "hard rock" or "soft rock" and shall include made-up ground and any loose stones or pieces of concrete not exceeding 0,03m³ in volume</p> <p>Subterranean water</p> <p>No subterranean water is expected</p> <p>Filling and layer work materials</p> <p>References such as "G1", "G2", etc and "C1", "C2", etc in descriptions of filling and layer work materials refer to corresponding references in the document "Guidelines for Road Construction Materials. TRH 14 : 1985" compiled by the Committee of State Road Authorities and the properties set out therein for each kind shall be applicable to the respective materials described hereinafter</p>				
	Carried to Collection				

	Extra over trench and hole excavations in earth for excavation in				
3	Soft rock	m ³	6,00		
4	Hard rock	m ³	3,00		
	Extra over all excavations for carting away				
5	Surplus material from excavations and/or stock piles on site to a dumping site to be located by the contractor	m ³	26,00		
	Risk of collapse of excavations				
6	Sides of trench and hole excavations not exceeding 1,5m deep	m ²	127,00		
	Keeping excavations free of water				
7	Keeping excavations free of all water other than subterranean water	Item	1,00		
	Earth filling with selected material obtained from the excavations and/or prescribed stock piles on site compacted to 93% Mod AASHTO density				
8	Backfilling to trenches, holes, etc	m ³	36,00		
9	Under floors, steps, pavings, etc	m ³	8,00		
	Compaction of surfaces				
10	Compaction of natural or excavated ground surface under trenches, holes, etc, including scarifying for a depth of 150mm, breaking down oversize material, adding suitable material where necessary and compacting to 95% Mod AASHTO density	m ²	58,00		
	WEED KILLERS, INSECTICIDES, ETC				
	Soil insecticide in accordance with SANS 5859				
11	Under floors, etc including forming and poisoning shallow furrows against foundation walls, filling in furrows and ramming	m ²	21,00		
12	To bottoms and sides of trenches, etc TESTS	m ²	74,00		
	Prescribed tests to determine degree of compaction or other properties of ground or filling				
13	Modified AASHTO Density test	No	2,00		
	Carried to Collection				

[illegible]

	<p>SCHEDULE F</p> <p>BUILDING WORK</p> <p>Bill No 2</p> <p>CONCRETE, FORMWORK & REINFORCEMENT</p> <p>PREAMBLES</p> <p>For preambles see "Model Preambles for Trades (2008 Edition)"</p> <p>SUPPLEMENTARY PREAMBLES</p> <p>General</p> <p>All concrete to be mixed by mechanical means or ready-mixed by a batching plant, all to the approval of the principal agent. The principal agent may permit certain items of non-structural concrete to be mixed by hand. If the concrete is mixed by hand, it shall first be mixed in a dry state on a clean non-absorbent surface until it is of uniform colour and consistency. Just enough water shall then be added to permit mixing and working at which stage the concrete shall continue to be mixed until it is of uniform colour and consistency. Surface beds cast in panels shall be cast in panels of approximately 9m².</p> <p>Testing of cement, sand and stone</p> <p>The contractor shall, when called upon by the principal agent, test the quality of cement, fine aggregate or coarse aggregate by an approved laboratory.</p>				
	Carried to Collection				

	<p>Concrete test cubes</p> <p>Descriptions and tendered rates for concrete strength test cubes, as required under clause 7, "Tests" of SANS 1200 G, shall be deemed to cater for all the costs of providing cube moulds necessary for the purpose, making, storing and sending thereof to an approved accredited laboratory for testing, paying all charges in connection therewith and for submitting test result reports to Principal Agent</p> <p>All concrete strength test cubes, each size 150 x 150 x 150mm, shall be prepared in a set of three</p> <p>It will be required from the Contractor to prepare concrete strength test cube sets for each building at the following minimum frequencies: - One set of three cubes for every 15m³, or part thereof, of concrete cast per day, or: - One set of three cubes for each batch of concrete cast per event</p> <p>All concrete strength test cubes shall be labelled and the identity thereof (ie. date, concrete strength type, position where batch was cast relative to the building and building identity) shall be properly recoded for future reference</p> <p>Formwork</p> <p>Descriptions of formwork shall be deemed to include use and waste only (except where described as "left in" or "permanent"), for fitting together in the required forms, wedging, plumbing and fixing to true angles and surfaces as necessary to ensure easy release during stripping and for reconditioning as necessary before re-use</p> <p>The vertical strutting shall be carried down to such construction as is sufficiently strong to afford the required support without damage and shall remain in position until the newly constructed work is able to support itself</p> <p>Formwork to soffits of solid slabs etc shall be deemed to be to slabs not exceeding 250mm thick unless otherwise described</p>				
	Carried to Collection				

	<p>Formwork to soffits of slabs, beams, etc shall be deemed to be propped up exceeding 1,5m and not exceeding 3,5m high unless otherwise described</p> <p>Formwork to sides of bases, pile caps, ground beams, etc. will only be measured where it is prescribed by the Principal Agent for design reasons. Formwork necessitated by irregularities or collapse of excavated faces will not be measured and the cost thereof shall be deemed to be included in the allowance for taking the risk of collapse of the sides of the excavations, provision which is made for in "Earthworks"</p> <p>Reinforcement</p> <p>Standard welded steel fabric reinforcement shall be as included in Table 1 of SANS 1024 and shall have 300mm wide laps The mass of binding wire is not included in the mass of the reinforcement and the cost thereof shall be included in the rates for the reinforcement</p> <p>Supervision</p> <p>A competent and experienced foreman shall supervise personally the whole of the concrete construction and pay special attention to:</p> <p>The quality, testing and mixing of materials; The placing and compaction of concrete; The construction and removal of formwork; and The sizes and position of the reinforcement</p> <p>The contractor shall obtain the permission of the principal agent before commencing concreting of foundations, surface beds and reinforced structure</p>				
	Carried to Collection				

	<p>No inspection, approval, authorisation to proceed, comment or instructions following from such an inspection, or failure of the principal agent to comment on any particular aspect of the work shall be deemed to relieve the contractor in any way from his obligation to ensure through his own supervision that the work is constructed in every way in accordance with the drawings, specifications and conditions of contract, nor relieve him from his obligations to make good any fault or defect, nor shall it be deemed that there is any obligation on the principal agent to inspect all or any part of the works or that such inspection is necessarily complete in every respect</p> <p>UNREINFORCED CONCRETE CAST AGAINST EXCAVATED SURFACES</p> <p>15MPa/19mm Concrete</p> <p>1 Surface blinding under bases m³ 2,00</p> <p>REINFORCED CONCRETE CAST AGAINST EXCAVATED SURFACES</p> <p>35MPa/19mm Concrete</p> <p>2 Strip footings m³ 6,00</p> <p>3 Bases m³ 14,00</p> <p>REINFORCED CONCRETE CAST ON/IN FORMWORK</p> <p>35MPa/19mm Concrete</p> <p>4 Surface beds m³ 1,00</p> <p>5 Surface beds on waterproofing m³ 1,00</p> <p>6 Slabs including beams and inverted beams m³ 8,00</p> <p>7 Bottoms and sides of isolated gutters m³ 2,00</p> <p>8 Columns m³ 9,00</p> <p>9 Anchor blocks m³ 4,00</p> <p>TEST CUBES</p> <p>Sundries</p> <p>10 Allow for preparing a set of three concrete strength test cubes, each size 150 x 150 x 150mm, sending them to an approved testing laboratory for testing and paying all charges in connection therewith Sets 6,00</p>				
	Carried to Collection				

	CONCRETE SUNDRIES				
	Finishing top surfaces of concrete smooth with a wood float				
11	Surface beds, etc	m ²	21,00		
12	Surface beds, etc to falls	m ²	9,00		
13	Slabs, etc	m ²	30,00		
14	Isolated box gutters	m ²	3,00		
	SMOOTH FORMWORK (DEGREE OF ACCURACY I)				
	Smooth formwork to sides				
15	Square shaped anchor blocks not exceeding 1.5m above bearing level	m ²	16,00		
16	Frustum shaped square columns with total height exceeding 11m and not exceeding 12.5m above bearing level (two sides splayed from 1000mm at bottom to 500mm at top)	m ²	63,00		
17	Inverted beams above concrete	m ²	28,00		
18	Sides of gutter beams above concrete	m ²	14,00		
19	Edges, risers, ends and reveals of slabs not exceeding 300mm high or wide	m	24,00		
20	Edges, risers, ends and reveals of gutters not exceeding 300mm high or wide	m	17,00		
	Smooth formwork to soffits				
21	Slabs propped up exceeding 1.5m and not exceeding 3.5m high	m ²	30,00		
22	Gutters propped up exceeding 4.5m and not exceeding 6m high	m ²	6,00		
	Carried to Collection				

	Bill No 2 CONCRETE, FORMWORK & REINFORCEMENT COLLECTION Total Brought from Page No Total Brought from Page No Total Brought from Page No Total Brought from Page No Total Brought from Page No Total Brought from Page No Total Brought from Page No		Page No 117 118 119 120 121 122 123		
	Carried forward to Summary Section No 1				

	Brickwork of NFX bricks (14 MPa nominal compressive strength) in class II mortar in loadbearing walls etc				
3	One brick walls	m ²	21,00		
	SUPERSTRUCTURE				
	Brickwork of NFP bricks in class II mortar				
4	Half brick walls	m ²	11,00		
5	One brick honeycomb walls	m ²	29,00		
	Brickwork of NFX bricks (14 MPa nominal compressive strength) in class II mortar in loadbearing walls etc				
6	One brick walls	m ²	47,00		
	BRICKWORK SUNDRIES				
	Brickwork reinforcement				
7	75mm Wide reinforcement built in horizontally in foundations	m	28,00		
8	75mm Wide reinforcement built in horizontally	m	16,00		
9	150mm Wide reinforcement built in horizontally in foundations	m	144,00		
10	150mm Wide reinforcement built in horizontally	m	311,00		
	Turning pieces to lintels etc				
11	220mm Wide turning pieces	m	1,00		
	FACE BRICKWORK				
	Corobrik Middelwit Red Travertine face bricks pointed with recessed horizontal and vertical joints				
12	Extra over brickwork in foundations for face brickwork	m ²	15,00		
13	Extra over brickwork for face brickwork	m ²	46,00		
14	Extra over brickwork for face brickwork to honeycomb walls	m ²	57,00		
15	Extra over brickwork for brick-on-edge header course lintels one course high, pointed on face and 110mm soffit	m	2,00		
	Carried to Collection				

University of Venda

	<p>SCHEDULE F</p> <p>BUILDING WORK</p> <p>Bill No 4</p> <p>WATERPROOFING</p> <p>PREAMBLES</p> <p>For preambles see "Model Preambles for Trades (2008 Edition)"</p> <p>SUPPLEMENTARY PREAMBLES</p> <p>Dampproofing to walls</p> <p>All joints in dampproof courses to walls shall be lapped a minimum of 150mm except at junctions and corners where the lap shall equal the full thickness of the wall</p> <p>Waterproofing</p> <p>Waterproofing of roofs, basements, etc shall be laid under a ten year guarantee. Waterproofing to roofs shall be laid to even falls to outlets etc with necessary ridges, hips and valleys. Descriptions of sheet or membrane waterproofing shall be deemed to include additional labour to turn-ups and turn-downs</p> <p>DAMPPROOFING OF WALLS AND FLOORS</p> <p>One layer 375 micron embossed polyethylene dampproof course (SANS 952-1985 type B)</p>				
1	<p>In walls</p> <p>One layer 250 micron green polyethylene waterproof sheeting (SANS 952-1985 type C) sealed at laps with PVC self-adhesive tape</p>	m ²	9,00		
2	<p>Under surface beds</p>	m ²	21,00		
	Carried to Collection				

	WATERPROOFING TO ROOFS ETC				
	One layer 4mm "Derbifum SP4" torch-fusion waterproof membrane sealed to primed surfaces to falls and crossfalls including protection separation sheet laid with 75mm side and 100mm end laps				
3	On flat roofs	m ²	24,00		
4	On flat box gutters	m ²	3,00		
5	On tops and sides of inverted beams and walls	m ²	24,00		
6	Sealing edges to brickwork or concrete including trowelled mastic bead	m	19,00		
7	Additional membrane 250mm girth and 400mm long at internal and external angles including forming darts as necessary	No	4,00		
8	Additional membrane 250mm girth and 500mm long at internal and external angles including forming darts as necessary	No	8,00		
9	Dressing and sealing into 100mm internal diameter outlet, including additional membrane	No	4,00		
10	30 x 30mm Triangular fillets	m	45,00		
	Two coats bituminous aluminium paint				
11	On waterproofing to roofs	m ²	38,00		
12	On waterproofing to box gutters	m ²	13,00		
	FLAT SHEET METAL				
	0,6mm Galvanised sheet steel				
13	Cover flashings 170mm girth with 100mm laps, including sealing top edge with mastic in and including groove in brickwork or concrete	m	45,00		
	WATERSTOPS, SEALING STRIPS, JOINT SEALANTS, ETC				
	abe dura kol G HM two-part grey polysulphide sealing compound including primer, etc				
14	10 x 10mm In expansion joints in floors, etc including raking out expansion joint filler as necessary	m	34,00		
	Carried to Collection				

[illegible]

	<p>SCHEDULE F</p> <p>BUILDING WORK</p> <p>Bill No 5</p> <p>ROOF COVERINGS, CLADDINGS, ETC</p> <p>PREAMBLES</p> <p>For preambles see "Model Preambles for Trades (2008 Edition)"</p> <p>SUPPLEMENTARY PREAMBLES</p> <p>All roof coverings, etc. to be with a covering of Z275 galvanizing and shall be free of white rust. All holes to be drilled and not punched The contractor is to submit a certificate signed by the merchant stating that the roof covering supplied complies with the required thickness and specification</p> <p>Roof manufacturing and erection must be done by a specialist. A written 5-year guarantee certificate must be issued on completion thereof</p> <p>Prices to include for all cutting and waste and relevant fixing material, unless otherwise described</p> <p>All rates for flashings, trimmings, etc., to include for forming drips and closed ends to troughs of sheet steel roof covering where applicable</p> <p>PROFILED METAL SHEETING AND ACCESSORIES</p> <p>0,58mm Thick double interlocking concealed fix "Klip-Tite" galvanised sheeting in single lengths fixed to steel purlins with "Chromadek" finish on one side and Pebble Grey backing coat</p>				
1	Roof covering with pitch not exceeding 25 degrees	m ²	308,00		
	Carried to Collection				

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	SCHEDULE F BUILDING WORK Bill No 7 IRONMONGERY PREAMBLES For preambles see "Model Preambles for Trades (2008 Edition)" HINGES, BOLTS, ETC 1 153mm DFB-SC-180 flush bolt with keep let into metal 2 153mm DFB-SC-180 flush bolt with keep let into concrete LOCKS Keys Unless otherwise described locks shall have two keys each Manufactured by "Dorma" 3 D035S SS Bathroom sash lock with 57mm backset 4 D07735 SS narrow stile heavy duty swivel dead lock with 35mm backset 5 D037 D SS clinder deadlock with 57 backset				
	Carried to Collection				

	EN-SUITE LOCKS The following locks are to be suitable for master key operation Manufactured by "Dorma"				
6	42m DSC054201 satin nickel five pin euro-profile single cylinder	No	2,00		
7	65mm DKC056501 KD satin nickel five pin euro-profile knob cylinder	No	3,00		
8	Master key	No	1,00		
	HANDLES Manufactured by "Dorma"				
9	TH126 WC SS Lever on rose with bathroom/wc furniture	Sets	1,00		
10	382 x 32mm DPH215 D-shaped offset back-to-back pull handles	Pairs	3,00		
11	149 x 19mm DPH301C BT straight tubular pull handle	No	3,00		
	ESCUTCHEONS Manufactured by "Dorma"				
12	DCE-105 SS narrow stile cylinder hole escutcheons	Pairs	3,00		
13	DCE-002 SS round cylinder hole escutcheons	Pairs	2,00		
	REBATE CONVERSION KITS Manufactured by "Dorma"				
14	D038R NP rebated conversion kit for euro-profile cylinder locks	No	1,00		
15	DOOR CLOSERS TS91B SL cam action slide channel door closer with non-hold open action and hydraulic speed control Manufactured by "Dorma"	No	3,00		
	LETTERS, NAME PLATES, ETC Manufactured by "Dorma" and screwed to doors, plugged to walls, etc				
16	150 x 150mm DSS-132-MF stainless steel plate with a male and female symbol	No	1,00		
17	150 x 150mm DSS-136-EL stainless steel plate with an electrical symbol	No	2,00		
	Carried to Collection				

	Bill No 7 IRONMONGERY COLLECTION Total Brought from Page No Total Brought from Page No Total Brought from Page No		Page No 136,00 137,00 138,00		
	Carried forward to Summary Section No 1				

	<p>SCHEDULE F</p> <p>BUILDING WORK</p> <p>Bill No 8</p> <p>STRUCTURAL STEELWORK</p> <p>PREAMBLES</p> <p>For preambles see "Model Preambles for Trades (2008 Edition)"</p> <p>SUPPLEMENTARY PREAMBLES</p> <p>General</p> <p>All structural steelwork shall comply with SANS 2001-CS1 or SANS 10162 and SANS 14713 as applicable. Structural fasteners shall comply with SANS 10094. Structural steelwork shall be cleaned and prepared by wire brushing in accordance with SANS 10064 and all surfaces shall be primed as specified with a minimum dry film thickness of 30 micrometres before leaving the workshop. Upon delivery to the site and again after erection all bared surfaces shall be made good with similar primer. The contractor shall be responsible for the preparation of all shop detail drawings.</p> <p>Descriptions</p> <p>No allowance has been made in the mass of steel for rolling margins, rivets, additional materials in welding, decorative or protective treatment nor constructional aids.</p> <p>Descriptions of bolts shall be deemed to include nuts and washers.</p> <p>Descriptions of L-shaped and U-shaped anchor bolts shall be deemed to include bending, threading, nuts and washers and embedding in concrete.</p>				
	Carried to Collection				

	<p>Descriptions of expansion anchors and bolts and chemical anchors and bolts shall be deemed to include nuts, washers and mortices in brickwork or concrete</p> <p>Descriptions of L-shaped and U-shaped anchor bolts shall be deemed to include bending, threading, nuts and washers and embedding in concrete. Where anchor bolts are described as embedded in sides or soffits of concrete it shall be deemed to include holes through formwork.</p> <p>Descriptions of expansion anchors and bolts and chemical anchors and bolts shall be deemed to include nuts, washers and mortices in brickwork or concrete.</p> <p>Metalwork described as "holed for bolt(s)" shall be deemed to exclude the bolts unless otherwise described</p> <p>STEEL COLUMNS</p> <p>Welded columns in single lengths with flat base and cap connection plates, embedded in concrete or bolted to brickwork</p>				
1	75 x 75 x 3mm Thick hollow section columns, 1790mm long	No	2,00		
2	Welded columns in single lengths with flat base, cap, bearer and connection plates, bolted to concrete and steel				
3	139.7mm External diameter x 4mm thick inclined columns with 6mm thick plate end caps welded on and both ends three times slotted for 200mm length to form openings for connection and support plates	t	0,25		
4	400 x 250 x 16mm Thick flat section base plate, four times holed for bolts	No	4,00		
5	200 x 200 x 20mm Thick flat section connection plates with rounded top edge to 100mm radius, once holed for bolt and welded to base plate	No	8,00		
6	300 x 225 x 20mm Thick flat section connection plates, twice rounded to 85mm radius, once holed for bolt and welded to rafter	No	8,00		
7	170 x 435 x 20mm Thick flat section connection plates, with one end rounded to 85mm radius, once holed for bolt and inserted and welded 200mm deep into column	No	8,00		
Carried to Collection					

	STEEL PURLINS, GIRTS, BRACING, ETC				
	Purlins and girts bolted to steel				
18	275 x 100 x 20 x 3mm Thick cold-formed lipped channel purlins	t	3,10		
19	125 x 50 x 20 x 2mm Thick cold-formed lipped channel carrier support purlins	t	0,07		
20	215 x 200 x 6mm Thick flat section purlin connection plates, four times holed for bolts and welded to rafter	No	60,00		
21	215 x 60 x 6mm Thick flat section support cleat welded to purlin connection plates	No	60,00		
	Welded bracing, anti-sag rails, etc with flat connection plates, bolted to steel				
22	IPEaa 100 anti-sag rails fixed to connection plates	t	0,49		
23	IPEaa 140 girts or support beams bolted to connection plates	t	2,41		
24	150 x 140 x 6mm Thick anti-sag rail connection plates welded to purlins	No	120,00		
25	215 x 60 x 6mm Thick flat girt connection plates welded to trusses	No	56,00		
	Ceiling rails welded to steel or bolted to concrete				
26	20 x 30 x 1,6mm ceiling connection plates welded to beams	m	89,00		
27	70 x 70 x 3mm ceiling connection plates, each ten times holed for expansion bolts (2 off)	m	17,00		
	SUSPENSION CABLES				
	Welded suspension cables, etc with flat connection plates, bolted to steel				
28	40mm Diameter solid section suspension rods with one end sleeved 110mm deep for 20mm thick connection plates and other end threaded for a length of 200mm and fixed to closed body rigging screws	t	0,97		
29	230 x 230 x 16mm Thick flat section wall plates inserted into side of concrete columns	No	12,00		
	Carried to Collection				

30	90 x 120mm Overall x 20mm thick irregular shaped flat section connection plates, once rounded to 32mm radius and once holed for bolt and welded to wall plate	No	24,00		
31	90 x 250 x 20mm Thick flat section triangular shaped connection plates, once holed and once rounded to 40mm radius and welded to trusses	No	12,00		
32	80 x 200 x 20mm Thick flat section connection plates, with one end rounded to 40mm radius, once holed for bolt and inserted and welded 110mm deep into suspension rod	No	12,00		
33	50 x Average 597mm long x 16mm thick flat section wall plate support plates, welded to wall plates	No	24,00		
	BOLTS, FASTENERS, ETC				
	Grade 4.8 bolts				
34	M20mm threaded anchor bolt 530mm long with 90 x 90 x 12mm plated welded on and embedded in top of concrete	No	16,00		
	Grade 8.8 bolts				
35	M12 bolts	kg	55,00		
36	M16 bolts	kg	45,00		
37	M20 bolts	kg	5,00		
38	M30 bolts	kg	35,00		
	Expansion bolts				
39	M8 x 50mm bolts	No	20,00		
	Elephant Lifting or "Vitalift" closed body rigging screws				
40	39mm Diameter closed body rigging screws with one end with "Clevis Jaw" for bolt fixing (including bolt, nuts and washers) and other end with lock nut to receive 40mm threaded suspension rod (6 ton working load capacity)	No	12,00		
	SUNDRIES				
	15Mpa "abe dura.grout" non-shrink grouting				
41	Bedding approximately 20mm thick under 400 x 250mm base plate	No	4,00		
Carried to Collection					

	Bill No 8 STRUCTURAL STEELWORK COLLECTION Total Brought from Page No Total Brought from Page No Total Brought from Page No Total Brought from Page No Total Brought from Page No		Page No 140 141 142 143 144		
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	<p>SCHEDULE F</p> <p>BUILDING WORK</p> <p>Bill No 9</p> <p>METALWORK</p> <p>PREAMBLES</p> <p>For preambles see "Model Preambles for Trades (2008 Edition)"</p> <p>SUPPLEMENTARY PREAMBLES</p> <p>Primer</p> <p>All surfaces of steelwork cleaned and prepared by wire brushing in accordance with SANS 10064 and all surfaces shall be painted with approved factory etch primer to a minimum dry film thickness of 30 micrometres before leaving the workshop of the manufacturer All scratches, chips or blemishes to be made good on site after erection All rates tendered must make provision for this as no claim will afterwards be entertained.</p> <p>Descriptions</p> <p>No allowance has been made in the mass of steel for rolling margins, rivets, additional materials in welding, decorative or protective treatment nor constructional aids</p> <p>Descriptions of bolts shall be deemed to include nuts and washers Descriptions of expansion anchors and bolts and chemical anchors and bolts shall be deemed to include nuts, washers and mortices in brickwork and concrete</p> <p>Metalwork described as "holed for bolt(s)" shall be deemed to exclude the bolts unless otherwise described</p>				
	Carried to Collection				

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	<p>ALUMINIUM WINDOWS, DOORS, ETC.</p> <p>SUPPLEMENTARY PREAMBLES</p> <p>Manufacturing and installation of aluminium doors, windows, shopfronts, etc</p> <p>All aluminium doors, windows, shopfronts, etc. are to be manufactured, supplied and installed complete under guarantee by an approved firm of specialists and shall comply with AAAMSA design criteria</p> <p>The following documents, certificates, guarantees, etc. shall be provided and the necessary approvals obtained from the Principal Agent prior to commencement of any fabrication and/or work on site:</p> <p>1 A complete set of manufacturing drawings as prepared by manufacturer of the aluminium doors, windows and shopfront units</p> <p>2 A copy of the relevant AAAMSA Performance Test Certificate from the manufacturer/specialist supplying or installing the glazed architectural products</p> <p>3 A copy of the appropriate SAFIERA Energy Rating Certification</p> <p>The following certificates, etc shall be provided and handed over to the Principal Agent upon completion of the aluminium work on site:</p> <p>1 AAAMSA Performance Test Certificate</p> <p>2 AAAMSA or SAGGA Glass & Glazing Certificate</p> <p>3 AAAMSA Surface Finishing Certificate</p> <p>4 AAAMSA or SASA Skylight System Certificate (where applicable)</p> <p>5 AAAMSA Architectural Product Certificate (in the event drawings are not provided)</p> <p>5 SAFIERA Energy Rating Certification</p>				
	Carried to Collection				

	<p>Approved workshop drawings, design and guarantee certificates</p> <p>It will be regarded the contractor's responsibility to timeously prepare, submit and obtain the necessary approvals from the principal agent in respect of the required manufacturing drawings and specified design and guarantee certificates</p> <p>Building in</p> <p>Tendered rates for doors, windows, shopfronts, etc., should include for the setting up and building in position in brickwork or concrete with all abutments, joints, etc. sealed with approved coloured silicon joint sealant and to be left completely watertight</p> <p>Upon completion of the works, all doors, windows, shopfronts, etc., are to be properly serviced and rendered in a complete and satisfactory state of repair and working order</p> <p>Protection</p> <p>Doors, windows, shopfronts, etc. shall be supplied with protective tape and plastic and must be erected, wherever practicable, as near to the end of the contract period as possible to minimise the danger of possible damages. Protective material must be maintained during the course of the project to ensure protection against possible damages, deterioration or discolouration caused by movement of personnel, mortar droppings, varnish, wax, paint, etc., all to the entire satisfaction of the principal agent and shall be removed only once surrounding trades have been completed</p> <p>Glazing</p> <p>All glazing and thicknesses thereof shall comply with SAGGA and AAAMSA regulations irrespective of thicknesses described and/or shown on the drawing or schedules</p> <p>Tendered rates must cater for glazing with all glass/frame abutments being be sealed with and including proprietary type neoprene extruded gaskets, well fitted and with fair cut mitres at corners. Care must be taken to ensure that all neoprene extruded gaskets do line up with the glazing rebates of frames</p>				
	Carried to Collection				

	<p>Steel louvered windows</p> <p>Steel louvered windows to be "Stormline" or other approved adjustable steel louvres of powder coated finish, complete with framework, stiles pivoted glass holds, weather beads, handle, etc., supplied by and installed all in accordance to the manufacturer's specifications</p> <p>Ironmongery</p> <p>- Hinges: Unless otherwise described, swing doors are to be hung on one-and-half pairs aluminium hinges with stainless steel pins, nylon bushes and stainless steel washers per leaf</p> <p>- Flush bolts: Double, sliding and sliding/stacking doors shall be factory fitted with and including flush bolts at bottom and top as described to facilitate easy access</p> <p>- Furniture: All other furniture (ie. door locks, door handles, door closers, door stops, etc) are described and provided for elsewhere in this document. Rates must make provision for preparing door leaves and fixing of ironmongery complete</p> <p>Tendered rates must make provision for the above-mentioned as no additional claims in this regard will afterwards be entertained</p> <p>Dimensions</p> <p>All dimensions given in the descriptions of the aluminium windows, doors, etc are nominal and actual measurements are to be obtained or taken on the site before fabrication commences</p> <p>Dimensions as quoted for the itemised doors, windows, shopfronts, etc. shall take precedence should any dimension on drawings be inconsistent with dimensions referred to in the items hereunder</p>				
	Carried to Collection				

	<p>Drawings for shopfronts, windows, doors, etc</p> <p>Full scale drawings of the above-mentioned can be viewed at and/or obtained, during normal office hours, from the principal agent</p> <p>Water penetration tests</p> <p>The external units are to be tested for water penetration in accordance with SANS and AAAMSA requirements</p> <p>Sealing</p> <p>Windows, shopfronts and curtain walls are to be sealed on both sides with an approved silicone sealant against adjoining plaster, brickwork, concrete, etc</p> <p>Outward opening aluminium casement windows</p> <p>Powder coated casement window units complete with subframes, ironmongery, 6.35mm clear laminated safety glass with one-way film on the inside, sealing, etc and fixing to brickwork or concrete</p>				
4	<p>Standard window type PT69, 600 x 900mm high overall</p> <p>Powder coated casement window units complete with subframes, ironmongery, 10.38mm clear laminated safety glass, sealing, etc and fixing to brickwork or concrete</p>	No	1,00		
5	<p>Purpose made window, 2488 x 1790mm high overall, with one transom and one mullion to form four panels, two top equal panels each 620mm high, top hung opening outward and two bottom equal panels each 1170mm high, fixed</p>	No	2,00		
6	<p>Purpose made window, 5577 x 1790mm high overall with one transom and four mullions to form ten panels, five top equal panels each 620mm high, top hung opening and five bottom equal panels each 1170mm high, fixed</p>	No	1,00		
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	<p>SCHEDULE F</p> <p>BUILDING WORK</p> <p>Bill No 10</p> <p>PLASTERING</p> <p>PREAMBLES</p> <p>For preambles see "Model Preambles for Trades (2008 Edition)"</p> <p>SUPPLEMENTARY PREAMBLES</p> <p>Preparatory work</p> <p>Surfaces shall be clean and free from oil and thoroughly wetted directly before any plastering or other in situ finishes are commenced. Concrete surfaces shall be slushed with a mixture of one part cement and one part coarse sand or otherwise treated to form a proper key. Preparatory coats shall be thoroughly scored and roughened to form a proper key</p> <p>Finish</p> <p>All coats of paving and plastering shall be executed in one operation without any blemishes</p> <p>Skirtings</p> <p>Skirtings shall not exceed 25mm thick and shall have a fair edge with arris or rounded external angle at top edge or V-joint to finish flush with plaster and coved or square junction with floor finish</p> <p>Plaster</p> <p>All plaster, other than skim plaster, shall not be less than 10mm and not more than 20mm thick</p>				
	Carried to Collection				

	<p>General</p> <p>Rates for plastering described as being on walls shall include concrete columns, beams and lintels flush with the face of the wall</p> <p>Granolithic</p> <p>Method</p> <p>The method to be used shall be either the monolithic method or the bonded method</p> <p>Preparation</p> <p>For granolithic applied monolithically, the concrete floor shall be swept clean after bleeding of the concrete has ceased and the slab has begun to stiffen; any remaining bleed water shall be removed and the granolithic applied immediately thereafter. For granolithic to be bonded to the floor slab after it has hardened, the slab surface shall be hacked (preferably by mechanical means) until all laitance, dirt, oil, etc is dislodged and swept clean of all loose matter. The slab shall then be wetted and kept damp for at least six hours before applying the granolithic</p> <p>Mix</p> <p>Granolithic shall attain a compressive strength of at least 41MPa. The coarse aggregate shall comply with SANS 1083 and shall generally be capable of passing a 10mm mesh sieve. Where the thickness of the granolithic exceeds 25mm, the size of the coarse aggregate shall be increased to the maximum size compatible with the thickness of the granolithic</p> <p>Panels</p> <p>Granolithic shall be laid in panels not exceeding 14m² for monolithic finishes, not exceeding 9,5m² for bonded finishes and not exceeding 6m² for all external granolithic. Wherever possible, panels shall be square but at no time should the length of the panel exceed 1,5 times its width</p>				
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	<p>SCHEDULE F</p> <p>BUILDING WORK</p> <p>Bill No 11</p> <p>TILING</p> <p>PREAMBLES</p> <p>For preambles see "Model Preambles for Trades (2008 Edition)"</p> <p>SUPPLEMENTARY PREAMBLES</p> <p>Patterns</p> <p>Unless otherwise described, tiles shall be laid with continuous joints in both directions</p> <p>Fixing</p> <p>Unless described as "fixed with adhesive to plaster (plaster elsewhere)" descriptions of tiling on brick or concrete walls, columns, etc shall be deemed to include 1:4 cement plaster backing and descriptions of tiling on concrete floors etc shall be deemed to include 1:3 plaster bedding</p> <p>Tiling described as "fixed with adhesive on power floated concrete" shall be deemed to include for approved tiling key-coat</p> <p>Ceramic, porcelain, marble and granite tiles are to be fixed and grouted with suitable adhesives and grouts as recommended by the manufacturer of the tiles</p> <p>WALL TILING</p> <p>200 x 200 x 5mm White matt ceramic tiles (A-grade) fixed with adhesive to plaster (plaster elsewhere)</p>				
1	On walls	m ²	12,00		
2	On walls in isolated panels, splashbacks, etc	m ²	2,00		
3	On narrow widths not exceeding 300mm	m ²	0,30		
	Carried to Collection				

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	<p>Bill No 12</p> <p>PLUMBING AND DRAINAGE</p> <p>PREAMBLES</p> <p>For preambles see "Model Preambles for Trades (2008 Edition)"</p> <p>SUPPLEMENTARY PREAMBLES</p> <p>Regulations</p> <p>All drainage and sanitary work shall be executed in accordance with the regulations of the Local Authority. Only registered plumbers and drainlayers shall be employed on any plumbing and drainage work on this contract and a Certificate of Compliance must be issued after completion of the work</p> <p>Prices</p> <p>Prices must include for arranging joints at convenient points, embedding in concrete or for rough cutting around brickwork as the work proceeds</p> <p>No distinction has been made between pipes chased in walls, fixed in ceilings, roofs, floors, columns, slabs, etc or for different finishes to these elements and has been described as "pipes".</p> <p>Prices shall therefore include for all holderbats, brackets, clips, bands, etc and building in or chasing of same, holes through brickwork, concrete, etc and for making good facings, plaster, granolithic and other in-situ finishes as necessary</p> <p>Prices to fixing of sanitary fittings etc shall include for setting up and fixing in position as described, joints to soil, waste and supply pipes as the case may be, making good finishes around and for protecting fittings from injury during subsequent building operations</p>				
	Carried to Collection				

	<p>Wire gratings</p> <p>Descriptions of gutter outlets etc shall be deemed to include wire balloon gratings</p> <p>Stainless steel basins, sinks, wash troughs, urinals, etc</p> <p>Stainless steel for economy basins, domestic sinks and worktops shall be Type 430 (17/0) Stainless steel for urinals, basins, quality sinks, wash troughs, institutional equipment, etc shall be Type 304 (18/8) Stainless steel for laboratory sinks, photographic equipment, etc shall be Type 316 (18/8) Units shall have standard aprons on all exposed edges and tiling keys against walls where applicable</p> <p>Sealing of edges</p> <p>Outer edges of sinks, basins, baths, urinals, etc are to be sealed against adjacent surfaces with approved silicone</p> <p>PVC-U pipes and fittings</p> <p>Sewer and drainage pipes and fittings shall be jointed and sealed with butyl rubber rings Soil, waste and vent pipes and fittings shall be solvent weld jointed or sealed with butyl rubber rings</p> <p>PVC-U pressure pipes and fittings</p> <p>Pipes of 50mm diameter and smaller shall be plain ended with solvent welded PVC-U loose sockets and fittings Pipes of 63mm diameter and greater shall have sockets and spigots with push-in type integral rubber ring joints. Bends shall be PVC-U and all other fittings shall be cast iron, all with similar push-in type joints</p> <p>High density polyethylene (HDPE) pipes and fittings</p> <p>Pipes shall be type IV and of the class specified with compression fittings</p>				
	Carried to Collection				

	<p>Polypropylene pipes</p> <p>Polypropylene pipes 54mm diameter and smaller shall be seamless copper coloured Class 16 pipes jointed with heat welded thermoplastic or where so described compression fittings. Pipes shall be firmly fixed to walls, etc with coloured nylon snap-in pipe clips with provision for accommodating thermal movement and jointed and fixed strictly in accordance with the manufacturer's instructions</p> <p>Copper pipes</p> <p>Pipes shall be hard drawn and half-hard pipes of the class described. Class 0 (thin walled hard drawn) pipes shall not be bent. Class 1 (thin walled half-hard), Class 2 (half-hard) and Class 3 (heavy walled half-hard) pipes shall only be bent with benders with inner and outer formers. Fittings to copper waste, vent and anti-syphon pipes, capillary solder fittings and compression fittings shall be "?" type. Capillary solder fittings shall comply with ISO 2016</p> <p>Copper pipes are to be installed in accordance with the latest revision of the Code of Practice for Copper Plumbing soldering techniques. Flux, solder, etc to be strictly in accordance with the manufacturer's requirements with special attention to copper flux composition</p> <p>Reducing fittings</p> <p>Where fittings have reducing ends or branches they are described as "reducing" and only the largest end or branch size is given. Should the contractor wish to use other fittings and bushes or reducers he may do so on the understanding that no claim in this regard will be entertained</p> <p>Fixing of pipes</p> <p>Unless specifically otherwise stated, descriptions of pipes shall be deemed to include fixing to walls, etc, casting in, building in or suspending not exceeding 1m below suspension level</p>				

	Carried to Collection				
	<p>Paper wrapping to pipes</p> <p>Pipes chased into brickwork must be wrapped with two layers of stout brown paper tied with wire. Rates are to include for wrapping around joints and fittings</p> <p>Disinfection of water pipework</p> <p>Water pipework is to be disinfected at completion</p> <p>Petrolatum anti-corrosion tape</p> <p>Pipes to be taped shall be coated with the appropriate primer and the tape shall be applied in the appropriate widths and with 75% overlaps. Couplings and fittings to pipes shall be taped in strict accordance with the manufacturer's instructions</p> <p>Prices for wrapping of pipes shall include for all work as described to couplings in the length</p> <p>Laying, backfilling, bedding, etc of pipes</p> <p>Pipes shall be laid and bedded in accordance with manufacturers' instructions and trenches shall be carefully backfilled</p> <p>Where no manufacturers' instructions exist, pipes shall be laid in accordance with the relevant section of SANS 2001</p> <p>General</p> <p>Descriptions of cast iron roof outlets shall be deemed to include joints to pipes and casting into concrete (adaptors for joints to PVC pipes, etc are given separately) Descriptions of overflow pipes where measured in number, shall be deemed to include joints to cisterns and splay cut ends</p> <p>Descriptions of pipes laid in and including trenches and of inspection chambers, catchpits, etc shall be deemed to include excavation, bedding, backfilling, compaction to a minimum of 95% Mod AASHTO density and disposal of surplus material on site</p> <p>Descriptions of service pipes and flexible connecting pipes shall be deemed to include connections to taps, cisterns, etc and to steel pipes (adaptors for connections to copper pipes, etc are given separately)</p>				
	Carried to Collection				

	<p>Descriptions of WC pans, slop hoppers, etc shall be deemed to include for joints to soil pipes (pan connectors are separately measured)</p> <p>As-built drawings</p> <p>Where required, the contractor shall prepare an updated set of as-built drawings. At completion of the contract the contractor shall hand these drawings to the principal agent for reproducing onto the originals for handing over to the employer (provision for allowance of as-built drawings elsewhere)</p> <p>Testing</p> <p>Descriptions for the testing of plumbing and drainage installations shall be deemed to cater for all testing apparatus, labour, etc. and shall be done strictly as directed by and in accordance to the Principal Agent's instructions, including for re-testing after taking out and making good all defective work to his entire satisfaction</p> <p>RAINWATER DISPOSAL</p> <p>PVC-U rainwater pipes</p> <p>1 110mm Pipes m 31,00</p> <p>Extra over PVC-U pipes for fittings</p> <p>2 110mm Bend No 12,00</p> <p>Fullbore cast iron outlets</p> <p>3 100mm 90° Side flat outlet No 4,00</p> <p>SANITARY FITTINGS</p> <p>Manufactured by "Vaal Sanitaryware"</p> <p>4 410 x 510mm "Amber" basin on brackets bolted to wall No 1,00</p>				
	Carried to Collection				

5	Orchid wall hung close coupled washdown suite including all fixing brackets, 90 degree outlet open rim pan, 6/3 litre dual flush cistern and "Jazz" thermostet seat Manufactured by Franke	No	1,00		
6	500 x 925mm "Cascade CDX611" inset sink with 343 x 410mm end bowl on cupboard (cupboard elsewhere) WASTE UNIONS ETC Supplied by "Itatile"	No	1,00		
7	32mm Basin unslotted anti-vandal waste union (code TVAC1033/CH) TRAPS ETC Manufactured by "Cobra Watertech"	No	1,00		
8	32mm Chromum plated bottle trap with 32mm inlet and 50mm outlet for PVC pipe (code 345/50)	No	1,00		
9	38mm Chromum plated bottle trap with 38mm inlet and 50mm outlet for PVC pipe (code 365/50) TAPS, VALVES, ETC Manufactured by "Cobra Watertech"	No	1,00		
10	15mm Isolating ball valve with plastic coated stainless steel lever (code 1090-15) with 350mm long flexible service connection tube and cap nut	No	2,00		
11	22mm Brass fullway gate valve (1003/125-22)	No	1,00		
12	15mm "Stella" chromium plated pillar tap (code 3311ST-15)	No	1,00		
13	15mm Brass hose bibtap (code 108-15)	No	2,00		
14	15mm "Steel Bright" chromium plated extended bibtap (code 3306SB/EXT-15)	No	1,00		
15	15mm Copper wallplate elbow (code D33-XS)	No	2,00		
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	ELECTRIC WATER HEATERS				
	Manufactured by "Kwikot"				
32	150 Litre "Megaflo" electric water heater vertically mounted to walls	No	1,00		
	Manufactured by "Cobra"				
33	PB 1.10 RB vacuum breaker	No	2,00		
34	PA 3.132 Masterflo 1 pressure reducing valve	No	1,00		
	FIRE APPLIANCES ETC				
	Manufactured by "Safequip"				
35	9 Kg DCP extinguisher with brackets screwed to and including hardwood backboard plugged	No	1,00		
36	First aid rotary continuous hydraulic hose reel complete with wall brackets, 25mm chromium-plated control valve, 30m length of 20mm four-ply rubber and canvas non-kinkable hose, chromium plated nozzle, cock and nozzle bracket, chromium plated swivelling roller guide, 2500kPa pressure gauge and bolted to brackets to wall and jointed to galvanised mild steel pipes	No	1,00		
	WATER SUPPLIES TO FIRE APPLIANCES				
	Galvanised medium steel pipes with screwed and socketed joints				
37	25mm Pipes	m	2,00		
38	25mm Pipes laid in and including trenches under floors, aprons, etc	m	1,00		
	Extra over galvanised medium steel pipes with screwed and socketed joints for steel fittings				
39	25mm Fittings	No	3,00		
	Testing				
40	Testing fire water pipe system	Item	1,00		
	Carried to Collection				

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	SCHEDULE F BUILDING WORK Bill No 13 GLAZING PREAMBLES For preambles see "Model Preambles for Trades (2008 Edition)" TOPS, SHELVES, DOORS, MIRRORS, ETC 6mm Silvered float glass copper backed mirrors with polished edges, holed for and fixed with chromium plated dome capped mirror screws with rubber buffers to plugs in brickwork or concrete				
1	Mirror 300 x 600mm high with four screws	No	1,00		
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	<u>Bill No 14</u> <u>PAINTWORK</u> <u>COLLECTION</u> Total Brought from Page No Total Brought from Page No		Page No 173 174		
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	<p><u>SECTION NO 2</u></p> <p><u>EXTERNAL WORKS</u></p> <p><u>Bill No 2</u></p> <p><u>ROADWORK, PARKING AREAS AND PAVING</u></p> <p><u>PREAMBLES</u></p> <p>For preambles see "Model Preambles for Trades (2008 Edition)"</p> <p><u>SUPPLEMENTARY PREAMBLES</u></p> <p><u>Supplementary preambles and full descriptions of materials, items, work, etc. applicable to this Section</u></p> <p>The contractor is referred to the previous section(s) for supplementary preambles and full descriptions of materials, items, work, etc. which shall be regarded to be equally applicable for work described in this section, unless specifically otherwise described</p> <p><u>Testing of material and filling</u></p> <p>Descriptions of earth filling, compaction, etc shall be deemed to include for all necessary testing required in accordance with the SABS 1200 series</p> <p><u>Precast concrete block road surfacing</u></p> <p>Paving shall be laid in accordance with SABS 1200 MJ, SANS 1058 and the Concrete Masonry Association's specifications</p> <p>Paving shall be laid on 20mm thick (thickness after final compaction) clean river sand (preparation of ground or filling elsewhere)</p> <p>Clean sand shall be swept into joints between roadstones at completion</p>				
	Carried to Collection				

	<u>Site clearance</u> Site clearance is measured elsewhere <u>ROADWORK, PARKING AREAS AND PAVING</u> <u>Digging up topsoil</u> 1 Digging up topsoil to an average depth of 100mm and preserving for use as filling <u>Compaction of surfaces</u> 2 Compaction of ground surfaces under pavings etc, including scarifying for a depth of 150mm, breaking down oversize material, adding suitable material where necessary and compacting to 95% Mod AASHTO density <u>Treatment of roadbed by ripping or blasting in</u> 3 Intermediate rock 4 Hard rock <u>Borrow to fill</u> 5 Selected layer compacted to 95% Mod AASHTO density 6 Overhaul (14km haul distance) <u>Filling hauled from borrow pit by the contractor under parking areas, roadways, etc</u> 7 Subbase and base courses of (G6) natural gravel material, compacted to 95% Mod AASHTO density 8 Extra over subbase or base course of natural gravel material for stabilisation with OPC cement at the rate of 3% <u>Soil insecticide</u> 9 Treat sand bed under concrete pavings with an approved insecticide solution at the rate of not less than 2 litre per 1m ²				
	Carried to Collection				

	<p><u>80mm Thick 25MPa precast concrete interlocking block paving of grey paving blocks in accordance with SANS 1058, laid to falls on and including 20mm thick sand layer with joints filled in with sand, compacted with a vibration compactor including filling in edges against kerbs, buildings, etc with approved cemented compound</u></p>				
10	Paving to parking areas etc to falls, including necessary straight edge blocks	m ²	350,00		
11	Cutting units to fit edge restraints	m	360,00		
	<u>25MPa/19mm In-situ concrete edge and restrainer beams</u>				
12	Edge beam 150mm wide x 150mm high overall in lengths not exceeding 3m, bedded 150mm deep into road bed and finished smooth on top with steel float with all external angles rounded, including all necessary excavations, formwork, backfilling, etc.	m	1 350,00		
	<u>Precast concrete finished smooth on exposed surfaces, including bedding, jointing and pointing</u>				
13	180 x 280mm High kerbs (SANS 927 fig 3) with 150 x 150 x 300mm unreinforced concrete haunching at back of each joint, including excavation, backfilling, etc	m	1 358,00		
	<u>Etching primer and two coats reflective road marking paint on concrete</u>				
14	Line 100mm wide	m	486,00		
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	<u>Bill No 3</u> <u>SCREEN WALLS, FENCING, ETC</u> <u>COLLECTION</u> Total Brought from Page No Total Brought from Page No Total Brought from Page No		Page No 182 183 184		
	Carried forward to Summary Section No 2				

	<p><u>SECTION NO 2</u></p> <p><u>EXTERNAL WORKS</u></p> <p><u>Bill No 4</u></p> <p><u>SITE SERVICES</u></p> <p><u>PREAMBLES</u></p> <p>For preambles see "Model Preambles for Trades (2008 Edition)"</p> <p><u>SUPPLEMENTARY PREAMBLES</u></p> <p><u>Supplementary preambles and full descriptions of materials, items, work, etc.</u></p> <p>The contractor is referred to the previous section(s) for supplementary preambles and full descriptions of materials, items, work, etc. which shall be regarded to be equally applicable for work described in this section, unless specifically otherwise described</p> <p>Laying, backfilling, bedding, etc of pipes</p> <p>Pipes shall be laid in accordance with clauses 5.1 and 5.2 of each of the following: SANS 1200L : Medium-pressure pipelines LD : Sewers LE : Stormwater drainagePipe trenches, etc shall be backfilled in accordance with clauses 3, 5.5, 5.6, 5.7 and 7 of SANS 1200 DB : Earthworks (Pipe trenches)Pipes shall be bedded in accordance with clauses 3.1 to 3.4.1, 5.1 to 5.3 and 7 of SANS 1200 LB : Bedding (Pipes)</p> <p>Concrete pipes</p> <p>Pipes shall be jointed with ogee joints with rubber collars or socket and spigot joints with rubber rings</p>				
	Carried to Collection				

	<p>uPVC class 34 drainage pipes</p> <p>Filling to trenches for pipes shall consist of a 300mm bedding cradle of selected granular material compacted to 90% Mod AASHTO density, selected blanket fill 200mm in depth compacted in 100mm layers to 90% Mod AASHTO density and selected fill from the excavations compacted in 150mm layers to 93% Mod AASHTO density</p> <p>uPVC pressure pipes and fittings</p> <p>Pipes for water supply shall be of the class stated</p> <p>Pipes of 40mm diameter and smaller shall be plain ended with solvent welded uPVC loose sockets and fittings</p> <p>Pipes of 50mm diameter and greater shall have sockets and spigots with push in type integral rubber ring joints. Bends shall be uPVC and all other fittings shall be cast iron, all with similar push-in type joints</p> <p>Reducing fittings</p> <p>Where fittings have reducing ends or branches they are described as "reducing". In the case of pipes with diameters not exceeding 60mm only the largest end or branch size is given. Should the contractor wish to use other fittings and bushes or reducers he may do so on the understanding that no claim in this regard will be entertained. In the case of pipes with diameters exceeding 60mm all sizes are given and no claim for extra bushes, reducers, etc will be entertained</p> <p>Exposed concrete surfaces</p> <p>Exposed surfaces of concrete stormwater channels, cover slabs, inspection eye marker slabs, gully tops, cleaning eye tops, catchpits, inspection chambers, etc shall be finished smooth with plaster</p> <p>Excavations</p> <p>No claim for rock excavation will be entertained unless the contractor has timeously notified the quantity surveyor thereof prior to backfilling</p> <p>Soft rock and "hard rock" shall be as defined in "Earthworks"</p>				
	Carried to Collection				

	<u>uPVC gulleys</u>				
8	110mm Dished gulley not exceeding 500mm deep including standard precast concrete surround and uPVC grating	No	1,00		
	<u>Precast concrete circular inspection chambers, including benching and cover slabs (channels and cast iron covers elsewhere)</u>				
9	1000mm Diameter inspection chamber not exceeding 1000mm deep internally	No	3,00		
10	1000mm Diameter inspection chamber exceeding 1000mm and not exceeding 2000mm deep internally	No	7,00		
11	1000mm Diameter inspection chamber exceeding 2000mm and not exceeding 3000mm deep internally	No	3,00		
	<u>Normal duty PVC-U sewer channels</u>				
12	160mm Channels in bottoms of inspection chambers	m	19,00		
	<u>Extra over normal duty PVC-U sewer channels for fittings</u>				
13	160mm Bend	No	7,00		
14	160mm Junction	No	2,00		
	<u>Cast iron covers etc</u>				
15	550mm Diameter x 71kg type 4 manhole cover and frame	No	10,00		
16	550mm Diameter x 176kg type 2A pavement manhole cover and frame	No	3,00		
	<u>Sundries</u>				
17	Extra over excavation in earth for pipe trenches, chambers, etc for excavation in soft rock	m ³	50,00		
18	Extra over excavation in earth for pipe trenches, chambers, etc for excavation in hard rock	m ³	25,00		
19	Concrete encasing to 110mm horizontal pipes	m	45,00		
20	Concrete encasing to 110mm bend	No	4,00		
21	300 x 300 x 50mm Precast concrete inspection eye marker slab set in ground	No	18,00		
22	uPVC bent cleaning eye with removable cover jointed to 110mm PVC-U pipe	No	18,00		
	Carried to Collection				

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23	265 x 265mm x 9kg Type 14A cast iron cover and frame over rodding eye (rodding eye elsewhere), including concrete encasing	No	18,00		
24	Cutting into side of existing inspection chamber for and connecting 110mm pipe, including inserting 110mm channel junction and making good concrete benching	No	1,00		
	<u>Testing</u>				
25	Testing soil drainage system	Item	1,00		
	<u>WATER SUPPLIES</u>				
	<u>Class 16 PVC-U pressure pipes with rubber ring joints including all excavations, bedding, backfilling, etc</u>				
26	50mm Diameter pipes in trenches	m	105,00		
27	63mm Diameter pipes in trenches	m	55,00		
28	110mm Diameter pipes in trenches	m	345,00		
	<u>Extra over class 16 PVC-U pressure pipes for uPVC pressure fittings with rubber rings</u>				
29	50mm Elbow	No	6,00		
30	63mm Elbow	No	4,00		
31	110mm Elbow	No	8,00		
32	50mm Tee	No	2,00		
33	50 x 25mm Male adaptor	No	1,00		
	<u>Extra over class 16 PVC-U pressure pipes for cast iron pressure fittings</u>				
34	63 x 50mm Reducer	No	1,00		
35	110 x 50mm Reducer	No	1,00		
36	63mm Tee	No	1,00		
37	110mm Tee	No	1,00		
	Carried to Collection				

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	<p><u>Bill No 4</u></p> <p><u>SITE SERVICES</u></p> <p><u>COLLECTION</u></p> <p>Total Brought from Page No</p> <p>Total Brought from Page No</p> <p>Total Brought from Page No</p> <p>Total Brought from Page No</p> <p>Total Brought from Page No</p> <p>Total Brought from Page No</p> <p>Total Brought from Page No</p> <p>Total Brought from Page No</p>		<p>Page No</p> <p>186</p> <p>187</p> <p>188</p> <p>189</p> <p>190</p> <p>191</p> <p>192</p> <p>193</p>		
	Carried forward to Summary Section No 2				

SECTION NO 2**SECTION SUMMARY-EXTERNAL WORK**

1	General Site Works	Page	177
2	Roads, paving, etc	Page	181
3	Screen walls, Fencing, etc	Page	185
4	Site services	Page	194

Carried to Summary			
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SECTION NO 3					
Bill No 1					
PROVISIONAL SUMS					
PREAMBLES					
For preambles see "Model Preambles for Trades (2008 Edition)"					
SUPPLEMENTARY PREAMBLES					
General					
Provisional sums are for material and equipment supplied and installed complete by firms of specialists					
Profit					
Where stated, the contractor may allow for profit if required					
Builder's work					
Builder's work in connection with specialist services is given elsewhere in these bills of quantities					
PROVISIONAL SUMS FOR NOMINATED OR SELECTED SUBCONTRACT WORKS					
Signage					
1	Provide the amount of R440,000.00 (Four hundred and forty thousand Rand) for signage	Item	1,00	440 000,00	R440 000,00
2	Allow for profit on above if required	Item	1,00		
3	Allow for attendance	Item	1,00		
Electrical installation					
4	Provide the amount of R920,000.00 (Nine hundred and twenty Rand) for the complete electrical installation	Item	1,00	920 000,00	R920 000,00
Carried to Collection					

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5	Allow for profit on above if required	Item	1,00		
6	Allow for attendance	Item	1,00		
	<u>Air-conditioning and ventilation</u>				
7	Provide the amount of R30,000.00 (Thirty thousand Rand) for the air-conditioning and ventilation installation including connection to electrical supply	Item	1,00	30 000,00	R30 000,00
8	Allow for profit on above if required	Item	1,00		
9	Allow for attendance	Item	1,00		
	<u>Kitchen cupboards and counters</u>				
10	Provide the amount of R60,000.00 (Sixty thousand Rand) for kitchen cupboards and counters	Item	1,00	60 000,00	R60 000,00
11	Allow for profit on above if required	Item	1,00		
12	Allow for attendance	Item	1,00		
	<u>Turnstiles</u>				
13	Provide the amount of R90,000.00 (Ninety thousand Rand) for turnstiles	Item	1,00	90 000,00	R90 000,00
14	Allow for profit on above if required	Item	1,00		R0,00
15	Allow for attendance	Item	1,00		R0,00
	<u>Vehicle control systems</u>				
16	Provide the amount of R360,000.00 (Three hundred and sixty thousand Rand) for entrance booms and other vehicular control systems	Item	1,00	360 000,00	R360 000,00
17	Allow for profit on above if required	Item	1,00		
18	Allow for attendance	Item	1,00		
	<u>Water holding tanks</u>				
19	Provide the amount of R430,000.00 (Four hundred and thirty Rand) for low-level water holding tanks	Item	1,00	430 000,00	R430 000,00
20	Allow for profit on above if required	Item	1,00		
	Carried to Collection				

21	<u>Booster pumps</u> Allow for attendance	Item	1,00		
22	Provide the amount of R88,500.00 (Eighty eighty thousand five hundred Rand) for booster pumps	Item	1,00	88 500,00	R88 500,00
23	Allow for profit on above if required	Item	1,00		
24	Allow for attendance	Item	1,00		
	<u>Screens and gates</u>				
25	Provide the amount of R200,000.00 (Two hundred Rand) for screens and gates including all concrete bases or footings, paintwork, etc and installed complete	Item	1,00	200 000,00	R200 000,00
26	Allow for profit on above if required	Item	1,00		
27	Allow for attendance	Item	1,00		
	<u>Seating benches</u>				
28	Provide the amount of R60,000.00 (Sixty thousand Rand) for seating benches	Item	1,00	60 000,00	R60 000,00
29	Allow for profit on above if required	Item	1,00		
30	Allow for attendance	Item	1,00		
	<u>Landscaping and irrigation</u>				
31	Provide the amount of R500,000.00 (Five hundred thousand Rand) for landscaping and irrigation	Item	1,00	500 000,00	R500 000,00
32	Allow for profit on above if required	Item	1,00		
33	Allow for attendance	Item	1,00		
	<u>Upgrading of the Western Gate</u>				
34	Provide the amount of R1 500,000.00(One million five hundred Rand) for the upgrading of the Western Gate	Item	1,00	1 500 000,00	R1 500 000,00
35	Allow for profit on above if required	Item	1,00		
36	Allow for attendance	Item	1,00		
	Carried to Collection				

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University of Venda

CONTRACT NO: IN/010/2022

FOR UNIVERSITY OF VENDA

ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA
ROAD(R524)SCHEDULE G: TESTING MATERIALS AND WORKMANSHIP, OCCUPATIONAL HEALTH
AND SAFETY, ENVIRONMENTAL MANAGEMENT PLAN AND TRAININGSECTION
8100

Number	LIC	Item Description	Unit	Quantity	Rate	Amount R
8100		TESTING MATERIALS AND WORKMANSHIP				
81.01		Special tests on elastomeric bearings (150% vertical load and 150% shear distortion) as described in subclause 6604(d)	No	5		
B81.02		Other special tests requested by the engineer				
		(i) Tests for water sorptivity	Prov sum	1	16 950	16 950.00
		(ii) Tests for oxygen permeability	Prov sum	1	16 950	16 950.00
		(iii) Tests for chloride conductivity	Prov sum	1	16 950	16 950.00
		(iv) Tests for concrete cover	Prov sum	1	16 950	16 950.00
		Other special tests requested by the engineer	Prov sum	1	282500	282 500.00
81.03		Providing testing equipment:				
		(a) Rolling straight-edge	No			Rate only
		(b) Core drill	No			Rate only
Total Carried Forward To Summary						

CONTRACT NO: IN/010/2022

FOR UNIVERSITY OF VENDA

ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA
ROAD(R524)SCHEDULE G: TESTING MATERIALS AND WORKMANSHIP, OCCUPATIONAL HEALTH
AND SAFETY, ENVIRONMENTAL MANAGEMENT PLAN AND TRAININGSECTION
C1000

Number	LIC	Item Description	Unit	Quantity	Rate	Amount R
C1000		ENVIRONMENTAL MANAGEMENT PLAN				
C10.01		Penalty for unnecessary removal or damage to trees for the following diameter sizes:				
		(a) 2 600mm girth or less	No	0	-5 650	0.00
		(b) Greater than 2 600mm, but less than 6 180mm girth	No	0	-1 130	0.00
		(c) Greater than 6 180mm girth	No	0	-33 900	0.00
C10.02		Penalty for serious violations:				
		(a) Hazardous chemical/oil spill and/or dumping in non-approved sites	No	0	-11 300	0.00
		(b) General damage to sensitive environments	No	0	-5 650	0.00
		(c) Damage to cultural and historical sites	No	0	-5 650	0.00
		(d) Pollution of water sources	No	0	-11 300	0.00
		(e) Unauthorised blasting activities	No	0	-5 650	0.00
		(f) Uncontrolled/unmanaged erosion per incident, depending on environment impacts, plus rehabilitation at contractor's cost	No	0	-5 650	0.00
		(g) Damage to sensitive vegetation within "no-go" areas of vegetation damaged, plus rehabilitation thereof at contractors' cost	No	0	-2 260	0.00
C10.03		Penalty for less serious violations:				
		(a) Littering on site	No	0	-1 130	0.00
		(b) Lighting of illegal fires on site	No	0	-1 130	0.00
		(c) Persistent or un-repaired fuel and oil leaks	No	0	-1 130	0.00
		(d) Any person related to the contractor's operations found within the designated "no-go" areas	No	0	-565	0.00
		(e) Any vehicles or equipment related to the Contractor's operations found within the designated "no-go" areas	No	0	-3 390	0.00
Total Carried Forward						



FOR UNIVERSITY OF VENDA

ROAD(R524)

SCHEDULE G: TESTING MATERIALS AND WORKMANSHIP, OCCUPATIONAL HEALTH AND SAFETY, ENVIRONMENTAL MANAGEMENT PLAN AND TRAINING

[illegible]

CONTRACT NO: IN/010/2022

FOR UNIVERSITY OF VENDA

ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA
ROAD(R524)

**SCHEDULE G: TESTING MATERIALS AND WORKMANSHIP, OCCUPATIONAL HEALTH
AND SAFETY, ENVIRONMENTAL MANAGEMENT PLAN AND TRAINING
SAFETY, ENVIRONMENTAL MANAGEMENT PLAN AND TRAINING**

Section	Description	Amount R
8100	TESTING MATERIALS AND WORKMANSHIP	
C100	OCCUPATIONAL HEALTH AND SAFETY PROVISION	
C1000	ENVIRONMENTAL MANAGEMENT PLAN	
E1200	TRAINING	

Total Carried Forward to Summary of Schedules

C2.3 SUMMARY OF BILL OF QUANTITIES

CONTRACT NO: IN/010/2022

FOR UNIVERSITY OF VENDA

ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA
ROAD(R524)

SUMMARY OF SCHEDULES		
Schedule	Description	Amount R
A	PRELIMINARY AND GENERAL	
B	ROADWORKS	
C	BRIDGE	
D	CULVERT AT KM 0+240	
E	ELECTRICAL WORKS	
F	NEW ACCESS GATE & GATEHOUSE	
G	TESTING MATERIALS AND WORKMANSHIP, OCCUPATIONAL HEALTH AND SAFETY, ENVIRONMENTAL MANAGEMENT PLAN AND TRAINING	

Total

C2.4 CALCULATION OF TENDER SUM

TENDER (CONTRACT) SUM

1)CONTRACT PRICE ADJUSTMENT (2.5%)

2)CONTINGENCIES (5%) (This amount is under the sole control of the employer)

3)VARIATIONS ON SPECIAL MATERIALS (2.5%)

SUBTOTAL

ADD 15% VAT

TENDER(CONTRACT)PRICE CARRIED FORWARD TO FORM OF OFFER OF ACCEPTANCE (Page C.3)

Note: Tender Sum is the value of the offered total of the prices exclusive of VAT, contingencies, CPA and special materials but including contractual variations

THE CONTRACT

PART C3	SCOPE OF WORKS
PART C4	SITE INFORMATION

**TENDER NO: IN/010/2019RE
FOR UNIVERSITY OF VENDA
ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD (R524)**

PART C3: SCOPE OF WORK

C3.1	DESCRIPTION OF WORKS	C.207
C3.2	ENGINEERING.....	C.212
C3.3	CONSTRUCTION.....	C.216
C3.4	MANAGEMENT	C.600

C3.1 DESCRIPTION OF WORKS

C3.1.1 Employer's Objectives

The employer's objectives are to deliver public infrastructure using labour intensive methods in accordance with EPWP Guidelines

Labour-intensive works

Labour-intensive works shall be constructed/maintained using local workers who are temporarily employed in terms of this Scope of Work.

Labour-intensive competencies of supervisory and management staff

Contractors shall engage supervisory and management staff in labour-intensive works that have completed the skills programme including Foremen/Supervisors at NQF "National Certificate: Supervision of Civil Engineering Construction Processes" and Site Agent/Manager at NQF level 4 "Manage labour-intensive Construction Processes" or equivalent QCTO qualifications.

C3.1.2 Overview

The project consists of an existing gravel road on the southern side of the University of Venda which will be upgraded from gravel to surfaced standards and a bridge over the Mvudi river replacing the existing 2 portal culverts.

This road is currently used by construction vehicles for the ongoing building projects within the University.

C3.1.3 Extent of Works

The project will consist of the following:

- Approx.500m long dual carriageway from R524 traffic circle tying on the existing university construction access road outside the boundary inclusive of a new traffic circle entering the university and a partial road towards the new student development on the west along the R524
- New university access gate with guardhouse
- Approx. 400m of dual carriageway within the university boundary
- Approx. 500m of single carriageway beyond the bridge up to the Health science building with traffic circle leading to agricultural section and planned future developments.

- New bridge over the river
- Installation of new street lighting
- Upgrading of existing traffic signal infrastructure

C3.1.4 Location of the Works

The project is located in Thohoyandou within Thulamela Local Municipality in the Vhembe District of the Limpopo Province. The works to be constructed is within and around the University of Venda's boundary towards the R524(Punda Maria road).

C3.1.5 Temporary Works

All temporary works required by the contractor to construct the new high-level bridge shall be removed after the complete construction.

C3.1.6 General Information

C3.1.6.1 Drawings

The reduced drawings contained in Annexure C5.3 that form part of the tender document shall be used for tender purposes only. Further drawings are to be provided on an on-going basis by the engineer.

The contractor will be supplied with an unreduced 0,05 mm thick transparent polyester print of each of the drawings. These polyester prints are issued free of charge and the contractor shall make any additional prints he may require at his own cost.

Any information in the possession of the contractor, which the resident engineer requires to complete the as-built drawings, shall be supplied to the resident engineer 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 engineer. The engineer will supply all figured dimensions omitted from the drawings.

C3.1.6.2 Power, Water Supply and Other Services

The contractor shall make his own arrangements concerning the supply of electrical power and all other services. No direct payment will be made for the provision of electrical and other services. The cost of providing these services will be deemed to be included in the rates and amounts tendered for the

various items of work for which these services are required.

C3.1.6.3 Contractor's Camp Site and Security

The contractor shall make his own arrangements regarding the establishment of a camp site and housing for his construction personnel and all regulations stipulated by the local authority shall be adhered to.

It is anticipated that the contractor's choice of a camp site will be influenced by the availability of telephone and electrical connections as well as the supply of potable water.

Provision is made in these specifications for the erection of a security fence around the site offices. The contractor shall be responsible for the security of his personnel and constructional plant on and around the site of the works and for the security of his camp, and the employer will consider no claims in this regard.

C3.1.6.4 Additional Requirements for Construction Activities

C3.1.6.4.1 The contractor may not commence constructional activities 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.

C3.1.6.4.2 The contractor shall submit proposals in connection with directional signs to the engineer for approval.

C3.1.6.5 Programme Requirements for Construction Activities

The contractor shall programme his activities to be suitable in terms of his resources to complete the contract inside the stipulated time period.

C3.1.6.6 Construction in Confined Areas

It may be necessary for the contractor to work in confined areas. In certain areas the width of the fill material and pavement layers may reduce to zero and the working space may be confined. The method of construction in these confined areas depends on the contractor's construction plant. However, the contractor must note that measurement and payment will be in accordance with the specified cross-sections and dimensions, irrespective of the method used to achieve these cross-sections and dimensions, and that the rates and amounts tendered will be deemed to include full compensation for any special equipment or construction methods or for any difficulty encountered in working in confined areas and narrow widths, and at or around obstructions, and that no extra payment will be made nor will any claim for payment be considered on account of these difficulties.

C3.1.7 Labour Regulations

C3.1.7.1 Applicable labour laws

The Ministerial Determination for Special Public Works Programmes, issued in terms of the Basic Conditions of Employment Act of 1997 by the Minister of Labour in **Government Notice N° R949 in Government Gazette 33665 of**

22 October 2010, as reproduced below, shall apply to works described in the scope of work as being labour intensive and which are undertaken by unskilled or semi-skilled workers.

C3.1.7.2 Contractor's default in payment to Labourers and Employees

- (a) Any dispute between the Contractor and labourers, regarding delayed payment or default in payment of fair wages, if not resolved immediately may compel the Employer to intervene.
- (b) The Employer may, upon the Contractor defaulting payment, pay the moneys due to the workers not honoured in time, out of any moneys due or which may become due to the Contractor under the Contract.

C3.1.7.3 Provision of Hand tools

- (a) The Contractor shall provide his labour force with hand tools of adequate quality, sufficient in numbers and make the necessary provisions to maintain the tools in good and safe working conditions

C3.7.1.7.4 Reporting

The Contractor shall submit monthly returns/reports as specified below:

- (a) Signed Muster rolls/pay sheets of temporary workers and permanent staff detailing the number, category, gender, rate of pay and daily attendance.
- (b) Copies of certified identity documents of workers
- (c) Number of persons who have attended training including nature and duration of training provided
- (d) Assets created, rehabilitated or maintained in accordance with indicators in the EPWP M&E framework
- (e) Plant utilization returns
- (f) Progress report detailing production output compared to the programme of works

Employment Of Unskilled And Semi-Skilled Workers In Labour Intensive Works
Requirements for the sourcing and engagement of labour.

C.1.1. Unskilled and semi-skilled labour required for the execution of all labour intensive works shall be engaged strictly in accordance with prevailing legislation and SANS 1914-5, Participation of Targeted Labour.

C.1.2. The rate of pay set for the SPWP shall be as per the latest government gazette.

C.1.3. Tasks established by the contractor must be such that:

- a) the average worker completes 5 tasks per week in 40 hours or less; and
- b) the weakest worker completes 5 tasks per week in 55 hours or less.

C.1.4. The contractor must revise the time taken to complete a task whenever it is established that the time taken to complete a weekly task is not within the requirements

C.1.5. The Contractor shall, through all available community structures, inform the local community of the labour intensive works and the employment opportunities presented thereby. Preference must be given to people with previous practical experience in construction and / or who come from households:

- a) where the head of the household has less than a primary school education;
- b) that have less than one full time person earning an income;
- c) where subsistence agriculture is the source of income.
- d) those who are not in receipt of any social security pension income

C.1.6. The Contractor shall endeavour to ensure that the expenditure on the employment of temporary workers is in the following proportions:

- a) 55 % women;**
- b) 55% youth who are between the ages of 18 and 35; and**
- c) 2% on persons with disabilities.**
- d) 100% people living in rural or underdeveloped areas or townships**

C3.2 ENGINEERING

C3.2.1 Design

- (a) The **Employer** is responsible for the design of the permanent Works as reflected in these Contract Documents unless otherwise stated.
- (b) The **Contractor** is responsible for the design of the temporary Works and their compatibility with the permanent Works.
- (c) The **Contractor** shall supply all details necessary to assist the engineer in the compilation of the as-built drawings.

C3.2.2 Employer's Design

- (a) Detail description of Works

The description of the works shall inter alia contain the following particulars regarding the work to be constructed and maintained under the contract.

C3.2.2.1 ROADWORKS

The project consists of the upgrading of approximately 1.4km of gravel road to surfaced standards comprising of a single and dual carriageway roadway between the Southern side of the University and the R524 Punda Maria Road. The scope includes a new bridge, large culvert and a new gatehouse (As described in C3.2.2.3). The upgrading of the roadworks scope will consist of the following:

- Approximately 800m upgrading to a surfaced 4-lane dual carriageway roadway (3.5m lanes)
- Approximately 600m upgrading to a surfaced 2-lane single carriageway roadway (3.5m lanes)
- Associative stormwater culverts, subsoil drains and stormwater down chutes
- Sidewalks and Medians
- Two Bus Stops
- Three new traffic circles
- Installation of new street lighting

C3.2.2.2 PAVEMENT DESIGN FOR ROADS AND SIDEWALKS

The pavement design is based on 20-year design traffic of 12 MESA:

- 30mm AC-AE2 Surfacing (Continuous TRH8 Course-Graded)

- 150mm BSM2 Base
- 150mm C3 Stabilised Subbase
- 150mm G6 Selected Subgrade
- In-situ

Sidewalks and medians:

- 60mm interlocking paving bricks
- 150mm G7 Subbase
- 150mm G7 Selected Subgrade
- In-situ

C3.2.2.3 STRUCTURAL WORKS

Phase 2 of this project requires one new bridge structure and one new major culvert to be constructed for the access road on the southern side of the University (towards R524 Punda Maria road).

(a)Major Culvert

There is a new major drop inlet culvert at km 0+240 from the R524 road structure other than typical drainage culverts included under roadworks is required. This is as follows:

A new drainage culvert will be required at chainage 2.4517km, with the central co-ordinates of:

-56 732.008 Y, and

2 542 940.270 X

The new culvert is of reinforced concrete construction with fill above the structure. The two outer barrels have lengths of 10m whilst the inner barrel has a length of 10.262m. The clear span and height of the culvert is 1.8m and 1.5m respectively. The inlet structure adjoining to the culvert consists of gabion boxes in stepped configuration to reduce the energy of the water entering the culvert. The outlet structure consists of concrete wing walls and an inverted concrete slab with a cut off wall. A Reno Mattress is situated further downstream connected with galvanised dowels to the concrete cut off wall.

Due to poor founding conditions, the structure is founded on a soil raft underlain by a rock fill layer.

The proposed structure is located on a horizontal curved alignment with a radius of 470m and on an 80m long vertical curve alignment, with a full super elevation cross-fall of 2.1% across the structure.

(b)Cable Stayed Bridge

The construction of one new bridge is required at chainage km 0+776. This structure will be of cable stayed construction with a central pylon with 3 columns. The central pylon will be supported on pile caps with 4 piles anchored into rock. The bridge spans a total length of 32 meters and consist of cable stays on each side of the deck.

The bridge will be on a straight horizontal alignment and has a slope of 5° vertical alignment.

The roadway above the deck will be dual carriageway with 2 x 3.5m lanes in each direction and a central median. The road prism will be cambered with a cross fall of 2% on each side. There will be 2 pedestrian sidewalks of 1.65m wide on either side of the bridge. The handrails are of precast concrete type.

The use of gabions and steel sheet pile walls have been adopted to channelize and transition the flow direction through the bridge structure. The sheet pile wall is required to protect the fill from scouring.

(c) Other structures

Gatehouse

The Gatehouse roof structure was designed to mirror the look of the adjacent cable stayed bridge. The roof structure has plan dimensions of 35.8m wide by 8.7m long and comprises of two tapering central concrete columns located within the traffic island. The central columns support the roof by means of cable stays.

The structure is founded on conventional reinforced concrete pad footings located approximately 5 meter deep within the road fill.

Four vehicle lanes, and 2 cycle lanes with security booms (including card readers) and a guard house are situated below the roof structure.

The guard house, is located in the central traffic island and includes a kitchenette and ablutions.

C3.2.3 Contractor's Design

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

C3.2.4 Design procedures

All designs and modifications thereto shall be communicated in writing and the

C.215

contractor and engineer shall maintain master lists to record and track all transactions.

C3.3 CONSTRUCTION

C3.3.1 STANDARD SPECIFICATIONS

- (a) The following specifications shall apply for the construction of the Works.
- (i) The COLTO Standard Specifications for Road and Bridge Works for State Road Authorities (1998).

The contractor may purchase copies of Volume (i) from the South African Institution of Civil Engineers.

SAICE
Waterfall Park / Postnet Suite 81
Howick Gardens / Private Bag X65
Vorna Valley / Halfway house
Becker Street / 1685
Midrand
Tel : (011) 805-5947
Fax : (011) 805-5971
Contact Person : Angeline Aylward

- (ii) **JBCC Series 2000 Principal Building Agreement (Edition 4.1 March 2005)** published by the Joint Building Contracts Committee.

Copies of these conditions of contract may be obtained from the Association of South African Quantity Surveyors (011-3154140), Master Builders Association (011-205-9000; 057-3526269) South African Association of Consulting Engineers (011-4632022) or South African Institute of Architects (051-4474909; 011-4860684; 053-8312003;)

- (b) SABS or BS Specifications and Codes of Practice

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

- (c) Various other specifications specified in the COLTO Standard Specifications or the Project Specifications.
- (d) Latest **Sabita Manual**, Manual 25 entitled "*Quality Management in the Handling and Transport of Bituminous Binders*".

C3.3.2 PROJECT SPECIFICATIONS RELATING TO STANDARD SPECIFICATIONS

C3.3.2.1 General Conditions of Contract Referred to in the Standard Specifications

The references to the General Conditions of Contract appearing in the COLTO Standard Specifications refer to the COLTO General Conditions of Contract which is superseded in this contract by the General Conditions of Contract for Construction Works 2015.

The corresponding clause in the latter document pertaining to the reference in the COLTO Standard Specifications is listed in the table below.

Clause No. in the Standard Specifications	Clause No. in COLTO General Conditions	Equivalent Clause No. in General Conditions of Contract 2015
1204	15	5.6.1
1206	14	Deleted
1209	52	6.10.2
1210	54	5.1.1
1212(1)	49	6.10.1
1215	45	5.12.1
1217	35	8.2.1
1303	49	6.8
1303	53	6.11
1303	12	5.6
1303	45	5.12.1
1403	40(1)	6.4.1
1505	40	6.4
31.03	40	6.4
3204(b)	40	6.4
3303(b)	2	3
5803(c)	40	6.4
5805(d)	40	6.4
6103(c)	40	6.4
Item 83.03	22	5.15
ALL SECTIONS	48	6.6

C3.3.2.2 Amendments to the Standard Specifications

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

C3.3.2.3 Project Specifications Relating to Standard Specifications

This part of the project specifications deals with matters relating to the standard specifications. Where reference is made in the standard specifications to the project specifications this part shall also contain the

relevant information e.g. the requirements where a choice of materials or construction methods are provided for the standard specifications.

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

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

Clauses and pay items referring to labour intensive methods are prefixed by L in the project specifications.

Clauses and pay items referring to emerging contractors are prefixed by E in the project specifications.

MATTERS RELATING TO THE STANDARD SPECIFICATIONS

SECTION 1200 : GENERAL REQUIREMENTS AND PROVISIONS	C.220
SECTION 1300: CONTRACTOR'S ESTABLISHMENT ON SITE AND GENERAL OBLIGATIONS	C.234
SECTION 1400 : HOUSING, OFFICES AND LABORATORIES FOR THE ENGINEER'S SITE PERSONNEL	C.235
SECTION 1500 : ACCOMMODATION OF TRAFFIC.....	C.237
SECTION 1700: CLEARING AND GRUBBING	C.242
SECTION 1800 : DAYWORK SCHEDULE	C.245
SECTION 2100 : DRAINS	C.247
2200 : PREFABRICATED CULVERTS	C.250
SECTION 2300 : CONCRETE KERBING, CONCRETE CHANNELLING, CHUTES AND DOWNPIPES AND CONCRETE LININGS FOR OPEN DRAINS	C.255
SECTION 3100 : BORROW MATERIALS	C.258
SECTION 3200 : SELECTION, STOCKPILING AND BREAKING-DOWN THE MATERIAL FROM BORROW PITS, CUTTINGS AND EXISTING PAVEMENT LAYERS, AND PLACING AND COMPACTING THE GRAVEL LAYERS	C.260
SECTION 3300 : MASS EARTHWORKS	C.261
SECTION 3400: PAVEMENT LAYERS OF GRAVEL MATERIAL	C.265
SECTION B3500: STABILISATION	C.270
SECTION B4100: PRIME COAT	C.294
SECTION 5200 : GABIONS	C.314
SECTION 5600 : ROAD SIGNS	C.322
SECTION 5700 : ROAD MARKINGS.....	C.325
SECTION 5800 : LANDSCAPING AND PLANTING GRASS	C.328
SECTION 5900 : FINISHING THE ROAD AND ROAD RESERVE AND TREATING OLD ROADS	C.330
SECTION 6100: FOUNDATIONS FOR STRUCTURES	C.331
SECTION 6400 : CONCRETE FOR STRUCTURES	C.343
SECTION B6600: NO-FINES CONCRETE, JOINTS, BEARINGS, PARAPETS AND DRAINAGE FOR STRUCTURES	C.343

SECTION 1200 : GENERAL REQUIREMENTS AND PROVISIONS

B1202 SERVICES

Add the following to the fifth paragraph:

“Provision is made in the bill of quantities for payment for searching and exposing of known or unknown services as well as the relocation and/or protection of existing services. Any moving of existing services which may be required within the proclaimed road reserve will be undertaken by the relevant service authorities or by a selected subcontractor if so ordered by the engineer.”

B1204 PROGRAMME OF WORK

(a) General requirements

Amend the word “network” in the fourth line of the first paragraph to read as “bar (Gantt) chart”.

Add the following after the third paragraph:

“The bar-chart programme to be provided by the contractor shall show the various activities in such detail as may be required by the engineer. Progress in terms of the programme shall be updated monthly by the contractor in accordance with the progress made by the contractor.

In compiling the programme of work, the contractor shall indicate and make due allowance for the following, as specified elsewhere in the contract documents:

- The requirements regarding the accommodation of traffic and areas that may be occupied at any time for construction purposes (as indicated on the drawings and specified in Section 1500 of the specifications)
- Requirements regarding the training of labourers and Emerging Contractors (EC's).
- The requirements for work to be undertaken by labourers and work to be undertaken by EC's.

(b) Programme of work for rehabilitation work

Amend the word “network” in the fourth line of the second paragraph to read as “bar (Gantt) chart”.

Insert the following after the first sentence of the second paragraph:

“The programme shall include the following details:

- i) A work breakdown structure that identifies all major activities.
- ii) Scheduled start and end dates for each activity.
- iii) Linkages between activities that clearly identify sequence, floats and critical path.
- iv) Intended working hours and resource allocations (plant and labour).
- v) Monthly cashflow projections.
- vi) Key dates in respect of information required or due delivery.”

B1205 WORKMANSHIP AND QUALITY CONTROL

Add the following after the title:

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

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

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

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

Add the following to the third paragraph:

“The engineer shall, however, undertake acceptance control tests for the judgement of workmanship and quality, without accepting any obligations vested with the contractor in terms of the contract with specific reference to quality of materials and workmanship. Such acceptance control test done by the engineer shall not relieve the contractor of his obligations to maintaining his own quality control system.”

Add the following at the end of this clause:

"The engineer shall, for the purpose of acceptance control on products and workmanship, assess test results and measurements in accordance with the provisions of section 8300 of the standard specifications. Where small quantities of work are involved, a lot shall mean a full day's production for a specific item of work subject to acceptance control testing."

Insert the following paragraph

“Dual laboratory facilities for the engineer and the contractor may be substituted with the combined laboratory facilities for process and acceptance control testing subject to the following requirements laid down by the South African National Roads Agency.

The following is required from the contractor:

- (a) A formal application
- (b) A clear indication of the type(s) of laboratory that will be included in the combined effort.
- (c) An undertaking that he will accept the test results of the combined laboratory. Should there be any doubts with regard to certain test results, this will be settled by an independent laboratory mutually agreed upon. The cost in such cases will be to the account of the party at fault.
- (d) An undertaking that the engineer will be in charge of the combined laboratory and the staff and equipment supplied by the contractor will be under the sole control of the engineer.
- (e) A monetary contribution that can be made up with respect to one or part of the following:
 - Qualified laboratory staff
 - Laboratory buildings
 - Laboratory equipment
 - Transport for field testing and sampling
 - Monetary

For the combined laboratory option, the contractor will be required to contribute towards at least 35% of the costs of the laboratory. The total cost of the laboratory for the 18 (thirteen) month contract period has been estimated at R 4.3 million for this contract.

B1206 THE SETTING-OUT OF THE WORK AND PROTECTION OF BEACONS

Add the following:

“The contractor shall be responsible for the true and proper setting out of the Works and for the correctness of the position, levels, dimensions and alignment of all parts of the Works and for the provision of all necessary instruments, appliances and labour in

connection therewith.”

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

The cost of replacing all beacons displaced or destroyed during the course of the Contract without the consent of the Engineer shall be borne by the Contractor.”

B1209 PAYMENT

(b) Rates to be inclusive

Add the following:

“VAT shall be excluded from the rates and provided for as a lump sum in the Summary of Bill of Quantities”.

(e) Materials on the site

Add the following:

"In addition, the engineer may at his sole discretion also allow payments under "Materials on Site" in respect of any construction materials if stored off-site providing that:

- (a) The site selected for this purpose is approved by the engineer
- (b) Such land is physically separated from any production plant or operation
- (c) Only materials for use under this contract is stockpiled on such land
- (d) The contractor has provided proof of an agreement with the owner of such land that the owner has no claim whatsoever on any materials stockpiled on such land
- (e) Materials obtained by the contractor for or on behalf of emerging subcontractors (EME/QSE's) shall remain the responsibility of the contractor after payment has been made in respect of materials on site.”

B1215 EXTENSION OF TIME RESULTING FROM ABNORMAL RAINFALL

Add the following after the first paragraph of this clause:

"For the purposes of this contract, extension of time resulting from abnormal rainfall or other forms of inclement weather shall be determined according to the requirements of Method ii (critical-path method).”

Method (ii) (Critical path method)

Delete “(based on a five-day working week)” in the fifth and sixth lines of the second paragraph of the description of this method.

Delete the last sentence of the second paragraph of the description of this method and replace with the following:

“The value of “n” shall be taken as five (05) working days per calendar month.

If normal rainy or inclement weather, resulting in delays, occurs for less than five (05) working days in any calendar month, the difference between the five (05) working days and the actual number of working days on which normal rainy or inclement weather occurred, shall be ignored and not accumulated for the duration of the contract period for the purposes of determining an extension of time due to normal rainy weather, nor due to any other reason.

Items of work on the critical path of the programme of work which are subject to climatic limitations shall also be considered for extension of time if such items of work are delayed by e.g. cold weather, high winds or other inclement weather conditions.

In this regard, reference shall be made to weather limitations specified for the application of various bituminous products. However, for months during which seal-work cannot be undertaken in terms of the specifications, no extension of time shall be claimed for.

Rainfall records for rainfall station No 067 7834 6 (Vhembe District - Hospital) for the period 1900 to 2002.

MONTH	AVERAGE RAINFALL (mm)	RAIN DAYS (per month)
JANUARY	119.2	3
FEBRUARY	144.5	2.6
MARCH	57.1	1.9
APRIL	24	0.7
MAY	14.8	0.5
JUNE	11.8	0.3
JULY	11.5	0.3
AUGUST	6.1	0.2
SEPTEMBER	12.8	0.3
OCTOBER	37.2	1.2
NOVEMBER	74.3	2.5
DECEMBER	88.6	2.7

The Contractor shall erect an effective rainfall gauge on the site and record the daily

rainfall figures in a book. Such book shall be handed to the employer's representative for his signature no later than 12 days after rain that is considered to justify an extension of time occurs.

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

Add the following subclause:

- "(h) No concrete kerbing or concrete drains directly adjoining the bituminous surfacing shall be constructed prior to the completion of the bituminous surfacing."

B1222 USE OF EXPLOSIVES

Add the following subclause:

- "(h) Where blasting operations are undertaken in close proximity of temporary deviations, the contractor shall implement all such safeguarding measures as may be required and instructed by the engineer."

B1224 THE HANDING-OVER OF THE ROAD RESERVE

Add the following:

"The total length of the road reserve between the specified limits of construction will be handed over to the contractor on the commencement date. Reference shall, however, be made to the requirements of section 1500 of these specifications where limitations in respect of work-areas are specified. In the event of the non-adherence by the contractor in terms of the mentioned specifications, the engineer shall withdraw such sections of the road reserve as may be justified to ensure suitable progress of the works or safe passage of traffic."

B1229 SABS CEMENT SPECIFICATIONS

Replace the last paragraph of this clause with the following:

"Where reference is made in this specification or the standard specifications to the cement specifications, eg. SABS 471: Portland cement and rapid hardening Portland cement, it shall be replaced with the new specification:

SABS ENV 197-1: Cement-composition, specifications and conformity criteria.

Part 1: Common cements.

Furthermore, where reference is made in this specification or the standard specifications to the different cement types, the following new names/types shall apply:

Typical new product nomenclature	
Cement type	Cement strength class
CEM I	32,5
CEM I	32,5R

Typical new product nomenclature		
Cement type		Cement strength class
CEM I		42,5
CEM I		42,5R
No provision made		No provision made
CEM II/A-S		32,5
CEM II/A-S		32,5R
CEM II/A-S		42,5
CEM II/A-V		32,5
CEM II/A-V		32,5R
CEM II/A-W		32,5
CEM II/A-W		32,5R
CEM II/A-V		42,5
CEM II/A-V		42,5R
CEM II/A-W		42,5
CEM II/A-W		42,5R
CEM III/A		32,5
CEM III/A		32,5R
CEM II/B-V		32,5
CEM II/B-W		32,5
	CEM II/B-S	32,5R
	CEM II/B-S	42,5
	CEM III/A	32,5R
	CEM III/A	42,5

CEM I 32,5, CEM II A-S 32,5, CEM II/A-V 32,5, or CEM III A may be used for the manufacture of reinforced concrete members.”

Add the following new clauses:

“B1230: IN-SERVICE AND STRUCTURED TRAINING

The contractor shall in addition to the structured (accredited) training as provided for in Part C of this document implement an in-service training programme, from the commencement of the contract, in which the various skills required for the execution and completion of the works are imparted to the labourers engaged thereon, in a programmed and progressive manner. Labourers shall be trained progressively throughout the duration of the contract, in the various stages of a particular type of work.

(a) Details of in-service and structured training

(i) The contractor shall attach to form RDP 1(E) basic details of his proposed in-service training programme, which details shall inter alia include the following:

- the details of training to be provided
- the manner in which the training is to be delivered

- the number and details of trainers to be utilised.
- (ii) The in-service training programme shall be submitted with the initial works programme. The progress in relation to this programme will be recorded monthly and attached to the site meeting minutes and payment certificate.
- (iii) The contractor shall provide on-site, sufficient skilled and competent trainers to train all labourers engaged on the contract, in the various skills required for the execution and completion of the works.
- (iv) All labourers shall be remunerated in respect of all time spent undergoing training.
- (v) Every worker engaged on the contract shall on the termination of his participation on the contract, be entitled to receive from the contractor, a certificate of service in which the following information shall be recorded:
- the name of the contractor
 - the name of the employee
 - the name of the project/contract
 - the nature of the work satisfactorily executed by the worker and the time spent thereon
 - the nature and extent of training provided to the worker
 - the dates of service.

The cost of the above obligations shall be deemed to be covered by the sums and rates tendered for items B13.01(a), (b) and (c) in the bill of quantities. The performance of the contractor in providing in-service training, shall be taken into consideration should the contractor fail to reach his CPG at the completion of the project.

(b) Lead time for training

The training of labour as specified shall, as far as possible, take place before commencement of each activity and the contractor shall take into account in his programme the lead-time he requires for such training. All training herein specified shall be deemed to be a construction activity and a non-negotiable condition of the contract”.

B1231 COMMUNITY LIAISON OFFICER (CLO)

The contractor or his appointed agent will appoint a Community Liaison Officer (CLO) after consultation with the local communities, the engineer and the employer. The contractor shall direct all his liaison efforts with the local communities through the appointed officer. The contractor shall, however, accept the appointed as part of his management personnel.

(a) Duties of the Community Liaison Officer

The Community Liaison Officer's duties will be:

- (i) To be available on site daily between the hours of 07:00 and 17:00 and at other times as the need arises. His normal working day will extend from 07:00 in the morning until 17:00 in the afternoon.
- (ii) To determine, in consultation with the contractor, the needs of the temporary labour for relevant skills training. He will be responsible for the identification of suitable trainees and will attend one of each of the training sessions.
- (iii) To communicate daily with the contractor and the engineer to determine the labour requirements with regard to numbers and skill, to facilitate in labour disputes and to assist in their resolution.
- (iv) To assist in and facilitate in the recruitment of suitable temporary labour and the establishment of a "labour desk".
- (v) To attend all meetings in which the community and/or labour are present or are required to be represented.
- (vi) To assist in the identification, and screening of labourers from the community in accordance with the contractor's requirements.
- (vii) To inform temporary labour of their conditions of temporary employment and to inform temporary labourers as early as possible when their period of employment will be terminated.
- (viii) To attend disciplinary proceedings to ensure that hearings are fair and reasonable.
- (ix) To keep a daily written record of his interviews and community liaison.
- (x) To attend monthly site meetings to report on labour and RDP matters.
- (xi) All such other duties as agreed upon between all parties concerned.
- (xii) To submit monthly returns regarding community liaison as illustrated in Part C5.1 of this document (form RDP 12(E)).

(b) Payment for the community liaison officer

A special pay item is incorporated in section 1200 of the bill of quantities relating to payment of the liaison officer on a prime cost sum basis. This payment shall only be made for the period for which the duties of the liaison officer are required. The remuneration of the CLO shall be determined by the Employer in terms of the Sectorial determination 2: Civil Engineering Sector (Task grade 3).

(c) Period of employment of the community liaison officer

The period of employment of the community liaison officer shall be as decided upon jointly by the contractor, engineer and employer at a maximum period of a six months basis, but with the option of renewal.

B1232 SUBCONTRACTORS

Over and above the stipulations of clause 4.4 of the General Conditions of Contract 2010, regarding subletting of part of the works, it is a condition of the contract that an approved

subcontractor shall not sublet part of his work, covered in his appointment by the main contractor, to another subcontractor without the consent and approval of the engineer. Subletting shall in all cases be critically considered by the engineer.

In addition to the provisions of clause 4.4 of the general conditions of contract regarding subcontracting of the works, it is a requirement of this contract that an approved subcontractor shall not further subcontract work subcontracted to him by the main contractor, to another subcontractor without the consent and approval of the engineer. Subcontracting shall in all cases be critically considered by the engineer. The engineer reserves the right to limit the extent or the volume of work subcontracted by the contractor, should he deem it necessary in terms of progress or quality of workmanship.

B1233 WORKMEN'S COMPENSATION ACT

All labour employed on the site shall be covered by the Compensation for Occupational Injuries and Deceases Act (COIDA). The contractor shall pay in full, including the payment of the necessary levies, such amounts, as are due in terms of the Act. The contractor at the commencement of the contract shall resolve the manner in which Workmen's Compensation will be handled. Amounts paid by the contractor shall not be included in the wage rates but shall be covered by the Contractor to be deemed as included in his General Obligations rates in Section 1300 of the Bill of Quantities.

Add the following clause:

B1234 MINE HEALTH AND SAFETY ACT 1996, ACT 29 OF 1996

(a) Introduction

The main objective of this Act is to protect the health and safety of persons at mines. This specification is therefore aimed at promoting health and safety specifically at borrow pits. Borrow pits are classified as mines.

(b) General Provisions

The contractor shall be responsible for controlling his operations at every borrow pit where material is being excavated to ensure compliance with all the requirements of the Mine Health and Safety Act, 1996. The contractor shall also ensure that the works, shaping and finishing off of the borrow pit are done in accordance with the provisions as specified in section 3100 of the COLTO Standard Specifications and this Act. The contractor shall also comply to the requirements as set out in C3.4.3.2 Environmental Management Plan.

The minimum requirements for operations at borrow pits are:

- Borrow pits are worked in such a way that the health and safety of employees and the public will not be endangered.
- A monthly report shall be submitted to the engineer on health and safety aspects at the borrow pits.
- The contractor shall appoint a manager to manage the borrow pits in

accordance with the Mine Health and Safety Act.

- The contractor shall take the necessary steps to ensure that the work area of the borrow pits are safe at all times. This shall include items such as the provision of fencing and security guards.

(c) Duties of the Manager

The minimum duties of the manager supervising the activities at borrow pits shall be:

- Maintain a healthy and safe borrow pit environment.
- Identify hazards and related risks to which persons and employees are exposed.
- Establish a health and safety policy that
 - o Describes the organisation of work.
 - o Contains aspects concerning the protection of the employees and other persons' health and safety.
 - o Contains a risk analysis.
- Supply and erect the necessary safety and warning signs.

Add the following pay items and change the clause number.

B12.35 MEASUREMENT AND PAYMENT

Add the following items:

“ITEM	UNIT
B12.01 Excavation	
Excavating material within the following depth ranges below ground level for the exposing of/or searching for services	
(a) 0m to 2m	
(i) soft material	cubic metre (m ³)
(ii) hard material	cubic metre (m ³)
(b) Extra over item B12.01(a) for excavation by means of hand tools such as picks, crowbars and pneumatic tools or mechanical breakers in close vicinity of services where no machine excavation is permitted	
(i) soft material	cubic metre (m ³)
(ii) hard material	cubic metre (m ³)

Measurement and payment shall be as specified for item 22.01 in the standard specifications.

ITEM	UNIT
B12.02 Backfilling	
(a) Using the excavated material	cubic metre (m ³)

- (b) Using imported selected material cubic metre (m³)

Measurement and payment shall be as specified for item 22.02 in the standard specifications.

ITEM **UNIT**

B12.03

- (a) Allow a provisional sum for existing services to be relocated and/or protected as ordered by the engineer provisional sum
- (b) Handling costs and profit in respect of subitem B12.03(a) above percentage (%)

Measurement and payment shall be in accordance with the general conditions of contract."

ITEM **UNIT**

B12.04 Provision for a Community Liaison Officer

- a) Provisional sum for the payment of the Community Liaison Officer Provisional Sum
- b) Handling costs and profit in respect of sub-item B12.04(a) Percentage (%)

Expenditure of the above item shall be made in accordance with the general conditions of contract.

The tendered percentage is a percentage of the amount actually spent under the sub-item B12.04 (a), which shall include full compensation for the handling costs of the contractor, and the profit in connection with providing the community liaison officer."

ITEM **UNIT**

B12.05 Mine health and Safety Obligation

- (a) Mine Health and Safety obligations Month
- (b) Special information signs Prime Cost Sum (PC Sum)
- (c) Provision of security guards Prime Cost Sum (PC Sum)
- (d) Handling cost and profit in respect of sub-item B12.05(b) and (c) Percentage (%)

Payment of the rate per month for sub-item B12.05(a) shall include full compensation for all the contractors obligations relevant to the Mine Health and Safety Act.

The prime cost sums shall be paid in accordance with the provisions of the General Conditions of Contract. The tendered percentage is a percentage of the amount actually

spent under the prime cost items, which shall include full compensation for the profit in connection with providing the specified service.

ITEM	UNIT
B12.06 Provision of computer facilities for the Resident Engineer	
(a) Computer	Lump Sum
(b) Printer	Lump Sum

The unit of measurement shall be the lump sum of providing (purchase, delivery and hand over) items (a) and (b) to the Resident Engineer. The computer specifications be advised by the Engineer including the required software.

ITEM	UNIT
B12.07 Additional Survey as requested by the engineer	Prov sum

The tendered percentage is a percentage of the amount actually spent under the item B12.07, which shall include full compensation for the handling costs of the contractor, and the profit in connection with the Additional Survey requested by the Engineer.”

ITEM	UNIT
B12.08 Project launch after completion of works	Prov sum

The tendered percentage is a percentage of the amount actually spent under the item B12.08, which shall include full compensation for the handling costs of the contractor, and the profit in connection with the arrangements for launching the project after completion of works on site as requested by the Client/Engineer.”

ITEM	UNIT
B12.09 Provision for compensation of land owners	Prov sum

The tendered percentage is a percentage of the amount actually spent under the item B12.09, which shall include full compensation for the handling costs of the contractor, and the profit in connection with the compensations to land owners for materials to be used on the project and all related items as requested by the Engineer.”

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

B1302 GENERAL REQUIREMENTS

(a) Camps, constructional plant and testing facilities

Add the following:

"The contractor shall, at each area where work is being undertaken, provide on a daily basis at least one (1) portable chemical latrine unit per thirty (30) workers for use by construction workers employed on the project. The latrine units shall be serviced daily and kept in a hygienic and orderly state to the satisfaction of the engineer. No separate payment shall be made for this requirement and shall be deemed to be included in the rates tendered for the contractor's time-related obligations."

B1303 PAYMENT

ITEM	UNIT
B13.01 The contractor's general obligations	(As specified)

Add the following after the fifth paragraph:

"The combined total tendered for sub-items (a), (b) and (c) shall not exceed 15% of the tender sum, excluding VAT.

Should the contractor be of the opinion that 15% is inadequate to cover his costs in terms of section 1300, he shall indicate separately with his tender where such costs have been allowed for in his tender. If no such indication is given, the contractor shall not at any stage during the contract for any reason whatsoever claim additional compensation under this item."

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

B1402 OFFICES AND LABORATORIES

(a) General

Add the following:

"The facilities to be provided for the engineer in terms of these specifications shall be fenced off by a two metre high veranda type security fence with diamond mesh on the vertical portion and barbed wire on the overhang. A security gate shall be provided in the fence which shall be guarded at all times by an acceptable watchman provided by the contractor.

The engineer's establishment may be incorporated within the contractor's establishment provided that the preceding requirements are met to the satisfaction of the engineer.

Separate payment shall be made for the provision and erecting of the security fence and gate as indicated on the drawings, but the cost in respect of the provision of a watchman at all times by the contractor shall be deemed to be included in the contractor's tendered rate for item B13.01(c)."

(b) Offices

Add the following new sub-sub-clause:

"(xviii) The engineer's site supervisory staff shall be provided with cellular telephones by the contractor for site communication purposes. Provision is made in the bill of quantities for separate payment of the supply and operating costs of such cellular phones."

B1403 HOUSING

(c) Rented accommodation

Add the following:

"The engineer may arrange for the obtaining of rented accommodation for his supervisory personnel on site. Payment of such rent shall be made under the provisional sum in sub-item 14.07(a) and shall be expended on a monthly basis by the contractor as ordered by the engineer."

ITEM

UNIT

B14.11 Provision and erection of security fencing (Including gate) metre (m)

The unit of measurement shall be the metre of security fence supplied and erected as indicated on the drawings and/or ordered by the engineer. The tendered rate shall include full compensation for procuring and furnishing of all material, including one vehicle gate, labour and equipment required to erect the specified security fence and maintain it for the duration of the contract."

General: Method of payment

Add the following:



C.236

"The tendered rates under this section of the bill of quantities shall also include full compensation for the dismantling and removal from site of all offices, laboratories and other facilities provided for the engineer's supervisory staff at the completion of the contract."

SECTION 1500 : ACCOMMODATION OF TRAFFIC**B1502 GENERAL REQUIREMENTS****(e) Access to properties**

Add the following:

“Where the alignment of the new road coincides with the alignment of the existing road, a number of accesses to private properties will have to be operational and maintained during the constructional period. No separate payment will be made for providing acceptable and safe access across the new road at all times during construction of the road.”

(i) Traffic safety officer

Add the following after subclause (viii):

- “(ix) be responsible for contacting all the relevant authorities in the event of an accident on the site of the Works
- (vi) arrange for the removal of broken down vehicles that obstruct the normal traffic flow

The Contractor shall provide the traffic safety officer with all the necessary resources to carry out his duties as specified, inter alia, light delivery van (LDV), personnel, warning signs and revolving amber flashing lights. A warning sign with the words “CONTRACTOR TRAFFIC CONTROL” and/or “AANNEMER VERKEERSBEHEER” in clearly legible letters shall be mounted on the vehicle at least 1,5m above ground level to be clearly visible. The vehicle shall be equipped with two revolving amber-coloured flashing lights with a minimum intensity of 55W. The flashing lights shall be switched on and the warning sign be displayed at all times when the vehicle is used on the site.

No separate payment will be made for the traffic safety officer, his vehicle, personnel and equipment and the cost thereof shall be included in the Contractor’s cost for his establishment and general obligations (Section 1300).”

Add the following new subclauses:

“(j) Handing over the site

The total extent of the site between the limits of construction as described in this document and indicated on the drawings will be handed over to the contractor at the commencement of the contract period. The engineer however reserves the right to adjust this arrangement should progress or safe passage of traffic warrant such a change.

(k) Use of explosives in close proximity of temporary deviations

The contractor shall arrange all necessary traffic control and other requirements to safeguard the traffic on temporary deviations during blasting operations.

(l) Land taken up for deviations

Negotiations with landowners to obtain the land taken up by temporary deviations will be undertaken by the employer. A prime cost sum is allowed in the bill of quantities for payment of compensation to affected landowners. All other negotiations regarding temporary access to properties, land-use, fencing requirements etc. shall be dealt with by the contractor in conjunction with the engineer and be confirmed in writing and be kept on record by the contractor.

“(m) Maximum lengths of construction areas

A temporary deviation, where the proposed road follows the existing route shall be constructed along the length of existing road. Traffic shall generally be accommodated as follows:

On a two-way two lane gravel deviation (Class 1) constructed partially outside or adjacent to the existing road reserve boundaries of road.

- (i) On one-way single lane gravel deviation (Class 2) constructed inside the existing road reserve boundaries and on either side of road. In this instance special cognisance shall be taken to accommodate traffic to private properties.

A maximum length of one section of approximately 5,0km or two sections of 3,0km each of deviation (Class 1 or 2) shall be operational at a time and no relieve of this limitation shall be considered by the engineer except where the programme necessitates such at the construction of bridges.”

B1503 TEMPORARY TRAFFIC CONTROL FACILITIES

Add the following after the first paragraph:

“All temporary road signs, devices, sequences, layouts and spacing shall comply with the requirements of the Road Traffic Act, 1996 (Act 93 of 1996), the National Road Traffic Regulations, 2000, the South African Road Traffic Signs Manual, the requirements of the relevant road authority and the drawings. All temporary traffic control facilities shall comply with the guidelines set in SA Road Traffic Signs Manual, Volume 2, Chapter 13: Roadworks Signing, (SARTSM, June 1999, obtainable from the Government Printer, Pretoria).”

(b) Road signs and barricades

Add the following:

“All the temporary road signs are to be mounted on posts as specified in section 5600 of the specifications. Provision shall be made for the supply and erection of the signs and the maintenance of the signs during the construction period. Provisions shall also be made for the removal of the temporary road signs on completion of the construction work when such signs are no longer required.

Temporary road signs and channelization devices shall be manufactured in accordance

with the latest edition of the South African Road Traffic Signs Manual (June 1999) and placed as shown on the drawings and in Road Signs Note 13. Delineators shall be manufactured from a non-metal material and shall be mounted on a base section also manufactured of non-metal material. Single as well as back-to-back mounted delineators are required.

The obligation to arrange safe passage of traffic shall always be vested with the contractor regardless what is indicated on the drawings of the engineer."

(c) Channelization devices and barricades

Add the following:

"Drums shall not be used as channelization devices.

TW 401 and TW 402 delineators shall comply with the following requirements:

- a) It shall be manufactured from a flexible material and shall comply with SABS 1555. The blade portion of the delineator shall be positively affixed to a base unit which in turn shall be stable on its own or be stabilized by means of sandbags when used on the road.
- ii) The blade shall be retro-reflectorized, with class 1 yellow sheeting on the side facing oncoming traffic..
- iii) It shall nominally be 1000mm high x 250mm wide and the bottom edge of the delineator shall not be more than 200mm above the road surface.
- iv) It shall be subject to the approval of the Engineer.

The maximum spacing between centres of delineators shall be as shown on the drawings or as directed by the Engineer."

(e) Warning devices

Add the following:

"It is a requirement of this contract that all construction vehicles and plant used on the works will be equipped with rotating amber flashing lights and warning boards as specified in the standard specifications. Construction vehicles travelling outside the limits of construction areas shall however, not operate the warning lights.

The warning lights shall have a base diameter of at least 170mm and the amber bulb cover a height of a least 150mm high. It shall be a requirement that the contractor also provides the engineer's site personnel with warning lights for their vehicles (a maximum of two lights are required) without any payment applicable.

B1514 TEMPORARY FENCING AND GATES

Replace the contents of this clause with the following:

"Where temporary fencing is ordered by the engineer, it shall be paid for under item 55.06 of the standard specifications. The temporary fencing shall be new fencing material, which shall subsequently be dismantled and removed and erected at an alternative position as directed by the engineer. When ordered by the engineer, temporary fences and gates shall be moved to new locations or either left in place or when no longer required be dismantled and removed from site if so directed. Allowance is made in the bill of quantities

for moving existing fences and gates.”

Add the following clause:

B1517 RETRO-REFLECTIVE MATERIAL

“Retro-reflective material for temporary signs shall comply with the requirements of SABS 1519-1 for weathered material. Tests shall be carried out with a field retro-reflectometer and the testing procedure and classification are described in Clause B 8118. The value of the coefficient of Retro-Reflection shall be at least 60% of the values indicated in Table B 8118/1.”

B1518 MEASUREMENT AND PAYMENT

Renumber item 15.01 as B15.01 and add the following:

“The tendered rate shall also include for all measures necessary to safeguard traffic on temporary deviations during blasting operations as well as all temporary traffic-control facilities for temporary deviations.”

Renumber item 15.03 as B15.03 and add the following

“This sections provides only for additional traffic-control facilities as and when required on instruction by the Engineer and does not provide for facilities already included under payment item B15.01”

Add the following sub-item:

“ITEM	UNIT
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B15.03 Temporary traffic control facilities

(n)	Provision of high visibility safety jackets and safety hats	number (No)
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The unit of measurement shall be the number of safety jackets supplied to the supervisory staff.

The tendered rate shall include full compensation for providing and maintaining hats and the jackets equipped with high visibility retro-reflective and/or fluorescent panels in red, yellow and white for the duration of the contract”.

ITEM	UNIT
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B15.14 Amber flashing lights mounted on signs (set of two mounted in a 2.4 m x 0.4 m sign with a yellow background)

Number (No)

The unit of measurement shall be the number of lights on the signs.

The tendered rate shall include full compensation to provide, erect, operate and maintain

two amber flashing lights per sign at the start of the traffic accommodation sections. It shall also include the provision of power to operate the lights, replacing bulbs as required and keeping the lenses clean and visible.

ITEM	UNIT
B15.16 Provision of traffic safety	
(a) Traffic Safety Officer	Month
The unit of measurement shall be the period in months that the approved traffic safety officer(s) is employed, irrespective of the number of traffic safety officers employed and one assistant as well as for additional traffic safety officers.	
(b) Traffic Safety Vehicle(s)	
The tendered rate per month shall include full compensation for the cost of the traffic safety officer's vehicle(s), fuel, vehicle maintenance and operation costs, required signage and flashing lights, for concurrent day and night shifts all as specified.	

ITEM	UNIT
"B15.20 Flashing illuminated arrow boards	number (No)
The unit of measurement shall be the number of flashing arrow provided and completely erected.	
The tendered rate shall include full compensation for the providing, erecting, maintaining, relocating and re-erecting the flashing illuminated arrow board around the boundaries of the site, including the electric supply for functioning of the lights. The lights shall be of the new LED type light and will be available for the entire period of the contract."	

ITEM	UNIT
"B15.21 Variable Message Signs mounted on trailers	number(No)

The unit of measurement shall be the number of signs provided for the time in months that the Variable Message Sign (VMS) is operative on site.

The tendered rate shall include full compensation for the provision of the VMS mounted on the trailer, the operation and maintenance thereof including frequent day and night inspections, protection against and repairs due to vandalism.

SECTION 1700: CLEARING AND GRUBBING

B1702 DESCRIPTION OF WORK

a) Clearing

Add the following:

“Clearing shall include the removal of material to a thickness of up to 150mm in-situ material as ordered by the engineer. No payment shall be made for temporary stockpiling of topsoil material in the case where this material is applied as topsoil after completion of road side slopes.

Should the required depth exceed 150mm, the total volume of material removed shall either be classified as “temporary stockpiling of topsoil” or “unsuitable roadbed material” or “cut to spoil” whichever is applicable as allowed for in the standard specifications. In these cases no payment shall be made for clearing and grubbing.

Clearing as described shall in all cases be undertaken in such a manner that the topsoil is preserved and not contaminated with other debris or rubbish. Cross-sections for the determination of earthworks quantities shall be taken after clearing (topsoil or unsuitable roadbed material) and roadbed preparation if applicable.

Payment for gabion boxes and mattresses which have to be removed and the material sorted and stacked shall be made under section 5200”

B1703 EXECUTION OF WORK

(a) Areas to be cleared and grubbed

Add the following:

“Apart from normal clearing and grubbing, the fill embankments of the existing roads are also to be cleared and grubbed over the areas where the new horizontal alignment coincides with the alignment of the existing road, or where repairs are required to the fill embankments of the approaches of bridges. Provision is made for separate payment for clearing and grubbing of the existing fill embankments where conventional machinery might be suitable to undertake the work due to the steep side slopes of the embankments. An additional pay-item is allowed for in the bill of quantities for this type of clearing and grubbing which may have to be undertaken by hand or similar manner.”

B1704 MEASUREMENT AND PAYMENT

Change item 17.01 to read as follows:

ITEM	UNIT
B17.01 Clearing and grubbing of:	
a) Normal areas:	
i) Within the road reserve	hectare (ha)
ii) In borrow pits	hectare (ha)
b) Existing fill embankments with Slopes steeper than 1:4	hectare (ha)
Measurement and payment for sub-items (a) and (b) shall be as specified for item 17.01 of the standard specifications. Where distinction is made for clearing and grubbing existing fill embankments with slopes steeper than 1:4 (vertical : horizontal), payment shall be made under item B17.01."	

ITEM	UNIT
B17.07 Removal and temporary stockpiling of topsoil:	
(a) In temporary stockpiles after loading material into trucks including 1,0km free haul	cubic metre (m ³)
(b) In windrows on the edges of borrow pits or spoil areas	cubic metre (m ³)

The unit of measurement for items (a) and (b) shall be the cubic metre of topsoil removed to windrow or temporary stockpile. The volume of topsoil removed shall be measured in cut, calculated from the difference in cross-sections of the natural ground level before the commencement of clearing to cross-sections taken after the removal of the topsoil.

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

C.244

The rates tendered shall include for the excavation of the topsoil and where required, the loading and hauling thereof to temporary stockpile as well as the maintenance of the stockpile until re-use of the material. The rates tendered shall also include for all supervision required to ensure that only topsoil is removed.”

SECTION 1800 : DAYWORK SCHEDULE

Note: This is a new section added to the Standard Specifications.

Add the following:

B1801 SCOPE

This section covers the listing of daywork items for use in determining payment for work which cannot be quantified in specific pay item "units" in the bill of quantities or work ordered by the engineer during the construction period which was not foreseen at tender stage for which no applicable rate exists in the schedule or for work of a special or different character warranting special payment as decided by the engineer.

B1802 ORDERING OF DAYWORK

No daywork shall be undertaken unless specific written authorisation is obtained from the engineer.

B1803 MEASUREMENT AND PAYMENT

The engineer may order the following daywork items:

ITEM	DESCRIPTION	UNIT
B18.01	Labourers:	
	(i) Unskilled	Hour (h)
	(ii) Semi-skilled	Hour (h)
	(iii) Skilled	Hour (h)
B18.02	Foreman	Hour (h)
B18.03	Tipper trucks:	
	(i) 3 – 5 ton	Hour (h)
	(ii) 5,1 – 10 ton	Hour (h)
B18.04	Loader (0,5m ³)	Hour (h)
B18.05	Grader (CAT 140G or similar)	Hour (h)
B18.06	LDV	Hour (h)
B18.07	Compaction Rollers:	
	(i) Vibrator roller	Hour(h)
	(ii) Tamping roller	Hour (h)
	(iii) Grid roller	Hour(h)
B18.08	Hand Controlled Compactors	
	(i) Pedestrian roller (Bomag BW90)	Hour(h)
	(ii) Vibratory plate	Hour(h)
	(iii) Rammers	Hour(h)
B18.09	Water truck (min 10000 l)	Hour(h)
B18.10	Dozer (D7 or similar)	Hour(h)
B18.11	Materials:	
	a) Procurement of materials	Prov Sum

B18.12	b) Contractor's handling costs, profit and all other charges in respect of sub-item B18.11(a) Transport: a) LDV b) Flatbed truck	Percentage(%) Kilometre(km) Kilometre(km)
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The unit of measurement shall be the actual number of hours worked by labourers or foremen or an item of plant.

The tendered rates shall include full compensation for all cost items including overheads, head-office expenses and profits as described in subclause 6.5 of the general conditions of contract and shall be subject to contract price adjustment as provided for in the contract.

The mark-ups on daywork items in accordance with the Appendix to the Tender shall not be applicable on daywork items listed in the bill of quantities in terms of the above specifications. In the event of new daywork rates being requested for items not appearing in the bill of quantities, then the provisions of the general conditions of contract and the Appendix to the Tender shall apply.

Prior to the commencement of any work by the labourers described under item B18.01, the contractor must obtain written consent from the engineer regarding the classification and composition of all labourers in terms of "unskilled" and "skilled" labourers required for the work as ordered by the engineer."

SECTION 2100 : DRAINS**B2101 SCOPE**

Amend the first paragraph to read:

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

B2103 SUBSOIL DRAINAGE**(a) Materials****(i) Pipes**

Delete the last sentence of the fifth paragraph and substitute it with the following:

“Perforation for 100mm pipes shall be spaced in two rows, one on each side of the vertical centre line of the pipe, and at one third of the circumference. The perforation for the 150mm pipes shall be spaced in four rows, two as described for 100mm pipes, and the other two rows at two thirds of the circumference.”

(ii) Synthetic-fibre filter fabric

Add the following:

“All filter fabric shall be a non-woven needle punched type material and must be approved by the engineer. Filter fabrics shall have a minimum co-efficient of permeability of 3×10^{-3} m per second.”

ITEM**UNIT****B21.04 Impermeable backfilling to subsoil drainage systems**

(b)G5 material stabilised with 4% stabilising agent

cubic metre (m³)”

ITEM**UNIT****B21.09 Polyethylene sheeting, 0,25mm thick, or similar approved material, for lining subsoil draining systems**

square metre (m²)

Measurement and payment shall be as specified for item 21.09 in the standard specifications.”

Add the following new items:

ITEM	UNIT
B21.20 Galvanised wire mesh 250 x 250mm, at the outlets of subsoil drainage systems. Mesh 10mm x 2,5mm wire diameter	Number (No)

The unit of measurement shall be the number of 250mm x 200mm pieces of wire mesh, with a 10mm x 10mm mesh and 2,5mm wire diameter built into the subsurface drain outlet structure as shown on the drawings.

The tendered rate shall include for procuring, furnishing and installing the material, cutting, waste and keeping the mesh in the pipe opening clean during installation.

ITEM	UNIT
B21.21 Clearing of subsoil drains	metre (m)

The unit of measurement shall be the metre of drain cleared with a sewer cleaning rod and thorough flushing on the instruction of the engineer.

The tendered rate shall include full compensation for all labour, equipment, tools and transport required for clearing subsoil drains and for disposal of the cleared material to approved sites."

ITEM	UNIT
B21.22 Subsoil drainage markers	Number (No)

Measurement and payment shall be as specified for item 22.24 in the standard specifications."

The unit of measurement is the number of 300 mm x 300 mm Perspex plate subsoil outlet marker boards fixed to the top portion of the fence line opposite each subsoil outlet structure in accordance with the details on the Drawings.

The tendered rate shall include full compensation for procuring and furnishing the subsoil outlet marker board, galvanizing and fixing the board to the fence.

ITEM	UNIT
B21.23 Break into existing drainage structures and install subsoil drain pipe	Number (No)

The unit of measurement is the number of subsoil drain pipes built into existing drainage structures in accordance with the details on the drawings or as instructed by the engineer.

The tendered rates shall include full compensation for supplying all labour, constructional plant and materials required, for all excavation, breaking into existing drainage structures, building pipes into the newly formed accesses, sealing around the pipes and making the joints watertight, breaking out existing benching and channelling where required and reconstructing them complete with granolithic rendering to suit the new pipe arrangement, backfilling and compacting to 90% of modified AASHTO density, transporting (including all haul) and disposing of all surplus excavated material and debris to approved dumping sites provided by the contractor, and dealing with the flows in the existing structures.

No distinction will be made between different types of structures, or diameters of subsoil drain pipes.”

SECTION 2200 : PREFABRICATED CULVERTS

B2201 SCOPE

This specification establishes general requirements for activities which are to be executed by hand involving the following:

- a) trenches having a depth of less than 1.5 metres
- b) storm water drainage
- c) low-volume roads and sidewalks

PRECEDENCE

Where this specification is in conflict with any other standard or specification referred to in the Scope of Works to this Contract, the requirements of this specification shall prevail.

HAND EXCAVATABLE MATERIAL

Hand excavatable material is material:

- a) granular materials:
 - i) whose consistency when profiled may in terms of table 1 be classified as very loose, loose, medium dense, or dense; or
 - ii) where the material is a gravel having a maximum particle size of 10mm and contains no cobbles or isolated boulders, no more than 15 blows of a dynamic cone penetrometer is required to penetrate 100mm;
- b) cohesive materials:
 - i) whose consistency when profiled may in terms of table 1 be classified as very soft, soft, firm, stiff and stiff / very stiff; or
 - ii) where the material is a gravel having a maximum particle size of 10mm and contains no cobbles or isolated boulders, no more than 8 blows of a dynamic cone penetrometer is required to penetrate 100mm;

Note:

1) A boulder, a cobble and gravel is material with a particle size greater than 200mm, between 60 and 200mm.

2) A dynamic cone penetrometer is an instrument used to measure the insitu shear resistance of a soil comprising a drop weight of approximately 10 kg which falls through a height of 400mm and drives a cone having a maximum diameter of 20mm (cone angle of 60° with respect to the horizontal) into the material being used.

Table 1: Consistency of materials when profiled

GRANULAR MATERIALS		COHESIVE MATERIALS	
CONSISTENCY	DESCRIPTION	CONSISTENCY	DESCRIPTION
Very loose	Crumbles very easily when scraped with a geological pick.	Very soft	Geological pick head can easily be pushed in as far as the shaft of the handle.
Loose	Small resistance to penetration by sharp end of a geological pick.	Soft	Easily dented by thumb; sharp end of a geological pick can be pushed in 30-40 mm; can be moulded by fingers with some pressure.
Medium dense	Considerable resistance to penetration by sharp end of a geological pick.	Firm	Indented by thumb with effort; sharp end of geological pick can be pushed in upto 10 mm; very difficult to mould with fingers; can just be penetrated with an ordinary hand spade.
Dense	Very high resistance to penetration by the sharp end of geological pick; requires many blows for excavation.	Stiff	Can be indented by thumb-nail; slight indentation produced by pushing geological pick point into soil; cannot be moulded by fingers.
Very dense	High resistance to repeated blows of a geological pick.	Very stiff	Indented by thumb-nail with difficulty; slight indentation produced by blow of a geological pick point.

Trench excavation

All hand excavateable material in trenches having a depth of less than 1,5 metres shall be excavated by hand.

Compaction of backfilling to trenches (areas not subject to traffic)

Backfilling to trenches shall be placed in layers of thickness (before compaction) not exceeding 100mm. Each layer shall be compacted using hand stampers

- a) to 90% Proctor density;
- b) such that in excess of 5 blows of a dynamic cone penetrometer (DCP) is required to penetrate 100 mm of the backfill, provided that backfill does not comprise more than 10% gravel of size less than 10mm and contains no isolated boulders, or
- c) such that the density of the compacted trench backfill is not less than that of the surrounding undisturbed soil when tested comparatively with a DCP.

Excavation

All hand excavateable material including topsoil classified as hand excavateable shall be excavated by hand. Harder material may be loosened by mechanical means prior to excavation by hand.

The excavation of any material which presents the possibility of danger or injury to workers shall not be excavated by hand.

Add the following:

“All rectangular culverts with spans from 0,9m up to and including 2,4m shall be constructed with precast units.

The attention of the contractor is drawn to the fact that information given on the plans, longitudinal sections or drainage schedules may have to be altered to suit actual site conditions and, therefore, the contractor shall only construct these culverts after the engineer has verified the information on the drawings from detail surveys taken on site by the contractor as directed by the engineer.

Precast units shall be ordered by the contractor from actual measurements of length acquired on the site and not from lengths stated in the drainage schedule or from the bill of quantities.

No precast units shall be ordered until the engineer has satisfied himself that the proposed units have been manufactured to the required tolerances and loading standards. The engineer must be given the opportunity to load test units if he considers this necessary”.

B2203 MATERIALS

(f) Skewed Ends

Delete the second and third paragraphs and substitute with the following:

“Precast portal and rectangular culverts placed on a skew shall be supplied with cast in situ skewed ends as shown on the drawings. In situ skew ends are to be constructed simultaneously with the wingwalls and headwalls”.

B2204 CONSTRUCTION METHODS

Add the following:

“In all cases where soft founding materials is classified as suitable for culvert bedding construction, the in situ material shall be ripped, moistened and compacted to 90% or 93% modified AASHTO density. The depth of preparation and compaction of founding material shall be as indicated on the drawings or as specified by the engineer. Allowance for measurement and payment for this work is made in the bill of quantities under this section.”

The Generic Labour-intensive specification below is the same as SANS 1921-5, Construction and management requirement for works contracts- Part 5: Earthworks activities which are to be performed by hand and should be included in the scope of works without amendment or modification as set out below.

(c) Excavation by hand

Where circumstances prevent the use of mechanical excavators and material can be

removed only by hand tools, the engineer shall authorise the supplementary payment to the contractor for such work at the tendered rates for excavation by hand should he be satisfied that the contractor had been unable to prevent the necessity for excavation by hand by proper planning and precautionary measures. The supplementary rate for excavation by hand shall not apply to minor finishing or clearing jobs in excavations which are otherwise being done by mass excavation plant.

Payment for hand excavation shall be an "extra over" payment to normal excavation as allowed for in item 22.01."

B2205 EXCAVATION FOR CONSTRUCTION BY TRENCH METHOD

Add the following subclauses:

"(c) Excavation by hand

Where circumstances prevent the use of mechanical excavators and material can be removed only by hand tools, the engineer shall authorise the supplementary payment to the contractor for such work at the tendered rates for excavation by hand should he be satisfied that the contractor had been unable to prevent the necessity for excavation by hand by proper planning and precautionary measures. The supplementary rate for excavation by hand shall not apply to minor finishing or clearing jobs in excavations which are otherwise being done by mass excavation plant.

Payment for hand excavation shall be an "extra over" payment to normal excavation as allowed for in item 22.01.

(d) Drainage of excavations

The contractor shall apply suitable, effective drainage and dewatering methods for preventing the ingress of water into the excavation and to keep them dry.

Drainage measures, with the exception of pumping, shall be maintained until the backfilling has been completed. Between various construction stages, pumping may be interrupted in consultation with the engineer.

Any draining or pumping of water shall be done in a manner as will preclude the concrete or materials or any part thereof from being carried away.

Allowance for measurement and payment for dewatering and keeping dry of culvert excavations is made in the schedule in this section".

B2210 LAYING AND BEDDING OF PREFABRICATED CULVERTS

B2210(b)(i) Cast in situ invert slabs

Replace with the following:

"In accordance with the drawings, transverse construction joints are required in cast in situ concrete invert slabs for portal culverts. In addition, longitudinal construction joints as shown on the drawings between the invert slabs of each of the barrels of multiple culverts are required. Allowance for measurement and payment for a Class F1 surface finish and soft board in these joints is made in the bill of quantities. No payment shall be made for formwork on the outside edges of invert slabs (closest to excavated face).

All culverts (precast as well as in situ) shall be constructed with an in situ reinforced

concrete floor laid on a 75mm concrete screed".

Delete subclause B.2210(b)(ii) : "Prefabricated floor slabs."

B2211 BACKFILLING OF PREFABRICATED CULVERTS

Change the last sentence in the fourth paragraph to read "90% or 93% as shown on the drawings or as directed by the engineer."

B2212 INLET AND OUTLET STRUCTURES, CATCHPITS AND MANHOLES

(b) Concrete work

Add the following:

"The type of surface finish for in situ concrete in the culverts shall be as indicated on the drawings. Generally all exposed faces shall be of Class F2 formwork and faces covered by backfill shall be Class F1. The top of parapet walls and wingwalls shall be finished to a Class U2 surface finish."

(h) Prefabricated inlet and outlet structures

Add the following:

"The use of precast concrete inlets and outlets as described in clause 2212(h), shall not be allowed under any circumstances. Cast in situ concrete wingwall type inlets and outlets shall be constructed as indicated on the drawings and shall be in accordance with section 6000 of the Standard Specifications. Allowance for measurement and payment for wingwall type inlets and outlets is made in the schedule in this section."

B2218 MEASUREMENTS AND PAYMENT

Add the following:

"ITEM	UNIT
B22.01 (c) Extra over subitem B22.01(a) for excavation by hand using hand tool	cubic metre (m ³)

Measurement shall be as specified for pay item 22.01 of the standard specifications.

The tendered rate shall include full compensation for carrying out the excavations by hand where circumstances prevent the use of mechanical excavators.

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

B2301 SCOPE

Add the following:

“The position and length of the types of concrete kerbs and channels are indicated on the geometric layout plans, typical drawings and on the drainage plans.

B2304 CONSTRUCTION

(d) Slip form kerbing

Add the following:

“Slip-form kerbing shall under no circumstances be allowed.”

(e) Cast in situ kerbs and channels

Add the following:

“Forming and templates used to form joints between alternate sections shall be of steel plate of which the thickness shall not be less than 5mm.”

Add the following new subclauses:

(i) Construction sequence

Replace paragraphs (i), (ii) and (iii) with the following:

“In all cases where kerbing and/or channelling adjoin the bituminous surface of the road, the kerbing and/or channelling may only be constructed after the bituminous surface has been completed.

Before commencing with the kerbing and/or channelling, the surfacing and the base, shall be accurately cut to line with a mechanical saw to a minimum depth of 75mm. After excavation the concrete shall then be cast against the cut surface without formwork. All material outside the cut line must be carefully removed to the required thickness of concrete without damaging the edge before commencing with the casting of the concrete. No payment shall be made for repair work as instructed by the engineer to damage caused

by the cutting/excavating process of surfacing and base layers. Any concrete spilt onto the surfacing shall immediately be removed and cleaned. Where so required by the engineer, the contractor shall, without any additional compensation, paint emulsion over the stained surface.

Add the following subclause:

(k) Formwork and finish

“Formwork and finish of concrete kerbs shall comply with the requirements of section 6200. All visible edges on the sides or at joints of cast in situ concrete kerbs or channels shall be rounded with a rounding tool.”

“ITEM		UNIT
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B23.17	Extra over items 23.01 and 23.02 for concrete kerbing or concrete kerbing and channelling on curves	
---------------	--	--

(a) on curves of radii more than or equal to 5,0 m but less than 20,0 m

..... metre (m)

(b) on curves with radii more than or equal to 1,0 m but less than 5,0 m

..... metre (m)

(c) on curves with radii less than 1,0 m metre (m)

The unit of measurement shall be the metre of concrete kerbing or kerbing and channelling combination complete as constructed, measured along the front face of the kerb.

The tendered rate shall include full compensation for the additional costs involved in setting out, preparing and constructing as specified on curves with radii less than 20 m.

“ITEM		UNIT
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B23.18	Pedestrian ramps at intersections	number (No)
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The unit of measurement is the number of pedestrian ramps.

The tendered rate shall include full compensation for removing existing kerbing if required, for procuring and placing the precast concrete blocks,

placing with finishing and contraction joints in the concrete surround and all other incidentals to complete the construction all in accordance with the drawings.”

SECTION 3100 : BORROW MATERIALS

B3102 NEGOTIATIONS WITH OWNERS AND AUTHORITIES

Add the following to sub-clause 3102(a):

“Arrangements regarding to access to borrow pits and the alignment of haul roads shall be made between the contractor and the owners of the land on which borrow pits are situated. The engineer’s representative on site shall be present at all such negotiations, which shall be confirmed in writing by the contractor. All costs involved with such negotiations as well as the requirements contained in clause 3102 and clause 1225 of the specifications shall be borne entirely by the contractor.”

B3103 OBTAINING BORROW MATERIALS

(a) General

Add the following:

“The expropriation and compensation for land from which borrow materials is obtained shall be negotiated and paid for by the employer.”

(b) Use of borrow materials

Add the following to the second paragraph of this subclause:

“Compensation to owners and arrangements with owners for taking material from alternative borrow pits proposed by the contractor shall be the contractor’s responsibility and entirely at his own expenses.”

B3104 OPENING AND WORKING BORROW PITS AND HAUL ROADS

(c) Excess overburden

Add the following:

“All excess overburden removed at borrow pits shall be replaced over the entire area of the borrow pit after initial shaping has been undertaken in an even layer. Payment for this requirement shall be deemed to be included in pay item 31.01

(f) Protecting borrow pits

Add the following:

“It is a requirement of the contract that each borrow pit or pits shall be provided with fencing around the perimeters, including a access gate, of the borrow areas, including the supply of danger warning signage fixed to the fencing, visible at all sides approaching the borrow pit area. The fencing shall be erected prior to entering the land for borrowing purposes and shall on final finishing of the borrow areas as specified by the employer, be dismantled and removed or left in-place as instructed by the employer. Payment for

fencing around borrow pits shall be made in accordance with the stipulations of section 5500 in these specifications."

In addition to fencing, Security Guards shall be supply on a 24 hour, 7 days a week basis, with full time communication to the Site Manager or site camp for the duration of the contract and activities at the borrow pits."

Add the following new subclause:

“(h) Haul roads

Haul roads to designated borrow pits along the road shall be constructed along alignments as instructed by the engineer and shall be maintained at the contractor’s own cost to the satisfaction of the engineer."

B3105 FINISHING-OFF BORROW AREAS AND HAUL ROADS

Add the following to this clause:

"Should the employer, engineer or any other authority approved by the engineer, require a higher standard of shaping and finishing off of borrow pits than specified in the standard specifications, measurement and payment for such extra work shall be made using daywork items as scheduled under this section."

B3108 MEASUREMENT AND PAYMENT

Change item 31.01 to read as follows:

"ITEM	UNIT
B31.01 Excess overburden :	

Measurement and payment shall be as specified for item 31.01 of the standard specifications with the abovementioned depth ranges applicable."

Add the following new item:

"ITEM	UNIT
B31.04 Compensation to landowners:	
(a) Prime cost sum for compensation to landownersprime cost (PC) sum	
(b) Handling cost and profit in respect of sub-item B31.04(a) above	percentage (%)

Measurement and payment shall be in accordance with the provisions of clause 6.6 of the general conditions of contract. Payment to the landowner shall be made within fourteen (14) days after such order has been given by the engineer. The contractor shall provide detailed proof of payment before payment shall be certified to the contractor.

The tendered percentage is an extra over percentage on the amount actually spent under sub-item B31.04(a) which shall include full compensation for the handling costs and profit of the contractor."

SECTION 3200 : SELECTION, STOCKPILING AND BREAKING-DOWN THE MATERIAL FROM BORROW PITS, CUTTINGS AND EXISTING PAVEMENT LAYERS, AND PLACING AND COMPACTING THE GRAVEL LAYERS

B3204 BREAKING-DOWN THE MATERIAL

(a) Initial breaking-down of the material in cuttings, borrow pits and existing pavement layers

Add the following to the table in the second paragraph of this subclause:

"Pioneer layers - 100mm maximum dimension

Not more than 20% of pioneer layer material shall pass through the 2,0mm sieve."

(b) Further breaking-down of pavement material

Add the following:

"Material used for the construction of selected, and wearing course layers shall be broken down by means of normal grid-rolling or additional normal grid-rolling to such an extent that the compacted pavement layer shall contain material of which 95% of the aggregate size shall not exceed 65mm. All oversize material, after breaking-down, shall be removed".

B3209 PLACING AND COMPACTING THE MATERIALS IN LAYER THICKNESSES IN EXCESS OF 200mm AFTER COMPACTION

Add the following new subclause:

(d) Pioneer layer

"The maximum size rock used in pioneer layers shall be 100mm and the layer thickness before compaction shall not be more than one-and-a-half times the maximum actual size of the rock. Not more than 20% of pioneer layer material shall pass through the 2,0mm sieve. Pioneer layer processing and compaction shall be as specified in subclause 3307(c) of the standard specifications".

SECTION 3300 : MASS EARTHWORKS**B3305 TREATING THE ROADBED****(a) Removing unsuitable material**

Add the following to the third paragraph:

"For the purpose of this contract, excavation and removal of in-situ clayey material over areas where the road is in a fill condition, shall be classified as removal of unsuitable material, irrespective of the stability or moisture condition of the in-situ material".

(c) Preparing and compacting the roadbed

Delete the last sentence of the first paragraph "If necessary, roadbed.....depth of compaction" and replace as follows:

"Where demarcated by the engineer, prior to the roadbed being scarified, the excess in situ material forming part of the present roadway, and within the limits of the roadbed, and in close proximity of the layer works, but falling within the limits of the layerworks, shall be bladed to controlled level in order to achieve the required level and necessary depth of compaction."

B3307 FILLS**(c) Constructing a pioneer layer**

Add the following to the first paragraph:

"For the purpose of this contract, pioneer layers shall be completed by means of eight-pass roller compaction using vibratory rollers as specified in subclause 3304(b) of the standard specifications.

Layer thicknesses shall not exceed 250mm in thickness. The sequence of construction shall be as follows:

- Shape roadbed
- Placement of geosynthetic to engineer's instruction / supplier's installation requirements
- Placement of Triax TX160 geogrid (or similar approved) to engineer's instruction / supplier's installation requirements
- Placement by means of end-tipping method (Clause 3208c) borrow material on Triax TX160 geogrid (or similar approved) in maximum 250mm layers.
- Compaction by means of eight-pass roller compaction using vibratory rollers (minimum 12 ton)

(d) Benching

Add the following:

“Benching of fill and pavement layer material is required to be undertaken into the existing fill embankments and pavement layers. No additional payment shall be made over and above the normal pay items applicable to earthworks and pavement layers where benching is required for widening of the existing road formation. Benching shall be undertaken as shown on the drawings.

It is a requirement that benching shall always be started at the bottom of the existing fill progressing to the top of the formation. The dimensions and details of benching are shown on the drawings.”

B3308 FINISHING THE SLOPES

(d) General

Add the following:

“Where existing cut and fill slopes are excessively eroded or where slippages occurred in slopes, the slopes are to be reinstated by means of backfilling with suitable gravel material. All loose material and vegetation shall first be removed from the eroded cut and fill slopes before backfilling may commence from the bottom of the cut or fill. The backfill material shall be benched into the existing slopes and compacted to 90% of modified AASHTO density, using suitable small compaction equipment e.g. Bomag walk-behind rollers or hand-held compaction tools. Benching shall be executed to the dimensions shown on the drawings. Upon completion of the backfilling operation the cut and fill slopes shall be neatly finished as specified.”

B3312 Measurement and Payment

Add the following new payment items:

“ITEM	UNIT
B33.20 Fill constructed with material obtained from commercial sources or sources provided by the contractor, including all haul	

(a) Gravel material in compacted layer thicknesses of 200 mm and less:

i) Compacted to 90% of modified AASHTO

- density cubic metre (m³)
- (ii) Compacted to 93% of modified AASHTO
density cubic metre (m³)
- (iii) Eight-roller-passes compaction cubic metre (m³)
- (d) Pioneer layer (as specified in subclause 3307(c)) cubic metre (m³)

The unit of measurement is the cubic metre of material measured in the compacted fill. The quantity measured shall be calculated by the method of average end areas from levelled cross-sections prepared from the ground line after clearing and grubbing and the removal of topsoil and the completion of any preparatory roadbed treatment which may have been ordered by the engineer, but prior to the construction of the fill, and the final specified or authorised fill cross-section superimposed at 20 m intervals along the centre line of the road. All measurement shall be neat and no payment will be made for that part of the fill placed in excess of the authorised cross-section shown on the drawings or instructed by the engineer, irrespective of the tolerances in workmanship allowed under the contract. Where the roadbed has subsided under the fills, the quantities shall be adjusted to make allowance for such subsidence, as set out in the note at the beginning of clause 3312. Measurement of fill shall distinguish between the alternative methods of processing and compacting.

Where measurement by cross-sections is considered by the engineer to be impractical, the compacted volume of the material may be taken as equal to 70% of the loose volume of material in the hauling vehicles as an alternative method of measurement.

The tendered rates shall include full compensation for the costs of negotiations and payment of royalties, for procuring, furnishing and transporting the materials over an unlimited free-haul distance from the sources to the site, for placing, preparing, processing, shaping, watering, mixing and compacting the materials to the densities or in the manner specified, and for removing and disposing of all oversize material from the road after processing, including transport for the haul distance to approved dumping sites provided by the contractor.

“ITEM**UNIT**

B33.21 Fill constructed with gravel hauled from designated borrow pits or from designated stockpiles (not made with material excavated on this project), including free haul up to 1 km

- (a) Gravel material in compacted layer thicknesses of 200 mm and less:
 - (i) Compacted to 90% of modified AASHTO
density cubic metre (m^3)
 - (i) Compacted to 93% of modified AASHTO
density cubic metre (m^3)
 - (iii) Eight-roller-passes compaction cubic metre (m^3)

The unit of measurement is the cubic metre of material measured in the compacted fill. The quantity measured shall be calculated by the method of average end areas from levelled cross-sections prepared from the ground line after clearing and grubbing and the removal of topsoil and the completion of any preparatory roadbed treatment which may have been ordered by the engineer, but prior to the construction of the fill, and the final specified or authorised fill cross-section superimposed at 20 m intervals along the centre line of the road. All measurement shall be neat and no payment will be made for that part of the fill placed in excess of the authorised cross-section shown on the drawings or instructed by the engineer, irrespective of the tolerances in workmanship allowed under the contract. Where the roadbed has subsided under the fills, the quantities shall be adjusted to make allowance for such subsidence, as set out in the note at the beginning of clause 3312. Measurement of fill shall distinguish between the alternative methods of processing and compacting.

Where measurement by cross-sections is considered by the engineer to be impractical, the compacted volume of the material may be taken as equal to 70% of the loose volume of material in the hauling vehicles as an alternative method of measurement.

The tendered rates shall include full compensation for the costs of negotiations and payment of royalties, for procuring, furnishing and transporting the materials over an a free-haul distance of 1 km from the sources to the site, for placing, preparing, processing, shaping, watering, mixing and compacting the materials to the densities or in the manner specified, and for removing and disposing of all oversize material from the road after processing, including transport for the free haul distance to approved dumping sites provided by the contractor."

"ITEM**UNIT****B33.22 Placement of Triax TX160 geogrid (or similar approved)**

The unit of measurement shall include all costs associated with the supply and installation as per Clause B3307 (c) per square metre of the multi-directional polypropylene geogrid. The geogrid shall have an Isotropic stiffness ratio of > 0.75 and a mean radial secant modulus at low strain of 455 ± 50 kN/m @ 0.5% strain. measured.

SECTION 3400: PAVEMENT LAYERS OF GRAVEL MATERIAL**B3402 MATERIALS****(a) General**

Add the following:

"Material requirements for gravel pavement layers are in accordance with TRH4 and shall be indicated on the drawings."

Add the following at the end of the second paragraph:

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

For bitumen stabilised layers the material shall conform to the requirements in table B3402/6.

For cold in situ recycled layers the target grading shall be as indicated in table B3402/7"

Add the following after the second paragraph:

"Distinction shall be made between crushed and natural G4, G5 and G6 materials. Where the crushing and/or screening of these materials has been specified, the combined grading shall conform to the grading limits specified for G4 class material in Table B3402/1.

The same shall apply for all materials obtained from commercial sources."

Replace the grading section in Table 3402/1 with:

Grading	Nominal aperture size of sieve (mm)	Percentage passing through sieve by mass			The percentage by mass passing the 2,00mm sieve shall not be less than 20% not more than 70%
		Crushed material		Uncrushed material	
		Nominal max size			
		37,5 mm	28 mm		
	53			100	
	50			95 - 100	
	37,5	100		85 – 100	
	28	86 - 95			
	20	73 - 86	87-96	61 - 91	
	14	61 - 76	73–86		
5	37 - 54	43-61	31 - 66		
2	23– 40	27–45	20 – 50		
0,425	11– 24	13–27	10 – 30		

	0,075	4 - 12	5 - 12	5 - 15	
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Note:

Refer to standard COLTO table for COLTO grading if required

Replace Table 3402/5 with:

"TABLE B3402/5: REQUIREMENTS FOR CHEMICALLY STABILISED LAYERS"

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

Note:

- * (1) For materials derived from the basic crystalline rock group, the Plasticity Index after stabilisation shall be non-plastic.
- * (2) Unconfined Compressive Strength @ 100% Mod. AASHTO density
- * (3) Indirect tensile Strength @ 100% Mod. AASHTO density (Rapid Curing)
- * (4) Wet/Dry Durability according to Method B 8110"

Add the following tables after table B3402/5:

"TABLE B3402/6: REQUIREMENTS FOR BITUMEN STABILISED LAYERS (BSM)

Test	Specimen Diameter (¹)	Classification (²)		
		BSM1	BSM2	BSM3
ITS _{dry}	100mm	>225 kPa	175 – 225 kPa	125 – 175 kPa
ITS _{wet}	100mm	>100 kPa	75 – 100 kPa	50 – 75 kPa
ITS _{equil}	150mm	>175 kPa	135 – 175 kPa	95 – 135 kPa
ITS _{soaked}	150mm	>150 kPa	100 – 150 kPa	60 – 100 kPa

Note:

- * (1) Specimen diameter appropriate to design level as per TG2 shall apply. In the case of constructed layers only 150mm diameter specimens shall be used.
- * (2) Classification of bitumen stabilised material in terms of the latest TG2 guidelines.

TABLE B3402/7: TARGET GRADING ENVELOPE FOR COLD IN SITU RECYCLED PAVEMENT LAYERS

Sieve Size (mm)	Percent Passing	
	Cement / Lime	BSM-Emulsion
50	100	100
37.5	87 – 100	87 – 100
28	82 – 100	82 -100
20	72 - 100	72 - 100
14	60 -90	60 -90
10	51 - 77	51 - 77
7	42 -65	42 -65

5	36 - 57	36 - 57
0.425	12 – 26	10- 24
0.075	4 - 10	2 - 9

b) Compaction requirements

Amend the compaction requirements as follows:

“Lower selected layer:	93%
Upper selected layer:	93%
Subbase:	95%
Base:	98%
Shoulder & wearing course:	93%”

B3403 CONSTRUCTION

Add the following subparagraph:

“(f) Cold in situ recycling and mixing

Where the in situ layer consisting of granular or cemented layers, which may include asphalt or bituminous surfacing above granular or cemented support layer is to be recycled, with or without any make-up material, the layer must be constructed according to the method described in B2512.”

B3405 CONSTRUCTION TOLERANCES

(e) Cross-section

Delete the second paragraph and replace with the following:

"The normal crossfall of the road wearing course where the road is in a straight horizontal alignment, is specified as 4% as shown on the drawings.

At any cross-section the measured crossfall between any two points shall at least be 3,8% and not more than 4,5%. At any cross-section the actual level at any point shall not be higher than 10mm above the computed level from the cross-section as specified and the

actual level, if lower than the computed level, shall not be lower by more than that derived from the specifications for longitudinal grade and crossfall deviations."

(f) Surface regularity

Add the following:

"Where transverse construction joints in base layers are made between newly and previously constructed sections, the contractor shall exercise level control at such joints by installing level poles at 5m intervals on either side of the joint of the layer covering at least a 30m length into the newly constructed section."

B3406 QUALITY OF MATERIALS AND WORKMANSHIP

Add the following:

"Test results and measurements shall be assessed by the engineer according to the provisions of Section 8300 of the standard specifications".

"Item

Unit

B34.14 Pavement layers constructed from gravel obtained from commercial sources:

The tendered rate shall include for all cost associated with the placement, compaction and sourcing of the materials. No additional haul shall be paid for the delivery of the material.

SECTION B3500: STABILISATION

B3502 MATERIALS

(a) Chemical stabilising agents

Delete subclauses (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 CEM 32,5 shall not be permitted."

The nominal rate of application for tender purposes as a percentage of the mass of the material to be stabilized and compacted to the required modified AASHTO density shall be as follows:

C3 material	:	3,5% on a G5 material
C4 material	:	3,0% on a G6 material

The engineer may instruct the contractor to amend the percentage and possibly the type of stabilizing agent if necessary after tests on the site during construction."

(e) Water

Add the following before the first paragraph:

"Water used in the compaction and curing of stabilised layers shall comply with the requirements of Water Quality Code H3 as specified in table B1219."

B3503 CHEMICAL STABILISATION

(d) Mixing in the stabilizing agent

Add the following:

"The contractor shall prepare a trial section for each type of material without any extra payment to demonstrate his proposed mixing process before extensive mixing commences. The cost of the trial section shall be deemed to be included in the rates tendered.

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

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

(h) Curing the Stabilised work

Add the following to paragraph (ii):

"The covering material shall be placed by end-tipping, and compaction of this covering layer shall be delayed until the underlying layer has cured for 7 days."

Add the following to paragraph (i):

"Method (iii) and (iv) shall not be applicable."

(i) Construction limitations

Add the following:

"No stabilisation shall be done with falling air temperatures when the air temperature falls to below 7°C, or during rising air temperatures, when the air temperature is below 3°C.

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

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 the necessary measures in this connection, and especially to refrain from

stabilizing when such temperatures become probable. When a sudden unforeseen temperature drop to a level below this limit occurs, the stabilized layer shall be covered with the material required for the next layer to be constructed.

All stabilized layers damaged by frost or by the formation of ice in the layer shall be removed and replaced by the contractor at his own expense.

The contractor shall make allowance for these requirements in his construction programme, and no claims in this connection will be considered."

In Table 3503/1, delete 8 hours for ordinary Portland cements and cement blends and replace with:

"6 hours"

Add the following subclause:

"(j) General

Any biscuit layers or bowls, identified by the hollow sound caused when a chain is dragged over the stabilized layer, shall be removed and repaired prior to surfacing. The repairs shall be for the account of the contractor. Before surfacing is allowed, ball penetration tests shall be carried out."

B3506 TOLERANCES

(b) Uniformity of mix (chemical stabilisation)

Add the following:

"The coefficient of variation shall not exceed 0,3 (30%) for mixing in place and 0,2 (20%) for plant-mixed material, calculated as follows:

$$\frac{S_n}{X_n} \times 100$$

where:

X_n is the average, and

S_n is the standard deviation of stabilizer."

B3507 CONSTRUCTION OF TRIAL SECTION

Add the following to the last paragraph:

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

B3509 QUALITY OF MATERIALS AND WORKMANSHIP

Add the following after the second paragraph:

"The test results and measurements will be judged in accordance with the provisions of Section 8200."

Add the following to the fourth paragraph:

"The stabilized material sampled from the layer for the compaction of modified AASHTO briquettes, shall be prepared according to TMH1 Method A16T; i.e. discard material coarser than a 37,5 mm test sieve, and compacted according to TMH1 Method A7."

Add the following paragraphs:

"The engineer shall be notified in good time to enable him to conduct tests himself.

Stabilization strength shall be determined by means of the Rapid Cure Method as described in clause B8110.

Where the stabilizing agent is to be spread by hand, pockets of the stabilizing agent shall be placed on the layer at regular intervals. However, spreading shall only commence when the engineer is satisfied that the correct quantity of stabilizing agent has been placed on the layer and has given permission that the stabilizing agent may be spread."

B3510 MEASUREMENT AND PAYMENT

"Item

Unit

B35.01 Chemical stabilization extra over unstabilised compacted layers

Replace the first paragraph with the following:

"The unit of measurement shall be the cubic metre of stabilized material, the quantity of which shall be determined in accordance with the final in-situ authorised dimensions of the

layers treated as instructed by the engineer. Additional material preshaped to allow for finishing by cutting only will not be included in the measurement."

"Item

Unit

B35.02 Chemical stabilizing agent

Replace the third paragraph with the following:

"Subject to the provisions of clause 1220, the quantity of stabilizer will be determined in accordance with the authorised rate of application and layer dimensions. Extra stabilizer added for wastage and higher preshaping levels will not be included in the quantity and the cost thereof shall be deemed to be included for in the rates."

"Item

Unit

B35.08 Bituminous stabilizing agent

Replace the 2nd payment paragraph with the following:

"The tendered rate for bituminous stabilising agents shall include full compensation for procuring and transporting the bituminous stabilising agent to site, for transfer into storage tanks, storage, heating and transfer into tankers for coupling to the recycling train, for all transport on site, for issuing the required as sized weighbridge ticket showing the mass of bitumen contained in the tanker, for any re-heating required, for all wastage and for strict adherence to all safety measures required when handling warm or hot bitumen . The rate shall further include full compensation for diluting and applying the stabilising agent, irrespective of the prescribed rated of application. For foamed bitumen, the rate shall include for foaming the bitumen on the recycler, including the water and any other additive that may be required to achieve the minimum foaming characteristics and for injecting the foamed bitumen into the recycled material."

Item

Unit

B35.13 Extra over Items 35.01 and 35.07 for trial sections

cubic metre (m³)

Amend the payment item as follows:

**“B35.13 Extra over Items 35.01, 35.07 and B35.19 for trial
 sections cubic metre (m³)”**

Add the following new payment items:

Item	Unit
B35.14 Sampling of in situ material for mix design procedure	Number (No)

The unit of measurement shall be the number of positions for sampling of in situ material for the mix design procedure.

The tendered rate shall include full compensation for all costs to make available, operate and to transport the recycling machine and other equipment to the sampling position. To provide the required traffic accommodation in terms of section B1500. The tendered rate shall further include full compensation for breaking up the pavement for sampling and temporary patching the disturbed road way by adding make-up material, watering, compacting and surfacing with a cold asphalt material. The tendered rate shall also include full compensation for all transport, labour and other incidentals required for the sampling process.

Item	Unit
B35.15 Removal from site of surplus material	cubic metre (m ³)

The unit of measurement shall be the cubic metre of surplus material removed from site. The quantity shall be taken as 70% of the loose volume measured in trucks. Accurate load records shall be kept on site and submitted to the engineer on a daily basis.

The tendered rate shall include full compensation for gathering the surplus material by windrowing or pushing it into heaps, for loading and transporting to a designated spoil or stockpile site including haul for a free haul distance of 1km, for offloading and either spreading the material or placing in neat stockpiles. It shall further include for all labour, plant, equipment and incidentals required to remove the material as specified.

Item	Unit
B35.16 Extra over item B35.16 for cross mixing of material	square metre (m ²)

The unit of measurement shall be the square metre of road surface where material that was pre-pulverised, is to be cross mixed, on instruction of the engineer, to ensure lateral mixing of the material. The quantity shall be calculated from measurements of the actual width and length of the section requiring cross mixing.

The tendered rate shall include full compensation for cross mixing, adding water and spreading the material. It shall further include for all labour, plant, equipment and incidentals required to do the cross mixing as specified.

Item	Unit
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B35.17 In situ recycling

(a) Chemically stabilised sub-base layer compacted to 95% of modified AASHTO density, using:

(i) Non-cemented material (150mm compacted layer (thickness) cubic metre (m³)

(b) Emulsion stabilised base layer compacted to 98% of modified AASHTO density, using:

(i) Non-cemented material (150mm compacted layer thickness) cubic metre (m³)

The unit of measurement shall be the cubic metre of in situ recycled pavement layer, the quantity of which shall be calculated in accordance with the authorized dimensions of the completed layer.

The tendered rate shall include full compensation for setting out the works, preparing and providing the production plan, preparing the existing road surface where required, breaking up the existing pavement layer to the specified depth, breaking down and preparing the material utilising a in situ recycling machine, spreading and mixing the stabilizing agent but excluding the cost of supplying the stabilizing agent, any extra water required, placing and

compacting (primary and secondary) the material, cutting final levels as well as the protection and maintenance of the layer, conducting process control and daily monitoring, measuring and demarcating the work where layers are reprocessed partly, protecting the adjacent pavement and its repair should it be damaged.

It shall further include for all labour, plant, equipment and incidentals required to in situ recycle the layer as specified.

The engineer reserves to himself the right to vary the thickness of the layer to be stabilized by up to 20 mm, and the contract rate for this work shall not be amended by such change.

Material which is temporarily bladed to windrow for the removal of an underlying layer and then bladed back and compacted, will be classed as in situ reconstruction and paid for under this item. The temporary blading of the material to windrow will be paid for under item 34.07

The tendered rate shall include full compensation for breaking down the material to comply with the specified grading requirements.

Item	Unit
B35.18 Extra over item 35.19 for adding extra material:	
(a) Selected layer (Specify material type and quality)	cubic metre (m ³)
(b) Subbase layer (Specify material type and quality)	cubic metre (m ³)
(c) Base layer (Specify material type and quality)	cubic metre (m ³)

(i)

The unit of measurement shall be a cubic metre of material added on the instruction of the engineer, which quantity shall be taken as 70% of the loose volume measured in trucks, unless instructed by the engineer that the quantity be determined by way of cross-sections.

The tendered rate shall include full compensation for procuring, adding and spreading the material to the existing pavement layer to be in situ recycled, and for haul over a free haul distance of 1,0 km except for material obtained from commercial sources where all haul will be deemed to be included. It shall further include for levelling and compacting the material to a nominal density of 95% of the modified AASHTO density.

Item	Unit
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B35.19 Finishing off of the stabilised layer

(a) Slushing with:

(i) Water square metre (m²)

(ii) diluted emulsion square metre (m²)

(b) Application of a fog spray litre (ℓ)

The unit of measurement for (a) (i) and (ii) shall be the square metre of stabilised layer finished off through slushing with water or diluted emulsion. The quantity shall be calculated from measurements of the actual width and length of the stabilised layer.

The tendered rate shall include full compensation for provision of all plant, equipment, materials, labour and all other incidentals to slush the layer as specified.

The unit of measurement for (b) shall be the litre of diluted emulsion measured at spraying temperature.

The payment description for payment item 45.04 shall apply mutates mutandis for this item.”

“B3511 PLANT AND EQUIPMENT FOR COLD IN SITU RECYCLING

All cold in situ recycling shall be done utilising purpose-built wheel-mounted in situ recycling machines. The following specifications are applicable to such machines. Where the contractor intends using any other type of machine to recycle (e.g. a modified track-mounted milling machine) he shall submit for the approval of the engineer a full motivation for using such a machine, including a detailed work plan describing the recycling / mixing process and subsequent compaction / levelling processes that will produce a layer that meets the specified end product requirements.

(a) In situ recycling machines

In situ recycling shall be carried out using a special-purpose recycling machine to break down and recover material from the prescribed horizon in the upper layers of the existing pavement, blended together with any imported material, stabilising agent(s), water and any

other specified additives. The machine employed shall be capable of achieving the required grading and consistency of mix in a single pass.

In addition, the recycling machine shall meet the following requirements:

- (i) Be factory-built by a proprietary manufacturer having a demonstrable track record and manufacturing history in producing such equipment;
- (ii) If older than 10 years, the machine shall be certified by the manufacturer or manufacturer's authorised agent to confirm operational fitness-for-purpose dated not more than 3 months earlier than the date on which it commences work on the contract;
- (iii) Have a level-control system to maintain the cut depth within a tolerance of ± 10 millimetres of the required depth during continuous operation;
- (iv) The milling / mixing drum (the "cutter") shall have a minimum cut width of 2 metres with a facility to change the speed of rotation. The machine shall be capable of recycling to the maximum depth specified in a single pass;
- (v) The cutter shall rotate within an enclosed chamber (the mixing chamber) into which water and any liquid stabilising agents are injected under pressure at the specified application rate relative to the mass of material in the mixing chamber.
- (vi) The cutter shall be mounted on a swing arm that is separate from the housing of the mixing chamber, thereby allowing the volume of the mixing chamber to increase as the depth of cut increases.
- (vii) Have a liquid application system dedicated to adding water to the material in the mixing chamber;
- (viii) Where a bitumen stabilising agent is to be applied, a second separate liquid application system shall be fitted to the mixing chamber. Such system shall be appropriate for the addition of either bitumen emulsion or foamed bitumen;
- (ix) All liquid application systems shall be controlled by a micro-processor / flow meter combination that accurately regulates pump delivery (flow rate) with the speed of advance.
- (x) All liquid application systems shall include a dedicated spraybar that spans the full width of the mixing chamber. Each spraybar shall be equipped with multiple injection nozzles mounted equidistant along the length of the bar at a maximum interval of 200mm with the ability to close off selected nozzles, thereby allowing the width of application to be preset;
- (xi) Where two liquid application systems are used, the water application spraybar shall be mounted below the other spraybar (relative to the direction of rotation of the cutter) such that the recycled material encounters the water spray before the stabilising agent; and
- (xii) The recycler shall have sufficient power to recover and mix the existing pavement material together with all additives to produce a homogenously mixed material whilst pushing (or pulling) bulk supply tanker(s).

- (xiii) For foamed bitumen the liquid application system mounted on the recycler shall have the following additional features:
- Each injection nozzle on the spraybar shall be fitted with an expansion chamber (the so-called “Mobil system”) for foaming the bitumen;
 - Functioning gauges on the bitumen supply line for monitoring temperature and pressure;
 - The ability to demonstrate that all expansion chambers are free of blockages in both the water and bitumen feed lines;
 - A means of producing a representative sample of foamed bitumen at any stage during normal operations (i.e. a “test nozzle”); and
 - The micro-processor shall continuously monitor the actual bitumen consumption whilst working and provide a running total that allows immediate reconciliation with theoretical (calculated) consumption.

Before any recycling work commences, the contractor shall submit a specification sheet (obtained from the manufacturer) stating the capacity, pressure and temperature limits for each liquid application system that will be used to treat the recycled material.

The recycling machine that the contractor intends deploying shall be subject to the engineer’s approval and he shall be entitled to reject a machine which, in his opinion, may not be capable of producing a consistent product when recycling to the specified depth(s).

(b) Plant for compacting and finishing the treated layer

The treated material exiting from the rear of the recycler shall be processed using suitable compaction equipment and graders to achieve a layer that meets the specified requirements. Sufficient plant and equipment shall be deployed to enable the treated material to be processed and finished off within the time limitations specified below.

(i) Primary compaction

Initial compaction shall be undertaken immediately behind the recycling machine using a vibrating single-drum padfoot roller selected in accordance with the following guidelines:

TABLE B3511/1 GUIDELINES FOR SELECTION OF PRIMARY ROLLERS

Minimum static mass of roller (tons)	Final layer thickness			
	< 150mm	150 – 200mm	200 – 250mm	> 250mm
	12	14	16	20
Minimum amplitude at frequency range	1.8mm @ 30 – 35Hz			

It will be advantageous if the roller is equipped with an integrated comptometer device to indicate and record the level of density that is achieved with each successive pass of the roller. These records can be used by the contractor for process control to indicate that the maximum density has been achieved.

(ii) Secondary compaction

After primary compaction and shaping of the layer a smooth drum vibrating roller with a static mass not less than 10 tons and not more than 14 tons shall be used to compact the upper portion of the layer.

(iii) Finishing of the layer

After the final level of the layer has been obtained a pneumatic-tyred roller (PTR) with a minimum static mass of 18 tons and mounted on at least seven (7) tyres shall be used to finish off the layer.

(c) Bulk tankers

Only tankers with a capacity exceeding ten thousand (10 000) litres shall be deployed to supply the recycling machine with water and/or liquid stabilising agents. Tankers containing a bitumen stabilising agent shall be fitted with appropriate tow hitches, one in front and one at the rear, thereby allowing the tanker to be pushed from behind by the recycling machine, and to push a water tanker in front. No leaking tanker will be permitted on the site.

Where a bituminous stabilising agent is added, each tanker shall be equipped with:

- (i) A thermometer reflecting the temperature of the contents in the bottom half of the tank; and
- (ii) A rear feed valve (minimum internal diameter of 75mm when fully opened) that is capable of draining the contents of the tank.

B3512 CONSTRUCTION OF LAYERS BY MEANS OF COLD IN SITU RECYCLING

(a) Requirements before recycling commences

- (i) Stabilisation mix design procedure for cold in situ recycling

The following mix design procedure shall be followed as a minimum requirement for each stabilisation type:

Within 30 days of the contractor taking possession of the site, the contractor shall commence with the mix design process. This process shall be carried out on samples of neat materials extracted from the full depth of the recycling horizon. Bulk samples shall be extracted by means of the recycling machine proposed for the stabilisation work. For each material uniform section identified, two separate bulk samples shall be extracted from the recycling horizon and used in the stabilisation mix design process. The location at which such samples are taken shall be indicated by the engineer.

Stabilisation mix designs shall be undertaken by the engineer to determine:

- details for blending the recycled material with imported material (where necessary);
- application rates for stabilising agent(s);
- target strengths achieved from such application rates; and
- impact of material variations (sensitivity analysis)

Stabilisation mix designs shall be carried out in accordance with the latest edition of the following best practice guideline publications:

- | | |
|-------------------------------|---------------|
| – Cementitious stabilisation: | SAPEM, SANRAL |
| M5 manual and TRH 13 | |
| – Bituminous stabilisation: | SAPEM and TG2 |

The contractor shall construct a trial section for the approved mix design developed for the first uniform section. Recycling work may only commence once the trial section has been approved by the engineer. Thereafter, it will be incumbent on the contractor to obtain the necessary approval for the relevant mix design for each uniform section ahead of the recycling work. Should the situation arise where the contractor has not followed the mix design procedure to obtain the required approval of the engineer recycling work shall cease until such time as the prescribed process for approval has been followed. The contractor shall have no recourse for costs incurred as a consequence of such a delay.

(ii) Setting out and control of the work for cold in situ recycling

Unless otherwise stated in the specifications, the contractor shall establish his own reference and level beacons for the setting-out and control of the works.

(1) Layers constructed utilising existing levels

(ii)

(iii) The existing horizontal alignment shall be retained and only minor modifications made to the vertical alignment, as described below.

(iv)

(v) The contractor shall establish a series of level control poles placed at a constant offset on both sides of the road at a maximum interval length indicated in clause B3405(a). At each level control location, the contractor shall record the existing road surface levels at the centre-line and at the outer limits of each lane and prepare a series of graphs (for sections not less than 2.0km in length) with the recorded levels plotted at an exaggerated scale against the km distance. Final levels for the new stabilised layer shall be selected in accordance with a “best-fit” principle, taking into account the following:

(vi)

- the required camber or super elevation details at each location;
- the minimum requirements governing changes in grade (longitudinal grade line);
- the thickness of the existing base layer; and
- minimising the amount of pre-work required (pre-treatment and/or importing new material) before recycling can commence.

At least two weeks before recycling work is scheduled to commence on any specific section, the contractor shall select the best-fit design levels and submit these proposals to the engineer (both as a schedule of longitudinal grade, cross-fall and final surface levels, as well as a drawing with the design lines superimposed on the existing levels) for approval or amendment.

The engineer will take control measurements to determine the accuracy and adequacy of the reference beacons / control poles, and may instruct the contractor to correct any faulty work and to take and provide such additional measurements and details as may be deemed necessary.

Survey work will not be measured and paid for separately and compensation for any work involved in staking, setting out, taking levels, determining the final surface elevations and transferring these design levels on to the level control poles (including the cost of all labour materials and reinstatement if required for any reason) will be deemed to be included in the rates for the relevant payment items for cold in situ recycling. No payment will be made for any inconvenience or delay caused by compliance with these requirements.

(2) Layers constructed utilising new levels

Layers shall be constructed according to new design levels as indicated on the drawings.

(iii) Production Plan

Prior to the start of a shift, the contractor shall prepare a production plan detailing his proposals for the forthcoming shift's work. As a minimum, this plan shall include a sketch showing:

- the overall layout of the length and width of road intended to be recycled during the day, broken into the number of parallel cuts required to achieve the specified width of treatment;
- the location of and overlap width (minimum 150mm) at each longitudinal joint between adjacent cuts, together with the location of the inner and outer wheel paths of each lane affected by recycling;
- the sequence and length of each cut to be recycled before starting on the adjacent or following cut; and
- an estimate of the time required for recycling each cut and for finishing off the work.

(iv) Preparing the surface

Before any recycling work commences, the surface of the existing road shall be prepared by:

- cleaning all vegetation, garbage and other foreign matter including road studs from the full road width, including any adjacent lanes or shoulders that are not to be recycled;
- removing any standing water;
- pre-milling to remove high-spots and/or pre-pulverising where ordered;
- providing a reference line to assist the operator to accurately steer the recycling machine, and
- record the location of all road marking features (e.g. extent of barrier lines) that will be obliterated by recycling.

(v) Surface shape and level requirements

Where surface defects are to be corrected and/or modifications made to the grade line, instructions will be issued detailing the new surface level requirements. These may be achieved prior to recycling by either pre-milling to remove in situ material, by pre-pulverising, pre-shaping and pre-compacting the pulverised material, or by importing material and accurately spreading on the existing road surface, as described below.

(vi) Pre-milling

Where instructed, pre-milling shall be undertaken using a milling machine (not a recycling machine) to:

- Remove isolated high spots and/or make minor modifications to crest vertical curves by accurate milling. The material resulting from such milling operations shall remain on the road, behind the milling machine, where it shall be spread across the width of recycling and rolled with a smooth-drum roller or loaded onto trucks and disposed of as directed;
OR
- Break down (pulverise) badly cracked asphalt layers, and/or sections where thin asphalt overlays are delaminating. To ensure that the milling operation achieves the required degree of pulverisation, the depth of milling shall be constantly monitored and adjusted so that the bottom of the milling drum remains within the lower half of the cracked / delaminating asphalt layer. Where an acceptable degree of pulverisation cannot be achieved, the machine shall be operated in reverse (i.e. down-cutting) with the same controls applied to the depth of milling. If such reverse milling fails to produce an acceptable degree of pulverisation, the asphalt layer shall be milled off and removed. The pulverised asphalt material generated from such pre-milling shall remain on the road, behind the milling machine, where it shall be spread across the width of recycling and rolled with a smooth-drum roller.

(vii) Pre-pulverising existing pavement material

Pre-pulverising shall only be undertaken on instruction from the engineer for the purpose of:

- breaking down excessively hard material;
- loosening the material across the road width so that it can be cross-mixed by grader;
- exposing the loosened (fluffed-up) material to the atmosphere to promote drying; or
- loosening the material in the existing pavement so that it can be loaded and removed from site.

The depth of pre-pulverising shall be carefully controlled throughout the operation to ensure that the cut horizon always remains at least 25mm above the bottom of the subsequent recycling / stabilisation horizon.

Unless the objective of pre-pulverising is to dry the material, a water tanker shall be coupled to the recycling machine and sufficient water added to allow the material to be compacted to a minimum density of 95% of the mod AASHTO density. Except where the material is to be cross-mixed, it shall be compacted immediately behind the recycler before using a grader to pre-shape the material in accordance with final level requirements.

(viii) Cross-mixing

Where cross-mixing is ordered, the material shall be bladed by grader or utilising other mixing equipment to achieve a uniform blend of material throughout the layer. The layer shall be compacted and shaped before being in situ recycled,

(ix) Addition of imported material

Where instructed to import material for blending and/or as make-up material for the purpose of shape, level or material grading correction, the prescribed material shall be imported and spread on the existing road surface prior to recycling. The method of placing and spreading the imported material shall be such as to achieve the required surface levels and will require the use of a paver, motor grader or other such plant. All imported material shall be pre-compacted to a minimum of 95% of the mod AASHTO density.

Nowhere shall the thickness of imported material exceed the recycling depth.

(b) The recycling process**(i) Before starting**

Prior to starting to recycle, the production planned for the day shall be approved by the engineer and the following checks carried out:

- All relevant temperatures shall be measured and recorded, including:
 - air temperature;
 - the material in the recycling horizon; and
 - the contents of all bulk supply tankers (including water).
- All plant and equipment is on site and the operators of the different machines are adequately trained and briefed on their particular tasks.
- The recycling machine has been prepared and set up for the first cut. Such preparations shall include:
 - checking that the mixing chamber is free of any material build-up that may affect the functioning of the application nozzles on all relevant spraybars;
 - the cutting tools have sufficient remaining life to complete the first cut without stopping;
 - all relevant liquid application systems are functioning, free of blockages and the in-line filters are clean. Where a bitumen stabilising agent is applied, a relevant check-sheet (similar to the example forms included in the Appendices of SAPEM and TG2) shall be diligently followed, signed off and submitted to the engineer;
 - the on-board computer has been correctly set up and the input data verified;
 - the spraybar is set up with the correct nozzles selected to achieve the required width of application;
- Bulk supply tanker(s) are coupled correctly to the recycling machine, all feed pipes are properly connected, bled of air and free of leaks. Where a bitumen stabilising agent is applied, the feed pipe shall only be connected immediately before work is about to start. Where the stabilising agent is foamed bitumen, the outlet plumbing on the tanker shall be checked and any “cold plug” of bitumen removed before attaching the feed pipe.
- Where cement or lime is spread by hand on the road surface ahead of the recycling machine, the bag spacing shall be checked at random intervals and recorded.
- A clear guideline is in place for the recycling machine to follow and is correctly aligned relative to the road geometry.
- The integrated compactometer system on the primary roller properly functioning and has been set up to record the correct relevant data.

(ii) Recycling

The recycling machine shall be set up and operated to ensure that:

- The speed of advance is regulated (below the maximum allowable of 10m/min) to achieve;
- adequate pulverisation of all bound materials in the existing pavement to produce a material that meets the grading requirements;
- operating pressures and flow rates in all liquid application systems that remain within the limits prescribed by the manufacturer of the machine.
- The depth of recycling coincides with the line and level specified for the bottom horizon of the new stabilised layer. The bottom of cut horizon shall be checked at least once every 100m of cut using a suitable T-bar to dip from a stringline pulled between the relevant final level reference marks on the level control poles.
- The planned width of overlap along all longitudinal joints is maintained and the line of cut does not deviate laterally by more than 50mm from that required (measured from the operator's guideline that shall be positioned for each and every cut).
- The process is continuous with a minimum number of stops. Transverse joints that occur every time the recycling machine stops are properly treated to achieve continuity of stabilisation and moisture across the resulting joint.
- The application rate of liquid stabilising agent(s) and water is uniformly continuous across the required width of treatment, including all longitudinal joints.
- The temperature across the width of material exiting the mixing chamber shall be checked at least once every 100m using a digital thermometer with a laser beam target held no more than 100mm above the material. Where the temperature varies consistently by more than 3°C along a particular longitudinal strip $\pm 200\text{mm}$ wide, the recycling machine shall be stopped and the relevant application nozzles on all spraybars that coincide with the offending strip shall be checked for blockages.
- The moisture content of the treated material is continuously monitored and the application of water adjusted to achieve a uniform moisture content as specified.
- The mixed material exiting from behind the recycling machine is struck off by the rear door of the mixing chamber with sufficient pressure applied to obtain a uniform surface that is free of valley lines, empty pockets and particle segregation.

The advance speed of the recycling machine and the speed of rotation of the recycling drum shall be set to obtain the required grading and sufficient mixing of all components (recycled material and additives) so that a homogeneous material is produced.

(c) Primary compaction

Recycling machines are configured such that their rear wheels run on top of the treated material towards the outer extremities of the cut. To prevent introducing a density differential across the width of cut, primary compaction shall be completed prior to any grader work commencing. If the treated material is pre-shaped by grader prior to being compacted, the work shall be summarily rejected.

A single-drum vibrating roller shall be deployed to compact the recycled material immediately behind the recycling machine. This roller shall travel forwards and backwards at a constant speed (maximum 3km/hr (50m/min)), remaining within the confines of the recycled cut. Recycled material covering the outer extremities of cut shall be moved at regular intervals (± 5 m) to expose the cut line, thereby allowing the operator to remain within the cut width.

Successive lengths of recycled / treated material shall be compacted (each approximately 50m in length).

Rolling shall continue on each section until the maximum achievable density has been reached. Where an integrated compactometer device is utilised normally rolling have to continue until the device indicates that no further density is being achieved over at least 80% of the length of the section (i.e. maximum achievable density has been reached). Should the device indicate a consistent loss of density at any point during primary compaction (as indicated over two successive recording passes), rolling on that section normally has to be terminated and the roller moved forward to start compacting the next section.

After each day's production, the contractor shall provide the engineer with his process control records of the densities achieved for primary compaction. Where a compactometer device was used an electronic copy of the data file containing detailed compaction records for the day's work shall be provided to the engineer. As a minimum, the records shall include the number of passes made on each section of every cut made by the recycling machine, the compaction achieved on every cut as well as the following data for each 2m interval along the length of each cut:

- the compactometer reading (where applicable);
- the amplitude of vibration; and
- the advance speed of the roller.

These records will constitute the contractor's Process Control for primary compaction.

A “roller pass” shall be defined as a single unidirectional pass made by the roller. Where the roller travels forwards and backwards over the same point, it would have made “2 passes”.

A “recording pass” is a roller pass where the compactometer readings are stored (recorded) and used for comparison purposes. Recording passes are always in one direction of travel only. Recordings shall be made commencing with the first pass and every alternative subsequent pass that is made (i.e. 1, 3, 5, 7, etc.)

The primary compaction process shall follow at the same rate as the recycling operation. The contractor shall ensure that a sufficient number of rollers are available to achieve this.

(d) Final levels and secondary compaction

- (i) After completing the primary compaction on all adjacent cuts that make up the width of pavement that is recycled in one shift, the surface shall be pre-shaped and final levels cut before final compaction is applied. Pre-shaping shall address the lateral shift of material resulting from the surface inclination (cross-fall). The moisture in the layer shall be controlled during this process. No roller will be allowed onto the layer during the pre-shaping process to prevent the lamination phenomenon (biscuiting) occurring,

Secondary compaction shall then be applied using the smooth-drum vibrating roller operating in low amplitude vibration mode. The outer cut extremities shall be exposed as a guide for the roller operator to ensure that the compaction effort is directed only on to the recycled material (thereby preventing any “bridging across” from the unrecycled pavement).

(e) Finishing off of the layer

When the grader work and secondary compaction of the recycled base is complete, the surface will be sprayed with an appropriate amount of water or diluted emulsion and a pneumatic tyred roller (PTR) applied. Such slushing shall be undertaken in short sections ($\pm 40 - 60\text{m}$) over the full width of the recycled layer. The PTR shall make sufficient passes and the surface must be sufficiently wet to generate a “mild” slush and close up voids in the surface together with any other grader-induced defects and achieve a tightly-knit surface finish. Rolling with the PTR must continue until no free water is visible and a uniform appearance, from a visual perspective, is achieved. Personnel equipped with squeegees

shall be deployed to move the slush over areas showing signs of roughness and/or segregation. Squeegees shall be used to remove any surplus slush to the side of the road. Whilst still damp, the slush shall be broomed off the road using hand brooms. If a mechanical powered broom is used care shall be taken not to damage or loosen the surface. The final surface shall have a smooth, tightly-knit finish with no “biscuit” layers. Brooming of the surface is not required if the road is opened to traffic. The slushing process must be completed on the same day that stabilisation work is completed. The slushing process is dependent on the material properties and therefore the desired finish must be determined through trial sections.

Where the recycled material is treated with a bitumen stabilising agent and the intention is to open the finished layer to early trafficking, a diluted emulsion (15% residual bitumen) applied at between 0.5 and 0.75 litres/m² depending on the material type may be substituted for water in the slushing process. A water tanker fitted with an appropriate spraying system (or binder distributor) shall be used to spray a uniform amount of dilute emulsion on the surface before applying the PTR. Additional dilute emulsion may be applied where the first application failed to generate sufficient slush under the wheels of the PTR. Rolling with a PTR should continue until a uniform appearance, from a visual perspective, is achieved and should stop before when the emulsion shows signs of breaking and becoming sticky/tacky.

Once slushing is complete, the entire area may, on instruction of the engineer, receive a fog spray application using the same dilute emulsion (applied at a nominal rate of 0.75 litres/m²) and left to dry back before opening the road to traffic.

Dilute emulsion for slushing and fog spraying shall only be applied using an appropriate water tanker or binder distributor.

B3513 PROTECTION AND MAINTENANCE

(a) Trafficking the completed layer

(i) Cementitious stabilisation

Under no circumstance shall traffic be allowed to travel on layers of cement stabilised material.

(ii) Bituminous stabilisation

(1) Where bitumen emulsion is applied as the stabilising agent

Traffic shall not be allowed to travel on the completed layer for a period of 24 hours. The moisture content of the layer shall then be checked and, provided it is below 80% of OMC, the new layer may be opened to traffic.

(2) Where foamed bitumen is applied as the stabilising agent

The moisture content of the layer shall be checked and, provided it is below 80% of OMC, the new layer may be opened to traffic. As soon as the surface of the layer has dried (normally within 24 hours under favourable weather condition), the section shall be closed to traffic to allow for the application of a fog spray. The section shall be reopened to traffic after two hours or as soon as the emulsion has broken.

Where the surface was slushed with a diluted emulsion and a fog spray applied as part of the finishing process, the section shall remain closed to traffic for a minimum of two hours after completion or until the emulsion at the surface has broken.

(b) Maintenance of the stabilised layer

Until the surfacing is applied, the contractor shall maintain the surface integrity of the new layer by deploying staff on a daily basis to visually monitor all sections under traffic and take immediate action as soon as signs of ravelling are detected. Such action shall include the local application of dilute emulsion (applied by hand using a large paint brush) or the application of a further fog spray.

Where damage occurs as a consequence of the surfacing not being applied within the time limits specified in clause B3513 (c) below, the engineer shall have the right to summarily reject the affected layer and the contractor will have no recourse for the costs he incurs in removing the layer and replacing it with fresh stabilised material.

(c) Application of surfacing

To prevent environmental degradation and/or abrasion damage, new base layers shall be surfaced as soon as the moisture content at all positions within the layer is below 50% of optimum moisture content according to TMH 1, Method A7.

The maximum time delay between completing a new base layer and applying the surfacing shall be 14 days (with due allowance made for inclement weather)."

SECTION B3600: CRUSHED STONE BASE

B3607 QUALITY OF MATERIALS AND WORKMANSHIP

Replace the second paragraph with the following:

"Test results and measurements will be assessed in accordance with the provisions of Section 8200."

SECTION B4100: PRIME COAT

B4102 MATERIALS

(b) Aggregate for blinding

Add the following sentence:

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

B4104 WEATHER AND OTHER LIMITATIONS

Replace paragraph (g) with the following:

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

B4106 APPLICATION OF THE PRIME COAT

Add the following to paragraph (c)

"The nominal application rate of the prime shall be 0,7 l/m². Unless directed otherwise by the engineer or indicated on the drawings, the edges of the primed surface shall be 150mm wider than the edges of the surfacing."

Add the following subclause

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

B4108 TOLERANCES

Replace the first paragraph with the following:

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

Table B4108/1

Payment Reduction Factors for Conditionally Accepted Prime Coat

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

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

B4109 TESTING

Add the following

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

SECTION B4200: ASPHALT BASE AND SURFACING

B4202 MATERIALS

a) Bituminous binders

(i) Conventional binders

Add the following:

“The binders to be used shall be as follows:

- (a) Continuously graded surfacing course: 50/70 penetration grade bitumen
- (b) Continuously graded base: 30/50 penetration grade bitumen”.

(ii) Non-homogeneous (heterogeneous) modified binders

Replace the last sentence with the following:

“The bitumen-rubber binder shall be manufactured according to the guidelines contained in “Technical Guideline: The use of Modified Bituminous Binders in Road Construction (TG 1-2007): Asphalt Academy”

(iii) Homogeneous modified binders

Replace the last sentence with:

“The modified binder to be used on this project shall be A-E2

The homogeneous modified binder shall be manufactured according to the guidelines contained in “Technical Guideline: The use of Modified Bituminous Binders in Road Construction (TG 1-2007): Asphalt Academy”. The base bitumen shall conform to SANS 4001-BT1:2012, or a blend of SANS 4001-BT1:2012 grades. The type as well as

percentage of modifier is not prescribed, however the contractor shall indicate in the Pricing Schedule what polymer he shall be using. The properties of the homogeneous modified binder shall comply with the relevant requirements for binder class A-E2 as listed in table B4202/12.

Table B4202/12: Properties of polymer-modified binder for hot-mix asphalt

Property	Unit	Test Method	Binder Class
			A-E2
Softening Point ¹	°C	MB-17	65-85
Dynamic Viscosity@165°C	Pa.s	MB-18	≤0.6
Force Ductility @ 5°C	N	EN 13703	Report*3
Elastic Recovery @ 15°C	%	MB-4	>60
Storage Stab @ 160°C)	°C	MB-6	≤5
Flash Point	°C	ASTM: D93	≥230
Creep Stiffness	MPa	AASHTO:TP1	Report
Properties after ageing (RTFOT)			
Diff in Softening Point	°C	MB-17	-2 to +8
Elastic Recovery @ 15°C	%	MB-4	>50
Mass change	%	MB-3	≤1.0

Property	Unit	Test Method	Binder Class
			A-E2
Dynamic Viscosity @ 165°C	Pa.s	MB-18	Report*2

* Notes:

1. The prescribed test method is based on not using stirrers although it has been reported that the use of stirrers has shown no difference in test results. For referencing purposes no stirrers should be used.
2. No limits are given and the values should be recorded for reporting purposes only as they may be used in future specifications.
3. No values given but the test can be used to rank various binders according to their low temperature cohesion properties

b) Aggregates

Add the following paragraph to the introductory description:

“Asphalt mixes shall be manufactures using different individual single size coarse aggregates fractions and crushed fine aggregates blended to conform to the specified grading requirements. The use of natural sands shall only be permitted if approved by the engineer and shall be limited to a maximum of 5% for continuously graded mixes. All aggregate in excess of 5mm shall consist of individual nominal single sized aggregate. For stone mastic asphalt mixes all aggregate fractions in excess of 2mm shall consist of individual single size fractions. The Contractor shall note that commercial suppliers may not be able to supply all the required single size aggregates, in which instance arrangements will have to be made for additional on site screening. No additional payment shall be made for screening aggregate. The use of run of crusher type materials shall not be permitted.”

(v) Absorption

Add the following sentence:

“In addition, the total binder absorption of the combined coarse and fine aggregate blend shall not exceed 0,5%”

(viii) Grading

Delete the second paragraph commencing with "The target grading..." and add the following paragraphs.

The grading limits for the combined aggregate grading for the asphalt surfacing shall be as specified in table 4202/7: Continuously graded medium grade.

(x) Rolled-in chippings

Replace Table 4202/11 with:

TABLE B4202/11

Sieve size (mm)	Chip size - Percentage passing by mass	
	20 mm	14 mm
20,0	100	
14,0	0 – 20	100
10,0	0 – 5	0 – 20
7	0 – 1	0 – 5
0,425	0,5 max	0,5 max

Note:

Refer to standard COLTO table for COLTO grading if required

Add the following new sub-item:

“(xi) Moisture content

The moisture content of aggregates, sampled from the cold feed belt, shall not exceed the following limits at the time that it is introduced into the mix:

- Coarse aggregate 2%
- Fine aggregate 4%”

c) Fillers

Delete the second last sentence of the first paragraph and replace with:

“With the exception of stone mastic asphalt, in no instance shall more than 2% by mass of active filler be used in the mixes.”

Add the following after the last paragraph:

“For tender purposes the active filler shall be hydrated lime”

h) General

Add the following after the second paragraph:

“Sufficient aggregate for a minimum of 3 days production shall be separately stockpiled and tested for conformance and uniformity prior to use. The test results shall be presented to the engineer”

B4203 COMPOSITION OF ASPHALT BASE AND SURFACING MIXTURES

In the first paragraph, third last line, after “or active filler content” add:

“or aggregate content”

Replace the fifth paragraph with the following:

“The design of the asphalt mixes shall be in accordance with “Interim Guidelines For The Design Of Hot-Mix Asphalt In South Africa (June 2001)”, and appropriate research results. The mix properties and requirements shall be as specified in the project specifications”

The relevant asphalt mixes for the base and surfacing layers shall comply with the requirements in table B4203/1.

Replace Table 4202/6 with:

TABLE B4202/6

	Sieve size (mm)	Maximum nominal size (mm)			
		Semi-gap		Continuously graded	
		37,5	28	37,5	28
		Percentage passing sieve by mass			
	37,5	100		100	
	28	87 – 100	100	86 – 95	100
	20	77 – 96	93 – 100	73 – 86	87 - 96

	14		83 – 94	61 – 76	73 - 85
	10	61 – 81	73 – 88	52 - 68	64 - 79
	7		62 – 77		
	5	46 – 61	51 – 65	37 – 54	43 – 61
	2	39 – 51	39 – 51	23 - 40	28 - 44
	1	35 - 46	35 – 46	17 - 32	20 - 35
	0,600	32 – 42	32 – 42		15 – 30
	0,300	22 – 35	22 – 35	9 – 21	11 – 24
	0,150	10 – 20	10 – 20	6 – 17	8 – 19
	0,075	4 - 10	4 – 10	4 - 12	5 - 12
Nominal Mix Proportions by Mass when Bitumen is Used	Aggregate	93,5%		95%	94,5%
	Bitumen (grade according to project specifications)	5,5%		4%	4,5%
	Active filler*	1,0%		1,0%	1,0%

* Active filler for tender purposes to be hydrated lime.

Notes: 1. For recycled asphalt the nominal mix ratios of recovered asphalt, new aggregate, new bituminous binders, and active mineral filler to be used for tender purposes, shall be as specified in the project specifications.

2. Refer to standard COLTO table for COLTO grading if required

Replace Table 4203/1 with:

Table B4203/1: Asphalt mix requirements: Base and Surfacing

Property	Continuously graded surfacing mixes
Marshall Stability (kn)	8 – 18

Property	Continuously graded surfacing mixes
Marshall Flow (mm)	2 – 6
Stability /Flow (kN/mm)	> 2,5
VMA (%)	> 15
VFB (%)	65 – 75
Air voids (%)	4 – 6
Indirect tensile strength @ 25°C (kPa)	> 1000
Dynamic Creep Modules @ 40°C (MPa)	> 20
Modified Lottmann @ 7% voids (TSR)	> 0, 8
Air permeability @ 7% voids (cm ²)	< 1 x 10 ⁻⁸
Binder film thickness (microns)	5,5 – 8,0
Filler bitumen ratio	1 – 1,5
Immersion index (%)	-

B4204 PLANT AND EQUIPMENT

(f) Vehicles

Replace the second paragraph with the following:

“To minimize temperature loss all vehicles used for transporting asphalt to the site shall be fitted with thermal asphalt covers (canvas covers not acceptable) irrespective of the prevailing climatic conditions or distance of transport.”

Add the following subclause:

B4205 GENERAL LIMITATIONS AND REQUIREMENTS AND THE STOCKPILING OF MIXED MATERIAL

b) Moisture

Amend the last paragraph as follows:

Insert “and/or primed base” after “surfacing” in the third line of the first sentence.

Replace the last sentence with “In such case the base shall be allowed to dry out to meet the above moisture content requirement prior to placing the surface layer.”

c) Surface Requirements

(iii) Tack Coat

Add the following paragraph:

“Hand spraying shall only be permitted on areas approved by the engineer. The binder distributor shall be capable to apply the binder evenly over the full area. The equipment shall comply with clause 4103. Tack coat shall be applied to all transverse and longitudinal joints by hand utilizing a paint brush.”

B4206 PRODUCING AND TRANSPORTING THE MIXTURE

b) Production of the mixture

(ii) Using drum-type mixer plants

Add the following:

“Pre-blending of aggregate fractions shall not be permitted and the contractor shall ensure that sufficient cold-feed bins are installed to accommodate each individual aggregate fraction, including the filler.”

c) Transporting the mixture

Delete the second sentence in this paragraph.

Add the following sub-clause:

“f) Approval of asphalt mixture

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

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

Samples of all aggregate and bitumen shall be submitted with the laboratory design mix to enable the engineer to carry out check design testing as necessary. The above design and aggregate shall be submitted to the engineer at least six weeks before it is intended to commence with any asphalt production.

After approval is obtained for the laboratory design mix, a plant mix at varying binder contents of approximately 5 to 10 tons each shall be produced. The purpose of the plant mix is for the contractor to prove that the laboratory design mix can be produced successfully. The engineer shall conduct the necessary testing on the plant mix. The plant mix shall not be placed on the road. During the production of the plant mix, the engineer shall be afforded the opportunity to inspect the asphalt plant.

After the plant mix is approved, permission shall be given for laying a trial section at varying binder contents in accordance with the requirements of section 4211 of the specifications. The engineer may require that the mix be further assessed by means of CSIR Wheel Tracking or MMLS testing, the cost of which will be borne by the Employer. Mass production of asphalt shall only commence after approval of the trial section, which should be given within a maximum of ten days.

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

B4208 JOINTS

Add the following to this clause:

“Where the difference in level between the new work and the existing road surface exceeds 25mm, joints shall be treated as follows:

Transverse steps at the end of a day’s work shall be tapered off at a slope of 1 vertical to 20 horizontal (1:20) to tie in with the existing surface. The tapered section shall be removed before surfacing is recommenced and a joint formed in accordance with clause 4208 of the specification.

Longitudinal joints exposed to traffic shall be provided with a taper of compacted asphalt material over the full length of the exposed joint. The width of the taper shall be at least 5 times the difference in level between the old and new work.

All costs involved in the provision and removal of these temporary ramps shall be deemed to have been included in the rates tendered for the relevant asphalt pay item.”

B4209 PRE-COATED CHIPPINGS FOR ASPHALT SURFACING

Replace the first sentence of the fifth paragraph with the following:

“The pre-coated chippings used shall be 14mm size aggregate.”

In the last sentence of the fifth paragraph, delete “between 0,6 and 1,0mm” and replace with:

“minimum 0,8mm”.

B4211 LAYING OF TRIAL SECTION

Add the following to the end of the first paragraph:

“As the purpose is not to calibrate any equipment, etc., the contractor shall calibrate the equipment and refine the mix design at his own cost.”

B4213 CONSTRUCTION TOLERANCES AND FINISH REQUIREMENTS

(c) Gradings

Replace Table 4213/1 with:

TABLE B4213/1: AGGREGATE GRADING TOLERANCES

Size of aggregate passing Sieve size (mm)	Permissible deviation from target grading (%)
28	± 5
20	± 5
14	± 5
10	± 5
7	± 5
5	± 4
2	± 4

Size of aggregate passing Sieve size (mm)	Permissible deviation from target grading (%)
1	± 4
0,600	± 4
0,300	± 3
0,150	± 2
0,075	$\pm 1^*$

* When statistical methods are applied the permissible deviation for the 0,075 fraction is $\pm 2\%$.

B4214 QUALITY OF MATERIAL AND WORKMANSHIP

b) Coring of asphalt layers

Add the following:

“A suitable coring machine shall be available on a daily basis when asphalt paving is taking place. Cores shall only be drilled, when the road temperature is 20°C or less. Core holes shall be filled with hot mix asphalt and compacted, all within 24 hours of the core being drilled. Coring shall be carried out within 48 hours after the paving has been completed and supplied to the engineer. The test results of cores shall be submitted to the engineer within 24 hours after coring.”

c) Routine inspection and tests

Add the following paragraphs:

“The contractor shall keep accurate records of:

- (i) The position where every truckload of asphalt is paved (chainage, lane, time and date).

C.310

- (ii) The temperatures of the asphalt in the trucks both at the mixing plant and at the paving equipment immediately prior to discharging the load.
- (iii) The truck and load number from which control samples are taken. All samples taken shall be appropriately numbered.

Test results and measurements will be assessed in accordance with the provisions of section 8200.”

Add the following sub-clause:

d) Special tests

n-Heptane-Xylene Equivalent (Spot test) (AASHTO-T102)

If the engineer suspects that bitumen or asphalt has been overheated, he may order that the bitumen, or the bitumen recovered from the asphalt, be subjected to the Spot Test. Recovery of binder for use in the Spot Test shall be carried out according to an approved method.

Any bitumen having an n-Heptane-Xylene equivalent in excess of 36, or in excess of the manufacturers test result on the dispatched stock, shall be considered to have been overheated and shall be deemed to be rejected unless proven otherwise."

B4215 MEASUREMENT AND PAYMENT

Amend the following payment item:

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

B42.08 100mm cores in asphalt paving	number (no)
---	-------------

Amend the 1st sentence by adding the following after the word “drilled....”:

“irrespective of depth of core.”

Add the following payment items:

Item	Unit
B42.21	Aggregate variations
	ton (t)

The unit of measurement in respect of increases or decreases in the aggregate content from that specified in the nominal mix shall be the ton.

Payment for variations shall be made as specified for clause 1213.”

C.1.7. COLTO SERIES 5000: ANCILLARY ROADWORKS

SECTION B5100: PITCHING, STONEMWORK AND PROTECTION AGAINST EROSION

B5102 MATERIALS

a) Stone

Replace the 2nd paragraph with the following:

“Unless suitable stone can be located on site, the stone for pitching shall come from commercial sources but, from whatever source, its use shall be subject to the prior approval of the engineer.”

c) Sand

(ii) Sand for bedding

Replace this sub-sub-clause with the following:

Sand for bedding used for paving blocks shall not contain any deleterious impurities and shall comply with the requirements given in table B5102/1.

TABLE B5102/1

Sieve size (mm)	Percentage passing
10	100

5	95 – 100
2	73 – 86
1	43 - 78
0,600	25 – 60
0,300	10 - 30
0,150	5 – 15
0,075	5 - 10

Note:

Refer to standard COLTO table for COLTO grading if required

B5106 SEGMENTAL BLOCK PAVING

d) Edge beams

Add the following paragraph:

"Where concrete edge beams are constructed the relevant specifications under section 2300 shall apply."

SECTION 5200 : GABIONS

B5201 SCOPE

Add the following paragraph

“This section also covers the removal, dismantling and stacking of existing gabion work, and the reuse of these materials where authorised by the engineer.”

B5203 CONSTRUCTION OF GABION CAGES

(a) General

Add the following new sub-clause:

“(iii) Reno mattresses or similar may be used as alternative to gabion boxes. These Reno mattresses are to be manufactured of 80mm x 100mm mesh (2,5mm diameter wires, diaphragm spacing 0,6m).

B5204 CONSTRUCTING GABIONS

(c) Assembly

Delete and substitute with:

(c) Assembly, erection and stretching

(i) Assembly

“Prior to assembly, the gabion material shall be opened out flat on the ground and stretched to remove any kinks and bends. The gabion boxes shall then be assembled individually by raising the sides, ends and diaphragms ensuring that all creases are in the correct position and that the tops of all four sides are even. The four corners of the gabion boxes shall be laced first followed by the edges of internal diaphragms to the sides. In all cases lacing shall commence at the top of the box by twisting the end of the lacing wire around the selvages. It shall then be passed round two edges being joined, through each mesh in turn and securely tied off at the bottom. The ends of all lacing wire shall be turned to the inside of the box on completion of each lacing operation.

(ii) Erection

Only assembled boxes, or groups of boxes, shall be positioned in the structure. The side, or end, from which work is to proceed, shall be secured to either completed work or by rods or stakes driven into the ground at the corners. These must be secured and reach at least to the top of the gabion box. Further gabions shall then be positioned in the structure as required, each being securely laced to the preceding one at all corners and diaphragm points.

(iii) Stretching

On completion of erection of a suitable length of gabion, the gabion boxes shall be stretched using a wire strainer or winch of at least one ton capacity firmly secured to the

free end of the assembled gabion boxes.

Whilst under tension the gabion boxes shall be securely laced along edges (top, bottom and sides) and at diaphragm points, to all adjacent boxes and shall thereafter be filled."

(d) Rock filling

Add the following new sub-sub-clause:

(iii) General

"Filling shall be carried out only whilst gabion boxes are under tension. Filling material shall consist of rock of size not less than 120mm and not greater than 250mm so placed to produce a neat face and line with a minimum of voids.

Internal horizontal bracing wire shall be provided at 500mm vertical centres or such spacing to ensure a ratio of four to every 1m³ of filling. These bracing wires shall be wrapped around two mesh wires and extended from front to back so positioned to ensure a neat face and line free of excessive bulges and depressions. Gabion boxes shall be filled in stages and horizontal bracing wires inserted as filling is brought up.

Similar bracing wires used vertically shall be provided in 0,5mm deep gabions at 330mm horizontal centres where water falls directly onto gabions or where a neat face is required.

Tension on the gabion boxes shall be released only when sufficiently full to prevent the mesh from slackening.

Gabion boxes shall be overfilled by 20 to 50mm above their tops to allow subsequent settlement of the filling."

Add the following new sub-clauses:

(e) Final wiring

"Closing and wiring down of lids shall proceed as soon as possible after filling operations and certainly in the likelihood of storms or floods during construction. The wiring down shall consist of wrapping around wire at such intervals as required or specified.

Lids shall be stretched tight over the filling with bars and wired down securely through each mesh along all edges, ends and diaphragms. The ends of all tying and bracing wires shall be turned into the gabion box on completion of all lacing operations.

Tightness of mesh, well packed filling and secure lacing is essential in all structures."

(f) Removal, dismantling and stacking of gabions

"Existing gabions, either damaged or not, that require to be removed or moved to a new location shall be dismantled. Material not required for re-assembly or unsuitable for re-use shall be neatly stacked at approved locations in accordance with the engineer's instructions. Payment will be made only for gabions removed in accordance with the written instruction of the engineer.

Where gabions require moving, or as declared suitable by the engineer are re-usable, the contractor shall re-use all the material, plus supply such new materials as may be required to re-assemble the gabion again to the standard specification for new gabions."

SECTION B5400: GUARDRAILS

B5402 MATERIALS

a) Guardrails

At the end of the 1st sentence delete the full stop and add “or SANS 51317 and carry the SABS mark.”

b) Guardrail posts

(ii) Steel posts

Replace the paragraph with the following:

“Where offered or instructed to be used, steel posts shall be part of an approved guardrail system as tested and complying with SANS 51317, and galvanized in compliance with the requirements of SABS 763 for type A1 articles, shall be used.

Where guardrails are placed on concrete retaining walls or concrete structures, the steel posts shall be of the type and size shown on the drawings or described in the project specifications.”

B5403 CONSTRUCTION

a) Erection

Replace the 7th paragraph with the following:

“Steel posts placed on concrete retaining walls or concrete structures shall be erected and fixed as shown on the drawings. For all other applications, steel posts shall be erected and fixed in compliance with the approved guardrail system as tested and approved in terms of SANS 51317.”

B5405 REMOVING, RENOVATING AND RE-ERECTING GUARDRAILS

a) Removing the guardrails

In the 3rd line of the 1st paragraph, after “150mm layers,” delete the full stop and add “of suitable material (than less than G7 quality material).”

B5406 MEASUREMENT AND PAYMENT

Replace item 54.01 with the following:

“Item	Unit
--------------	-------------

B54.01 Guardrails on 3.81m spaced posts

Note to Tenderer: Select and price either the timber post or steel post system – not both

- | | | | |
|-----|---|-------------|--|
| (a) | Complete galvanised system on: | | |
| | (i) Timber posts | metre (m) | |
| | (ii) Steel posts | metre (m) | |
| | | | |
| (b) | Extra over 54.01(a) for the following | | |
| | (i) Flared ends (including end wing) | number (No) | |
| | (ii) End treatments where single guardrail sections
are used (including additional posts) | number (No) | |
| | (iii) End treatments where double guardrail sections
are used (including additional posts) | number (No) | |
| | (iv) Bridge adaptors (including extra rail and posts) | number (No) | |
| | (v) Horizontally curved guardrails factory bent to a
radius of less than 45m | metre (m) | |

The unit of measurement for (a) and (b)(v) shall be the metre of guardrail as erected, (including length of end treatments and curved guardrails).

The unit of measurement for (b)(i) to (b)(iv) shall be the number of end treatments of each type installed.

The tendered rates shall include full compensation for furnishing all materials and labour for erecting and galvanizing the guardrails, complete with posts, spacer blocks, bolts, nuts, washers and reinforcing plates, and excavating holes in all classes of material, concrete, backfilling and removing any surplus material. It shall also include full compensation for incidentals in respect of supplying and erecting curved guardrails, end treatments, and turned down sections.

Reflective plates and drilling and blasting will be paid for separately under items 54.06 and 54.12 respectively.”

Replace item 54.02 with the following:

“Item	Unit
--------------	-------------

B54.02 Guardrails on 4.0m spaced posts

Note to Tenderer: Select and price either the timber post or steel post system – not both.

- | | | | |
|-----|---|-------------|--|
| (a) | Complete galvanised system on: | | |
| | (i) Timber posts | metre (m) | |
| | (ii) Steel posts | metre (m) | |
| | | | |
| (b) | Extra over 54.02(a) for the following | | |
| | (i) Flared ends (including end wing) | number (No) | |
| | (ii) End treatments where single guardrail sections
are used (including additional posts) | number (No) | |
| | (iii) End treatments where double guardrail sections
are used (including additional posts) | number (No) | |
| | (iv) Bridge adaptors (including extra rail and posts) | number (No) | |
| | (v) Horizontally curved guardrails factory bent to a
radius of less than 45m | metre (m) | |

The unit of measurement for (a) and (b)(v) shall be the metre of guardrail system (complying with SANS 51317) as erected (including length of end treatments and curved guardrails).

The unit of measurement for (b)(i) to (b)(iv) shall be the number of end treatments of each type installed.

The tendered rates shall include full compensation for furnishing all materials and labour for erecting and galvanizing the guardrails, complete with posts, spacer blocks, bolts, nuts, washers and reinforcing plates, and excavating holes in all classes of material, concrete, backfilling and removing any surplus material. It shall also include full compensation for incidentals in respect of supplying and erecting curved guardrails, end treatments, and turned down sections.

Reflective plates and drilling and blasting will be paid for separately under items 54.06 and 54.12 respectively."

Delete items 54.03, 54.04 and 54.05 without replacement

Item	Unit
B54.07 Removing existing guardrails	metre (m)

Add the following:

"The tendered rate shall also include for the backfill of the holes with suitable G7 quality material."

Add the following pay item:

"Item	Unit
B54.14 Nailing of gang nail plates on top of timber guardrail posts	number (No)

The unit of measurement shall be the number of gang-nail plates supplied and fixed as specified.

The tendered rate shall include full compensation for supplying all materials and labour and for fixing to the top of the sealed guardrail post.”

SECTION B5500: FENCING

B5501 SCOPE

Add the following:

“This section also covers the repairing of existing fences that form part of the permanent work and/or routine maintenance”

B5514 MEASUREMENT AND PAYMENT

Add the following pay item:

Item	Unit
B55.10 Repairing existing fences	kilometre (km)

The unit of measurement for repairing existing fences shall be the kilometre of existing fence repaired on the instruction of the engineer.

The tendered rate shall include full compensation for untying the existing fence (where necessary) and reinstating it, tying of droppers and repairing and re-aligning of standards to the satisfaction of the engineer as well as for coiling

and stacking material unsuitable for re-use. Fencing material replaced shall be paid for under items 55.02 and 55.03.

If the existing fence is damaged by the contractor's construction activities, the contractor shall repair the fence at his own cost."

SECTION 5600 : ROAD SIGNS

B5601 SCOPE

“This section also covers the supply and erection of permanent danger plates at culverts and bridges at the locations indicated on the drawings or as directed by the engineer.”

B5603 MANUFACTURING OF ROAD SIGN BOARDS AND SUPPORTS

(a) Road signboards

Add the following:

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

(a) (ii) Steel profile road signboards

Add the following:

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

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

B5604 ROAD SIGN FACES AND PAINTING

Add the following new subclause:

“(e) Application of retro-reflective material

All sign faces shall be faced with class 1 grade retro-reflective material. Painted front sign faces shall not be used.

Where applied to Chromadek sections, retro-reflective material shall be applied as specified for aluminium section in Clause 5603(d) of the Standard Specification, and of Clause B5603(a)(ii) of this project Specification. All sign lettering and symbols are to be class 1 retro-reflective material with the exception of direction signs which is to be Class III retro-reflective material.

For W405, W406, R1 and W409 signs, the sign faces shall be Class III retro-reflective material and the lettering and symbols shall be Class III retro-reflective material.”

B5605 STORAGE AND HANDLING

Add the following:

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

Drilling of holes, except for the fastening of overlays

Application of any form of adhesive

Cleaning with any chemicals that are not specifically approved by the manufacturer of the retro-reflective material

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

B5606 ERECTING ROAD SIGNS

(c) Erection

Add the following:

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

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

B5608 DISMANTLING, STORING AND RE-ERECTING EXISTING ROAD SIGNS

Add the following:

“Existing overhead and ground mounted road signs that are being replaced by new signs shall be dismantled and disposed of by the Contractor. Where possible the dismantling of the signs shall not be before the replacement sign is erected and displayed. Where dismantling of the sign is required before erection of the replacement sign, the dismantling shall not take place until immediately before work is to commence on the replacement, and the replacement shall be completed and the new sign displayed as soon as possible thereafter (within 72 hours).

Dismantling shall include sign panels and ground mounted sign supports.

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

Pay items are provided in the Bill of Quantities. Payment will differentiate between different types of sign panels.”

B5609 MEASUREMENT AND PAYMENT

ITEM	UNIT
<p>B56.01 Road sign boards with painted or coloured semi-matt background. Symbols, lettering, and borders in diamond grade retro-reflective material, where the sign board is constructed from:</p> <p>Amend the last two lines of the second paragraph to read:</p> <p>“completion, delivery, installation of the road sign board complete as specified, and the removal and disposal of all vegetation obstructing the motorists’ view of the new or replaced sign board.</p> <p>Items (ii) and (iii) with areas greater than 2 m² shall be corrugated Chromadek plate.</p>	

Add the following pay items:

"ITEM	UNIT
B56.10 Danger plates at culverts/structures	
(a) Type A at storm water culverts (size indicated)	number (No.)
(b) Type B at bridges (size indicated)	number (No.)

The unit of measurement shall be the number of danger plates provided and erected in accordance with the drawings.

The tendered rate shall include full compensation for all labour and material, painting, posts, excavation, backfilling with soil etc., as may be necessary for completing the work in accordance with the details shown on the drawings."

SECTION 5700 : ROAD MARKINGS**B5706 SETTING OUT THE ROAD MARKINGS**

Add the following:

“Where road markings are to be replaced after milling/overlay seal, it is essential that all existing barrier lines and other road marking lines be accurately referenced before commencement of milling or other operations which will obliterate the existing road markings. The position of barrier lines shall be re-assessed on site by the Engineer before the Contractor commences with the road marking.”

B5707 APPLYING THE PAINT

Add the following:

“The Contractor’s establishment on site and general obligation shall be deemed to fully include the establishment of the road-marking team, irrespective of the number of times the road-marking team is required to be onsite or is required to move within the site.”

B5711 GENERAL

Insert the following into the last sentence of the last paragraph between “black paint” and “or chemical paint remover”:

“, bituminous emulsion, slurry”

Add the following to the last paragraph:

“Where black paint is used, it shall be matt.”

Add the following new clause:

“B5715 REMOVAL OF EXISTING ROAD STUDS

The existing road studs shall be removed from the road surface prior to milling.”

B5714 MEASUREMENT AND PAYMENT**ITEM****UNIT**

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

Add the following:

“Referencing of existing barrier lines and other road marking lines prior to milling and other operations, shall be included in the tendered rate for setting out and pre-marking.”

B57.05 Roadstuds

Add the following after the first sentence of the second paragraph:

“No additional payment will be made should temporary or permanent road studs be replaced if lost or broken during the construction period or the maintenance period.”

ITEM	Unit
B57.10 Cold plastic road marking material	

- | | | |
|-----|---|--------------------------------|
| (a) | White lettering and symbols | square metre (m ²) |
| (b) | Yellow lettering and symbols | square metre (m ²) |
| (c) | Transverse lines, painted island and arrestor bed markings (any colour) | square metre (m ²) |

The unit of measurement for applying the roadmarking material for the lettering, symbols, transverse lines, islands and arrestor bed markings shall be the square metre, and the quantity to be paid for shall be the actual surface area of the lettering, symbols, transverse lines, islands and arrestor bed markings, completed in accordance with the instructions of the Engineer.

The tendered rate per square metre for applying the road marking material shall include full compensation for procuring and furnishing all material, including the retro-reflective beads and all necessary equipment, and for applying, protecting and maintenance as specified, including the setting out of lettering, symbols, transverse lines, islands and arrestor bed markings.

ITEM	Unit
B57.11 Re-establishing the painting unit on instruction of the Engineer during the construction period	number (No)

The unit of measurement shall be the number of times the painting unit is re-established on site on instruction of the Engineer.

The Contractor's establishment on site and general obligation shall be deemed to fully include the establishment of the road-marking team, irrespective of the number of times the road-marking team is required to be on site or is required to move within the site.

Provision is made under payment item 57.07 for de-establishment and re-establishment in the contract or maintenance period if such action is required by delays not attributable to the contractor and/or ordered by the Engineer.

The tendered rate shall include full compensation for re-establishing the complete painting unit on the site and the subsequent removal of all special equipment, personnel, etc., for painting the road-traffic markings during the construction period."

SECTION 5800 : LANDSCAPING AND PLANTING GRASS

B5802 MATERIALS

(c) Grass seeds

Add the following:

"The seed mixture to be used for borrow pit areas shall be:

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

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

Eragrostis Curvula "Selected"	:	3kg/ha
Eragrostis Tef	:	2kg/ha
Cynodon Dactylon	:	7kg/ha
Chloris Gayana	:	5kg/ha
Cenchrus Ciliaris	:	5kg/ha
Digitaria Eriantha	:	4kg/ha
Pioneer seed	:	<u>10kg/ha</u>
		<u>36kg/ha</u>

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

Aristida Adscensionis	:	2kg/ha
Chloris Virgata	:	2kg/ha
Eleusine Coracana Subsp. Africana	:	2kg/ha
Melinis Repens Subsp. Repens	:	2kg/ha
Urochloa Panicoides	:	2kg/ha

The contractor shall make his own arrangements to obtain the specified seed mixtures. Should specific species not be available, alternative seeds may be proposed by the contractor for consideration by the engineer at tender stage."

Item		Unit
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B58.03	Preparing the areas for grassing	
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(f) Stockpiling topsoil (free haul 1,0km) where the following applies:

- | | | |
|-----|--|-------------------------------|
| i) | topsoil stored at a stockpile site agreed with by the engineer | cubic metre (m ³) |
| ii) | topsoil pushed or bladed into heaps next to area from which it was taken | cubic metre (m ³) |

“Item		Unit
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B58.12	Removal of undesirable vegetation	kilometre (km)
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The unit of measurement shall be the linear kilometre measured along the road centerline and within the road reserve, and measured each time the contractor has been instructed by the engineer to remove the undesirable vegetation under this pay item. This item shall not include areas of undesirable vegetation that have occurred within areas affected by construction activities, which are considered a contractual obligation (5807(e)).

The tendered rate shall include full compensation for all plant, equipment, labour and consumables required to effectively remove the undesirable vegetation, including the entire root system, and disposing by approved means.”

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

B5902 FINISHING THE ROAD AND ROAD RESERVE

Add the following to the first paragraph:

“The contractor shall pay special attention to the collection and removal of all waste materials originating from the construction activities. All materials trimmed or excavated from the road shall be collected and removed from the road reserve to the satisfaction of the engineer.

This requirement shall be deemed to be incorporated in the tendered rates for item 59.01 of the bill of quantities or such other items as the contractor may decide upon.

The engineer may order additional finishing of the road reserve which will entail the collection and disposal of loose rocks etc. Payment for this work will be made under daywork items included in section 5900 of the bill of quantities as described in section 1800 of these project specifications.”

SECTION 6100: FOUNDATIONS FOR STRUCTURES

B6103 GENERAL

a) Subsurface Data

Add the following:

“It is expressly understood that, while all subsurface information is given in good faith, the correctness of the information furnished is not guaranteed. Where the actual foundation conditions encountered are considerably at variance with conditions visualised and described in the Contract documents and those terms for which the rate or price provided for in the Contract is rendered unreasonable or inapplicable, such other rate or price consistent with the rates set out in the Contract shall be fixed as set out in Clause 6.3 of the SAICE General Conditions of Contract (2010) subject always to a founding depth variation not exceeding 2.5m in any foundation component (except piling depth) of the permanent structure not, by itself, being held to constitute cause for variation for the Contract rates or prices.”

B6104 ACCESS AND DRAINAGE

c) Drainage

Add the following:

“Where dewatering and keeping dry of excavations has not been billed separately as per item 61.03 “Access and Drainage”, it shall be deemed to be included in the rates tendered and paid for excavation and backfill.”

B6105 EXCAVATION

a) General

Add the following:

“Excavation required for diverting, channelling or widening streams within 5.0m of concrete structures shall be measured and paid for under item 61.02. Excavations beyond the 5.0m limit shall be measured and paid for under the appropriate items in Sections 2100 and 3300.”

c) Excavation

Add the following paragraphs:

“Where excavation is in soft material, the final 0.75m and in the case of hard material, the final 0.25m of material shall be removed using suitable hand tools such as pick and shovel or pneumatic tools.

During construction of the river bridges the Contractor will only be permitted to construct, subject to the approval of the Directorate of Water Affairs, low level causeways access the rivers that cause negligible backing up and cofferdams around the piers and abutments for the construction of the foundations using material excavated in the road prism consisting of natural alluvial deposits of sand boulders, etc. These obstructions must be removed at the end of the contract and the river and banks restored to their original condition.

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:

"Where founding takes place in soils or at "founding level" before the placing of foundation fill the in-situ material in the bottom of the excavation shall be compacted to a density of 90% or 93% of modified AASHTO density as directed by the engineer. The depth of preparation and compaction of founding material shall be specified by the engineer. Allowance for measurement and payment for this work is made in the bill of quantities under this section."

Add the following clause at the end of the last paragraph:

"Where foundation slabs or pile caps 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 overbreak 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

(a) General

Add the following clause:

- (iv) "During backfilling within 1,0m of any concrete structure, or as directed by the Engineer, only hand operated mechanical compaction equipment shall be used to achieve the required density."

B6109 FOUNDATION FILL

In the 5th paragraph, 7th line delete "60" substitute "45".

Add the following after the 6th paragraph:

“Concrete blinding shall extend 200mm 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 750mm beyond the edge of the foundation.”

B6115 MEASUREMENT AND PAYMENT

Add the following

Item	Unit
B61.50 Pile Integrity Testing on bored/augured piles	
(a) Constructing 4.0m long reinforced concrete/ grout calibration bored piles of (indicate diameter(s)) inclusive of the required number of 85mm diameter mild steel tubes..... number (No)	
(b) Providing and installing 85mm diameter mild steel tubes used for “Cross Hole Sonic Logging” in all designated piles (per pile construction site) metre (m)	
(c) Impact Frequency Response (IFR) tests and interpreted results (per pile diameter and per pile construction site) number (No)	
(d) Cross-Hole Sonic Logging tests and	

interpreted results (per pile diameter and
per pile construction site) metre of pile (m)

(e) Base integrity tests (per designated pile,
per pile construction site):

(i) Establishment on the site for core
Drilling (as per COLTO payitem
61.37) lump sum (LS)

(ii) Moving equipment and assembling
it at each location/pile position
where cores are to be drilled (as per
COLTO payitem 61.38) number (No)

(iii) Drilling the cores (diameter indicated) in:
(aa) Concrete metre (m)
(bb) Founding formation:
(1) Irrespective of hardness..... metre (m)
(2) With a hardness of (hardness
indicated) metre (m)

(iv) Log of cored data number (No)

The unit of measurement shall be the number of cores logged. The tendered rate shall include full compensation for the log of the core data by a qualified person, who shall be approved by the engineer. The core logging shall be done in general accordance with the "Guidelines for soil and rock logging" compiled by the Geotechnology Workshop and published by SAICE in 1990.

(v) Grouting up all CSL tubes after successful
testing cubic metre (m³)

C.336

The unit of measurement shall be the volume of grout used to fill all the tubes used for sonic testing and the cores.

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 subitem (a) shall be the number of 4.0m long calibration reinforced concrete bored piles provided complete with the required number (and length) of 85mm mild steel tubes to facilitate CSL testing and constructed similarly to the proposed working piles.

The unit of measurement for subitem (b) for the 85mm 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 subitem (c), viz for the Impact Frequency Response tests shall be the number of designated piles tested by the IFR method as compensation for establishment on site, procurement, preparation, conducting and supervising the tests and full compensation for the proper evaluation and reporting of the results and findings to the engineer, by the IFR consultant.

The unit of measurement for subitem d), 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 1:
 - (i) 0 to 5m depth lump sum (LS)
 - (ii) 5 to 10m depth lump sum (LS)
- (b) Other locations

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 by way of a lump sum, 50% of which 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% of the lump sum shall become payable after the excavation platform has been completed, and the final 10% of the lump sum 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 B61.03(A)."

SECTION B6200: FALSEWORK, FORMWORK AND CONCRETE FINISH

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) General

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) Formwork to exposed surfaces

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”.

(vi) Permanent formwork

Add the following paragraph:

“Anchor ties shall be designed to resist full buoyancy forces and details of such shall be submitted to the engineer for approval. Void formers shall be held in position in order that no movement exceeding 1% of the deck thickness takes place during concreting.”

d) Class F3 surface finish

Replace the second paragraph with the following:

C.340

“The use of steel forms shall be permitted to form surfaces for which Class F3 surface finish has been specified, provided that only undamaged forms shall be used for such work and that the forms shall be subject to the approval of the engineer.”

B6210 MEASUREMENT AND PAYMENT

Item	Unit
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B62.04 Inclined Formwork to provide (class of finish indicated as F2 surface finish to

i) Deck	m ²
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Delete the entire note at the end of this pay item.

B62.05 PERMANENT FORMWORK

Add the following to the second paragraph:

“The tendered rates shall include for the installation of permanent drainage holes within the void formers at the low points of each void. “

SECTION B6300: STEEL REINFORCEMENT FOR STRUCTURES

B6306 PLACING AND FIXING

Replace the second and third paragraphs with the following:

“The concrete cover for all structural concrete shall be within the acceptance ranges shown in Table B6404/6. Prior to fixing the steel, samples of the proposed cover and spacer blocks 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 cover to the lapped bars remains constant at the specified cover.”

B6307 COVER AND SUPPORT

Amend the second paragraph as follows:

Replace the second sentence, commencing with:

“Where no cover is indicated...shown in Table 6306/1” with the sentence “Where no cover is indicated, the contractor shall inform the engineer who shall after consultation with the design engineer indicate the required cover in writing and the as-built drawings shall indicate such cover”.

Add the following to the end of the fifth paragraph:

“Concrete cover and spacer 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 shrinkage, thermal movements and strain are minimised.

Cover blocks shall be water cured by submersion for a minimum of 7 days and thereafter kept submerged in water until immediately before fixing onto reinforcing steel. Where concrete 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. Only semi-spherical concrete cover blocks shall be used. Where fixing wire is inserted into cover blocks, it shall be galvanised. Cover and spacer blocks manufactured from other materials e.g. plastic or wood, shall not be permitted. All cover blocks regardless of the type of material manufactured from, shall not be visible on exposed concrete surfaces.”

Delete Table 6306/1 in its entirety.

Add the following paragraph:

“Where the concrete cover specified has not been achieved after cover tests have been carried out in accordance with clause B8106(j), reduced payment as determined under clause B8212 shall be applied to all the relevant pay items under section 6300.”

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 latest version of the new SANS 50197-1:2000 code for cements: (refer to CNCI website www.cnci.org.za)”

Add the following new paragraphs:

“The type of cement chosen 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 as approved by the engineer.

With the exception of the standard SANS approved cement blends supplied by the primary cement producers, the blending of CEM1 and extenders shall not be permitted unless specifically approved by the engineer on the basis of an acceptable quality assurance procedure.”

(b) Aggregates

Delete the remainder of the sentence after “exceed” in subclause (i)(1) and replace with the following:

“150% of that of the reference norite aggregate or any of the other three reference aggregates”

Delete the remainder of the sentence after “exceed” in subclause (i) (2) and replace with the following:

“200% and of the coarse aggregate 175% of that of the reference norite aggregate or any of the other three reference aggregates”

Delete the remainder of the sentence after “exceed” in the first paragraph of subclause (i)(3) and replace with the following:

“235% of that of the reference norite aggregate or any of the other three reference aggregates”

Delete the entire last paragraph of subclause (i)(3) commencing with “The drying shrinkage of concrete...”

Add the following new subclause:

- “(vi) The maximum chloride ion content of fine aggregate shall be 0,03% by mass of aggregate as specified by SANS 1083:2002. Where concrete is situated in a chloride environment the value shall be reduced from 0,03% to 0,01%.”

(d) Water

Add the following:

“Water for concrete other than prestressed concrete, shall not contain chlorides, calculated as sodium chloride, in excess of three thousand parts per million (3000ppm) nor sulphates, calculated as sodium sulphate, in excess of two thousand parts per million (2000ppm).

Water for curing concrete shall not contain impurities in sufficient amount to cause discolouration of the concrete or produce etching of the surface.

No sea-water or water containing salts shall be used.

No water shall be added on site to ready mix concrete prior to placing to improve workability. All concrete delivered to site shall be checked for workability using the slump cone test and slump measured outside of the limit set from the design mix shall be rejected.”

(e) Admixtures

Add the following sub 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 20° C.
- (vi) A retarding admixture shall be used if the temperature of concrete mixes using cements of strength class 42.5 or higher is between 20 to 30° C or where the ambient temperature is between 20 to 30° C .

Add the following:

“Note: Only admixtures of the type that do not increase the water content of the mix will be considered by the Engineer. In addition, no admixtures shall be added on site to ready mix concrete prior to placing to improve workability.”

B6404 CONCRETE QUALITY

a) General

Insert the following new paragraph after the second paragraph:

“When structural concrete prefixed ‘W’ is shown on the drawings, it shall, in addition to the strength requirement, comply with the durability requirements specified in subclause 6404(h) below to ensure that the concrete has been placed, compacted and cured correctly.

Structural concrete prefixed ‘W’ shall not apply to minor structural elements such as side drains, catch pits, etc. Requirements for concrete quality (including any durability requirements) for concrete pavements are found in Section 7100 of the specifications.”

b) Strength Concrete

Replace the sixth paragraph with the following:

“Where concrete is designated by the prefix “W”, eg class W30/19, such designations shall denote concrete achieving the durability criteria specified in the relevant tables under subclause B6404(h).”

Replace subsubclauses (ii) and (iii) of the seventh paragraph with the following :

“ii) a characteristic cube compressive strength corresponding to all the relevant Durability Parameter requirements set out in subclause B6404(h)(ii).”

Add the following new subclauses:

“B6404(h) Concrete Durability

(i) General

Concrete designated by the prefix 'W' shall, in addition to the requirements of sub-clause 6404(b) comply with the durability parameters described below. Durability is influenced by the materials used in the concrete, their mix proportions, transporting, placing, compacting and, in particular, curing of the finished cover concrete (concrete layer between the outermost layer of steel reinforcement and the exposed outer surface of the concrete element). The tests required to prove durability performance of the placed concrete are given under sub-clause B8106(i).

It is the engineer's responsibility to approve the component materials and their mix properties, however it is the contractor's responsibility to utilise acceptable component material and to achieve mix properties complying to the specifications. It is the contractor's responsibility to design and blend materials to produce concrete of the specified quality

(i) Durability parameters

Water sorptivity : Sorptivity is sensitive to surface effects and may be used to assess the effectiveness of initial curing.

Oxygen permeability : Permeability is sensitive to changes in the coarse pore fraction and thus a means of assessing compaction of concrete. It is used to quantify the microstructure of the concrete and sensitive to macro-defects such as voids and cracking

Chloride conductivity : Chloride conductivity provides a method of characterisation of concretes in the marine environment and is used to assess the chloride resistance of concrete.

Cover concrete: Cover concrete is the outer concrete layer that protects reinforcing steel. Concrete cover is a requirement for all concrete whether specified as durability concrete (Class "W") or normal reinforced concrete.

Individual Cover Depth Individual cover depth measurement determined

Measurement (CDM): by an electromagnetic cover meter, complying with BS 1881, Part 204.

Average Cover:	The average of at least 30 individual CDM's per m ² determined on a clearly identified area.
Overall Cover:	The mean average cover determined for the scanned area per structure.
Scan Area:	Areas of approximately 1m ² , randomly distributed over the entire structure, representing at least 5% of total surface area for that structure.
Individual bar reading:	A minimum of 3 linear CDM's, spaced at 100mm intervals, representing a single bar of reinforcement.
Capped CDM:	The value applied to all CDM's in excess of the maximum allowed CDM, determined by the engineer (e.g. 40mm (specified cover) + 15mm (upper limit) = 55mm) or
Capped Value:	A value in mm, assigned to a cover reading where the raw reading exceeds the specified cover, plus a value (mm) specified by the engineer.
Quick/Linear Scan:	For evaluation of cover depth measurements taken perpendicular to closest rebar in a line covering required area to be scanned.
Image/Block/Grid Scan:	Provides an overview of rebar layout. Measurements taken over a square meter clearly indicating position of first and second layer of rebar.

Notes:

1. Water sorptivity and Oxygen Permeability tests are required to assess carbonation resistance
2. Water sorptivity, permeability and chloride conductivity tests are required to assess chloride resistance

Concrete cover:	Concrete cover is a dimensional indicator of cover concrete depth and it varies according to the requirements of the different environmental exposure classes.
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When tested in accordance with the test protocols described in B8106 for each potential Durability Parameter, the concrete shall meet the limits listed in tables B6404/3 and B6404/5.

(ii) Cement

In order to meet the durability criteria, the proportions of cementitious binder used shall be determined to suit the fine and coarse aggregate and cement type used in order to achieve the durability limits specified in tables B6404/4 and B6404/6 under the Acceptance Category of "Concrete made, cured and tested in the laboratory."

In order to avoid the possibility of Alkali Silica Reaction (ASR), the following shall be taken into account when designing the mixes:

1. Where the cementitious contents is less than 350kg/m³, the maximum equivalent sodium monoxide content (calculated as Na₂O) permitted shall be 0.60%, unless a test certificate from the CSIR (Built Environment) is provided stating that the long term testing has proved the aggregate to be non-reactive.
2. Where the cement content exceeds 350kg/m³, the maximum equivalent sodium monoxide content permitted shall be 2.1kg/m³ of concrete.
3. Where potentially reactive aggregate is used, the maximum cement content shall be 400kg/m³ and the equivalent sodium oxide (Na₂O) content permitted shall be 2.4kg/m³ of concrete.
4. The contractor shall prior to the use of cement provide test certificates from an approved laboratory confirming the equivalent sodium oxide (Na₂O) content of the batch of cement to be used.
5. Special literature should be consulted e.g. Fulton's Concrete Technology.

(iii) Environmental Classes of Exposure

For this project, the environmental classes for carbonation and chloride exposure for the different structural elements are as shown below in Table B6404/3.

TABLE B6404/3: ENVIRONMENTAL CLASSES OF EXPOSURE FOR ELEMENTS OF STRUCTURE

Element	Carbonation Environment (OPI)	Chloride Environment (Chloride Conductivity)
Foundations	n/a	n/a
Substructures	XC3	n/a
Superstructures	XC3	n/a

Acceptance ranges**TABLE B6404/4: DURABILITY PARAMETERS ACCEPTANCE RANGES**

Acceptance Category	Test No./ Description/ Unit				
	Water Sorptivity (mm/ h)	Oxygen Permeability (log scale)			
		Parapets	Sub-structures	Super-structure	Etc for other members

Concrete made, cured and tested in the laboratory using Trial Panels	<10.0	>9.6	>9.6	>9.6	> 9.6
Full acceptance of in situ using Test Panels	<10.0	>9.6	>9.6	>9.6	>9.6
Conditional acceptance of in situ concrete based on results of Test Panels	Not applicable ²	9.2 - 9.6	9.2 - 9.6	9.2 - 9.6	9.2 - 9.6
Rejection based on results of Test Panels	Not applicable ²	<9.2	<9.2	<9.2	<9.2

Notes:

1. A value has been given, but the value to be adopted shall be based on the results from design mixes.
2. Although no value has been given due to ongoing research, values above 12 are regarded as poor quality concrete.
3. For purposes of interpretation, substructure is deemed to be all supporting elements below the deck (superstructure), including buried lengths of columns, etc, but excluding foundation elements like bases and spread footings.

TABLE B6404/6: DURABILITY PARAMETERS ACCEPTANCE RANGES: COVER FOR ALL CONCRETE TYPES

Test No.	Description of Test	Specified Cover (mm)	Acceptance Range	
			Min	Max
			Overall cover	Overall cover
B8106(g) (iv)	Concrete cover to reinforcement (mm)	30 to 80	85% of specified cover – 5mm	Specified cover + 15mm or where member depth is less than 300mm the limit accepted in writing by Design Engineer.

(v) Site Testing

To ensure that the concrete has been placed, compacted and cured correctly, a number of tests shall be carried out on the concrete by an approved laboratory.

(vi) Non-compliance with specified criteria

The Contractor should also note that there is specific provision made for curing of concrete under payment item B64.07 of the project specification. The amount priced under this item will be subject to reduced payments should the durability tests indicated under B8106(h) fail to meet the required targets. Similarly, failure to achieve the required durability test results will be sufficient cause to apply partial payment factors for all the payitems of the elements of the structure under sections 6300 and 6400 of the standard and project specifications or in some cases the removal of the rejected concrete.

Add the following sub-clauses:

i) Mix design approval procedures

(i) General

The compressive strength achieved on 'W' class concrete shall generally exceed the characteristic strength class structurally required. The contractor shall note that the process of finalising 'W' class mix designs could take up to two months. In order to expedite the process, the contractor must submit samples of aggregate and cement to an approved laboratory within seven days of the Commencement Date. Should 'W' class concrete be required before the mix design is finalised, the engineer will approve a preliminary mix design in consultation with the contractor.

(ii) Laboratory designs and site tests based on Trial Panels

Good mix design practice is essential and the following criteria shall be taken into consideration when pricing and determination of the mix design:

1. Selection of sands and aggregates to achieve a good grading is important if the desirable concrete density and durability have to be achieved.
2. The selection and use of the correct cement grade and type for the environmental conditions (and not based solely on costs) is fundamental
3. 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, 70 ± 2 mm in diameter shall be made or cored from a trial panel during the laboratory trial mix for performance of tests B8106(g)(i), (ii) (if required).

Note that concrete cubes are not cored for durability testing during design trial mix stage or during the construction stage.

Testing for approval purposes shall be carried out by an accredited laboratory approved by the engineer, the costs of which are deemed to be included in the contractor's rates for structural concrete. Concrete as designed shall satisfy the limits set out in Table B6404/4 under the heading "Concrete made, cured and tested in the laboratory, using Trial Panels". It is therefore a requirement that the trial panels be cast on the site and the cores extracted and tested in the laboratory as part of the mix design approval process. Where the site is remote from the laboratory, the Trial Panels may be cast at the laboratory in accordance with the requirements of sub-clause B8106(g).

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. In general, mean target strength = characteristic strength + $1,645 \times S_n$.

Once the mix is approved, the target mean compressive strength for quality control purposes for durability class concrete shall be the mean compressive strength obtained from the mix that satisfies the durability requirements."

B6404 (i) Trial Panels for Durability Concrete (W class concrete)

For all different durability class mixes, trial panels shall be constructed on the site. Each trial panel shall be constructed using the same type of concrete mix, shuttering type, placing and curing methods (including application rates of curing compounds if applicable) as to be used on the final structural element to be constructed. The dimensions of such a trial panel shall be 1,0m wide, 1,0m high and 150mm thick. The panel shall generally be constructed vertically. It is suggested that two lifting hooks be cast into the panel to facilitate lifting, moving or disposal of panels. However for decks two panels shall be constructed; one cast vertically (to equate to the vertical faces) and one horizontally (to equate to the top floated surface). It most likely will be that one trial panel will be required for substructures (piers, abutments, retaining walls, etc) and another two for the decks due to type of casting and curing methods.

The test area for taking of cores (taken in horizontal direction) shall not be less than 150mm from all horizontal and vertical edges.

The costs for construction of the trial panels shall be deemed to be included under pay item 64.01.”

B6407 PLACING AND COMPACTION

Add the following:

(b) Placing

“Casting of the in-situ parapets or placing of precast parapets shall only commence after removal of the deck staging, and in addition, in the case of prestressed decks, the stressing must be complete. Where specified on the drawings the top of the parapets after placing shall follow the pre-camber levels specified on the drawings to allow for future creep effects. This is of particular importance on the edges of very long skew decks and prestressed simply supported decks. The levels of the top rail of each panel of the parapets shall be confirmed in writing by the design engineer”

B6408 CONSTRUCTION JOINTS

Add the following:

(a) General

“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 to with the engineer.

B6409 CURING AND PROTECTION

Add the following to the end of sub clause 6409(f):

Where a curing compound is used, it shall consist of approved water based low viscosity clear wax emulsion applied in accordance with the manufacturer’s instructions.

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 2 hours. 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. In order to prevent early settlement and shrinkage of the concrete, the concrete placed shall be re-vibrated after initial compaction while the concrete is still in a plastic state. Any remedial measures shall be as approved in writing by the engineer. On bridge decks, the top surface shall be cured using the method described in clause 6409(d) i.e. "Constantly spraying the entire area of exposed surfaces with water".

For all concrete curing shall be excluded from the make-up of rates for measurement under items B64.01 and B64.02 and will be paid for separately under pay item B64.07. Where the application of a curing compound is used, the type and nominal application rate thereof shall be as specified in the schedule 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 10° C to 30° 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 30° C 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.

B6413 PRECAST CONCRETE

Add the following new final paragraphs at the end of clause 6413:

"Precast concrete units shall comply with the requirements of the latest SANS 986:2006 specification.

Prior to the manufacture of any units the manufacturer shall submit his Quality Plan to be approved by the engineer. The Quality Plan must incorporate all requirements and frequency for durability index testing i.e. Sorptivity, Oxygen Permeability, Chloride Conductivity (if required) and Cover Testing. As part of the Quality Plan submitted for approval, copies of calibration certificates of both gauges used for proof loads and cover meters used at the factory shall be supplied to the engineer. The originals of these certificates shall at all stages also be available for inspection at the factory premises. The manufacturer shall check each precast unit for cover compliance, and random checking of units shall not be permitted. The engineer's representative may visit the factory at any stage to ascertain adherence to the quality plan including test results from the durability index testing as well as to check covers before delivery to site. Any substandard cover shall result in the batch being rejected. Should the manufacturer not be adhering to their Quality Plan the engineer may exercise the right to reject the use of products from the manufacturer concerned. The employer shall also be informed in all such cases.

For durability requirements due to the reduced cover provided for precast culverts, all such durability testing shall be done in accordance with clause B6404(h)."

B6414 QUALITY OF MATERIALS AND WORKMANSHIP

(a) Criteria for compliance with the requirements

Add the following new paragraphs after the first paragraph:

The cores taken from the design mixes made in the laboratory shall be cored from standard cubes cured in the standard conditions at between 22 to 25°C.

In the event that for 'W' classed concrete strength requirements the actual achieved average cube strengths of an element are less than 85% of the target mean strength needed to meet durability requirements or less than 100% of the target mean strength to meet strength requirements, it may result in the durability parameters not meeting the prescribed targets and the engineer will instruct the taking of cores from the test panel and structure for additional testing. The cost of these in situ tests shall be borne by the contractor.

The approved quality control criteria for process control testing for durability concrete shall be coring and testing of test panels. The frequency of manufacture and coring of test panels shall be as ordered by the engineer and indicated in Tables B8106/1 and B8106/2.

Tests no.'s B8106(g)(i), (ii) and (iii) (when required), shall be conducted on cores drilled from the test panel and additional test cubes when the concrete reaches the age of at least 28 days. To allow for variability in the material potential, the target chloride conductivity values (when required) shall be limited to 90 percent of the values indicated in Table B6404/4. Test no. B8106(g) (iv) shall be conducted on cast structural elements to confirm that the specified depth of concrete cover has been achieved. The frequency of these tests shall be as described under item B8106(g). The test results shall be accepted or rejected on the criteria set out in Table B6404/3 and B6404/4 based on the following categories:

(i) Full Acceptance

Concrete shall be accepted unconditionally and full payment shall be made.

(ii) Conditional Acceptance

Concrete may be accepted, based on the cube strength and durability index results with a warning that construction methods be examined to improve the durability criteria. A reduced payment shall be applied to all the relevant payitems of the specific element under B6300 where the cover requirements are not achieved and B6400 where the oxygen permeability and strength requirements are not achieved for the non-conforming element or concrete pour as set out in Tables B8212/1 and B8212/2. The decision to accept the substandard concrete at reduced payment shall rest solely with the Employer.

Should the test result(s) indicate conditional acceptance of the element tested, the Contractor shall have the option of carrying out additional tests (on 4 extracted cores) on that element of the structure, at his own expense to confirm or disapprove the original test result(s). These cores shall be extracted within 56 days from the date of the element being cast.

Should the additional test confirm the original test result, then the original test result shall serve to determine payment in accordance with Tables B8212/1 and B8212/2.

Should the additional test show that the structure meets the targets, the penalty shall be halved."

(iii) Rejection

The concrete shall be removed and replaced with fresh concrete at the expense of the contractor, as directed by the engineer.

B6416 MEASUREMENT AND PAYMENT

Add the following at the beginning of clause 6416:

"Note that pay items B64.01, B64.02 and B64.07 below are only applicable to durability concrete prefixed 'W'."

Item

Unit

B64.01 Cast in situ concrete

Amend the descriptions of subitems 64.01(a) and (b) to read as:

- (a) Durability Concrete (Class W) cubic metre (m³)
 - (i) Indicate part of structure and strength e.g. Piers (W30/19))
 - (ii) Etc for other parts of structure

- (b) Normal Concrete cubic metre (m³)
 - (i) Indicate part of structure and strength e.g. Blinding (15/19)
 - (ii) Etc for other parts of structure

In the case of cast in situ durability concrete, delete “curing and protecting the concrete,” in the sixth line of the description of the tendered rate for item 64.01.

Add the following after the second paragraph in the rate make-up:

“The Contractor shall note that the strengths indicated above are to meet structural requirements only. In order for the durability criteria to be achieved, it may result in higher strengths being required. Target mean strengths to be achieved for durability purposes may therefore be higher than those shown above, as discussed under sub-clauses B6406(b) and B6404(h)(ii). All durability testing costs required for process control testing shall be included in the rate make-up for durability class concrete.”

"Item

Unit

B64.07 Curing of concrete:

- (a) (Indicate structural element and surface to be cured)
(Tenderer to specify method of curing)..... square metre (m²)

- (b) Etc. for various elements
(Tenderer to specify method of curing)..... square metre (m²)

The unit of measurement shall be the square metre of completed concrete element cured using an approved method as described in clause B6409 of these Project Specifications.

The tendered rates shall include full compensation for providing the curing agent and applying it to the fresh concrete surface by means of an approved pressure distributor (or other approved methods of application) in accordance with the manufacturer's specified nominal rates of application. Wet fine mist spray curing is also permitted providing it is done for 7 days. Payment will also be made under this item if this is the preferred method to be used. Should no curing method be specified at time of tender then it will be assumed wet fine mist spray curing is to be done. Partial payment shall be applied in the event that the engineer allows conditional acceptance."

Item	Unit
B64.08 Hot weather concreting	lump Sum (LS)

The tendered Lump sum shall include full compensation for all measures specified in clause B6410(d) required to ensure that the temperature of the concrete placed will not exceed the temperature specified under clause B6410(f) of these specifications.

Payment will be made pro-rata to the quantity of al structural concrete, which is placed on the contract. Payment will only be made if all the necessary measures required to ensure that the concrete is placed at the temperature specified are implemented".

SECTION B6500: PRESTRESSING

B6512 MEASUREMENT AND PAYMENT

Add the following after Item 65.03:

Item	Unit
B65.04 Cable Bars	

(a) MeKano4

(i) MKT460 M56 carbon steel or similar approved metre (m)

(ii) MKT460 M64 carbon steel or similar approved..... metre (m)

The unit of measurement for the cable bars shall be the meter of cable complete in accordance with the drawings.

The tendered rate for the cable shall include full compensation for supplying, storing, handling and protecting all materials (excluding anchorages and couplers), fabricating, supporting and installing the cables.

The cable specified shall conform to the MKT460 Carbon Steel System with the bar specification conforming to Grade 460 according to BS EN 1025-1, steel S355J2G3 modified and a resilience 27 J at -20°C.

The surface finish shall be galvanised with a local coating thickness (minimum) of 40µm and mean coating thickness (minimum) of 50µm.

The rate shall include for all materials, labour and equipment required for the construction.

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

B65.05 Anchorages and couplers as per MKT460 M56 fittings:

(a) Anchorage (Description of anchorage measured

by number) number (No)

The unit of measurement for the sub-items shall be the number of items complete in accordance with the drawings.

The tendered rate for the items shall include full compensation for supplying, storing, handling and protecting all materials, fabricating, supporting and installing the cables.

The items specified shall conform to the MKT460 Carbon Steel System with the materials specification conforming to Grade 460 according to BS EN 1025-1, steel S355J2G3 modified and a resilience 27 J at -20°C. As per PTS Solutions (paulh@pts-solutions.co.za).

The surface finish shall be galvanised with a local coating thickness (minimum) of 40µm and mean coating thickness (minimum) of 50µm.

The rate shall include for all materials, labour and equipment required for the construction.

Item	Unit
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B65.06 Extra over item 65.05 for partially

tensioning the M56 cables: Meganewton (MN)

The unit of measurement shall be the meganewton, which is calculated as the product of the nominal tensile strength in megapascals of the cable steel and the cross-sectional area of the cable in square meters, effectively anchored or coupled.

The tendered rate for the items shall include full compensation for the use of all equipment, as well as for all the work and incidentals required for tensioning and anchoring the tendons to the specified partial force.

B6600: 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 Agrément certification for bridge deck joints, with the target date for new applications for Agrément assessment one year from receipt and acceptance by Agrément South Africa of each application. Proof of original acceptance of application by Agrément is required in such a case.

(1) current Agrément assessments: 1 September 2010.

(2) new applications for Agrément assessment one year from receipt and acceptance by Agrément South Africa of each application. Proof of original acceptance of application by Agrément is required in such a case.”

(g) Installing the expansion joints

Delete the first paragraph and replace with the following:

C.362

“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
Asphalt plug type joints	- 10 years
Concrete nosings (replacement)	- 10 years
Joint sealant	- 5 years

All deck expansion joints will only be considered for use on this contract if the manufacturer has obtained Agrément certification. New applications for Agrément assessment takes up to one year from receipt to acceptance by Agrément South Africa.”

B6604 BEARINGS FOR STRUCTURES

(e) Proprietary Bearings

(i) Construction

Delete the final three (3) paragraphs of subclause (e)(v)(7) and replace with the following:

“Applying two coats of epoxy MIO paint, with each coat a minimum of 75 micrometers of dry-film thickness and of a dark grey colour.

Applying a semi-gloss, acrylic polyurethane (2 pack) finish with a minimum of 50 micrometers of dry-film thickness and of light grey colour.

Surfaces in contact with concrete shall be sprayed with zinc, but not painted, so that it complies with the requirements of SABS 1391 part 1 for type Zn 150 surfacing.”

B6608 MEASUREMENT AND PAYMENT

Item	Unit
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B66.04 Installation of proprietary expansion joints	metre (m)
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Add the following to the end of the second paragraph:

“The tendered rate for subitems (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
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B66.05 Expansion Joints	metre (m)
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Add the following to the measurement clause of subitem (b):

“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 subitems (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
-------------	-------------

B66.06 Filled Joints metre (m)

Add the following to the end of the second paragraph:

“The tendered rate for subitems (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 metre (m)

Add the following to this clause:

“The tendered rate shall include for sealing of joints between balustrade units as shown on the drawings.

Item	Unit
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B66.27 Concrete pedestrian railings metre (m)

The unit of measurement shall be the metre of railing complete in accordance with the drawings. The concrete railing shall include the concrete upstand for fixing the concrete railing and all work above the concrete upstand and for any kerbing and coping forming an integral part of the railing.

The tendered rate shall include full compensation for all labour, plant and materials (including reinforcing steel and prestressing requirements) for the manufacture and erection of the precast concrete railings.

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

B66.28 Drainage strips metre (m)

The unit of measurement shall be the linear metre of drainage strips laced behind the earth faces as shown on the drawing.

The tendered rate shall include full compensation for all material, labour, and equipment to supply and install the strips as shown.

Item	Unit
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B66.29 Perforated drainage pipes - M65 Netlon drainage pipe wrapped in Kaymat U34 or similar approved	metre (m)
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The unit of measurement shall be the linear metre of perforated drainage pipes placed behind the earth faces as shown on the drawing.

The tendered rate shall include full compensation for all material, labour, and equipment to supply and install the perforated pipes as shown including the 300mm wide by 50mm thick mortar bed under the core.

Item	Unit
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B66.30 Joint protection plates	metre (m)
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The unit of measurement shall be the linear metre of specified width installed. The tendered rate shall include full compensation for supplying all materials, including fastening or adhesives, for galvanizing and installation, including all labour and equipment, and for any wasted material.

Item	Unit
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B66.31 Additional water tests for joints ordered by the engineer	number (No)
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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.”

SECTION B7000: SUNDRY STRUCTURES

SECTION B7400: PATENTED EARTH RETAINING SYSTEMS

B7405 ROCKWALL EARTH RETAINING STRUCTURES

All specifications as per Tensar model specifications, hereunder

TensarTech® RockWall™ Earth Retaining Structures

This document is intended to form a basis for Tender documents where the following Reinforced soil system is required.

1. GENERAL

This work shall consist of constructing reinforced soil structures (often referred to as strengthened earthworks or mechanically stabilised earth) typically using a proprietary Welded Mesh Facing Unit, constructed in accordance with the suppliers drawings and specifications and in conformity with the alignment, grades and dimensions shown on the contract documents or as established by the Engineer. Where necessary the Contractor shall provide a complete set of drawings issued for construction, design calculations and complete specifications of the proposed system for the approval of the Engineer 90 days prior construction. Any particular requirements of approved detailed specifications for the approved proprietary system shall override any conflicting or incompatible requirement contained within this section.

The provider of the proposed system must demonstrate previous International experience for design and construction of reinforced soil systems with a minimum height of 20.0m and a minimum in service life of 20 years.

The geogrid soil reinforcement must have a current British Board of Agrément (BBA) HAPAS certificate, demonstrating suitability for use in highways structures with a minimum 60 year design life.

2. DESIGN

The choice and specification of the system shall address the climatic and soil conditions existing specific to the site in question and provide a minimum design life of 60 years and up to 120 years if specifically required to do so. The specifications as presented to the Engineer shall state any requirements for or limitations on the backfill used in the structure to ensure the design life. The tender submission shall be accompanied by:

- A. A copy of the current BBA certificate
- B. Sample design calculations for the proposed walls in compliance with BS8006 as appropriate
- C. Soils test information of the proposed reinforced soil fill
- D. Method statement for construction
- E. Confirmation of the Professional Indemnity and Product Liability insurance cover provided by the reinforced soil System Supplier

3. STANDARDS

The following standards and codes in their latest edition shall be particularly applied to work covered by this specification where applicable; together with any further standards or codes as described within the approved Specification for the approved reinforced soil wall system.

3.01 Steel Mesh Facing Units

- A. **BS EN 10218-2:2012** - Steel wire and wire products. General. Wire dimensions and tolerances
- B. **BS EN 10244-2:2009** - Non-ferrous metallic coatings on steel wire – Part 2: Zinc or zinc alloy coatings on steel wire

3.02 Geogrid Reinforcement

A	ISO 2602: 1980	Statistical Interpretation of Test Results
B	BS EN ISO 9001: 2000	Quality Systems – Model for Quality Assurance in Production, design and development installation & servicing
C	BS 2782: Part 4	Methods of Testing Plastics. Part 4: Chemical Properties
D	GRI GG2 - 87	Geogrid Junction Strength
E	BS EN ISO 10321: 1996	Geotextiles – Tensile Test for Joints-Seams by Wide-Width Method
F	BS EN ISO 10319: 1996	Wide-Width Tensile Test
G	BS EN ISO 13431: 1999	Geotextiles and geotextile related products. Determination of tensile creep and creep rupture behaviour

3.03 Soils

A	BS1377: 1990	Moisture Density Relationship for Soils, Standard Method
B	BS1377: 1990	Gradation of Soils
C	BS1377: 1990	Atterberg Limits of Soil
D	BS1377: 1990	Shear Box Test
E	BS3882: 1994	Specification for topsoil

4. MATERIALS

The reinforced soil system will comprise of structural steel mesh facing units, uniaxially orientated high density polyethylene (HDPE) geogrids and a high efficiency mechanical connection between facing and primary geogrid.

4.01 Steel Mesh Facing Units

- Manufactured from steel mesh with nominal square openings of 75mm.
- The steel shall be Galvan® coated and where required PVC coated to produce an extremely high level of corrosion resistance.
- The nominal wire diameter shall be 3.0mm for the lid, base, back and internal panels and from 4.0mm wire diameter for the face panel.
- The units when fabricated are jointed with Galvan® coated helical spirals for speed and security. Lacing wire of nominal diameter of 2.5mm may also be used.
- The units are delivered folded flat ready for rapid fabrication in 2.025m long x 0.675m high units, complete with two internal diaphragms and corner ties.
- Base panels extend 0.225m beyond the back of the 0.675m wide facing unit, ready to accept the geogrid and polymer bodkin connection.
- All facing units are supplied with sufficient Galvan® coated helical spirals, internal corner ties and lacing wire for connection purposes on site.

4.02 Geogrid Reinforcement

- The primary reinforcing element shall be a geogrid manufactured in accordance with a Quality Management System which complies with the requirements of BS EN ISO 9001:2000. If required by the Engineer, the Contractor shall provide evidence that the manufacturer's Quality Assurance System has been certified to conform with BS EN ISO 9001:2000 by an external authenticating authority approved by the Department of Trade and Industry.
- The reinforcing element shall be a geogrid manufactured from High Density Polyethylene (HDPE) sheet, oriented in one direction so that the resulting ribs shall have a high degree of molecular orientation, which is continued through the integral transverse bar.
- The long term creep rupture strength P_c (Ultimate Limit State), for a design life of 60 or 120 years, shall be in accordance with the following table at a mean temperature for design country (10°C, 20°C or 30°C). This shall be determined by application of standard extrapolation techniques to creep data obtained in accordance with BS EN ISO 13431:1999 and shall be a lower bound value. Values shall be based on a minimum 100,000 hour of continuous creep testing.

		Geogrid Type - design life of 120 years					
	Units	RE510	RE520	RE540	RE560	RE570	RE580
$P_{c 10^\circ C}$	kN/m	20.71	27.34	33.40	45.93	61.31	71.09
$P_{c 20^\circ C}$	kN/m	19.01	25.10	30.66	42.16	56.28	65.27
$P_{c 30^\circ C}$	kN/m	17.24	22.76	27.80	38.23	51.03	59.17

		Geogrid Type - design life of 60 years					
	Units	RE510	RE520	RE540	RE560	RE570	RE580
$P_{c 10^\circ C}$	kN/m	21.10	27.85	34.02	46.78	62.44	72.41
$P_{c 20^\circ C}$	kN/m	19.37	25.56	31.23	42.95	57.33	66.48
$P_{c 30^\circ C}$	kN/m	17.56	23.18	28.32	38.94	51.98	60.27

- The geogrid shall have an appropriate partial factor for site installation and construction damage, determined by the particle size distribution of the reinforced fill and in accordance with the values used in the design. This

factor shall be based on full-scale tests carried out in accordance with BS8006 Annex D and witnessed by an independent Approval Authority. If required by the Engineer, the Contractor shall provide supporting documented evidence of testing for this and any other partial factors assumed in the design. Partial factors for site installation and construction damage based on limited laboratory based testing are not acceptable.

- E. The strength of the junctions between the longitudinal ribs and transverse bars, as determined by the Geosynthetics Research Institute, Drexel University, USA, Test Method GG2-87, shall be not less than 95% of the Quality Control Strength.
- F. Any site joints in the reinforcement roll length shall be capable of carrying 100% of the geogrid Long Term Creep Rupture Strength. If required by the Engineer, the Contractor shall provide evidence of this.
- G. The geogrid shall be inert to all chemicals naturally found in soils and shall have no solvents at ambient temperature. It shall not be susceptible to hydrolysis, shall be resistant to aqueous solutions of salts, acids and alkalis, shall be non-biodegradable and shall have a minimum of 2% finely divided carbon black, as determined by BS 2782 Part 4, Method 452B 1993, to inhibit attack by ultraviolet light.
- H. The geogrid shall have an independent test certificate proving resistance and durability in a pH range of 2.0 to 12.5. Specifically, 'The sample of the geogrid chosen shall have a test certificate from a recognised independent test authority, showing that when tested to ENV ISO 12960, March 1998, they can withstand immersion in a saturated solution of calcium hydroxide with a pH of 12.5, at 60 deg C for 3 days with no loss of tensile strength.'
- I. The geogrid shall be CE Marked by an independent, authorised Certification Body to demonstrate that the product has been tested in accordance with the relevant European Standard relating to its specific use in construction, in accordance with the EU Construction Products Directive.
- J. The product labelling must show the CE Mark, together with the Certification Body Number and the FPC (factory production control) number. 'Accompanying Documentation' indicating the relevant testing 'declared values', should be available on request.

4.03 Steel Mesh Facing Unit to Geogrid Connection

- A. The connection between the steel mesh facing units and the geogrid shall be a continuous mechanical connection. The full width of geogrid is connected to the horizontal base panel of the facing unit using a HDPE bodkin of minimum 12mm diameter. Friction only connections, those using tie wire or a combination of both will not be allowed.

4.04 Reinforced (Infill) Soil

The reinforced soil material proposed should comply with the specification for 6I/6J material as detailed in Tables 6/1 and 6/2 of the 'MANUAL OF CONTRACT DOCUMENTS FOR HIGHWAY WORKS (MCHW) VOLUME 1 SPECIFICATION FOR HIGHWAY WORKS (MCHW1) – Series 600 for Earthworks, Highways Agency document November 2009'

This preferred material should be well graded crushed and granular not sub-rounded, and should also comply with the following:

- A. Minimum angle of friction (ϕ_{cv}) of 30 degrees
- B. The contractor should provide the Reinforced soil system supplier and the Engineer/Client with Effective Stress Parameters soil test information including soil density to allow completion and checking of the final design.
- C. The contractor may propose the use of an alternative fill material such as a consistent good quality cohesive or semi cohesive material as well as recycled materials. Proposals should also include provision for any additional drainage materials that may be necessary along with the design properties for use in the design.

4.05 Fill to Steel Mesh Facing Units

- A. The fill shall be hard durable and non frost susceptible (rock or stone type) having a maximum dimension not less than the mesh opening and a maximum dimension of 200mm.
- B. Placing the external layer of stone by hand can give a better appearance to the completed wall to be constructed without affecting the strength of the steel mesh facing unit structure.

5. CONSTRUCTION

5.01 Excavation

- A. Contractor shall excavate to the lines and grades shown on the Contract Drawings. Contractor shall take precautions to minimize over-excavation. Over-excavation shall be filled with compacted approved infill material, or as directed by the Engineer.
- B. Contractor shall verify the location of existing structures and utilities prior to excavation. Contractor shall ensure all surrounding structures are protected from the effects of any excavation. Excavation support, if required, is the responsibility of the Contractor.

5.02 Foundation Preparation

- A. Following the excavation, the foundation soil shall be examined by the Engineer to assure actual foundation soil strength meets or exceeds the design bearing strength. Soils not meeting the required strength shall be removed and replaced with infill soils, as directed by the Engineer.
- B. Foundation soil shall be proof rolled and compacted to 95% standard Proctor density and inspected by the Clients Engineer prior to placement of the steel mesh facing units and reinforced fill.

5.03 Steel Mesh Facing Units and Geogrid Installation

- A. When handling wire or wire mesh, the cut ends may cause injury, therefore the installation Contractor should ensure that all operatives have and use the appropriate Personal Protective Equipment including: protective gloves, fluorescent jacket, eye wear and footwear.
- B. Where mesh has been cut, any free ends should be trimmed or turned inwards so that they do not protrude outside the facing unit.
- C. Guard rails should be installed where safety is an issue on unprotected embankment edges.
- D. Open out the facing unit flat and rotate front, rear, ends and diaphragms vertically and join by manual lacing using tie wire provided by the supplier in accordance with Note [1].
- E. Where helical binders are specified for use on vertical joints, the top and bottom helical turn should be rotated through 90 degrees to prevent movement. All horizontal joints are to be laced as described in Note [1].
- F. Prepare the formation to line and level in accordance with the contract documents.
- G. Cut the lengths of the required grade of geogrid from the roll as indicated by the design drawings. Place on to the formation with the leading edge at the front edge of the structure. Ensure that the geogrid is orientated in the correct direction.
- H. Place the assembled facing units in position to the correct line, level and inclination as required by the design and form the joints to the adjacent units using either helical binders (where specified for vertical joints) or tie wire provided by the supplier referring to Note [1].
- I. The same procedure is to be carried out to the rear of the unit. Ensure that the 'tail' at the base of the unit is facing backwards.
- J. The geogrid should now be connected to the tail at the base of the facing units using the polymer bodkins provided by the supplier. The geogrid should run all the way through to the front of the unit with the bodkin joint formed at midpoint of the tail (refer to Figure 1). Adjacent lengths of geogrid are butt jointed at the face or as specified on the contract drawings.

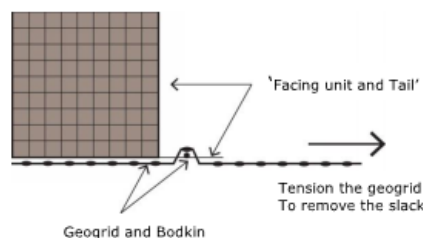


Figure 1 – Positive connection between geogrid and facing unit using bodkin detail

- K. Insert the tensioning beam [2] through the apertures at the free end of the geogrid & apply a load sufficient to remove any slack. Further tensioning will be required once facing unit is filled (refer to step V).
- L. Where specified and supplied geotextile should be cut and fixed to the inside rear face of the facing unit. It should be turned back through 90° into the facing unit at the top, bottom and sides by a minimum of 150mm. It may be located carefully using the wire provided or with plastic cable ties.
- M. Selected rock fill for the facing unit should be hard, durable, non-frost susceptible rock, stone or clean crushed concrete as specified by design. The grading of the fill is to be 100 to 150mm or 100 to 200mm.
- N. Rock fill material at the face should be hand placed to achieve a neat finish as possible and with the effect of a dry-stone wall. Working in this fashion will help to control bulging and movement at the face.
- O. Fill the facing unit to half height ensuring no large voids are present. The fill should be manually redistributed to ensure, as far as possible, that the fill is tightly packed to avoid later internal settlement. The internal pre formed corner ties must now be installed.
- P. Hook the pre formed corner tie, 3 meshes in from the corner around a mesh joint intersection on the face and rear panel. Diagonally brace to the side panels, 5 meshes back and rotate the free end around a mesh joint intersection wrapping around to secure by twisting the return end over its own stem (refer to Figures 2 & 3).

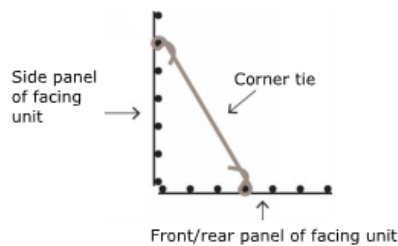


Figure 2 – Plan view of corner tie location

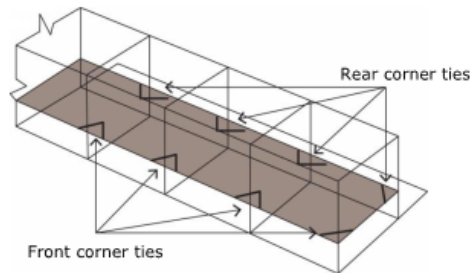


Figure 3 – corner ties installed

- Q. Should bulging of the face occur, then ensure the corner ties are correctly installed. Loose or over-tightened ties will cause bulging to occur. Timbers or scaffold tubes can be temporarily wired to the face externally to act as a shuttering to prevent bulging and removed when filling is complete.
- R. Repeat the filling operation to the full height of the facing unit. Ensure that the cells are filled sequentially such that the difference in fill in adjacent cells is never greater than half of the cell height.
- S. If a run of facing units is not filled to each level in one go, then always step down the filling at the end otherwise facing unit distortion will occur. This also allows further facing units to be connected later (refer to Figure 4). At no time try to completely fill one cell at a time, unless the unit has internal bracing in both directions.

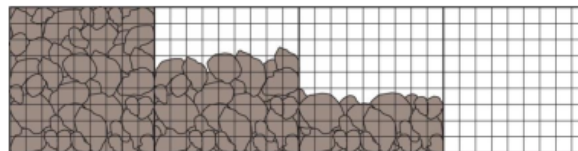


Figure 4 – Stepping down the fill at the end to avoid distortion

- T. When filling to full height, ensure that when the lid is closed the mesh is a tight fit onto the rock without the need to apply too much force so as to cause the facing unit to distort or risk breaking the welds in the lid. Use the tie wire provided to lace all sides, end and diaphragm panels as per Note [1].
- U. When the first course of facing units is filled and the lids fixed into position the structural fill may be placed behind. Selected structural fill material should be in full compliance with the needs of the design and have the approval of the Engineer.
- V. Tension from the free end of geogrid using tensioning beam [2] inserted through the apertures until the geogrid is tight and laying flat.
- W. Whilst maintaining tension, place a layer of fill on the geogrid, which will be sufficient to restrain it when the load is removed. Release the tension and remove the beam and compact the fill in accordance with Contract specification, up to the level of the next geogrid layer. Fill should be placed by plant such as an excavator bucket or a dozer with an opening bucket, which causes the fill to cascade onto the geogrid. A minimum of 150mm thick cover of fill must be maintained between the tracks of any plant and the geogrid to avoid damage. Care should be taken during this operation to maintain the alignment of the facing units.
- X. All construction plant, including compaction equipment with a mass exceeding 1000kg should be kept at least 2m from the face of the wall. Compaction plant within 2m of the wall should be restricted to vibrating rollers having a mass per metre width not exceeding 1300kg or plate compactors with a mass less than 1000kg.

- Y. Compaction should always commence nearest the facing units, working away towards the free end of the geogrid.
- Z. Once the structural fill has reached the top of the facing unit, the next geogrid layer and course of facing units may be placed. It is recommended that the facing units are tiered to achieve the necessary face angle and they should be continually joined using tie wire supplied to the course below along all horizontal joints at the front of the wall. Refer to Note [1] for lacing requirements. The facing units should be aligned so that the bottom edge wire of the upper unit lines up with a longitudinal wire on the mesh of the lower facing unit.
- AA. Wherever possible the next course should be offset horizontally by a half unit width to ensure vertical joints are not coincident (effectively stretcher bond).
- BB. Construction should proceed as described in steps A to AA.
- CC. So far it has been assumed that the geogrid has been located at base level of each of the facing units. However in some circumstances such as in particularly high structures geogrid reinforcement may be detailed at half or even third height of the facing units. In this situation the geogrid may be connected to the rear face of the facing unit with a bodkin (refer to Figure 5).

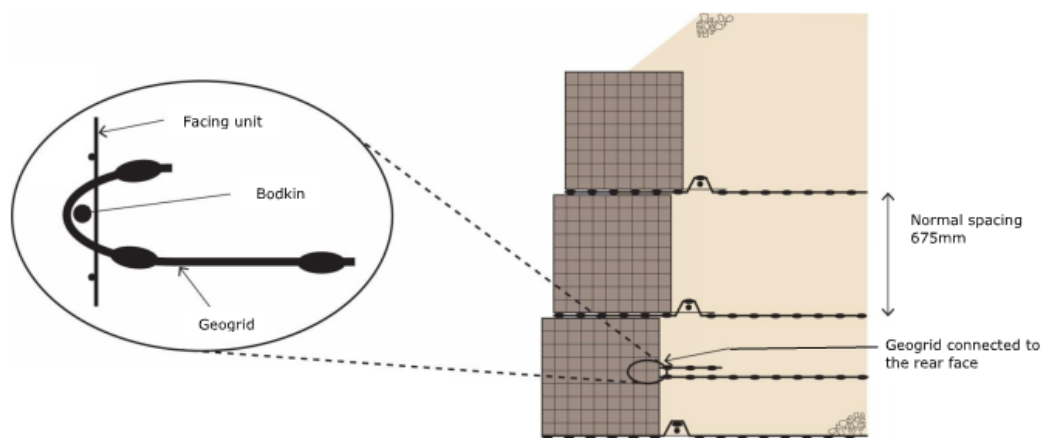


Figure 5 – additional geogrid connected to rear of facing unit if required

- DD. The Contractor must fully assess the safety risk associated with working at height and where appropriate install the necessary temporary edge protection.
- EE. The contractor is responsible for checking wall geometry during construction and taking all necessary actions to ensure that wall tolerance is met in accordance with Tensar recommendations.

Notes

1. Lacing is to be one continuous wiring operation along all joints both vertically and horizontally using single and double twists on alternative apertures ensuring that it forms a tight joint. Start and termination of lacing is formed by three turns ensuring the free end is turned into the unit. Tie wire supplied is 2.5mm diameter.
2. A suitable tensioning beam should be used to remove the slack from the geogrid and bodkin joint. The Reinforced soil supplier should supply a proprietary item for this purpose.

6. Submission of Alternatives

6.01 Any alternative to the specified system for Reinforced Soil proposed by the Tenderer shall be submitted with the tender and shall include:

- the names of the supplier and designer
- a full set of calculations
- outline drawings
- product samples and specifications
- test certificates for the reinforcing elements

The outline drawings must be sufficient to indicate the details of the construction of the Reinforced Steep Slopes including:

- typical plans
- elevations and section drawings
- foundations
- facing details (including vegetation if appropriate)
- anchoring reinforcing elements at the face
- reinforcing element joints and overlaps

The width and length of the soil reinforcing elements should be clearly shown along with details of their orientation in the works.

This document is drafted on an entirely generic basis and its use in any tender documentation in any way must be reviewed by the user and made specific to their project

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Tensar model specification

7/7

MS/RockWall

B7406 STEEL SHEET PILING

All specifications as per Arcelor Mittal model specifications, hereunder

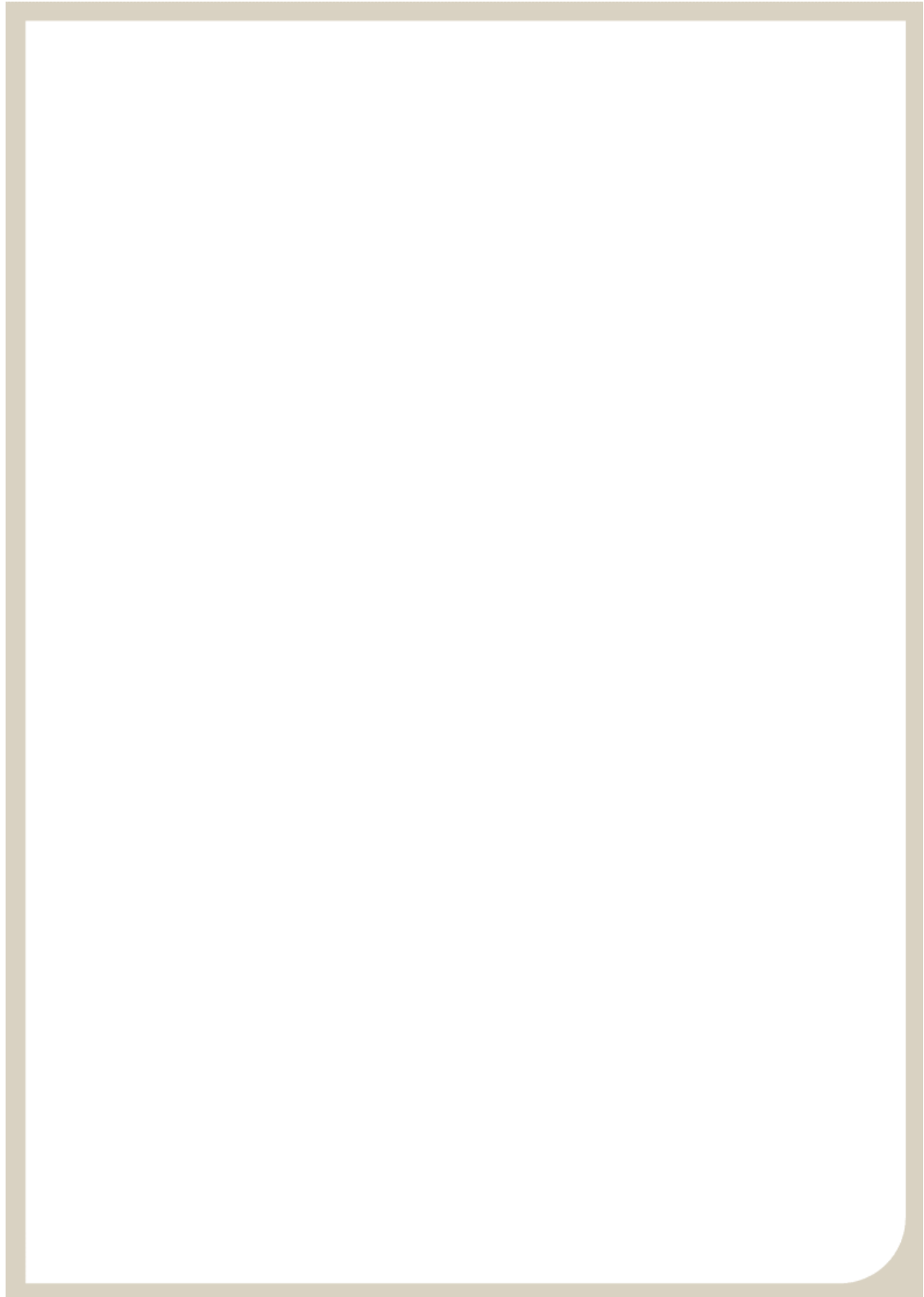


ArcelorMittal

Steel Sheet Piling

General Catalogue
2008







Steel Sheet Piling

General Catalogue
2008



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Deepwater port, Northport, New Zealand

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Introduction

ArcelorMittal Commercial RPS is the sales and marketing company for steel sheet piles and bearing piles produced by ArcelorMittal Belval & Differdange (formerly known as ProfilArbed). ArcelorMittal's mills in Belval and Differdange are the world's main producers of sheet and bearing piles and have been playing a leading role in the development of piling technology for nearly 100 years.

The first steel sheet piles were rolled in 1911 and 1912: the 'Ransome' and 'Terre Rouge' piles. Since then the production programme of ArcelorMittal's mill in Belval, Luxembourg has undergone constant improvement and development to include U- and Z-piles with widths of up to 750 mm (AU) and 700 to 770 mm (AZ-700, AZ-770).

ArcelorMittal's piling series are especially suitable for building, reliable structures rapidly and cost effectively. They are characterised by excellent section modulus to weight ratios and high moments of inertia.

Sheet piles are used worldwide for the construction of quays and harbours, locks and breakwaters, and for bank reinforcement on rivers and canals. Other applications are the protection of excavations on land and in water and excavation works for bridge abutments, retaining walls, foundation structures, etc.

Following the high demand for steel sheet piles, ArcelorMittal's mill in Rodange, Luxembourg will start rolling steel sheet piles in 2008. Following the merger with Mittal Steel, ArcelorMittal Commercial RPS is now also selling the U-piles produced by Dabrowa, Poland (formerly, Huta Katowice).

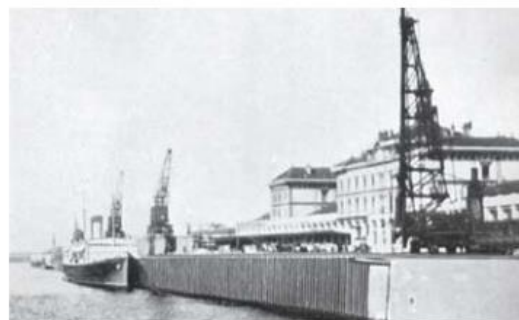
ArcelorMittal is the world's largest producer of hot-rolled steel sheet piles. Our Technical and Marketing Department offers comprehensive services throughout the world with customised support to all involved in the design, specification and installation of sheet and bearing piles, e.g. consulting engineers, architects, regional authorities, contractors, academics and their students.



Belval steel works, Luxembourg, 1930s



Sheet pile catalogues, 1910s



Port of Calais, France



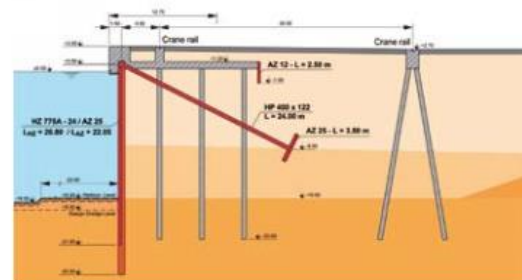
Mariakerke jetty extension, Ostend, Belgium

In-house design team

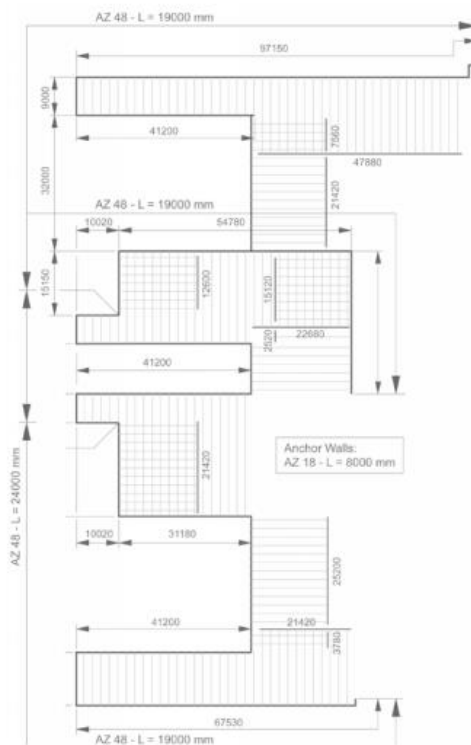
Services provided free of charge by the ArcelorMittal Commercial RPS in-house design team:

- Preliminary designs of complete solutions including anchorage and waling systems
- Elaboration of lay-out drawings and working drawings (driving plans)
- Assistance and recommendations on pile installation methods and driving equipment.

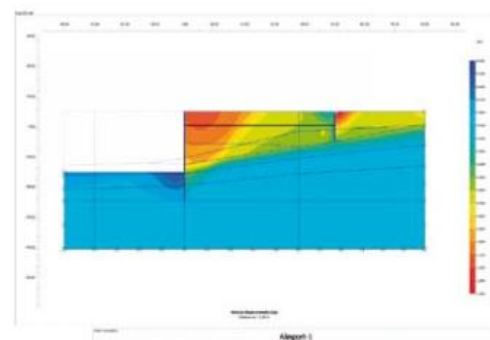
Please note that the legal responsibility for the final structure remains with the owner.



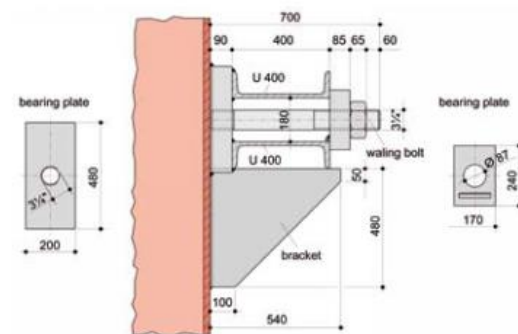
Feasibility studies



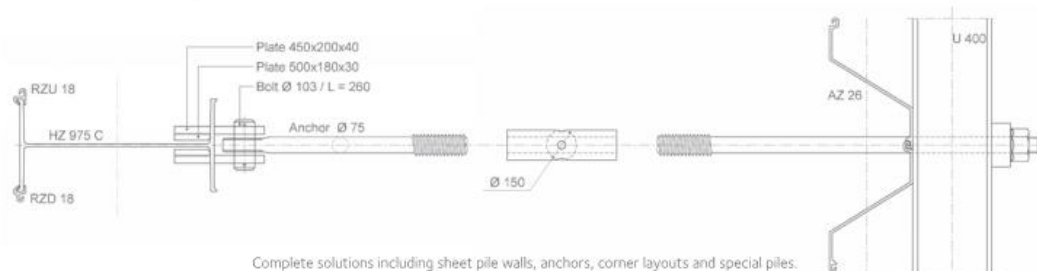
Sheet pile installation drawings



Preliminary designs



Solutions for execution details



Complete solutions including sheet pile walls, anchors, corner layouts and special piles.

Z-Sections

The essential characteristics of Z-sections are the continuous form of the web and the location of the interlock symmetrically on each side of the neutral axis. Both aspects have a positive influence on the section modulus. The AZ series, a section with extraordinary characteristics and the proven qualities of the Larssen interlock, has the following advantages:

- extremely competitive section-modulus-to-mass ratio
- increased inertia for reduced deflection
- large width, resulting in good installation performance
- good corrosion resistance, the steel being thickest at the critical corrosion points

Section	Width	Height	Thickness		Sectional area	Mass		Moment of inertia	Elastic section modulus	Static moment	Plastic section modulus	Class ¹⁾								
			b	h		t	s					cm ² /m	kg/m of single pile	kg/m ² of wall	cm ⁴ /m	cm ³ /m	cm ³ /m	cm ³ /m	S 240 GP	S 270 GP
AZ 12	670	302	8.5	8.5	126	66.1	99	18140	1200	705	1409	2	3	3	3	3	3	3	3	3
AZ 13	670	303	9.5	9.5	137	72.0	107	19700	1300	765	1528	2	2	2	3	3	3	3	3	3
AZ 14	670	304	10.5	10.5	149	78.3	117	21300	1400	825	1651	2	2	2	2	2	2	3	3	3
AZ 17	630	379	8.5	8.5	138	68.4	109	31580	1665	970	1944	2	2	3	3	3	3	3	3	3
AZ 18	630	380	9.5	9.5	150	74.4	118	34200	1800	1050	2104	2	2	2	3	3	3	3	3	3
AZ 19	630	381	10.5	10.5	164	81.0	129	36980	1940	1140	2275	2	2	2	2	2	2	3	3	3
AZ 25	630	426	12.0	11.2	185	91.5	145	52250	2455	1435	2873	2	2	2	2	2	2	2	2	2
AZ 26	630	427	13.0	12.2	198	97.8	155	55510	2600	1530	3059	2	2	2	2	2	2	2	2	2
AZ 28	630	428	14.0	13.2	211	104.4	166	58940	2755	1625	3252	2	2	2	2	2	2	2	2	2
AZ 46	580	481	18.0	14.0	291	132.6	229	110450	4595	2650	5295	2	2	2	2	2	2	2	2	2
AZ 48	580	482	19.0	15.0	307	139.6	241	115670	4800	2775	5553	2	2	2	2	2	2	2	2	2
AZ 50	580	483	20.0	16.0	322	146.7	253	121060	5015	2910	5816	2	2	2	2	2	2	2	2	2
For minimum steel thickness of 10 mm																				
AZ 13 10/10	670	304	10.0	10.0	143	75.2	112	20480	1350	795	1589	2	2	2	2	3	3	3	3	3
AZ 18 10/10	630	381	10.0	10.0	157	77.8	123	35540	1870	1095	2189	2	2	2	2	3	3	3	3	3
AZ-700 and AZ-770																				
AZ 12-770	770	344	8.5	8.5	120	72.6	94	21430	1245	740	1480	2	2	3	3	3	3	3	3	3
AZ 13-770	770	344	9.0	9.0	126	76.1	99	22360	1300	775	1546	2	2	3	3	3	3	3	3	3
AZ 14-770	770	345	9.5	9.5	132	79.5	103	23300	1355	805	1611	2	2	2	2	3	3	3	3	3
AZ 14-770-10/10	770	345	10.0	10.0	137	82.9	108	24240	1405	840	1677	2	2	2	2	2	2	3	3	3
AZ 17-700	700	420	8.5	8.5	133	73.1	104	36230	1730	1015	2027	2	2	3	3	3	3	3	3	3
AZ 18-700	700	420	9.0	9.0	139	76.5	109	37800	1800	1060	2116	2	2	3	3	3	3	3	3	3
AZ 19-700	700	421	9.5	9.5	146	80.0	114	39380	1870	1105	2206	2	2	2	3	3	3	3	3	3
AZ 20-700	700	421	10.0	10.0	152	83.5	119	40960	1945	1150	2296	2	2	2	2	2	2	3	3	3
AZ 24-700	700	459	11.2	11.2	174	95.7	137	55820	2430	1435	2867	2	2	2	2	2	2	2	3	3
AZ 26-700	700	460	12.2	12.2	187	102.9	147	59720	2600	1535	3070	2	2	2	2	2	2	2	2	2
AZ 28-700	700	461	13.2	13.2	200	110.0	157	63620	2760	1635	3273	2	2	2	2	2	2	2	2	2
AZ 37-700	700	499	17.0	12.2	226	124.2	177	92400	3705	2130	4260	2	2	2	2	2	2	2	2	2
AZ 39-700	700	500	18.0	13.2	240	131.9	188	97500	3900	2250	4500	2	2	2	2	2	2	2	2	2
AZ 41-700	700	501	19.0	14.2	254	139.5	199	102610	4095	2370	4745	2	2	2	2	2	2	2	2	2

¹⁾ Classification according to EN 1993-5, Class 1 is obtained by verification of the rotation capacity for a class-2 cross-section.
A set of tables with all the data required for design in accordance with EN 1993-5 is available from our Technical Department. Steel grade S 460 AP following specifications of the mill is available on request.



C.386

Interlock



AZ Larssen interlock in accordance with EN 10248.
All available AZ sheet piles can be interlocked.
Theoretical interlock swing: $\alpha_{\max} = 5^\circ$.



Delivery form

Single Pile
Position A



Single Pile
Position B



Double Pile
Form I standard

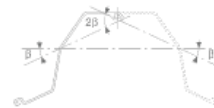


Double Pile
Form II on request



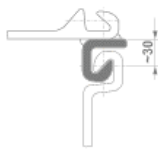
Bent piles

Maximum bending angle: $\beta = 25^\circ$. Z-piles are bent in the middle of the web. They are generally delivered as single piles. Double piles are available upon request.

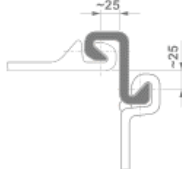


Corner sections

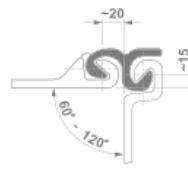
C 9
Mass ~ 9.3 kg/m



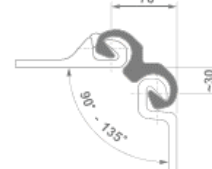
C 14
Mass ~ 14.4 kg/m



DELTA 13
Mass ~ 13.1 kg/m



OMEGA 18
Mass ~ 18.0 kg/m

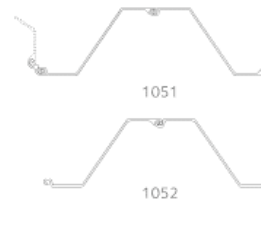
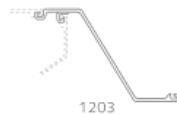
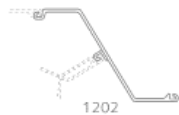
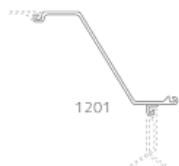


Special corner sections interlocking with Z-sections make it possible to form corner or junction piles without using fabricated special piles. Corner sections are fixed to the sheet pile in accordance with EN 12063.

Different welding specifications are available on request. The corner sections are threaded and welded with a 200 mm setback from the top of the piles.

Corner and junction piles

The following special piles, among others, are available as single and double piles on request.



Crimping points

Threaded AZ double piles are recommended for facilitating the installation process. AZ double piles are not crimped for statical reasons. However, due to customer demand, most of our AZ piles are crimped into double piles, according to our standard specification, for the following reasons:

- Single piles easily bend around the weak axis under driving
- Faster installation progress with double piles



Pile length < 6 m:

3 crimping points per 1.8 m
= 1.7 crimping points per m

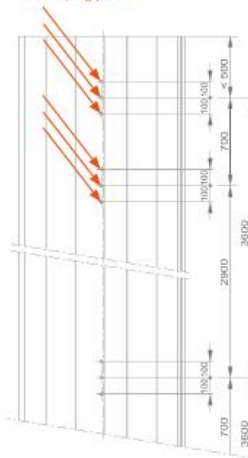
Pile length ≥ 6 m:

6 crimping points per 3.6 m
= 1.7 crimping points per m

3 crimping points



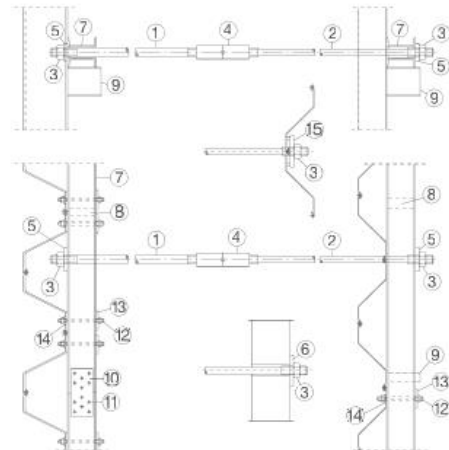
6 crimping points



Tie back system

Most sheet pile retaining walls need supplementary support at the top, in addition to embedment in the soil. Temporary cofferdams generally use waler or strut bracing inside the excavation. Permanent or large retaining walls are often tied back to an anchor wall installed a certain distance behind the main wall. Other anchor systems, like injection anchors or anchor piles, can also be used. The drawing shows a typical horizontal tie-rod connection for sheet pile walls. The following components can be seen:

- | | |
|-----------------------------|----------------------|
| 1 Plain tie-rod | 7 Waling |
| 2 Upset end tie-rod | 8 Spacer |
| 3 Nut | 9 Supporting bracket |
| 4 Turnbuckle | 10 Splicing plate |
| 5 Bearing plate | 11 Splicing bolt |
| 6 Bearing plate on concrete | 12 Fixing bolt |
| | 13 |
| | 14 Fixing plate |
| | 15 |



Durability of steel sheet piles

Unprotected steel in the atmosphere, water or soil is subject to corrosion that may lead to damage. Local weakening and rusting-through are normally considered to be maintenance problems that can be remedied locally. Depending on life-time requirements and accessibility of the structure, they are often protected from uniform corrosion by one or more of the following methods:

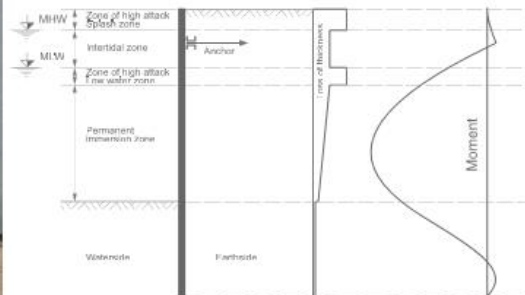
- Corrosion protection by coating (typically only in high corrosion zones)
- Choice of stronger section or higher steel grade to create higher reserves
- Choice of Marine Grade Steel ASTM A690
- Avoiding important bending moments in the high corrosion zones
- Extension of concrete capping beam below the low-water level
- Cathodic protection by impressed current or by sacrificial anodes

Corrosion rates



The maximum steel stress in most sheet pile structures is situated within the permanent immersion zone. The loss of thickness in this zone is considerably lower than in the high corrosion zones. Steel stress is generally very low in the maximum corrosion zones: splash zone & low water zone. These locations are therefore not the critical part of the structure despite their negative appearance if unprotected.

Typical loss of thickness due to corrosion and moment distribution for anchored sheet pile wall in marine environment:



Please refer to EC 3 Part 5 for details on loss of steel thickness as a result of exposure in different media.

Surface coating

The classical corrosion protection for steel sheet piling is surface coating. EN ISO 12944 deals with protection by paint systems and its various parts cover all the features that are important in achieving adequate corrosion protection. It is essential that the steel surface is properly prepared: removal of millscale by abrasive blasting (cf. ISO 8501-1) before applying a coating system. Most systems consist of one or two primers, an intermediate coat and a topcoat. Zinc primers are used frequently due to their good corrosion-inhibiting properties. Intermediate coats

increase the total thickness and thus increase the distance for moisture diffusion to the surface. Topcoats are chosen for colour and gloss retention, for chemical resistance, or for additional resistance to mechanical damage. Epoxies are generally used for seawater immersion and chemical resistance, polyurethanes for colour and gloss retention. In the following, paint systems are proposed for different environments according to classifications of EN ISO 12944.

Metro Copenhagen, Denmark



Atmospheric exposure

In applications such as retaining walls, the aesthetic and functional look of the sheet piles is important, so polyurethane finishes – which are easy to apply and maintain – are the most common choice due to their good gloss and colour retention characteristics.

Proposal (EN ISO 12944 – Table A4, corrosivity category C4):

Zinc silicate epoxy primer
 Recoatable epoxy intermediate coating
 Aliphatic polyurethane topcoat

Nominal dry-film thickness of the system: 240 µm



Dyke, Hamburg, Germany

Freshwater Immersion

Polyamine-cured epoxy coatings are suitable for freshwater projects for aesthetic reasons whilst also being able to deal with brackish and/or polluted water conditions.

Proposal (EN ISO 12944 – Table A8, corrosivity category Im 1)

Polyamine-cured epoxy coating

Nominal dry-film thickness of the system: 300 µm

Seawater immersion

For long-term performance of steel structures immersed in seawater there should be no compromise on quality as abrasion and impact may damage the coating system. The application must be properly carried out and inspected on a regular basis. Cathodic protection is often specified in combination with a (fully compatible) coating system.

Proposal (EN ISO 12944 – Table A8, corrosivity category Im2)

Polyamide-cured epoxy primer
Polyamide-cured coaltar epoxy coating

Nominal dry-film thickness of the system: 450 μm

Lock, Venice, Italy



Waste disposal

Excellent protection is essential due to exposure to highly aggressive substances. The coating system must have outstanding resistance to mineral and organic acids and other chemicals as well as capacity to withstand abrasion and impacts.

Proposal

Micaceous iron oxide pigmented polyamide cured epoxy primer
Polyamide-cured-epoxy coating with increased chemical resistance

Nominal dry-film thickness of the system: 480 μm

Waste disposal, Horn, Austria





C.392

Delivery conditions

Geometric tolerances of hot rolled steel sheet piles according to EN 10248 (reduced tolerances on request)

Tolerances	AU, PU, PU-R, GU	AZ	AS 500	HZ
Mass	±5%	±5%	±5%	±5%
Length	± 200 mm	± 200 mm	± 200 mm	± 200 mm
Height	H ≤ 200 mm: ±4.0 mm	H ≤ 200 mm: ±5.0 mm	-	±7.0 mm
	H > 200 mm: ±5.0 mm	200 mm < H < 300 mm: ±6.0 mm H ≥ 300 mm: ±7.0 mm	-	
Thickness	t, s ≤ 8.5 mm: ± 0.5 mm	t, s ≤ 8.5 mm: ± 0.5 mm	t, s ≤ 8.5 mm: ± 0.5 mm	t, s ≤ 12.5 mm: -1.0 mm / +2.0 mm
	t, s > 8.5 mm: ± 6%	t, s > 8.5 mm: ± 6%	t, s > 8.5 mm: ± 6%	t, s > 12.5 mm: -1.5 mm / +2.5 mm
Width single pile	± 2%	± 2%	± 2%	± 2%
Width double pile	± 3%	± 3%	± 3%	± 3%
Straightness	0.2% of pile length	0.2% of pile length	0.2% of pile length	0.2% of pile length
Ends out of square	2% of pile width	2% of pile width	2% of pile width	2% of pile width

Maximum rolling lengths (longer sections available on request)

Section	AZ	AU, PU	PU-R	GU sp ¹⁾	GU dp ¹⁾	AS 500	HZ	RH / RZ	OMEGA 18	C9 / C14	DELTA 13
Length [m]	31	31	24	24	22	31	33	24	16	18	17

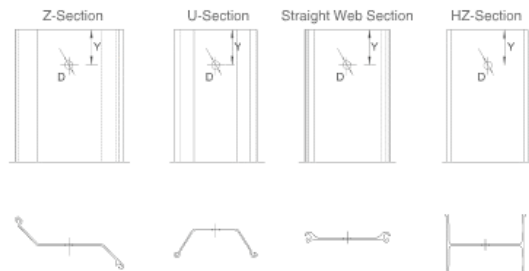
¹⁾ sp = single pile, dp = double pile

Handling holes

Sheet pile sections are normally supplied without handling holes. If requested, they can be provided with handling holes in the centerline of the section. The standard handling hole dimensions are as follows:

Diameter D [mm]	40	40	50	50	63.5
Distance Y [mm]	75	300	200	250	230

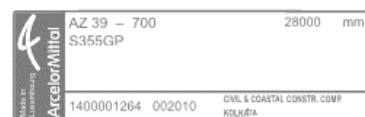
Diameter D [in]	2.5
Distance Y [in]	9



Markings

The following markings can be supplied on request:

- colour marks defining section, length and steel grade
- adhesive stickers showing the customer's name, destination, order number, type and length of profile and steel grade.



Delivery conditions / 45

Steel grades of sheet pile sections

AZ, AU, PU, AS and HZ sections are delivered in the steel grades based on EN 10248-1 mentioned below.
PU-R sections: please contact us for S 390 GP, S 430 GP and ASTM A690 steel grades.

GU sections: available up to S 320 GP, please contact us for S 355 GP.

Steel grade EN 10248	Min. yield point N/mm ²	Min. tensile strength N/mm ²	Min. elongation L ₀ =5.65 √S ₀ %	Chemical composition (% max)					
				C	Mn	Si	P	S	N
S 240 GP	240	340	26	0.25	–	–	0.055	0.055	0.011
S 270 GP	270	410	24	0.27	–	–	0.055	0.055	0.011
S 320 GP	320	440	23	0.27	1.70	0.60	0.055	0.055	0.011
S 355 GP	355	480	22	0.27	1.70	0.60	0.055	0.055	0.011
S 390 GP	390	490	20	0.27	1.70	0.60	0.050	0.050	0.011
S 430 GP	430	510	19	0.27	1.70	0.60	0.050	0.050	0.011

Mill specification

S 460 AP	460	550	17	0.27	1.70	0.60	0.050	0.050	0.011
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Materials to other specifications including S 460 AP, A 572 Gr. 65 as well as special steels with improved corrosion resistance (A 690), or copper addition in accordance with EN 10248 Part 1 Chapter 10.4 can be supplied on request.
A modified grade A 690 with higher yield strength is also available upon request.

Galvanisation has an influence on the chemical composition of the steel and must therefore be specified in the purchase orders.

We strongly recommend informing us of all surface treatment to be applied to the product when placing orders.

Reference standard	EN 10248	S 270 GP	S 320 GP	S 355 GP	S 390 GP	S 430 GP	S 460 AP ¹³
International standard	ASTM	A 328	–	A 572 Gr.50; A 690	A 572 Gr.55	A 572 Gr. 60	A 572 Gr. 65
International standard	CSA	Gr. 260 W	Gr. 300 W	Gr. 350 W	Gr. 400 W	–	–
International standard	JIS	SY 295	–	–	SY 390	–	–

¹³ Mill specification



Geometric tolerances of tubular piles

Tolerance on pile length: ± 200 mm

Norm	Outside diameter (D)	Wall thickness (t)	Straightness	Out-of-roundness	Mass	Maximum weld bead height ¹⁾
EN 10219-2	$\pm 1\%$ ± 10 mm	$\pm 10\%$ ± 2 mm	0.20 % of total length	$\pm 2\%$	$\pm 6\%$	$t \leq 14.2$ mm: 3.5 mm $t > 14.2$ mm: 4.8 mm
API 5L	+ 6.4 mm - 3.2 mm	+ 19.5 % - 8 %	0.20 % of total length	$\pm 1\%$	+ 10 % - 3.5 %	$t \leq 12.7$ mm: 3.2 mm $t > 12.7$ mm: 4.8 mm

¹⁾ Tolerance on height of internal and external weld bead for submerged arc-welded hollow sections.

Steel grades of tubular piles

Steel grade EN 10219-1	Minimum yield strength R_{eH} ($t \leq 16$ mm) N/mm ²	Minimum yield strength R_{eH} ($16 < t \leq 40$ mm) N/mm ²	Minimum ultimate tensile strength R_m ($3 \leq t \leq 40$ mm) N/mm ²	Minimum elongation ($t \leq 40$ mm) %	Chemical composition (% max)						
					C	Mn	P	S	Si	N	CEV ($t \leq 20$ mm)
S 235 JRH	235	225	340-470	24	0.17	1.40	0.045	0.045	-	0.009	0.35
S 275 JOH	275	265	410-560	20	0.20	1.50	0.040	0.040	-	0.009	0.40
S 355 JOH	355	345	490-630	20	0.22	1.60	0.040	0.040	0.55	0.009	0.45
S 420 MH	420	400	500-660	19	0.16	1.70	0.035	0.030	0.50	0.020	0.43
S 460 MH	460	440	530-720	17	0.16	1.70	0.035	0.030	0.60	0.025	-

Steel grade API 5L, PSL1 ¹⁾	Min. yield strength R_{eH}	Min. ultimate tensile strength R_m	Min. elongation ²⁾	Chemical composition (% max)				
				C ³⁾	Mn ³⁾	P	S	N
B	241	414	23	0.26	1.20	0.030	0.030	0.04
X 42	290	414	23	0.26	1.30	0.030	0.030	0.04
X 46	317	434	22	0.26	1.40	0.030	0.030	0.04
X 52	359	455	21	0.26	1.40	0.030	0.030	0.04
X 56	386	490	19	0.26	1.40	0.030	0.030	0.04
X 60	414	517	19	0.26	1.40	0.030	0.030	0.04
X 65	448	531	18	0.26	1.45	0.030	0.030	0.06
X 70	483	565	17	0.26	1.65	0.030	0.030	0.06

¹⁾ API: American Petroleum Institute; PSL: Product Specification Level

²⁾ Minimum elongation according to API in two inches (50.8 mm)

³⁾ According to API 5L: For each reduction of 0.01% below the specified max C content, an increase of 0.05% above the specified max Mn content is permissible, up to a max of 1.50% for grade X 42 to X 52, 1.65% for X 56 to X 65 and 2.00% for X 70



Tubular pile mill, Dintelmond, Netherlands

Delivery conditions / 47

B7405 MEASUREMENT AND PAYMENT

Add the following after item 74.03

Item	Unit
B74.04 Patented earth retaining systems:	
(a) Tensar Geogrid (type RE560)	metre squared (m ²)
(b) Extra over fill within restricted area.....	cubic metre (m ³)

The tendered rate for subitems (a) shall be squared metre of the horizontal grid of the earth retaining system placed in position as shown on the drawings.

The tendered rate shall include full compensation for procuring, furnishing, transporting, handling and placing all materials, and shall include all costs for materials, labour, plant and equipment used during the construction.

The tendered rate for subitems (b) shall be cubic metre, and the quantity measured shall be the calculated as per the width and height measured on the drawings.

The tendered rates shall include full compensation for furnishing and placing all materials within the entire excavation, transporting the material within the free-haul distance of 1.0km, and preparing, processing, shaping, watering, mixing and compacting the material to the specified densities.

Item	Unit
B74.05 Establishment on the site for	
sheet piling:	Lump Sum (L/sum)

The tendered lump sum shall include full compensation for establishment on the site and the subsequent removal of all special plant for installation of the sheet piling and additional plant for carrying out operations, the cost of which does not vary with the actual amount of work to be done.

This work will be paid by way of a lump sum, 75% of which will become payable when all the equipment is on site and the first sheet pile installed. The remaining 25% will become payable after all the holes have been drilled and the equipment has been removed from the site.

Item	Unit
B74.06 Arcelor Mittal sheet piles, AZ 18	
grade 50 / B high yield steel grade,	
ultimate stress 490 / 620 MPa or	
similar approved:	

(a) Sheet Piles

(1) Exceeding 0 m and up to 10 m..... squared metre (m²)

The limits for the depth range shall be measured down from the average ground surface (subclause 6113 (h)) to the agreed founding level (clause 6106). The unit of measurement shall be the square metre of the sheet pile.

The tendered rate shall include full compensation for supplying all the materials, installation of the sheet pile, treating the forms and all accessories.

C.1.8. COLTO SERIES 8000: SUNDRIES

SECTION B8100: TESTING MATERIALS AND WORKMANSHIP

B8102: TESTING METHODS

Insert the following as a new first paragraph:

“Where reference is made to TMH test methods in this specification or the standard specifications, it shall be replaced with the relevant current published SANS test method.”

B8105 TESTING OF AGGREGATES

Add the following sub-clause:

“g) Determination of Ethylene Glycol Durability Index

The Ethylene Glycol Durability Index shall be determined as follows:

(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 and allow to settle. Observe and record the response of the aggregate to the ethylene glycol according to the criteria listed in (iii) below. Continue the above cycle at intervals of 24 hours for a further 4 days, in each case recording the observed response. After 5 days allow the samples to remain submerged in the solution and

observe and record the disintegration response after a total period of 15, 30 and 60 days have elapsed.

(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.

TIME CLASS

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

Class 4: 0 - 5 days

Class 3: 6 - 15 days

Class 2: 16 - 30 days

Class 1: 31 - 60 days

Class 0: Over 60 days

(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.”

Amend the heading of B8106 to read as follows:

“B8106 TESTING THE CONCRETE AND COVER TO STEEL REINFORCEMENT”

Add the following sub-clauses under B8106:

“g) Trial panels for durability concrete (W class concrete)

As part of the durability class concrete mix design approval process, trial panels shall be constructed on the site (or at the laboratory) before construction of structural elements commences, to ensure that the contractor can successfully achieve the oxygen permeability and sorptivity targets set for the in situ concrete with method of construction to be adopted. Each trial panel shall be constructed using the same type of concrete mix, shuttering type, placing and curing methods (including application rates of curing compounds if applicable) as to be used on the final structural element to be constructed. The dimensions of such a trial panel shall be 0.40m wide, 0.60m high and 150mm thick. The panel shall be constructed vertically. It is suggested that 2 lifting hooks be cast into the panel to facilitate lifting, moving or disposal of panel. It most likely will be that one trial panel will be required for substructures (piers, abutments, retaining walls, etc.) if the same grade concrete is specified for all substructures and another for the decks due to type of casting and curing methods.

The test area for taking of cores (taken in horizontal direction) shall not be less than 100mm from all horizontal and vertical edges. The number of cores to be extracted and tested is described under B8106(i).

h) Test panels for durability concrete (W class concrete)

During casting of concrete on site, test panels shall be constructed on the site adjacent to where the concrete element is being placed. Each test panel shall be constructed with the same concrete, shutter type, compaction and curing methods being used in the element being cast (including same vibrator frequency and curing compound application rates), and be left to cure for 28 days adjacent to the concrete element. Thereafter it shall either be cored on site or transported to the laboratory for testing of the required durability parameters. The dimensions of the test panels shall be 0,4m wide, 0,6m high and 150mm thick and be cast vertically to simulate vertical casts of the substructures and vertical faces of bridge decks. It is suggested that 2 lifting hooks be installed at both top ends of the test panel to assist with transport. For precast concrete, test panels will not be constructed, as cores will be drilled from the concrete elements at the Precast yard before being placed at its final location. For the horizontal faces of in situ bridge decks and culverts, test panels will also not be constructed. Instead cores will be extracted from the top surface of the decks.

The frequency of the testing and number of cores to be extracted is described under B8106(i).

The test area for the taking of cores (taken in a horizontal direction) shall not be less than 100mm all horizontal and vertical edges.

The costs for construction of the test panels shall be deemed to be included under rates for pay item 64.01."

i) Testing for concrete durability

Durability predictions for durability concrete prefixed 'W' will be based on the following tests that shall be carried out by an accredited laboratory approved by the Engineer:

- (i) Oxygen permeability
- (ii) Water sorptivity
- (iii) Chloride conductivity (if specified)

Notes:

The test methods shall be as described below.

For test no's (i) and (ii) (and (iii) when required), cores of $70 \pm 2\text{mm}$ diameter shall be extracted from the test panels when the concrete reaches the age of at least 28 days and tested for the durability criteria set out in clause B6404(h) and used to determine the payment as per Table B8212/1. Test No. (iii) may only be required where specified (e.g. within a chloride environment along the coast or where chlorides are present in ground water).

A sample for the purposes of durability testing is as defined in Table B8106/1. The cores for durability testing shall be extracted from the test panels for process and acceptance control (at the frequency as shown in Table B8106/2). Durability testing shall only be required for concrete specified as durability concrete with the prefix "W". The number of samples to be taken shall be as shown in Table B8106/2.

TABLE B8106/1: NUMBER OF CORE RESULTS REQUIRED FOR A SINGLE SAMPLE FOR DURABILITY TESTING

Durability Parameter	No. of Core Results
a. Sorptivity	2
b. Oxygen Permeability	4
c. Chloride Conductivity	4

* Test undertaken only if specified and within a chloride environment.

TABLE B8106/2: NUMBER OF TEST PANELS REQUIRED FOR DURABILITY TESTING

Element	No. of Test Panels to be taken (see
---------	-------------------------------------

	Table B8106/1 for number of core results required for a single sample)
In situ Bridge Decks	1 (per pour) ¹
Bridge Piers/Abutments	1 (per element) ²
Precast Elements	1 (per element) ^{2, 3}
Bridge / Culvert Parapets	1 (per element) ²
Culvert walls / wingwalls / slabs	1 (per wall section) ^{1, 2}
Retaining walls	1 (per wall section) ²
All bases	1 (per element/pour) ²

Note:

1. Test panels required to be cast vertically. Additional cores required to be extracted from top of deck / major culvert slabs, i.e. in situ cores.
2. Note that where group of elements are cast on the same day, only one test panel will be required, but only if the same grade concrete is used.
3. Sample required to be taken from Precast element in casting yard. For edge beams, inner face to be cored.

For cores to be extracted from precast elements and top of bridge decks, the engineer will indicate the positions at which the cores will be extracted. Filling of the holes left by the drilling of the cores shall be the responsibility of the contractor and shall be carried out using an approved proprietary non-shrink repair mortar so as to restore structural integrity and durability of the structural element tested.

If the test results indicate that the durability requirement has not been achieved, then the structural element shall be cored and tested for the durability criteria. The engineer will indicate the positions at which the cores will be extracted. The costs for testing of the structure shall be borne by the contractor. Filling of the holes left by the drilling of the cores shall be the responsibility of the contractor and shall be carried out with material as described in the paragraph above.

Note that if testing has to be undertaken on sides of decks and walls, the cores shall be taken on the exposed faces of the concrete i.e. the sidewall face taking care not to cut the reinforcing bars. Where the cores do contain pieces of reinforcing steel, they shall not be used for the tests. The cores shall be extracted through the cover concrete from the Test

Panels or constructed concrete element as applicable. The outer 5mm of the exposed surface of the core shall be cut off and then a slice (30 ± 2 mm thick) shall then be cut and prepared for testing. The engineer will indicate the positions at which the cores will be extracted.

The methodology and latest revisions for the durability index tests are available at the University of Cape Town's web address at www.civil.uct.ac.za. In addition, the results of all the durability testing shall be submitted at least once a month in the required format to the University of Cape Town, where the present contact person is:

Dr. H Beushausen - email: hans.beushausen@uct.ac.za.

j) Testing for concrete cover

Concrete cover testing shall be conducted using an approved calibrated electromagnetic cover meter, able to comply to requirements as defined in linear and block scans, and has the ability to save and calculate data measured.

The testing (non-destructive) shall be conducted to confirm that the specified depth of concrete cover has been achieved. The cover meter tests shall cover at least 1m^2 for every 20m^2 surface area of concrete placed. Readings shall be taken to identify individual bars, with at least 3 readings at 100mm spacing on every single bar within 1m^2 . The average cover of the 1m^2 subjected to the test shall be used to determine the payment as per Table B8212/2 unless the Contractor chooses to carry out additional tests as detailed in the final paragraph of clause B6414(a). The cover meter must be calibrated whenever being used to test for cover on each project. Standard Calibration block must be used on each project, and where substantial testing is required, the calibration block shall be kept on site. Cover meters shall comply with the relevant modern standards (e.g. EN55011, 50082-1, 6100-6-1, 6100-6-2, 6100-6-3, 6100-6-4 and BS18881 Part 204).

Critical elements for cover surveys are parapets, deck edges including underside of cantilevers, lower portions of columns and abutments and walls. Soffits should be excluded from measurements. All parapets (F-shaped) including the parapet beam shall be fully tested for cover

compliance. In addition, the entire area up to 1,5m high on piers, walls and abutments, including the rear of abutments and wingwalls, shall be fully tested before being backfilled. The engineer will identify other critical areas required to be surveyed. Should any of these areas shows deficiencies, the engineer may order additional cover tests on other areas at the contractors costs.

The procedure for testing for depth of reinforcement from concrete surface shall be in accordance with the manufacturer's requirements for the relevant electromagnetic cover meter, but further requirements are set out in clause B8119. All cover meters shall be calibrated on site under the control of the engineer. The number of readings taken of the layer of rebar closest to the concrete surface to each 1m² to be tested shall be such that an accurate average cover can be determined for the tested area. For the purposes of calculating the average depth of cover bars that have covers 15mm or greater than what is specified shall be capped at specified cover plus 15mm in the calculations. For calculation of payment, specified cover to be reduced by 5mm (allowance for variation of equipment) before apply criteria as defined in Table B8212/2.

Example, where Specified cover = 40mm, test as 35mm, then apply limits, $85\% \times 35 = 30\text{mm}$.

Quick Scan readings are to be taken perpendicular to the layer of rebar closest to the concrete surface for each scan area (± 30 per m²), so that an *average cover* to reinforcement can be determined for the tested area.

Readings are to be taken to identify individual bars within each 1m². At least three cover readings, at 150mm spacing, per an individual bar shall be shown in the test results but only overall cover measurement would be used for payment purposes. Reports generated by the equipment shall be used for determining payment. Where more than 10% of readings are below specified lower limit, the area shall be re-scanned, by *Image, Block or Grid scan* method, to verify the average cover. For calculation refer to specific worksheet (attached)

Cognizance to be taken of the effect to cover depth measured, where spliced bars are measured in same area as single bars. The size of rebar shall be corrected manually on the device by means of applying the following formula (approximately $1.41 \times$ diameter of rebar as shown in design).

Where insufficient cover are established before placing of concrete, e.g. Starter bars from base not correct position, remedial action to be performed before continuing with next concreting – these actions to be clearly recorded and area identified.

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

Add the following at the end of this clause:

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

$$\frac{(b-a)}{b}$$

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

B8110 TESTS RELATING TO CHEMICAL STABILISATION

Add the following sub-clause:

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

1. Scope

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

2. Apparatus

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

3. Method

3.1 *Preparation of specimens*

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

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

Use the apparatus and compaction method as described in TMH 1 method A7 (100% Modified AASHTO at predetermined OMC).

3.2 *Curing of specimens*

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

3.3 *Wetting, drying and brushing*

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

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

3.4 *Determination of soil-cement losses*

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

4. Calculations

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

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

Where

L = soil-cement loss (%)

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

N = final oven-dry mass (g).

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

5. Notes

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

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chemical stabilizers, for example lime, or mixes of lime and milled blast furnace slag, or cement and milled blast furnace slag.

5.5 The pressure of the brushing stroke is determined as follows:

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

5.6 Rapid curing:

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

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

B8114 GEOTEXTILE AND GEOTEXTILE – SOIL COMPACTIBILITY TESTS

Add the following new sub-clause:

“c) Other Tests:

i. Thickness (mm):

The thickness of the material shall be specified by the contractor (or supplier).

Thickness and compressibility tests shall be carried out in accordance with Code of Practice SABS 0221:1988. The Testing of Geo-textile, to check that the material supplied conforms to the thickness specified by the contractor.

ii. Mass per unit area (g/m^2):

Testing shall be carried out in accordance with Code of Practice SABS 0221.

iii. Tensile strength (kN/m):

Testing shall be carried out in accordance with Code of Practice SABS 0221.

iv. Penetration load (kN):

Testing shall be carried out in accordance with Code of Practice SABS 0221.

v. Puncture resistance (mm):

Testing shall be done in accordance with test procedures laid down by CSIR, Pretoria.

vi. Permeability (l/s/m^2):

Testing shall be carried out in accordance with Code of Practice SABS 0221.”

B8117 MEASUREMENT AND PAYMENT

Amend pay item 81.02 as follows:

Item	Unit
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B81.02 Other special tests requested by the engineer

“(a) Employer’s contribution to concrete durability tests

- (i) Tests for water sorptivity (Provisional sum)
- (ii) Tests for oxygen permeability (Provisional sum)
- (iii) Tests for chloride conductivity (Provisional sum)
- (iv) Tests for concrete cover (Provisional sum)
- (b) Other tests (Provisional sum)

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 the provisions of the SAICE General Conditions of Contract (2010). Payment will not be made for any special tests should the result indicate that the specifications have not been complied with.”

*Insert “(a) & (b)” after “81.03” in the 1st line of the 2nd paragraph of the **Note***

Add the following clauses:

“B8119 CONCRETE COVER TESTING PROCEDURE

1. Scope

This procedure covers all measurements to be done on concrete structures to establish conformance to specified concrete cover requirements.

2. Guidelines and Preparation

- a. The contractor is to complete a cover survey request and forward it to the engineer.
- b. The selected area for cover measurement is to be indicated on a sketch (see example attached).
- c. The responsible person must identify the area to be scanned, take measurements on the required date and calculate the results in terms of project specification.
- d. The cover meter is to be checked against a calibration box/block constructed with typical reinforcement of known parameters, on each day of use. Any deviations from actual measurement must be recorded on a Cover Survey Request.
- e. Cognizance shall be taken of the effect to cover depth measured, where spliced bars are measured in the same area as single bars (typically, the rebar diameter is increased by a factor of 1.44).
- f. The depth of cover shall be determined with equipment, complying with BS 1881, Part 204 and capable of identifying the location and depth of reinforcement on a scanned area. The results shall be recorded electronically by the equipment software.
- g. Measurements are to be taken in accordance with cover meter manufacturer's guidelines.
- h. The person responsible for measurements must indicate the position, dimension, type and splicing of reinforcement on the sketch for each scanned area.

3. **Method of Measurement**

Two methods of measurement are proposed as follows:

a. Quick/Linear Scan Method

- (i) Readings are to be taken perpendicular to the layer of rebar closest to the concrete surface for each scan area (+/- 30 per m²), so that an *average cover* to reinforcement can be determined for the tested area.
- (ii) Readings are to be taken to identify individual bars within each 1m². At least three cover readings, at 150mm spacing, per individual bar shall be shown in the test results but only the overall cover measurement would be used for payment purposes. Reports generated by the equipment shall be used for determining payment. Further specified cover to be reduced by 5mm (allowance for variation of equipment), before applying criteria as defined in table B8212/2a.

e.g. If specified cover is 40mm, the lower limit for full acceptance is:

$$(40 \text{ mm} - 5 \text{ mm}) \times 85\% = 30 \text{ mm}.$$

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- (iii) Where more than 10% of readings are below specified lower limit, the area shall be re-scanned, by *Image, Block or Grid scan method*, to verify the average cover. Refer to item 3.2 below.

An example of Quick Scan information and presentation is shown in Figure B8119-1 below.

Fig
b. Im

(i)

(ii)

(iii)

An
in

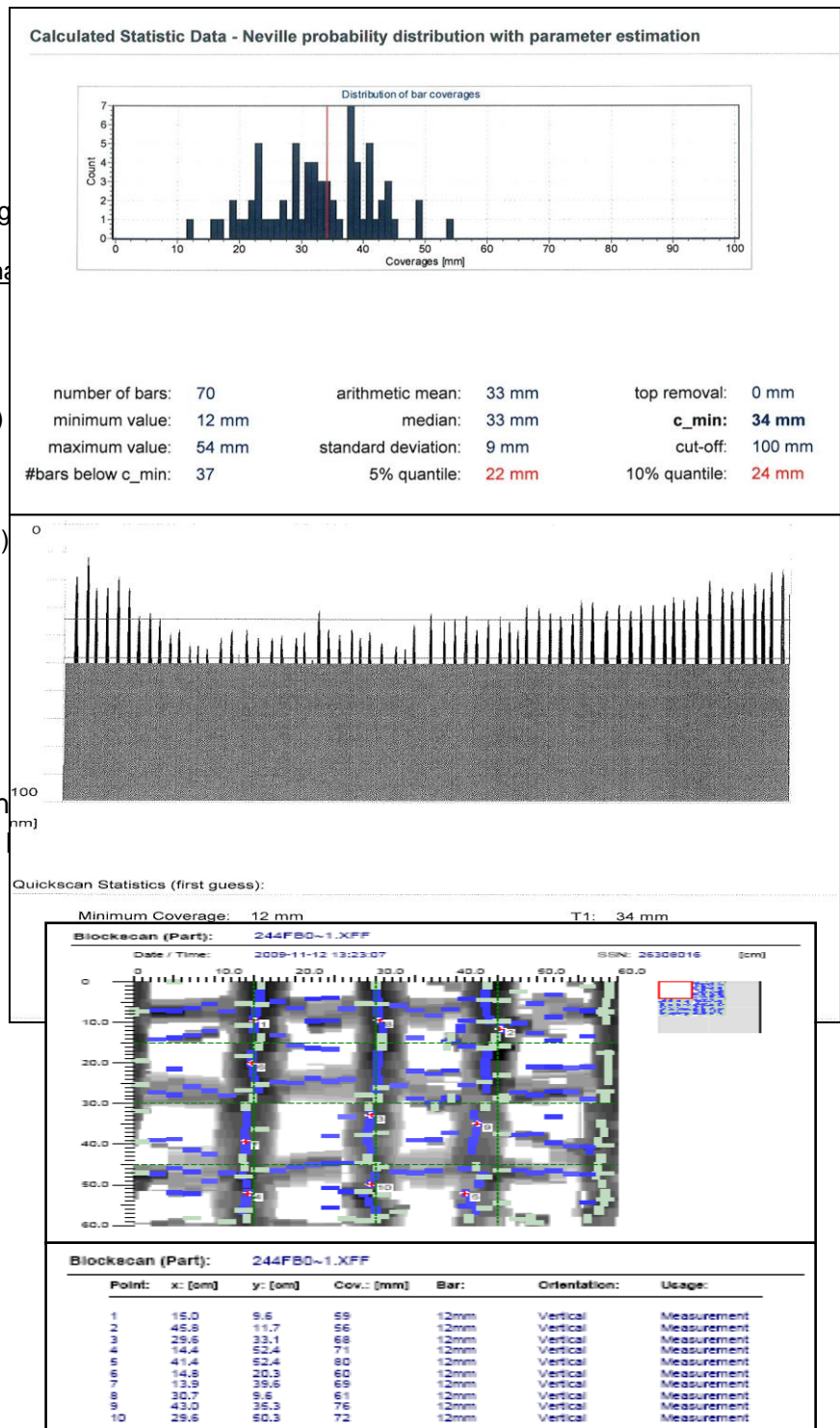


Figure B8119-2 : Example of a Imagescan output

If the equipment used is not able to provide the above presentation it has to be done manually by determining the grid of rebar, first and second layer closest to surface, and manually record readings in order to establish the depth of rebar, as shown in Figure B8119-3 below.

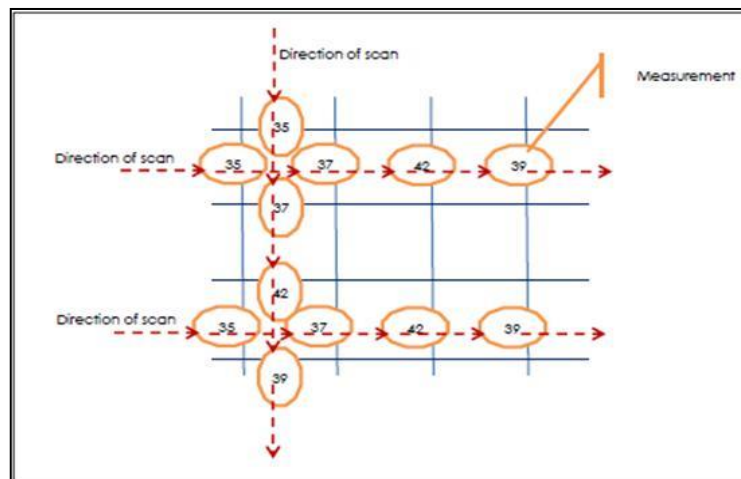


Figure B8119-3 : Manual recording of readings"

SECTION B8200: QUALITY CONTROL

B8206 JUDGEMENT PLAN B

Notes (Table 8206/3)

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

(c) **Voids**

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

L_s = specified values -1,0% points

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

Add the following clause:

"B8212 DETERMINING BOTH REDUCED PAYMENTS FOR 'W' CLASS CONCRETE AND COVER METER TESTING

Payments for all durability concrete prefixed 'W' shall be based on the test results of the compressive strengths and of the durability parameters, i.e. oxygen permeability (from test panels) and for both durability and non-durability class concrete, cover meter testing as indicated in Tables B8212/1 and B8212/2 a and b.

General note:

The percentage payment shall be applied to a specific concrete member and shall apply to the relevant pay items of sections 6300 (based on concrete cover test) and 6400 (based on the worst results from the oxygen permeability and compressive strength tests.

TABLE B8212/1: TABLE OF REDUCED PAYMENTS FOR OXYGEN PERMEABILITY INDEX - 'W' CLASS CONCRETE

Description of test	Oxygen permeability index (log scale)	Percentage (%) payment
Full acceptance	See Table B6404/4 for limit	100%
Conditional acceptance (with reduced payment)	See Table B6404/4 for limit	80%
Rejection	See Table B6404/4 for limit	Not Applicable

TABLE B8212/2: TABLE OF REDUCED PAYMENTS FOR CONCRETE COVER

Concrete cover (mm)	% of specified cover	Percentage (%) payment
	Overall cover	
Full acceptance	$\geq 85\% < (100\% + 15\text{mm})$	100%
Conditional acceptance (with reduced payment)	$< 85\% \geq 75\%$	85%
Conditional acceptance (with remedial measures as approved by the Engineer and reduced payment)	$< 75\% \geq 65\%$	70%
Non-conforming (non-conformance raised with remedial measures as approved by the Engineer)	$< 65\%$	Agreed by Engineer (Note: remedial measures at the contractor's costs should restore full payment)

The following notes shall apply to Table B8212/2:

1. Specified cover to be reduced by 5mm (allowance for variation of equipment) before applying criteria as defined in Table B8212/2, e.g. where specified cover = 40mm, test as 35mm, apply limits, $85\% \times 35 = 30\text{mm}$.
2. For cantilevers, the cover shall in no instance be greater than 10mm of the specified cover for the top reinforcement.
3. Percentage payment for concrete cover shall be based on the average number of cover meter tests performed on a particular concrete element.

In addition, the engineer shall confirm to the Employer whether substandard cover at a reduced payment shall be acceptable by agreement with the contractor.”

1.0 CONCRETE DURABILITY

a) General

All structural concrete prefixed ‘W’ shall conform to the durability requirements specified under sub-clause B6404(h) of the Project Specifications. Durability is influenced by the materials used in the concrete, their mix proportions, transporting, placing, compacting and, in particular, curing of the finished cover concrete (concrete layer between the outermost layer of steel reinforcement and the exposed outer surface of the concrete element). The tests required to prove durability performance of the placed concrete are given under sub-clause B8106. The numbers of panels and tests are shown in Tables 1 and 2 below and are the minimum requirement that the engineer considers necessary to achieve the desired quality of concrete.

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 practice 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, 70 ± 2 mm in diameter must be made or cored from a laboratory trial mix for performance of tests B8106(g)(i), (ii) and (iii) (if required).

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.

c) Site testing

To ensure that the concrete has been placed, compacted and cured correctly, a number of tests shall be carried out on the trial and test panels as well as on the tops of decks and precast panels by an approved laboratory.

For this contract the following number of test / trial panels and testing are envisaged:

TABLE 1: MINIMUM NUMBER OF TRIAL / TEST PANELS REQUIRED

Panel Type	No. Vertical Cast	No. Horizontally cast	Total No.
Trial Panel	1	2	3
Test Panel			
Substructures	4	0	4
Culverts	0	0	0
Retaining walls	4	0	4
Bases	0	2	2
Decks	0	2	2

TABLE 2: MINIMUM NUMBER OF CORE RESULTS REQUIRED

Element	No. of Cores
Substructures	
Culverts	<i>As per Tables B8106/1 & 2</i>
Retaining walls	
Bases	
Decks	
Precast element	

d) Non-compliance with specified criteria

The contractor should also note that there is specific provision made for curing of concrete under payment item B64.07 of the project specification. The amounts priced under this item will be subject to reduced payments should the durability tests indicated under B8106(g) fail to meet the required targets. Similarly, failure to achieve the required durability test results will be sufficient cause to apply partial payment factors for all the

pay items of the elements of the structure under section 6300 and 6400 of the standard and project specifications or in some cases the removal of the concrete rejected.



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SCHEDULE SECTION F: REHABILITATION OF STRUCTURES AND BRIDGES

**SERIES 12000: DRAFT SPECIFICATIONS FOR THE REHABILITATION OF BRIDGES
THAT SUPPLEMENT TO THE COLTO STANDARD SPECIFICATIONS FOR ROAD
AND BRIDGE WORKS FOR STATE ROAD AUTHORITIES**

SECTION F: REHABILITATION OF STRUCTURES AND BRIDGES

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SECTION 12 100: ACCESS FOR BRIDGE REHABILITATION

F12 101 SCOPE

This specification covers the requirements for the provision of suitable and safe access to all areas requiring concrete demolition, repair work or rehabilitation of bridges in accordance with the contract, and for inspections by the engineer.

This specification shall be read with the COLTO Standard Specifications for Road and Bridge Works for State Road Authorities (1998 edition), in particular Section 1200: General Requirements and Provisions, and Section 1300: Contractor's Establishment on Site and General Obligations of the Standard Specification.

F12 102 INTERPRETATION

(a) Supporting specifications

The following specifications shall be read with, and shall form part of the contract:

- Project Specification
- COLTO Standard Specifications for Road and Bridge Works for State Road Authorities (1998 edition).
- SABS and BS standards referred to in this specification.

(b) Definitions

(i) Temporary works

The temporary works necessary for access to the work area includes all foundations, scaffolding and support structures, working platforms, cradles, fixtures to existing structural members, etc. required for the safe access to and execution of the work, and

for the protection of passing persons, animals and vehicles against injury or damage and prevention of damage and littering to the environment.

(ii) Mobile access unit

A mobile access unit consists of a vehicle-mounted access gantry and work platform, including mobile crane type units.

(iii) Location

Location means a specific bridge as a whole where rehabilitation work has to be done.

(iv) Structural element

Setting up at each structural element as measured in the pricing schedule shall include all movement from point to point on a particular element. Structural elements are abutments, piers, decks and parapets/balustrades/edges of deck only. Other parts of a bridge shall be deemed to be included in the structural element to which they are most closely associated. A pier, abutment, deck or balustrade/parapet/ edge of deck may comprise single or multiple elements.

F12 103 General requirements

The contractor shall provide and will be responsible for safe access structures and work platforms to all areas requiring remedial work. The access and temporary works shall be designed, constructed and maintained in accordance with the current relevant safety regulations, all in compliance with the Occupational Health and Safety Act (Act 85 of 1993) and its applicable Regulations, and shall remain in place until removal is authorised by the engineer. Appropriate allowances shall be made for screening of the work and other protective measures required by the various work activities.

Access and work platforms may be provided from overhead mobile access gantries or vehicles, or from temporary works supported from the ground or fixed to structural members. The design and erection/construction of such temporary works shall be certified by a professional engineer on behalf of the contractor to comply with the relevant safety regulations regarding strength and stability for all imposed loads that can be anticipated to arise from the specified work activities.

Notwithstanding approval given by the engineer for the design and drawings prepared by the contractor and the acceptance of temporary works including the working platform(s) and access structure(s) as constructed, the contractor shall be solely responsible for the safety and adequacy of the temporary works and shall indemnify and keep indemnified the employer and engineer against any losses, damage to persons or property, all claims, demands, proceedings, damages, costs, charges and expenses whatsoever, which may arise out of or in consequence of the design, construction, use and maintenance of the temporary works.

For works on, over, under or adjacent to any railway line which is controlled by Transnet, the contractor shall comply, inter alia, with the requirements for the preparation and submission of drawings for falsework and formwork, and the submission of certificates for the proper construction thereof, all in accordance with the latest Transnet Specification, E7(2). The contractor shall submit to the engineer the relevant design details and drawings of the working platform(s) and access structures for comment and/or record purposes.

Abseiling techniques shall not be allowed.

The contractor shall comply with any additional imposed or physical restraints upon the means of access to and from the structure as stated in the project specification and/or the drawings.

The contractor shall provide access facilities for inspection and testing by the engineer, including the inspection at the end of the maintenance period. Any specific access facility required for the inspection at the end of the maintenance period shall be as specified in the pricing schedule.

F12 104 Material

All timber, structural steel and scaffolding used shall be free from defects that may prejudice the stability of the working platform(s) and access structures. The jacks, devices, clamps and fittings shall all be in good working order and of adequate design and strength.

The type, grade and condition of the material shall be subject to the engineer's inspection.

F12 105 Plant and Equipment

(a) Mobile access units

Access structures and work platforms mounted and operated from a mobile vehicular support base shall be of an approved type and capacity for the intended use. The unit shall at all times be operated within the recommended limits in terms of reach and capacity as stated by the manufacturer or the authority responsible for the operation and maintenance of the access unit.

The contractor shall, prior to dispatching the mobile access unit to the site, provide certification from the manufacturer or the operating authority that the unit has been thoroughly inspected and serviced, that the unit is functioning properly and that it complies with the relevant safety regulations.

(b) Scaffolds, platforms and cradles

Temporary works entailing scaffolds, platforms and cradles providing access to the work area shall be assembled and constructed from materials and structural sections complying with the relevant specifications. The temporary works shall be designed, erected, operated, maintained and dismantled so as to ensure safe working conditions for all site personnel, and where necessary the safety of the general public having access to the site.

F12 106 Construction

All temporary access structures and work platforms and associated works shall be erected, modified, maintained and dismantled under the direction of an experienced and competent supervisor or safety officer.

Prior to using any temporary access structure or facility, and at regular intervals thereafter, or following unforeseen circumstances, the temporary works shall be inspected and certified by a suitably experienced and qualified person on behalf of the contractor.

To ensure the safety of, and to prevent injury or damage to passing persons, vehicles, animals, etc. the temporary works shall be enclosed with a suitable screening membrane or boarding where necessary to contain material or work equipment within the limits of the restricted work area.

Suitable debris containers and chutes shall be provided to assist in the removal of debris and unusable or rejected materials.

Where temporary works are to be fixed to, or supported from an existing permanent structure, the location shall be subject to the approval by the engineer. Such temporary works shall be removed when the work is completed and any holes, surface damage or blemishes arising from the fixture shall be repaired to the surface finish of the adjacent surface to the satisfaction of the engineer.

F12 107 Measurement and payment

The payment items in this clause shall include full compensation for all works items associated with the provision of suitable and safe access to all areas on site which are not already covered by the measurement and payment items of the Standard Specifications, i.e. all temporary works related to access structures and work platforms, or mobile access units including associated plant, equipment and labour.

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

F121.01 Temporary access structures and work platforms

Access and platform to (height range indicated)

(i) Design, supply and erect at the following structural elements and height ranges inclusive of dismantling and moving to the next structural element

No

The unit of measurement shall be either lump sum, meter or the number as scheduled.

The height range shall be measured from the average ground surface to the agreed height limit accessed from the work platform.

The height range shall be measured in the following height bands:

- 0m up to 5,0m
- Exceeding 5,0m up to 10,0m
- Exceeding 10,0m up to 20,0m
- Etc. in increments of 10m height

The tendered amount shall include full compensation for design, supply, fabrication, erection, dismantling, movement and for all labour, materials, and equipment required for the above works including the inspections, supervision by the safety officer and maintenance of the temporary access structure and work platform.

The amount shall also include for all temporary traffic accommodation required during the deployment of the access equipment.

SECTION 12 200: DEMOLITION AND REMOVAL OF STRUCTURAL CONCRETE

F12 201 Scope

This specification covers the work in connection with the demolition of entire members of a concrete structure as well as cutting back concrete to expose reinforcement and the initial preparation of the exposed surface. Surface and structural repair of concrete members is covered in Section 10 300.

F12 202 Interpretation

(a) Supporting specification

The following specifications shall be read with, and form part of the contract:

- (i) Project Specification
- (ii) COLTO Standard Specifications for Road and Bridge Works for State Road Authorities (1998 edition)
- (iii) SABS and BS standards referred to in this specification

(b) Definitions

(i) Concrete members

All references to concrete members shall include mass concrete, un-reinforced, reinforced and prestressed concrete members.

(ii) Demolition of concrete members

Demolition means the breaking up and removal of an entire concrete member.

(iii) Removal of concrete

Removal of concrete means cutting back into the surface or end of a concrete member and the removal of unsound, damaged or contaminated concrete, or the partial removal of concrete sections, to expose a sound surface for bonding new material for the repair or extension of the concrete member.

F12 203 Materials

All devices used to remove concrete or to demolish concrete members, shall be handled, stored and used strictly in accordance with the manufacturer's instructions and current safety regulations.

F12 204 Plant and Equipment

(a) General

All plant, equipment, tools and devices used for the demolition of concrete members or the removal of portions of existing concrete shall be based on proven and accepted technology within the industry. The plant, equipment, tools and accessories shall be inspected and maintained on a regular basis to ensure that they remain in good working order, function efficiently, and that safety is not compromised. All cutting and breaking tools shall be kept sharp to reduce the force required to break out concrete to a minimum.

The plant, equipment, tools and devices used for the demolition or removal process shall be of the accepted type and capacity for the relevant application. The suitability of the

chosen method shall be demonstrated on a representative test section identified by the engineer prior to the execution of any programmed work.

(b) Access structures and working platforms

Where necessary, the contractor shall provide suitable and safe temporary access structures, working platforms, debris collection and removal chutes and bins, including protection screens where required, at each location where concrete has to be demolished or removed.

The temporary structures, platforms, chutes, etc. must be stable and of sufficient strength and rigidity to safely carry the imposed temporary loads arising from the work activity, all as described in Section 12 100.

F12 205 Construction

(a) Sequence of execution

The method and sequence of demolition or removal of concrete shall be in accordance with the drawings or as directed by the engineer and the approved method statement submitted by the contractor following pre-construction testing if necessary.

Any temporary propping specified in the approved method statement and the drawings shall be securely positioned in accordance with each stage of the demolition or removal sequence prior to commencement of the following stage.

(b) Site preparation and access

The necessary access and temporary support structures shall be in place prior to the commencement of demolition or removal of concrete. Screening and protective measures shall be established around the work area as necessary to ensure acceptable environmental, health and safety conditions.

(c) Demolition of concrete members

The demolition of entire concrete structures or major elements of a structure shall employ techniques that do not damage adjacent structures or structural elements, nor contaminate the surrounding environment except during special periods as may be approved by the engineer.

The contractor shall ensure that any nuisance associated with his work activity is minimised by implementing appropriate precautions and measures to the approval of the engineer. Common nuisances associated with demolition and concrete removal include fumes, noise, dust, flying fragments, heat and vibration.

Concrete members which are to be demolished completely shall be broken into suitably sized fragments to allow easy removal from site to an approved dump area.

Recommended demolition techniques include the use of percussion breakers, chisels or other approved mechanical equipment, the use of thermal or hydraulic cutting techniques or by non-explosive chemical means, to ensure minimal damage (e.g. micro-cracking) to the existing concrete. Demolition by explosive means will normally not be acceptable and will be subject to the engineer's written approval. Water jet removal of concrete is preferred wherever feasible.

(d) Removal of concrete from structural elements

(i) Cutting back concrete to a new finished surface

The concrete and reinforcement shall be cut back adequately to provide the prescribed concrete cover to the new finished surface as indicated on the drawings or as directed by the engineer. The technique used shall be suited to its intended purpose and shall not cause damage to the remaining concrete member.

Only techniques that do not damage the inherent structure, bond or strength of the remaining sound concrete shall be used. The thermal cutting technique shall not be used closer than 100mm from the final surface as indicated on the drawings. The remaining concrete shall be removed using approved mechanical equipment or hydraulic techniques.

The fixed exposed contact surface shall be bounded by straight line edges cut at least 10mm deep by a diamond cutting saw, angle grinder or other approved equipment.

(ii) Cutting back concrete to expose reinforcement

Where a concrete member has to be joined or extended or replaced by new concrete, the concrete shall be carefully cut or broken from the reinforcement bars to expose the bars to the dimensions and outline as shown on the drawings or as directed by the engineer. Care shall be taken not to damage or reduce the strength of the exposed bars or concrete member thereby making them unfit for use. The remaining concrete contact surface shall be cut to a plane and even surface with exposed faces perpendicular to the horizontal face or side faces as applicable.

The bounding lines of the cut concrete shall be straight and neat cut to at least 10mm depth using a diamond cutting saw, angle grinder or other approved concrete cutting equipment.

(e) Removal of metal sections embedded in concrete

Metal sections that are embedded in concrete members by means of grout pockets shall be removed by carefully chipping out the embedment grout filling the pocket. Care shall be taken not to damage the structural concrete surrounding the pocket. Suitable tools such as hand-held power tools with chisel bits or hand tools shall be used.

Following the removal of the metal section, all remaining grout shall be removed and the pocket cleaned out to expose only solid concrete surfaces. The pocket shall be finally cleaned using high-pressure water jetting or oil-free compressed air to remove all loose fragments of grout, or concrete aggregate.

(f) Preparation of exposed contact surfaces

(For extension of existing concrete elements or construction of new concrete members)

All loose and shattered concrete, as well as foreign material such as oil, paint, grease, etc. shall be removed from the contact surface of old concrete before new concrete is placed. The aggregate must be exposed to provide a good bonding surface.

The mechanically prepared concrete surface shall be cleaned by means of oil-free compressed air or water jetting.

The breaking out and preparation of damaged, spalled and/or cracked concrete surfaces is described and measured under the Sections 12 300 and 12 400.

(g) Disposal of waste material

All waste materials, rubble, scrap and rubbish arising from the contractor's presence on site and/or the execution of the works shall be disposed of weekly to a disposal site identified by the contractor and approved by the engineer.

F12 206 Tolerances

The contractor shall remove concrete to a planar, uniform surface with 25mm maximum deviation from the level or dimension indicated on the drawings unless otherwise approved by the engineer. The outer edge of the contact surface shall consist of straight lines with maximum deviation of 5mm from straight, measured with

A 1m long straight edge, and shall be within 5mm of the position indicated on the drawings, or as instructed by the engineer.

F12 207 Testing

The contractor shall carry out pre-construction tests with the proposed equipment to determine the suitability of the technique for the envisaged application. The test results shall be reported to the engineer and shall be subject to the engineer's approval.

F12 208 Measurement and Payment

The pay items in this clause shall include full compensation for all work associated with the demolition and removal of concrete structural elements including initial preparation of concrete surfaces or portions thereof which are not already covered by the measurement and payment items of the Standard Specifications or the Project Specification, such as procurement, transport, access and temporary works, plant and equipment required to undertake the work as specified. General access, work platforms and associated temporary works are covered in Section 12 100.

The quantities indicated in the pricing schedule under Section 12 200 are based on the dimensions shown on the drawings and on inspections carried out as part of the preliminary and detail design phases increased to allow for unseen work. It must, however, be accepted that the quantities of work actually done may vary significantly from the scheduled quantities, and that the contractor shall be deemed to have allowed in his tendered rates for such variations in quantities which can be reasonably expected.

Item	Unit
F122.01 Demolition of concrete members (location and description)	cubic metre (m ³)

The unit of measurement is the cubic metre of concrete demolished, measured in its original position and shape based on:

- (i) Full demolition
- (ii) Partial demolition

The tendered rate shall include full compensation for all labour, material, screening of the structure for safety and environmental protective measures, equipment and plant as well as for all work and incidentals required to complete the work as specified and required to demolish the concrete member and to load, transport and dump the concrete segments and rubble at the nearest approved dumping site. See 12 205(g)

SECTION 12 600: PROTECTIVE COATINGS AND TREATMENTS FOR CONCRETE

F12 601 SCOPE

This section covers the material, equipment and work required for applying protective coatings and treatments to concrete surfaces.

F12 602 INTERPRETATION

(a) Supporting specification

The following specifications shall be read with and shall form part of the contract:

- (i) Project Specification
- (ii) COLTO Standard Specifications for Road and Bridge Works for State Road Authorities (1998 edition).

F12 603 MATERIALS

(a) Penetrant pore liner (Water-repellent surface impregnants)

Penetrant pore liners are low viscosity fluids which penetrate the concrete surface. After the concrete has been impregnated by one of these substances, the carrier fluid evaporates, leaving behind a hydrophobic (water-repellent) layer in the pores of the concrete.

They are generally colourless and make little change to the appearance of the concrete.

Typical examples are silanes, siloxanes, silicon resins and stearates.

(b) Penetrant pore blocker

Penetrant pore blockers are low viscosity solutions that can penetrate concrete surfaces and block the pores, thereby increasing the surface density of the concrete.

Some of these materials react with the concrete substrate (calcium hydroxide present in hydrated cement) to form crystals. Other fluids such as resins and drying oils penetrate and harden by chemical reaction.

Typical examples are silicates, silicon fluorides, epoxy resins and acrylics.

(c) Sealer

Sealers are more viscous fluids which both penetrate the concrete and form a thin film on its surface. They are sometimes used as sealing coats or primers to a coating. The thin film of the sealer is vulnerable to weathering.

Typical examples are epoxy resins, polyurethanes, acrylics and linseed oil.

(d) Coatings

Coatings are viscous fluids that form a film on the surface of the concrete and provide protection as a result of the thickness of the film itself. They are usually pigmented to provide colour, and extended or filled to provide thickness and surface texture to the coat.

Typical examples are epoxy resins, polyurethanes, alkyds, vinyls, acrylics, chlorinated rubber, styrene-butadiene, bitumens and combinations of these.

(e) Renderings

Renderings are thick film coatings, generally applied by trowel rather than by brush or spray. They work in a similar way as coatings, by providing a physical barrier.

Typical examples are cement mortar with various polymer additions and crystal growth systems.

(f) Carbonation inhibitor barrier coatings

An approved carbonation inhibitor barrier coating shall comply with the following criteria:

- (i) Present a uniform appearance with the final colour to be decided by the engineer.
- (ii) Provide barrier protection against ingress of water, oxygen and carbon dioxide
- (iii) Permit the passage of water vapour.
- (iv) Resist the deleterious effects of UV light.
- (v) Weather such that only minimal surface preparation is required when overcoating.
- (vi) Adhere strongly to concrete and repair materials.
- (vii) Bridge minor cracks and have flexibility to accommodate small movement.
- (viii) Provide a 12 year guarantee against coating failure and UV degradation.
- (ix) Supply a specification for surface preparation and application of overcoating after a 12 year period.

The coating material will be deemed to meet the requirements of (b) and (c) with respect to water, oxygen, water vapour and carbon dioxide barrier protection if it complies with the following specification:

- The product of the minimum dry film thickness of the coating (microns) and the carbon dioxide diffusion resistance coefficient shall exceed 50m.
- The cured coating shall reduce the water absorption of good quality 30MPa concrete by a factor of at least 20.

- The product of the average dry film thickness of the coating (microns) and the water vapour diffusion resistance coefficient shall not exceed 4m.

In the event that a multi-layer and/or a multi-product system is proposed criteria (i), (ii) and (iii) shall apply to the complete system acting as a combined barrier coating.

(g) Corrosion inhibitor

Corrosion inhibitors are emulsion type impregnating fluids that are applied to the outer surface of existing concrete members. Inhibitors migrate into concrete and are absorbed onto the surface of embedded reinforcing steel thus delaying the onset of corrosion and/or reducing the rate of corrosion that is in progress.

F12 604 PLANT AND EQUIPMENT

(a) General

All plant and equipment used for pressure cleaning and protective treatment application shall be based on proven technology and practice, and shall be maintained in a clean and good working order. The equipment shall be inspected, serviced and calibrated at regular intervals and tested to ensure that the system functions efficiently and accurately, all to the satisfaction of the engineer.

(b) High-pressure water-jetting equipment

The type and capacity of the water-jetting equipment, delivery hoses and nozzles shall be capable of delivering at least 1000 kPa water pressure through nozzles which shall at least remove curing compounds or membranes and shutter release compounds without producing an exposed aggregate finish.

(c) Low-pressure airless sprayer

Low-pressure airless sprayers consist of knapsack sprayers which shall be capable of providing a uniform discharge rate and even spread over the spray area.

(d) Access structures and working platforms

Where necessary the contractor shall provide suitable and safe measures at each location for pressure cleaning and surface coating. These provisions shall be deemed to form part of the access for bridge rehabilitation as specified in Section 12 100

F12 605 CONSTRUCTION

(a) Storing of materials

The contractor shall provide a lock-up store for the repair materials and observe all storage requirements and safety precautions recommended by the materials manufacturers.

(b) Surface preparation

(i) Procedures

All concrete surfaces that are to receive protective coatings and/or treatments such as:

- Penetrant pore liners
- Penetrant pore blockers
- Sealers
- Coatings
- Renderings
- Corrosion inhibitors

Shall be prepared strictly in accordance with the materials manufactures instructions. The preparation shall include for everything that is necessary to prepare the surface to receive the protective coatings and/or treatments.

The contractor shall ensure that technical representatives, appointed or employed by the materials suppliers, carry out regular inspections of the preparation work and provide written confirmation that the work is in accordance with the materials supplier's

requirements. The reports shall be specific and definitive, generalised statements will not be acceptable.

Where surface preparation is found by the technical representatives to be inadequate the report shall contain specific advice to enable the contractor to attain a required standard.

The contractor shall provide the engineer with copies of all technical inspection reports before any surface treatment or protective coatings is applied to a bridge element.

Where the time between surface preparation and treatment exceeds two days and/or during windy and/or wet weather the prepared surfaces shall be reinspected and approved by the technical representative.

The moisture content of patch repair areas must be specifically checked by the technical representative to ensure that coatings are not applied over surfaces that contain moisture.

(c) Batching and mixing

Mixing equipment, mixing times, working life and overcoating times shall conform to the manufacturer's recommendations taking into account the temperature at time of application.

Treatment materials shall be mixed (if applicable) and applied strictly in accordance with the manufacturer's specifications. Thinning or diluting shall not be permitted without the approval of the engineer.

(d) Protective surface treatment

Surface treatment or coatings may consist of a system of several coats of more than one type of coating. Where such a system is applied, the various components shall be compatible and preferably from one manufacturer.

Protective treatments shall be applied to all of the exposed concrete surface as indicated. Items or areas which are not to be coated shall be suitably protected or masked before application of the treatment.

(i) Application of surface coatings

All protective coatings and treatments for concrete shall be stored, mixed and applied strictly in accordance with the product manufacture's specifications and the project specifications.

All surface coating materials shall be handled, mixed and applied strictly in accordance with the manufacture's specification.

(ii) Application rate records

Records of application rates shall be submitted by the contractor to the engineer on a daily basis indicating batch numbers, the area covered by each coat and the quantity of coating material used. Only material from the same batch shall be used for any continuous, visible, unbroken surface to attain uniformity of colour and texture on the concrete surface.

(iii) Trial sample panels

Protective treatment shall not be applied until trial sample panels of the protective treatment have been prepared by the contractor and approved by the engineer and the material supplier's technical representative.

The contractor shall prepare the sample panels using the same surface preparation mixing and batching equipment, application technique, application rate and under the same climatic conditions he intends to treat the whole structure. The position of the trial sample panels are subject to the engineer's approval.

Product manufacturers of coating products are required to inspect, assist and finally approve (in writing) all aspects of surface preparation and product application employed on the trial sample panel.

The trial sample shall be used as a standard against which the rest of the work will be judged and shall be maintained intact until all other coating work is complete.

(iv) Proprietary protective surface coatings

The suitability of the protective surface coating for a particular application shall be proved by testing and submission of an approved industry track record of usage under similar circumstances.

The contractor shall submit details of proprietary protective surface coatings to the engineer for approval prior to its use in the permanent works.

The surface coating systems shall be either:

A. Coating system 1 * Sika Products

Corrosion Inhibitor Sika Ferro Gard 903

Penetrant pore liner Sikagard 705L

Barrier coating Sikagard 550W Elastic Top

B. Coating system 2 * Degussa Products

Corrosion inhibitor Protectosil CIT

Penetrant pore liner Dynasylan BHN

Barrier Coating Masterseal 300H (incl. primer)

C. Coating system 3 Pro-Struct Products

Corrosion inhibitor Cortex MCI 2020

Penetrant pore liner Pro-Struct 670

Barrier Coating Pro-Struct 684/4

D. Coating system 4 Alternative as proposed by the contractor. The contractor shall submit details of Repair System 4 to the engineer for approval during the tender period.

(c) Health and safety precautions

The contractor shall observe the health and safety precautions recommended by the manufacturer regarding the handling and the disposal of unused material and containers.

The contractor shall ensure that natural water streams or rivers are not polluted by protective treatment material under any circumstances.

F12 606 TESTING

The contractor shall ensure that only compatible materials are used for the surface treatment or protective coatings.

The test results shall be reported to the engineer and will be subject to the engineer's approval.

F12 607 MEASUREMENT AND PAYMENT

Payment for items in this section shall include full compensation for all works associated with the execution of the work and quality assurance procedures which are not separately covered by the measurement and payment items of the Standard Specifications or the Project Specifications. General access and work platforms and associated temporary works are covered in Section 12 100.

All work and material for which no specific pay item is defined shall be deemed to be covered by the items in this section.

Item	Unit
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F126.01 Cleaning and preparation of concrete surface

(Method and surface finish indicated)	square metre (m ²)
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This item covers concrete areas that will not be treated with protective coatings and treatments.

The unit of measurement shall be the square metre of surface area cleaned by the method indicated.

The tendered rate shall include full compensation for all material, plant and equipment, all labour and incidentals required to execute the work as specified.

Item	Unit
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F126.02 Application of protective treatment and treatments

(Type and application rate indicated)	square metre (m ²)
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The unit of measurement shall be the square metre of surface area to be protected or treated as specified. For payment purposes, the surface area shall be measured once only irrespective of the number of layers of protective coatings and/or applications of surface treatment is required to achieve the specified application rate.

The tendered rate shall include full compensation for all surface preparations, labour, materials, equipment, additional safety measures, storage, mixing and applications of the protective coatings and treatments, cleaning and disposal of unused or rejected material and all incidentals necessary to execute the work (including wastage) as specified, all to the satisfaction of the engineer.

Item	Unit
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F126.03 Trial sample panels	square metre (m ²)
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The unit of measurement shall be the square metre surface area of successful and accepted trial sample panels to be treated. For payment purposes, the surface area shall be measured once only, irrespective of the number of applications of material and attempts required to achieve an acceptable sample with the specified application rate.

The tendered rate shall include full compensation for everything that is necessary to prepare an acceptable sample panel.

SECTION 12 800: REPLACEMENT AND REPAIR OF ANCILLARY BRIDGE ELEMENTS**F12 801 SCOPE**

This section covers the requirements for the removal of debris from expansion gaps, clearing of drainage elements, repair of expansion joints, repair of handrails, removal and rebuilding of brickwork on bridges, provision of drainage to deck void formers and the refurbishment of bridge bearings.

F12 802 ACCOMMODATION OF TRAFFIC

Work requiring accommodation of traffic shall be carried out in stages and widths approved by the engineer. Traffic accommodation shall be provided in accordance with Section 1500 of the COLTO Standard Specifications for Road and Bridge Works for State Road Authorities (1998 edition).

F12 803 REMOVAL OF DEBRIS FROM EXPANSION GAPS

All debris in the expansion gaps and expansion joints between deck ends, walls and girder beds shall be removed and the gaps shall be cleaned out with high-pressure water or air jets or other suitable means. Solvents or fire shall not be used unless approved by the engineer.

Protective measures such as screening shall be provided to contain flying debris, dust and water spray to ensure that passing traffic is not endangered and that the environment is not contaminated.

F12 804 CLEARING OF BRIDGE DRAINS

All drains, in the deck and substructure, including drain inlets, outlets and channels shall be cleared of all debris and all organic material, sand etc. Where drain inlets have been covered or clogged with concrete or asphalt pavement materials, the material shall be carefully removed without damaging the inlet or the surrounding concrete.

Drain pipes shall be cleared and flushed to attain a free flowing drainage system.

Damage to inlets, outlets or pipe components shall be repaired or replaced as instructed by the engineer.

F12 805 REPAIR OF EXPANSION JOINTS

Remedial work on bridge expansion joints and repairs to joint nosings shall be in accordance with the detail drawings. Refurbishment of proprietary joint systems shall entail the servicing of the joint in situ, or the removal and replacement of joint components.

Damaged portions of concrete in joint nosings, or concrete nosings that are to be replaced shall be carefully removed and replaced with new concrete in accordance with Sections 12 200 and 12 300 as applicable.

Debonded or damaged sealants shall be removed and the bonding surfaces cleaned to receive replacement sealant in accordance with Section 6600 of the COLTO Standard Specifications.

The installation of new replacement joints shall be executed in accordance with Section 6600 of the COLTO Standard Specifications, and/or relevant portions of Section 12 300.

Traffic shall not be permitted directly on concrete nosings before the concrete has attained a cube strength of 30MPa. If the nosings are required to carry traffic before a strength of 30MPa is attained, steel bridging plates held down at both ends with scope for horizontal movement shall be provided over the concrete nosings, and shall remain in place until the concrete has attained adequate strength.

F12 806 REPAIR OF HANDRAILS

Remedial work shall be carried out on metal handrails that have been damaged or require maintenance work.

All painting shall be in accordance with Section 8400 of the COLTO Standard Specifications with the requirement that previously painted handrails shall be cleaned and prepared for over-coating in accordance with the recommendations of the paint or protective coating manufacturer.

Damaged components of handrails shall be repaired where possible or replaced as instructed by the engineer.

The removal of sections embedded in concrete shall be done in accordance with Section 12 200.

F12 807 REMOVAL AND REBUILDING OF BRICKWORK

Brickwork that needs to be rebuilt, shall be broken down and removed as instructed by the engineer.

Care shall be taken not to damage brickwork or concrete adjacent to the section to be removed.

New brickwork shall be joined to existing brickwork using a stepped-back or keyed joint. Joints shall only be provided where shown on the detail drawings or as instructed by the engineer.

Rebuilt walls shall be plastered and the surfaces shall be treated as specified to provide a uniform texture and colour.

F12 808 DRAINAGE TO DECK VOID FORMERS

The provision of drainage to deck void formers covers the drilling of holes and installation of drainage pipes from deck soffits into void formers in the deck to facilitate drainage.

The contractor shall ensure that the equipment used is suited to the application.

The contractor shall determine the positions of void formers as accurately as possible from the detail drawings.

Prior to drilling the contractor shall use a covermeter to determine the location of reinforcement bars and to position the drainage holes between such bars maintaining at least 40mm concrete cover to the bars.

Drainage holes of 20mm diameter shall be drilled into the lowest end of the void former, and a PVC pipe with a 10mm overhang free from the deck soffit, attached to the void

former. The contractor shall take care not to damage the surrounding concrete during the drilling of holes. A 20mm diameter PVC tube, 50mm long must be inserted and epoxied 25mm deep into each drainage hole.

F12 809 REPLACEMENT OF BEARINGS

The maintenance or replacement of bearings which involves jacking of the deck, shall be performed as discussed under section 12X100: Jacking of Bridge Structures.

F12 810 DISPOSAL OF WASTE MATERIAL

All waste materials, rubble, scrap and rubbish arising from the contractor's presence on site and/or the execution of the works shall be disposed of weekly to a disposal site identified by the contractor and approved by the engineer.

F12 811 MEASUREMENT AND PAYMENT

Item	Unit
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F128.01 Removal of debris from expansion gaps

(description)	metre (m)
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The unit of measurement shall be the metre (m) of expansion gaps cleaned.

The tendered rate shall include full compensation for all labour, material, plant and equipment required to execute the work including any additional protective measures and disposed of debris to an approved dump site.

Item	Unit
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F128.02 Clear bridge drainage system

(description of elements)	number (No)
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The unit of measurement shall be the number of drainage elements cleaned.

The tendered rate shall allow full compensation for all labour, material, plant and equipment required to execute the work including any special protective measures.

Item		Unit
F128.03	Service or replacement of existing joint system	

(a)	Service and repair of bridge joints (description)	metre (m)
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(b)	Replace bridge joint with (description)	metre (m)
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The unit of measurement shall be the metre of specified expansion joint removed or serviced, repaired and replaced as detailed.

The tendered rate shall include full compensation for all plant, equipment, labour and material required to service and replace, or to remove and dispose of the existing joint system and the preparation and installation of the new system as detailed. The rate shall also allow for the provision of special protective measures specified during each stage of the installation.

In addition, the tendered rates shall include full provision for trimming the expansion gap of the concrete nosings, if required by the engineer. This will be executed with a multi-blade cutting machine.

SECTION D: ELECTRICAL WORKS – STREET LIGHTING

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D1001 SCOPE

This part of the specification covers the setting out of streetlight pole positions and the complete installation of the streetlight, either photocell control or timer control. This standard serves as a minimum requirement to meet when constructing street lighting for Rural Electrification. For street lighting in Urban areas shall generally comply with the Local Supply Authority's requirements.

D1002 STREET LIGHTING

Refer to the SANS Standard Specifications for Medium and Low Voltage Electricity Distribution Works Part B-08 Street Lighting including:

SANS 10098-1: Public Lighting Part 1: The lighting of public thoroughfares

SANS 10098-2: Public Lighting Part 2: The lighting of certain specific areas of streets and highways

SANS 1277: Street lighting Luminaries

1.General

As a rule of thumb, streetlights shall be installed on every second pole in built-in areas.

1.1 Streetlight poles shall be planted not less than 1m away from the erf boundary towards the street.

1.2 Streetlights shall be mounted on poles not less than 7m from ground level.

1.3 Streetlight poles shall be planted not less than 30m apart from each other in urban areas and not less than 40m apart in rural areas.

1.4 Streetlight poles along main road shall be planted not less than 5m from the edge of the road.

1.5 Streetlight poles shall be planted with a minimum depth of 1.5m in the ground.

1.6 Streetlights installed in main roads shall have a protruding arm of not less than 1m.

1.7 Street light constructions in urban areas shall contain a cantilever for an epoxy tar coating.

1.8 Street lighting in urban area shall also have its own metering point and each street light should have its own daylight sensitive switch.

2 Pole Planting

The contractor shall be responsible for setting out the pole positions. Approval of the positions shall be obtained from the Engineer before the holes are excavated.

Excavation depths for planting poles shall be as stipulated for the poles. The pole holes shall be suitably sized to allow for working in the hole.

Street lighting poles shall be planted vertical in all directions and in positions indicated on the specification drawings.

Terminal poles of all straight runs of poles shall be planted first after which intermediate poles shall be planted to line up accurately with the terminal poles. Care shall be taken that the mounting height of all luminaires above final street level is equal and as required by SANS 1277.

After the pole has been located in its hole backfilling shall take place in stages. Each layer not exceeding 300mm shall be well tamped before the next layer is applied.

Where the excavated material consist of broken rock, shale or loose sand is not suitable for backfill the contractor shall be responsible and shall import soil for backfill to the approval of the Engineer and which consolidates perfectly. Surplus backfill shall be removed from site to a point approved by the Engineer.

3. Wooden Street Lighting Poles

3.1 Wooden Pole

Pine species Class A (treated Tanalith CCA) in accordance with SANS 753 and SANS 754. The poles shall be specially selected with straight poles with SANS permissible values for crook and sweep reduced by 60%.

3.2 Overall length and size

Poles shall be tanalith treated 8m or 9m long having a top diameter of 120 to 140mm.

3.3 Plant depth

Poles shall be planted 1,5m deep to provide a mounting height for the luminaire of normal height of 7,5m.

4. Streetlight Brackets

For mounting the luminaire a side entry hot dip galvanized bracket in accordance with SANS 121 (150mm short), no outreach required shall be clamped to the top of the pole providing a 15 degree rake angle for the luminaire.

Care shall be taken that the luminaire is fixed properly and that the axis of the luminaire is vertical to the line of the street.

5. Streetlight Junction Box

A cable Y-junction box shall be mounted 400mm above ground level against the pole suitable to take the street lighting cable to be looped into at each pole and the luminaire supply cable. 60 A terminal blocks for terminating the street lighting cables and a 5A or 10A miniature circuit breaker for individual control of the light shall be provided inside the junction box, depending on the voltage of the lamps. Alternatively Y-joints may be used instead of the junction boxes.

6. Supply Cable to Luminaire

The supply cable to the luminaire shall be 4 core 6mm² (Phase, Neutral, Earth) PVC SWA PVC cable terminated at the junction box and run along the pole through the bracket to the luminaire. The cable shall be neatly saddled in a straight run onto the pole.

The street lighting cable shall be looped into each pole. The cable ends shall be made off inside the junction box to be provided on 5 terminal blocks. From the junction box mounted against the pole the luminaire shall be supplied by means of a 3 core 2,5mm² cable (phase, neutral, earth). A 10A miniature circuit breaker for the individual control of the luminaire shall be installed either inside the junction box at the bottom of the pole or the luminaire as agreed to by the engineer or inside the miniature substation control board.

All streetlights to be connected to a single street lighting feeder shall be distributed equally over the three phases and the expected load balanced.

7. Street Lighting Luminaire

The street lighting luminaires shall be of the side entry type suitable to be mounted onto the bracket mentioned above at a rake angle of 15°. The luminaires shall be supplied complete with ballast, power factor correction gear, etc.

The circuit breaker 5A or 10A to be provided in the pole junction box may if suitable also be installed inside the luminaire easily accessible for the maintenance staff.

8.Streetlight Supply Circuit

Contactor

The street lighting control contactor C1 shall have 3 N/O contacts rated 60A. The contactor shall be mounted in a separate dustproof box and shall be positioned easily accessible for maintenance purposes.

The control wiring shall be as schematically indicated on the drawing and shall provide C1 to be energized by the photo electric relay.

Circuit breakers

Circuit breakers for controlling the individual streetlight circuits, the photo electric relay and contractor coil and to provide a bypass for the contractor shall be circuit breakers having a rupturing capacity of 5kA and in accordance with SANS 152 and SANS 156.

Photo electric relay bypass switch

A 5A switch in accordance with BS 2631 shall provide for manually bypassing the photo electric relay.

9.Daylight Switch / Photocell

A Photocell suitable for mounting inside kiosk, rated for 220 V a/c, 10 A shall be installed. One photo electric relay shall be supplied loose with each substation. The contactor shall be rated 5A and all switching shall be time delayed for a period of 30 to 60 seconds.

10. Streetlight Metering

Streetlight metering shall be provided by the Supply Authority if required.

D1003 EARTHING OF STREET LIGHT BRACKETS

Refer to :

NamPower : Code of Practice for the Earthing of Low Voltage Distribution Systems

SANS 10199 : The design and installation of an earth electrode

SANS 1063 : Earth rods and couplers

SANS 10200 : Neutral Earthing in medium voltage industrial power systems

SANS 10292 : Earthing of low-voltage (LV) distribution systems

ESKCAAB4 : Zinc coated earth conductor, guy and stay wire for transmission lines.

SANS 10313 : The protection of structures against lightning

For mounting the luminaire, a side entry hot dip galvanized bracket in accordance with SANS 121 (150mm short), no outreach required shall be clamped to the top of the pole providing a 15-degree rake angle for the luminaire.

Care shall be taken that the luminaire is fixed properly and that the axis of the luminaire is vertical to the line of the street.

Streetlight brackets and any other metal part shall be bonded to the earth wire in accordance with SANS 10292

D1004 STREET LIGHT SPECIFICATIONS FOR SINGLE LANE

This type of Lighting is very cost effective as they are designed with main Idea of reducing

energy consumption levels, but not compromising required luminaire levels as required by SANS 10098.

LED lights save about 70% as compared to a normal HPS/High Pressure sodium Luminaires that consume 258Watts. LED may consume 16-150Watts which is far

much better to use.

These street lights have a life of about 60 000 Hours. They are also capable to withstand African temperature of 35°C and made of LM6 Alluminium Alloy, i.e. Corrosion Resistant Alloy.

D1005 STREET LIGHT SPECIFICATIONS FOR DOUBLE LANE

As above.

C3.3.3 PROJECT SPECIFICATIONS: ADDITIONAL SPECIFICATIONS

CONTENTS

- C3.3.3.1 REQUIREMENTS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT REGULATIONS**
- C3.3.3.2 ENVIRONMENTAL MANAGEMENT PLAN**
- C3.3.3.3 PROVISION OF STRUCTURED TRAINING**
- C3.3.3.4 PROVISION OF THE TEMPORARY WORKFORCE**

C3.3.3.1 OCCUPATIONAL HEALTH AND SAFETY ACT 1993 : HEALTH AND SAFETY SPECIFICATION

CONTENTS

C3.3.3.1.1 INTRODUCTION

C3.3.3.1.2 SCOPE

C3.3.3.1.3 GENERAL OCCUPATIONAL HEALTH AND SAFETY PROVISIONS

C3.3.3.1.4 OPERATIONAL CONTROL

ANNEXURE 1: MEASURING INJURY EXPERIENCE

ANNEXURE 2: EXECUTIVE SHE RISK MANAGEMENT REPORT

ANNEXURE 3: LIST OF RISK ASSESSMENTS

C3.3.3.1.1 Introduction

In terms of the Construction Regulation 4(1) (a) of the Occupational Health and Safety Act, No. 85 of 1993, UNIVERSITY OF VENDA, as the Client, is required to compile a Health & Safety Specification for any intended project and provide such specification to any prospective tenderer.

The Client's further duties are as in C3.5.1.3.1.1. below and in the Construction Regulations, 2014.

This specification has as objective to ensure that Principal Contractors entering into a Contract with the UNIVERSITY OF VENDA achieve an acceptable level of OH&S performance. This document forms an integral part of the Contract and Principal and other Contractors should make it part of any Contracts that they may have with Contractors and/or Suppliers.

Compliance with this document does not absolve the Principal Contractor from complying with minimum legal requirements and the Principal Contractor remains responsible for the health & safety of his employees and those of his Mandataries.

C3.3.3.1.2 Scope

Development of a health & safety specification that addresses all aspects of occupational health and safety as affected by the abovementioned contract work.

The specification will provide the requirements that Principal Contractors and other Contractors will have to comply with in order to reduce the risks associated with the abovementioned contract work that may lead to incidents causing injury and/or ill health, to a level as low as reasonably practicable.

C3.3.3.1.3 General Occupational Health & Safety Provisions

(a) Hazard Identification & Risk Assessment (Construction Regulation 7)

(i) Risk Assessments

Annexure 3 contains a list of Risk Assessment headings that have been identified by UNIVERSITY OF VENDA as possibly applicable to the abovementioned contract work. It is, by no means, exhaustive and is offered as an assistance to Contractors intending to tender.

Based on the Risk Assessments, the Principal Contractor must develop a set of site-specific OH&S rules that will be applied to regulate the OH&S aspects of the construction.

The Risk Assessments, together with the site-specific OH&S rules must be submitted to the UNIVERSITY OF VENDA before mobilisation on site commences.

Despite the Risk Assessments listed in Annexure 3, the Principal Contractor is required to conduct a baseline Risk Assessment and the aforesaid listed Risk Assessments must be incorporated into the base-line Risk Assessment. The baseline Risk Assessment must further include the Standard Working procedures (SWP) and the applicable Method Statements based on the Risk Assessments

All out-of-scope work must be associated with a Risk Assessment.

(ii) Review of Risk Assessments

The Principal Contractor is to review the Hazard Identification, Risk Assessments and SWP's at each Production Planning and Progress Report meeting as the Contract work develops and progresses and each time changes are made to the designs, plans and construction methods and processes.

The Principal Contractor must provide the Client, other Contractors and all other concerned-parties with copies of any changes, alterations or amendments as contemplated in above.

(b) Legal Requirements

All Contractors entering into a Contract with the UNIVERSITY OF VENDA shall, as a minimum, comply with the

- Occupational Health & Safety Act and Regulations (Act 85 of 1993). A current, up-to-date copy of the OHS Act must be available on site at all times
- Compensation for Occupational Injuries & Diseases Act (Act 130 of 1993). The principal Contractor will be required to submit a letter of Registration and "good-standing" from the Compensation Insurer before being awarded the Contract. A current, up-to-date copy of the COID Act must be available on site at all times.
- Where work is being carried out on mines' premises the Contractor will have to comply with the Mine Health & Safety Act and Regulations (Act. 29 of 1996)

and any other OH&S requirements that the mine may specify. A current, up-to-date copy of the OHS Act must be available on site at all times.

(c) Structure and Responsibilities

(i) Overall Supervision and Responsibility for OH&S

- * It is a requirement that the Principal Contractor, when he appoints Contractors (Sub-contractors) in terms of Construction Regulations 5(3), (5), (9), (10) and (12) he includes an OHS Act Section 37(2) agreement: "Agreement with Mandatary" in his agreement with such Contractors.
- * Any OH&S Act (85/1993), Section 16(2) appointee/s as detailed in his/her/their respective appointment forms

(ii) Further (Specific) Supervision Responsibilities for OH&S

The Contractor shall appoint designated competent employees and/or other competent persons as required by the Act and Regulations. Below is a list of identified appointments and may be used to select the appropriate appointments for the current contract:

	Ref. Section/Regulation in OHSAct
Batch Plant Supervisor	(Construction Regulation 6(1))
Construction Vehicles/Mobile Plant/Machinery Supervisor	(Construction Regulation 6(1))
21) Demolition Supervisor	(Construction Regulation 12)
Drivers/Operators of Construction Vehicles/Plant	(Construction Regulation 21)
Electrical Installation and Appliances Inspector	(Construction Regulation 22)
Emergency/Security/Fire Coordinator	(Construction Regulation 27)
Excavation Supervisor	(Construction Regulation 11)
Explosive Powered Tool Supervisor	(Construction Regulation 19)
Fall Protection Supervisor	(Construction Regulation 8)
First Aider	(General Safety Regulation 3)
Fire Equipment Inspector	(Construction Regulation 27)
Formwork & Support work Supervisor	(Construction Regulation 10)
Hazardous Chemical Substances Supervisor	(HCS Regulations)
Incident Investigator	(General Admin Regulation 29)
Ladder Inspector	(General Safety Regulation 13A)
Lifting Equipment Inspector	(Construction Regulation 20)
Materials Hoist Inspector	(Construction Regulation 17)
OH&S Committee	(OHS Act Section 19)
OH&S Officer	(Construction Regulation 6(6))
OH&S Representatives	(OHS Act Section 17)

Person Responsible for Machinery	(General Machinery Regulation 2)
Scaffolding Supervisor	(Construction Regulation 14)
Stacking & Storage Supervisor	(Construction Regulation 26)
Structures Supervisor	(Construction Regulation 9)
Suspended Platform Supervisor	(Construction Regulation 15)
Tunneling Supervisor	(Construction Regulation 13)
Vessels under Pressure Supervisor	(Vessels under Pressure Regulations)
Working on/next to Water Supervisor	(Construction Regulation 24)
Welding Supervisor	(General Safety Regulation 9)

The appointments must be in writing and the responsibilities clearly stated together with the period for which the appointment is made. This information must be communicated and agreed with the appointees.

Copies of appointments must be submitted to the UNIVERSITY OF VENDA together with concise CV's of the appointees. All appointments must be officially approved by UNIVERSITY OF VENDA. Any changes in appointees or appointments must be communicated to UNIVERSITY OF VENDA forthwith.

The Principal Contractor must, furthermore, provide UNIVERSITY OF VENDA with an organogram of all Contractors that he/she has appointed or intends to appoint and keep this list updated on a weekly basis.

In addition UNIVERSITY OF VENDA may require that a Traffic Safety Officer be appointed for any project.

(iii) Designation of OH&S Representatives (Section 18 of the OHS Act)

OH&S Representatives have to be designated in writing and the designation must include the area of responsibility of the person and term of the designation.

(iv) Duties and Functions of the OH&S Representatives (Section 19 of the OHS Act)

The Principal Contractor must ensure that the designated OH&S Representatives conduct a minimum monthly inspection of their respective areas of responsibility using a checklist and report thereon to the Principal Contractor

OH&S representatives must be included in accident/incident investigations

OH&S representatives must attend all OH&S committee meetings.

(v) Appointment of OH&S Committee (Section 20 of the OHS Act)

The Principal Contractor must establish an OH&S Committee consisting of all the designated OH&S Representatives together with a number of management representatives that are not allowed to exceed the number of OH&S representatives on the committee and a representative of the Client who shall act

as the chairman without a vote. The members of the OH&S committee must be appointed in writing.

The OH&S Committee must meet minimum monthly and consider, at least, the following Agenda:

1. Opening & Welcome
2. Present/Apologies/Absent
3. Minutes of previous Meeting
4. Matters Arising from the previous Minutes
5. OH&S Reps Reports
6. Incident Reports & Investigations
7. Incident/Injury Statistics
8. Other Matters
9. Endorsement of Registers and other statutory documents by a representative of the Principal Contractor
10. Close/Next Meeting

(d) Administrative Controls and the Occupational Health & Safety File

(i) The OH&S File (Construction Regulation 5 (7))

As required by Construction Regulation 5(7), the Principal Contractor and other Contractors will each keep an OH&S File on site containing the following documents as a minimum:

- * Notification of Construction Work (Construction Regulation 3.)
- * Copy of OH&S Act (updated) (General Administrative Regulation 4.)
- * Proof of Registration and good standing with a COID Insurer (Construction Regulation 4 (g))
- * OH&S Programme agreed with the Client including the underpinning Risk Assessment/s & Method Statements (Construction regulation 5 (1))
- * Copies of OH&S Committee and other relevant Minutes
- * Designs/drawings (Construction Regulation 5 (8))
- * A list of Contractors (Sub-Contractors) including copies of the agreements between the parties and the type of work being done by each Contractor (Construction Regulation 9)
- * Appointment/Designation forms as per (a)(i) & (ii) above.
- * Registers as follows:
- * Accident/Incident Register (Annexure 1 of the General Administrative Regulations)

- * OH&S Representatives Inspection Register
- * Asbestos Demolition & Stripping Register
- * Batch Plant Inspections
- * Construction Vehicles & Mobile Plant Inspections by Controller
- * Daily Inspection of Vehicles. Plant and other Equipment by the Operator/ Driver/User
- * Demolition Inspection Register
- * Designer's Inspection of Structures Record
- * Electrical Installations, -Equipment & -Appliances (including Portable Electrical Tools)
- * Excavations Inspection
- * Explosive Powered Tool Inspection, Maintenance, Issue & Returns Register (incl. cartridges & nails)
- * Fall Protection Inspection Register
- * First Aid Box Contents
- * Fire Equipment Inspection & Maintenance
- * Formwork & Support work Inspections
- * Hazardous Chemical Substances Record
- * Ladder Inspections
- * Lifting Equipment Register
- * Materials Hoist Inspection Register
- * Machinery Safety Inspection Register (incl. machine guards, lock-outs etc.)
- * Scaffolding Inspections
- * Stacking & Storage Inspection
- * Inspection of Structures
- * Inspection of Suspended Platforms
- * Inspection of Tunnelling Operations
- * Inspection of Vessels under Pressure
- * Welding Equipment Inspections
- * Inspection of Work conducted on or Near Water
- * All other applicable records

UNIVERSITY OF VENDA will conduct an audit on the OH&S file of the Principal Contractor from time-to-time.

- (e) OH&S Goals & Objectives & Arrangements for Monitoring & Review of OH&S Performance

The Principal Contractor is required to maintain a CIFR of at least 8 (See Annexure 1. to this document: "Measuring Injury Experience) and report on this to RAL on a monthly basis

(f) Notification of Construction Work (Construction Regulation 3.)

The Principal Contractor must, where the Contract meets the requirements laid down in Construction Regulation 3, within 5 working days, notify the Department of Labour of the intention to carry out construction work and use the form (Annexure A in the Construction Regulations) for the purpose. A copy must be held on the OH&S File and a copy must be forwarded to RAL for record keeping purposes.

(g) Training, Awareness and Competence

The contents and syllabi of all training required by the Act and Regulations are to be included in the Principal Contractor's OH&S Plan.

(i) General Induction Training

All members of Contractor's Site management as well as all the persons appointed as responsible for OH&S in terms of the Construction and other Regulations will be required to attend a general induction session by the Client

All employees of the Principal and other Contractors to be in possession of proof of General Induction training.

(ii) Site Specific Induction Training

The Principal Contractor will be required to develop Contract work project specific induction training based on the Risk Assessments for the Contract work and train all employees and other Contractors and their employees in this.

All employees of the Principal and other Contractors to be in possession of proof of Site Specific OH&S Induction training at all times.

(iii) Other Training

All operators, drivers and users of construction vehicles, mobile plant and other equipment to be in possession of valid proof of training.

All employees in jobs requiring training in terms of the Act and Regulations to be in possession of valid proof of training as follows:

OH&S Training Requirements: (as required by the Construction Regulations and as indicated by the OH&S Specification & the Risk Assessment/s):

- * General Induction (Section 8 of the Act)
- * Site/Job Specific Induction (also visitors) (Sections 8 & 9 of the Act)
- * Site/Project Manager
- * Construction Supervisor
- * OH&S Representatives (Section 18 (3) of the Act)
- * Training of the Appointees indicated above
- * Operators & Drivers of Construction Vehicles & Mobile Plant (Construction Regulation 21)
- * Basic Fire Prevention & Protection (Environmental Regulations 9 and Construction regulation 27)
- * Basic First Aid (General Safety Regulations 3)
- * Storekeeping Methods & Safe Stacking (Construction Regulation 26)
- * Emergency, Security and Fire Co-coordinator

(iv) Awareness & Promotion

The Principal Contractor is required to have a promotion and awareness scheme in place to create an OH&S culture in employees. The following are some of the methods that may be used:

- Toolbox Talks
- OH&S Posters
- Videos
- Competitions
- Suggestion schemes
- Participative activities such as OH&S Safety circles.

(v) Competence

The Principal Contractor shall ensure that his and other Contractors personnel appointed are competent and that all training required to do the work safely and without risk to health, has been completed before work commences

The Principal Contractor shall ensure that follow-up and refresher training is conducted as the contract work progresses and the work situation changes.

Records of all training must be kept on the OH&S File for auditing purposes.

(h) Consultation, Communication and Liaison

OH&S Liaison between the Client, the principal Contractor, the other Contractors, the Designer and other concerned parties will be through the OH&S committee as contemplated in above.

In addition to the above, communication may be directly to the Client or his appointed Agent, verbally or in writing, as and when the need arises.

Consultation with the workforce on OH&S matters will be through their Supervisors, OH&S Representatives, the OH&S committee and their elected Trade Union Representatives, if any.

The Principal Contractor will be responsible for the dissemination of all relevant OH&S information to the other Contractors e.g. design changes agreed with the Client and the Designer, instructions by the Client and/or his/her agent, exchange of information between Contractors, the reporting of hazardous/dangerous conditions/ situations etc.

The Principal Contractor will be required to do Site Safety Walks with RAL at least on a basis to be determined between the two parties.

The Principal and other Contractors will be required to conduct Toolbox Talks with their employees on a weekly basis and records of these must be kept on the OH&S File. Employees must acknowledge the receipt of Toolbox Talks which record must, likewise be kept on the OH&S File.

The Principal Contractors most senior manager on site will be required to attend all UNIVERSITY OF VENDA OH&S meetings and

a list of dates, times and venues will be provided to the Principal Contractor by UNIVERSITY OF VENDA.

(i) Checking, Reporting and Corrective Actions

(i) Monthly Audit by Client (Construction Regulation 1(d))

UNIVERSITY OF VENDA will be conducting a Monthly Audit to comply with Construction Regulation 4(1)(d) to ensure that the principal Contractor has implemented and is maintaining the agreed and approved OH&S Plan.

(ii) Other Audits and Inspections by UNIVERSITY OF VENDA:

UNIVERSITY OF VENDA reserves the right to conduct other ad hoc audits and inspections as deemed necessary. This will include Site Safety Walks.

(iii) Conducting an Audit

A representative of the Principal Contractor must accompany UNIVERSITY OF VENDA on all Audits and Inspections and may conduct his/her own

audit/inspection at the same time. Each party will, however, take responsibility for the results of his/her own audit/inspection results.

(iv) Contractor's Audits and Inspections

The Principal Contractor is to conduct his own monthly internal audits to verify compliance with his own OH&S Management system as well as of with this specification.

(v) Inspections by OH&S Representative's and other Appointees

OH&S Representatives must conduct weekly inspections of their areas of responsibility and report thereon to their foreman or supervisor whilst other appointees must conduct inspections and report thereon as specified in their appointments e.g. vehicle, plant and machinery drivers, operators and users must conduct daily inspections before start-up.

(vi) Recording and Review of Inspection Results

All the results of the abovementioned inspections to be in writing, reviewed at OH&S committee meetings, endorsed by the chairman of the meeting and placed on the OH&S File.

(vii) Reporting of Inspection Results

The Principal Contractor is required to provide the Client with a monthly report in the format as per the attached Annexure 2: "SHE Risk Management Report"

(j) Incident Reporting and Investigation

Reporting of Accidents and Incidents (Section 24 and General Administrative Regulation 8 of the OHS Act)

The Principal Contractor must report all incidents where an employee is injured on duty to the extent that he/she:

- * dies
- * becomes unconscious
- * loses a limb or part of a limb
- * is injured or becomes ill to such a degree that he/she is likely either to die or to suffer a permanent physical defect or likely to be unable for a period of at least 14 days either to work or continue with the activity for which he/she was usually employed

OR where:

- * a major incident occurred
- * the health or safety of any person was endangered
- * where a dangerous substance was spilled
- * the uncontrolled release of any substance under pressure took place
- * machinery or any part of machinery fractured or failed resulting in flying, falling or uncontrolled moving objects
- * machinery ran out of control

to UNIVERSITY OF VENDA within two days and to the Provincial Director of the Department of Labour within seven days (Section 24 of the Act & General Administrative Regulation 8.) EXCEPT that, where a person has died, has become unconscious for any reason or has lost a limb or part of a limb or may die or suffer a permanent physical defect, the incident must be reported to both RAL and the Provincial Director of the Department of Labour forthwith by telephone, telefax or E-mail.

The Principal Contractor is required to provide UNIVERSITY OF VENDA with copies of all statutory reports required in terms of the Act within 7 days of the incident occurring.

The Principal Contractor is required to provide UNIVERSITY OF VENDA with copies of all internal and external accident/incident investigation reports including the reports contemplated below within 7 days of the incident occurring.

Accident and Incident Investigation (General Administrative Regulation 9)

The Principal Contractor is responsible for the investigation of all accidents/incidents where employees and non-employees were injured to the extent that he/she/they had to be referred for medical treatment by a doctor, hospital or clinic

The results of the investigation to be entered into the Accident/Incident Register listed in above.

The Principal Contractor is responsible for the investigation of all minor and non-injury incidents as described in Section 24 (1) (b) & (c) of the Act and keeping a record of the results of such investigations including the steps taken to prevent similar accidents in future.

The Principal Contractor is responsible for the investigation of all road traffic accidents and keeping a record of the results of such investigations including the steps taken to prevent similar accidents in future.

The UNIVERSITY OF VENDA reserves the right to hold its own investigation into an incident or call for an independent external investigation.

C.3.3.3.1.4 Operational Control

- (a) Emergency Preparedness, Contingency Planning and Response

The Principal Contractor must appoint a competent person to act as Emergency Controller/Coordinator.

The Principal Contractor must conduct an emergency identification exercise and establish what emergencies could possibly develop. He/she must then develop detailed contingency plans and emergency procedures, taking into account any emergency plan that UNIVERSITY OF VENDA may have in place.

The Principal Contractor and the other Contractors must hold regular practice drills of contingency plans and emergency procedures to test them and familiarise employees with them.

(b) First Aid (General Safety Regulation 3)

The Principal Contractor must provide First Aid equipment (including a stretcher) and have qualified First Aider/s as required by General Safety Regulation 3 of the OHS Act.

The Contingency Plan of the Principal Contractor must include the arrangements for speedily and timeously transporting injured/ill person/s to a medical facility or of getting emergency medical aid to person/s that may require it.

The Principal Contractor must have firm arrangements with his other Contractors in place regarding the responsibility of the other Contractors injured/ill employees

(c) Security

The Principal Contractor must establish site access rules and implement and maintain these throughout the construction period. Access control must include the rule that non-employees will not be allowed on site unaccompanied.

The Principal Contractor must develop a set of Security rules and procedures and maintain these throughout the construction period

(d) Fall Protection (Working in Elevated Positions (Construction regulation 8.))

A pre-emptive Risk Assessment will be required for any work to be carried out above two metres from the ground or any floor level and will be classified as "Work in Elevated Positions".

As far as is practicable, any person working in an elevated position will work from a platform, ladder or other device that is at least as safe as if he/she is working at ground level and whilst working in this position be wearing a single belt with lanyard that will be worn to prevent the person falling from the platform, ladder or other device utilised. This safety belt will be, as far as is possible, secured to a point away from the edge over which the person might fall and the lanyard must be of such a length that the person will not be able to move over the edge.

Alternatively any platform, slab, deck or surface forming an edge over which a person may fall may be fitted with guard rails at two different heights as prescribed in SABS 085: Code of Practice for the Design, Erection, Use and Inspection of Access Scaffolding.

Where the requirement in is not practicable, the person will be provided with a full body harness that will be worn and attached above the wearer's head at all times and the lanyard must be fitted with a shock absorbing device OR the person must be attached to an approved, by UNIVERSITY OF VENDA, fall arrest system.

Where the requirements are not practicable, a suitable catch net must be erected.

Workers working in elevated positions must be trained to do this safely and without risk to health

Where work on roofs is carried out, the Risk Assessment must take into account the possibility of persons falling through fragile material. Skylights and openings in the roof.

C3.3.3.1.5 Measurement and Payment

Payment for the contractor's obligations in respect of the Occupational Health and Safety act and Construction Regulations shall be made through three payment items described below. The three payment items together shall include full compensation for all personnel (including a dedicated full time Construction Safety Officer), cost and incidentals in respect of compliance with the enforcement of the Health and Safety Specifications, which shall include for the compilation, presentation, implementation and maintenance of the Health and Safety Plan as contemplated. In tendering rates for the three items the contractor shall ensure that the sum of the amounts for the three items shall not be less than one percent (1%) of the Tender Amount.

Item

Unit

C1.1 Contractor's initial obligations in respect of the Occupational Health and Safety Act and Construction Regulations

Lump Sum

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

- (a) The contractor has notified the Provincial Director of the Department of Labour in writing of the project.
- (b) The contractor has made the required initial appointments of employees and sub-contractors.

- (c) The client has approved the contractor's Health and Safety Plan.
- (d) The contractor has set up his Health and Safety File.

Item	Unit
C1.2 Contractor's time related obligations in respect of the Occupational Health and Safety Act and Construction Regulations	Month

The tendered monthly amount shall represent full compensation for that part of the contractor's general obligations in terms of the Occupational Health and Safety Act and the Construction Regulations which are mainly a function of time. This includes inter alia payment of all costs for the appointment of all staff contemplated in the construction regulations and the transport of employees on site. Payment will be monthly only after payment for Item **C1.1** has been made.

Item	Unit
C1.3 Submission of the Health and Safety File	Lump Sum

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

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

C3.3.3.1.6 Project/Site Specific Requirements

See Annexure 3

Annexure 1: Measuring Injury Experience

Annexure 2: SHE Risk Management Report

Annexure 3. Project Baseline Risk Assessment

ANNEXURE 1: MEASURING INJURY EXPERIENCE

Injury experience has traditionally been measured by the use of a disabling injury frequency rate, the so-called “DIFR”. The DIFR is calculated by multiplying the number of disabling injuries by 1 million and dividing by the number of man-hours worked.

Lately the DIFR has been replaced internationally with a DIIR: disabling injury incidence rate. The only difference between the two rates are that the 10 million in the calculation is replaced with 200 000. (200 000 purported to be the number of hours and average person works in a lifetime.)

The use of the two rates above has proved to be somewhat problematical as they are open to manipulation and disabling injuries are often “hidden” by returning the injured employee to the workplace so as not to lose a shift and therefore having to register a disabling injury.

The Construction Industry recently decided to promote the use of a new frequency rate based on the number of compensation injury claims as these are more difficult to hide or manipulate because the reporting of compensable injuries is a legal requirement.

The industry is hoping that adoption of this new measurement of injury experience will enable the industry to monitor itself as far as work related injuries are concerned.

Below follows an explanation of this new rating system.

COMPENSATION INCIDENCE FREQUENCY RATE (CIFR)

FORMULA

No. of Compensation Claims X 200 000 /

*220 man hours X No. of Employees

DEFINITIONS

No. of Compensation

Claims: **The number of claims lodged with the COID insurer for the period under review**

200 000: The fixed factor to align the rate with other rates used internationally

Manhours Worked

Include: *

- * Hourly Paid Employees
- * Sub-contractors (No. of Employees X *220 each)
- * Staff (No. of Employees X *220 hours each)

220 manhours: The *average number of hours worked by one employee in one month in the Construction industry.



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* Overtime, absence on leave or sick leave, unrecorded after hours time worked by senior and middle management factored into this average.

No. of Employees: The actual or average number of employees employed for the period under review.

2002/03CIFRSystem

ANNEXURE 2: EXECUTIVE SHE RISK MANAGEMENT REPORT

The SAFCEC OH&S committee recently developed the following report in an attempt to standardise on reporting and assist contractors in obtaining a clear picture of their SHE Risk Management performance. It is hoped that clients will also accept this standardised report. Your comments/suggestions for improvement is invited.

EXAMPLE ONLY: ALL INFORMATION IS FICTITIOUS

XYZ construction

*SHE RISK MANAGEMENT REPORT

PERIOD JANUARY TO MARCH 2002

*(SHE = Safety, Health & Environment)

1. Introduction

We hope that this new format of quarterly SHE Risk Management reporting will provide a clear picture of the company's performance as far as occupational health & safety is concerned.

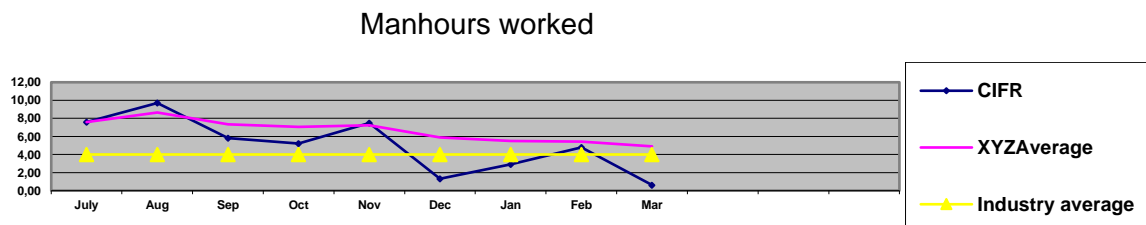
The first quarter of 2002 generally reflected an improvement in injury experience and shows a decline in the number of injuries. Although Building was the only division where there was an increase in compensation claims, figures are still well down from the average 2001 figures. A sub-contractor experienced one fatality.

All divisions are eagerly awaiting the final implementation in May of the new electronic SHE Management system that will make the tools to implement the SHE programme available to all management and supervisory staff.

2. Incident Statistics

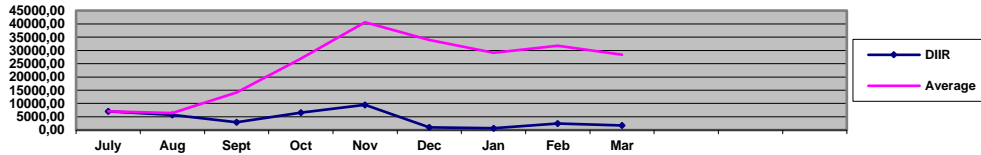
Compensation Incident Frequency Rate (CIFR)

$\text{CIFR} = \frac{\text{Total No. of Claims against the Workmen's Compensation Fund} \times 200\,000}{\text{Manhours worked}}$



2.2. Disabling Injury Incidence Rate (DIIR)

$\text{DIIR} = \frac{\text{No. Disabling Injuries} \times 200\,000}{\text{Manhours worked}}$



2.3. Other Major Incidents

Three other major incidents were experienced in the period under review:

- 2.3.1. A major trench collapsed at Job. 00123: XYZ Head Office, Bochum: No personnel injured, extensive damage to foundations: 3 days delay.
- 2.3.2. A concrete dumper ran away when its brakes failed. It smashed into the glass façade of the building on Job 00332: McDonalds, Polokwane. The driver jumped off and was not injured. Cost of damage to façade: R45 000.
- 2.3.3. A storage hut on Job 00567: BP Petrol Station, Swartruggens was demolished by fire when the night watchman made a fire inside the storage hut which contained concrete vibrators and levelling machines. Cost of replacing the hut and machines: R30 000

3. RISK AREAS

The following items of concern need priority consideration by management:

- 3.1. New employees must undergo pre-employment medical examinations to:
 - protect XYZ from claims at a later stage
 - ensure that only healthy persons are employed
 - prevent injuries and illness in the workplace
 - enhance XYZ image
- 3.2. Vehicle drivers and plant operators must be instructed to inspect their vehicles daily before start-up using the prescribed checklists to ensure that these are safe to operate and in good condition.

4. AUDITS

Three SHE audits were conducted in February and March:

- 4.1. Job 00432: Gillooly's Mall Compliance: 56%(*)
 Job 00786: Cullinan Head Office Compliance: 83%(****)
 Job 00589: Cleveland Station Compliance: 76%(***)

5. TRAINING

One hundred and forty two employees, representing 7% of employees, attended nine training courses. *Our objective is to train 5,5% of employees quarterly.

Month	No. of Employees Trained	Course	Source
January	26 15 3	Induction OH&S Reps Crane Drivers	Internal Consultant External
February	23 17	Induction OH&S Reps	Internal Consultant
March	43 9 3 3	Induction OH&S Reps Bomag Rollers First Aiders	Internal Consultant Supplier St. John's

6. LEGAL ISSUES

- 6.1. An inspector of the Department of Labour issued an improvement notice on Job 00987: Gillooly's Mall. The notice requires that all scaffolding comply with the SABS standards for the Erection and Maintenance of Access Scaffolding (SABS 085). This is currently being attended to and the inspector will return on 15 April 2002 to ascertain if the notice has been complied with.

8. OCCUPATIONAL AND OTHER HEALTH MATTERS

8.1. HIV Aids

The proposed SAFCEC clinic will soon be operational and we will then be able to send our employees who have tested positive to the clinic for counselling and eventual treatment when necessary

The mobile clinic saw and tested fifty employee volunteers at 3 sites this month. Eighteen of them tested positive.

8.2. Tuberculosis

The mobile clinic will be calling at Gillooly's Mall and Cleveland Station on 15 and 16 October respectively to screen employees for TB.

8.3. Noise

All suspected noise pollution areas have been tested and the results are awaited. Employees working in areas testing over 85dBa will be issued with suitable hearing protectors.

9. ENVIRONMENTAL MEASURES

Inspectors from the Botswana Department of the Environment visited Djwaneng and inspected the site and yard. They gave it a "clean bill of health" and advised that we should increase the dust control measures by spraying roads three times per day instead of the present twice per day.

10. ACHIEVEMENTS/AWARDS

- 10.1. The client at Djwaneng (Job 00786) awarded the XYZ site first position in the housekeeping competition conducted bi-monthly by the client's SHE managers. The project manager and his team are to be congratulated for this sterling effort.
- 10.2. Job 0987: Refurbishment of Pretoria Main Railway Station has just completed 1million compensation claim free days. This was no easy achievement if we consider the conditions being worked under after the extensive fire that caused major damage.

SHE Risk Manager

2002.09.27

ANNEXURE 3: BASELINE RISK ASSESSMENTS

Project Baseline Risk assessment

UNIVERSITY OF VENDA

ROADS INFRASTRUCTURE: CONSTRUCTION OF UNIVEN TO PUNDA MARIA(R524) ROAD

Contract Number: DHET/2019/21/01

**Date: 07 June
2019**

RISK ASSESSMENT DEVELOPED BY:					REVIEWED BY THE FOLLOWING PERSONNEL:				
No	Name	Signature	Position	Date	No	Name	Signature	Position	Date
1			Safety Consultant		1				
2					2				

Approved by:		Designation:		Signature:	
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To be discussed with all concerned prior to work!

P.P.E REQUIREMENTS		PLANT, EQUIPMENT & TOOLS FOR JOB		Tagging and Signage		PERMITS & INSTRUCTION	
Safety Harness	<input checked="" type="checkbox"/>	Ladder	<input checked="" type="checkbox"/>	Men Working Above	<input checked="" type="checkbox"/>	MSDS's	<input checked="" type="checkbox"/>
Static Line	<input type="checkbox"/>	Hand Tools	<input checked="" type="checkbox"/>	Barrier Mesh	<input checked="" type="checkbox"/>	Working on Heights Permit	<input type="checkbox"/>
Steel Capped Boots	<input checked="" type="checkbox"/>	Shovel	<input checked="" type="checkbox"/>	Danger Tape	<input checked="" type="checkbox"/>	Hot Work Permit	<input type="checkbox"/>
Hard Hat	<input checked="" type="checkbox"/>	Pick	<input checked="" type="checkbox"/>	Flagging	<input checked="" type="checkbox"/>	Excavation Entering Permit	<input checked="" type="checkbox"/>
Tinted Safety Glasses	<input checked="" type="checkbox"/>	Welding Machine	<input checked="" type="checkbox"/>	Lock-out Tags	<input type="checkbox"/>	Concrete Pouring Permit	<input checked="" type="checkbox"/>
Clear Safety Glasses	<input checked="" type="checkbox"/>	Compactor	<input checked="" type="checkbox"/>	Safe for use	<input checked="" type="checkbox"/>	Shutter Stripping Permit	<input checked="" type="checkbox"/>
Mono goggles	<input type="checkbox"/>	Drill	<input checked="" type="checkbox"/>	Not Safe for Use	<input checked="" type="checkbox"/>	Confined Space Permit	<input type="checkbox"/>
Face Shield	<input type="checkbox"/>	Angle Grinder	<input checked="" type="checkbox"/>	Falling Objects	<input checked="" type="checkbox"/>	DSTI/DSWP	<input checked="" type="checkbox"/>

Sun Screen <input type="checkbox"/>	Scaffold <input checked="" type="checkbox"/>		Scaffold Checklist <input checked="" type="checkbox"/>
Hearing Protection <input checked="" type="checkbox"/>	Earthworks Plant <input checked="" type="checkbox"/>		
Respirator <input type="checkbox"/>	Extension Leads <input checked="" type="checkbox"/>		
Gloves – PVC <input checked="" type="checkbox"/>	Power Source <input type="checkbox"/>		
Gloves – Leather <input checked="" type="checkbox"/>	Lifting Equipment <input checked="" type="checkbox"/>		
Dust Mask <input checked="" type="checkbox"/>	Chemicals <input checked="" type="checkbox"/>		

Identify the job hazards and assess the RISK personnel may be exposed to before safeguards are implemented:

Electrical <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Vehicles <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>	High Pressure <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Inclement Weather <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Radiation (Hot Work / Sun) <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Heat <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>	Asbestos <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Chemicals <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Height <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>	Access <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Bacteria <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Fumes <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Dehydration <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>	Engulfment <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Tools <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Depth <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Vibration <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Dust <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>	Moving Equipment <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>	Extreme Cold <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Manual Handling <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>
Gasses <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Weight <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Noise <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>	Slip/Trip <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>	Lifting Equipment <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>	Overhead Hazards <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>



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RISK SCORE CALCULATOR						
Use the Risk Score Calculator to Determine the Level of Risk of Each Hazard						
What would the SEVERITY Of an occurrence be?	What is the LIKELIHOOD of an occurrence?					Hierarchy of Control Ranking
	Almost Certain	Very Likely	Likely	Unlikely	Very Unlikely	
Disaster Fatality/ Multiple Fatalities	High 25	High 20	High 15	Medium 10	Medium 5	Can the hazard be Eliminated or removed from the work place?
Very Serious Major Illness or Injury, disability	High 20	High 16	High 12	Medium 8	Low 4	Can the product or process be substituted for a less hazardous alternative?
Serious Serious but non-permanent injury or ill health Work days lost	High 15	High 12	Medium 9	Medium 6	Low 3	Can the hazard be engineered away with guards or barriers?
Substantial Medical attention needed. No work restrictions.	Medium 10	Medium 8	Medium 6	Low 4	Low 2	Can Administration Controls be adopted I.e. procedures, job rotation etc.
Minor Minor cuts & bruises or sickness	Medium 10	Medium 5	Low 3	Low 2	Low 1	Can Personal Protective Equipment & Clothing be worn to safe guard against hazards?

Please Note the Following! This risk assessment must be produced/developed following the "Hierarchy of Controls Measures" (HOC) below.

1. E=Eliminate 3.ENG=Engineering Control, 5. PPE. (the last resort) The intent of using the Hierarchy of Control Measures, is to reduce the risk of harm occurring to as low as
2. S=Substitute 4. A=Administration Controls reasonably practicable. Taking into account the three P's Plant, Procedure, People

No	Activity Steps What you do, NOT how you do it	Hazards identified What can go wrong?	Risks Identified What damage, hurt or illness can occur?	Raw Risk Score	Control Measures (Safe Work Procedure)	Residual	HOC Ranking selected	Action By
						Risk New score after control measures		
1	Discussing task specific risk assessment, toolbox talk, daily safe task instruction and safe working procedure.	Employees not inducted DSTI not discussed to employees, Employees not familiar with the risk associated with the task.	General body injuries, minor, serious injuries to employees. Financial implications.	M6	<ol style="list-style-type: none"> All employees before starting work on site shall undergo site induction, and also have on the job training. Ensure all task specific risk assessment, toolbox talk, daily safe task instruction, safe working procedure has been discussed with all the employees, and they understand the hazards associated with the task. Employees who attended task specific risk assessment, toolbox talk, daily safe task instruction and safe working procedure shall sign on the attendance register. Task specific risk assessment, toolbox talk, and daily safe task instruction, safe working procedure shall be discussed with any employee who arrived late or who was not present during the discussion. 	L1	A	Safety Officer & Construction Manager

No	Activity Steps What you do, NOT how you do it	Hazards identified What can go wrong?	Risks Identified What damage, hurt or illness can occur?	Raw Risk Score	Control Measures (Safe Work Procedure)	Residual	HOC Ranking selected	Action By
						Risk New score after control measures		
2	Emergency preparedness, contingency planning and response.	Inadequate emergency preparedness, contingency planning and response could result in the inability to effectively respond to emergencies.	This could impact negatively on the health and safety of employees and other persons.	L4	<ol style="list-style-type: none"> UNIVERSITY OF VENDA will appoint a competent person to act as emergency controller and/or coordinator. They will conduct an emergency identification exercise and establish what emergencies could possibly develop. He/she must then develop detailed contingency plans and emergency procedures, taking into account any emergency plan that the Client may have in place. UNIVERSITY OF VENDA and the other contractors must hold regular practice drills of contingency plans and emergency procedures to test them and familiarise employees with them. 	L1	A	Safety Officer & Construction Manager.

No	Activity Steps What you do, NOT how you do it	Hazards identified What can go wrong?	Risks Identified What damage, hurt or illness can occur?	Raw Risk Score	Control Measures (Safe Work Procedure)	Residual	HOC Ranking selected	Action By
						Risk New score after control measures		
3	Security	Inadequate site access control.	Inadequate security arrangements could result in unauthorised access by members of the public that could pose a risk to employees working on this site or could also result in the illegal removal of equipment and/or material from the site or injuries to these members of the	M9	1. We will establish site access rules and implement and maintain these throughout the construction period. Access control must, amongst other, include the rule that nonemployees will not be allowed on site unaccompanied. 2. We will develop a set of project applicable security rules and procedures and maintain these throughout the construction period.	L4	A	Safety Officer & Construction Manager.

4	Accommodation of traffic	Inadequate traffic control.	public. Inadequate traffic accommodation pose a potential risk to employees as well as road users and could not only result in injuries and subsequent medical and other costs to employees, but also injuries to road users and damages to vehicles with subsequent claims against us and the		1. We will ensure that appropriate and a sufficient number of road signs be posted as per 's minimum specification in this regard be utilised and then also be actively maintained to protect employees against traffic and to warn road users of the presence of construction activities and related risks next to and in the road surface. These signs should be repeated as actual construction work and risk are approached. 2. The maintenance of the road signs including after hour's management should also be actively managed.				Traffic Safety Officer & Construction Manager.
				H12		M9	ENG		
5	Lifting equipment	The use of unsafe lifting equipment could result in loads being lifted to fail and fall	client. injuries or even fatalities as well as asset damages that will result in claims		Lifting equipment to be designed and constructed in accordance with the manufactures/designers specifications as well as generally accepted technical				

			and reputation risks.	H12	<p>standards and operated, used, inspected and maintained in accordance with the manufactures requirements as well as that of the Driven Machinery Regulation 18 of the OHSACT:</p> <p>We will require that:</p> <p>a. Lifting equipment be clearly and conspicuously marked with the maximum mass load (MML) that it is designed to carry safely. When the MML varies with the conditions of use, the table of maximum loads shall be used by the driver/operator;</p> <p>b. Each winch on a lifting machine will at all time have, at least, three full turns of rope on the drum when the winch has been run to its lowest limit;</p> <p>c. Lifting equipment be fitted with a brake or other applicable device capable of holding the MML. This brake or device will automatically prevent the downward movement of the load when the lifting power is interrupted;</p> <p>d. Lifting equipment fitted with a load limiting device that automatically arrest the lift when the load reaches its highest safe position or when the mass of the load is greater than the MML;</p>	M6	ENG	Safety Officer & Construction Manager.
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					<p>e. Every chain or rope on a lifting machine that forms an integral part of the machine will have a factor of safety as prescribed by the manufacturer of the machine and where no standard is available the factor of safety will be:</p> <ul style="list-style-type: none"> • chains – 4 (four) • steel wire ropes - 5 (five) 			
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						Residual		
No	Activity Steps What you do, NOT how you do it	Hazards identified What can go wrong?	Risks Identified What damage, hurt or illness can occur?	Raw Risk Score	Control Measures (Safe Work Procedure)	Risk New score after control measures	HOC Ranking selected	Action By

				<ul style="list-style-type: none"> • fibre ropes- 10 (ten) <p>f. Every hook or load attaching device will be designed as such or fitted with a device that will prevent the load from slipping off or disconnecting;</p> <p>g. Every lifting machine will be inspected and load tested by a competent person every time it has been dismantled and re-erected and every 12 months after that. The load test will be in accordance with the manufacturers prescription or to 110% of the MML in addition all ropes, chains, hooks or other attaching devices, sheaves, brakes and safety devices forming an integral part of a lifting machine must be inspected every 6 months by a competent person;</p> <p>h. All maintenance, repairs, alterations and inspection results will be recorded in a log book and each lifting machine will have its own log book; and</p> <p>i. No person may be lifted by a lifting machine not designed for lifting persons unless in a cradle approved by an inspector of the Department of Labour.</p>			
6	Lifting tackle	The use of unsafe lifting tackle could result in loads being lifted to fail and fall.	Injuries or even fatalities as well as asset damages that will result in claims and reputation risks.	H12 <p>The following requirements will be adhered to when lifting tackle is utilised:</p> <p>a. Manufactured of sound material, well-constructed and free from latent defects;</p> <p>b. Clearly and conspicuously marked with an identity number;</p> <p>c. Maximum mass load factor of safety:</p> <ul style="list-style-type: none"> • Natural fibre ropes - 10 (ten) 	M6	ENG	Safety Officer & Construction Manager.

					<ul style="list-style-type: none"> Man-made fibre ropes and woven webbing - 06 (six) 			
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						Residual		
No	Activity Steps What you do, NOT how you do it	Hazards identified What can go wrong?	Risks Identified What damage, hurt or illness can occur?	Raw Risk Score	Control Measures (Safe Work Procedure)	Risk New score after control measures	HOC Ranking selected	Action By
					<ul style="list-style-type: none"> Steel wire ropes – single rope - 06 (six) Steel wire ropes – combination slings - 08 (eight) Mild Steel chains - 05 (five) High tensile/alloy steel chains - 04 (four) <p>d. Steel wire ropes will be discarded (not used any further for lifting purposes) when wear and corrosion is evident and must be examined by a competent person every three months for this purpose and the results recorded in a designated log book.</p>			

7	Construction vehicle and mobile plant operators.	The use and operating of vehicles and/or plant by operators that are not competent.	Employees hit by construction mobile plant (Excavator, TLB, Tipper Trucks, Roller and Water cart) This could result in incidents with subsequent injuries or even fatalities as well as asset damage with subsequent costs/claims and reputation risks.	M9	<p>The following requirements will apply to construction vehicle and mobile plant operators:</p> <p>a. Only certified and/or competent employees will be allowed to operate any construction vehicle and mobile plant.</p> <p>b. Every lifting machine operator will be trained specifically for the type of lifting machine that he or she is operating.</p> <p>c. Only employees duly authorised to do so will operate any construction vehicle and mobile plant.</p> <p>d. Only employees physically fit, i.e. in possession of a medical certificate of fitness (Annexure 3), will be allowed to operate any construction vehicle and mobile plant.</p>	L4	ENG & A	Safety Officer & Supervisors & Construction Manager.
8	Construction vehicles and mobile plant	Unsafe and substandard construction vehicles and plant.	This could result in incidents with subsequent injuries or even fatalities as well as asset		Construction vehicles and mobile plant will initially during the site establishment process be inspected by our health and safety officer prior to being allowed on site and suppliers of hired vehicles, plant and equipment will be			

No	Activity Steps What you do, NOT how you do it	Hazards identified What can go wrong?	Risks Identified What damage, hurt or illness can occur?	Raw Risk Score	Control Measures (Safe Work Procedure)	Residual	HOC Ranking selected	Action By
						Risk New score after control measures		
			damage with subsequent costs and reputation risks.	M9	<p>required to comply with this assessment as well as the OHSACT and Regulations. Construction vehicles and mobile plant will be:</p> <ol style="list-style-type: none"> Of acceptable design and construction; Maintained in good working order; Used in accordance with their design and intention for which they were designed; Operated and/or driven by trained, competent and authorised operators/drivers. No unauthorised persons to be allowed to drive construction vehicles and mobile plant; Provided with safe and suitable means of access; Fitted with adequate signalling devices to make movement safe including reversing; Excavations and other openings must be provided with sufficient barriers to prevent construction vehicles and mobile plant from falling into same; Provided with roll-over protection; Inspected daily before start-up by the driver, operator and/or user and the findings 	L4	ENG & A	Safety Officer & Supervisors & Construction Manager.

				<p>recorded in a register/log book and any defects addressed as matter of urgency;</p> <p>10. Fitted with two head and two tail lights that is in good working condition whilst operating under poor visibility conditions; and;</p> <p>11. Used for transporting persons must have seats firmly secured and sufficient for the number of persons being transported.</p> <p>No loose tools, material etcetera will be allowed in the driver and/or operators</p>			
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No	Activity Steps What you do, NOT how you do it	Hazards identified What can go wrong?	Risks Identified What damage, hurt or illness can occur?	Raw Risk Score	Control Measures (Safe Work Procedure)	Risk New score after control measures	HOC Ranking selected	Action By
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					<p>compartment/cabin nor in the compartment in which any other persons are transported.</p> <p>No person will not ride on construction vehicles and mobile plant except for in a safe place designed and provided for this purpose.</p> <p>The construction site will be organised to facilitate the movement of construction vehicles and mobile plant in such a manner that pedestrians and other vehicles are not endangered. Traffic routes to be suitable, sufficient in number and adequately demarcated.</p> <p>Construction vehicles and mobile plant left unattended after hours adjacent to roads and areas where there is traffic movement will be fitted with lights, reflectors or adequate barricades to prevent moving traffic from a sudden emergency, or to come into contact with the parked construction vehicles and mobile plant.</p> <p>In addition construction vehicles and mobile plant left unattended after hours will be parked with all buckets, booms etc. full lowered, the emergency brakes engaged and, where necessary, the wheels chocked, the transmission in neutral and the motor switched off and the ignition key removed and stored safely. All construction vehicles and mobile plant</p>			
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					daily inspection records will be kept in the occupational health and safety file.			
9	Pre-inspection of construction mobile plant	Operator using construction mobile plant without preuse inspection.	This could result in incidents with subsequent injuries or even fatalities as well as asset damage.	M9	1. Operators shall inspect the construction mobile plant as per pre-use inspection checklist.			



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						Residual		
No	Activity Steps What you do, NOT how you do it	Hazards identified What can go wrong?	Risks Identified What damage, hurt or illness can occur?	Raw Risk Score	Control Measures (Safe Work Procedure)	Risk New score after control measures	HOC Ranking selected	Action By
					<p>2. Any defects found will be placed on the register and reported to the supervisor immediately.</p> <p>3. Once defects rectified then only will the construction mobile plant be used for operations.</p> <p>4. The Excavator, Dozer, Loader, TLB, Tipper Trucks, Roller and Water cart will be fitted with a fire extinguisher with a valid date of service, a reverse audible alarm, rotating/flashing amber light and a construction vehicle sticker.</p> <p>5. Employees shall use the correct PPE for the task (Leather gloves, hard hat, safety glasses or goggles, reflective vest, safety boots and overalls)</p>	L4	A	Safety Officer & Supervisors & Construction Man

10	Rip new or existing road with a Grader or Milling machine.	Incompetent operator Operator not familiar with operating procedure.	Multiple fatality. Damage to property. Financial implications.	M6	<p>1. Only competent operators shall be allowed to operate the grader and or Milling machine.</p> <p>2. Under no circumstances will the plant be given to any other person who is not authorized and appointed as an operator by the site manager to operate the plant on site.</p> <p>3. The operator shall operate the plant safely without risk to employees in the working area.</p> <p>4. The plant will be operated on site at a speed not exceeding 30 km/h.</p> <p>5. The operator will watch out for employees in the working area.</p> <p>6. Employees will keep a safe distance from the plant, by maintaining the 3m rule.</p> <p>7. The plant operator will take 15 min break after 2 hours of work.</p>	L2	A & PPE	Safety Officer & Supervisors & Construction Manager
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						Residual		
No	Activity Steps What you do, NOT how you do it	Hazards identified What can go wrong?	Risks Identified What damage, hurt or illness can occur?	Raw Risk Score	Control Measures (Safe Work Procedure)	Risk New score after control measures	HOC Ranking selected	Action By
11	Loading of material with Excavator/Loader/TLB onto Tipper Trucks.	Incompetent operator Operator not familiar with operating procedure.	Multiple fatality. Damage to property. Financial implications.	M9	1. Only competent Excavator or Loader or TLB and Tipper Truck operator will be allowed to operate the grader. 2. Under no circumstances will a Excavator or Loader or TLB and Tipper Truck be given to any other person who is not authorized and appointed as an operator by the site manager to operate the Grader or Excavator or Loader or TLB and Tipper Truck on site. 3. All employees will stand clear during loading operation. 4. One person will give instructions to the operator loading the tipper truck and to the tipper truck for correct loading of material. 5. Loading of material will be controlled by a tally man. 6. The tally man or supervisor will ensure that the tipper truck is not overloaded to avoid material falling from the tipper truck during transportation. 8. The operator will operate the Excavator or Loader or TLB and Tipper Truck	L2	A & PPE	Safety Officer & Supervisors & Construction Manager.

				<p>safely without risk to employees in the working area.</p> <p>9. The Excavator or Loader or TLB and TipperTruck will be operated on site at a speed not exceeding 30 km/h.</p> <p>10. The Excavator or Loader or TLB and TipperTruck operator will watch-out for employees in the working area.</p> <p>11. Employees will keep a safe distance from the Excavator or Loader or TLB and Tipper Truck, by maintaining 3 meters rule.</p> <p>12. The Excavator or Loader or TLB and Tipper Truck operator will take 15 min break after</p>			
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No	Activity Steps What you do, NOT how you do it	Hazards identified What can go wrong?	Risks Identified What damage, hurt or illness can occur?	Raw Risk Score	Control Measures (Safe Work Procedure)	Residual	HOC Ranking selected	Action By
						Risk New score after control measures		
				M9	<p>2 hours of work.</p> <p>13. The Grader or Excavator or Loader or TLB and Tipper Truck will not be left unattended with the engine running.</p> <p>14. When stopping for a short while and the operator of the Excavator or Loader or TLB and Tipper Truck gets out of the grader, the engine will be switched off and the ignition key removed from the ignition and the key kept in his possession.</p> <p>15. Jumping from the Excavator or Loader or TLB and Tipper Truck is not allowed, use the access provided by the manufacture</p> <p>16. Employees and/or supervisor approaching the Excavator or Loader or TLB and Tipper Truck to speak to the operator, will signal to the Excavator or Loader or TLB and Tipper Truck operator before approaching to ensure the operator can see them, to make the machine safe for them to approach.</p> <p>17. We will ensure the correct PPE is worn at all times (safety boots, reflective jackets, leather gloves, flame retardant overalls, hard hat, safety glasses or goggles, dust mask and ear plus where necessary)</p>	L2	A & PPE	Safety Officer & Supervisors & Construction Manager.

12	Tipping of material with Tipper Trucks.	Incompetent tally man directing Tipper Truck. Poor housekeeping. Unsafe terrain.	Multiple fatality. Damage to property. Financial implications.	M9	<p>1. Only competent Tipper Truck operator shall be allowed to operate the Tipper Truck.</p> <p>2. Under no circumstances must a Tipper Truck be given to any other person who is not authorized and appointed as an operator by the site manager to operate the Tipper Truck on site.</p> <p>3. The operator shall operate the Tipper Truck safely without risk to employees in the working area.</p>	L4	A & PPE	<p>Safety Officer & Supervisors & Construction Manager.</p>
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						Residual		
No	Activity Steps What you do, NOT how you do it	Hazards identified What can go wrong?	Risks Identified What damage, hurt or illness can occur?	Raw Risk Score	Control Measures (Safe Work Procedure)	Risk New score after control measures	HOC Ranking selected	Action By
					<p>4. Supervisor shall ensure that competent tally man is available to give directions to the Tipper Truck driver.</p> <p>5. The Tipper Truck driver shall take instruction from the tally man, not from everyone around the working area.</p> <p>6. Housekeeping to be done as per client standard, ensure all sharp objects are removed from the working area.</p> <p>7. The Tipper Truck shall be operated on site at a</p>			

				<p>M9</p> <p>speed not exceeding 30 km/h.</p> <p>8. The Tipper Truck operator shall watch-out for employees in the working area.</p> <p>9. Employees shall keep a safe distance from the Tipper Truck, by maintaining 3 meters rule.</p> <p>10. The Tipper Truck operator shall take 15 min break after 2 hour of work.</p> <p>11. The Tipper Truck shall not be left unattended with the engine running.</p> <p>12. When stopping for a short while and the operator of the Tipper Truck gets out of the Tipper Truck, the engine must be switched off and the ignition key removed from the ignition and the key kept in his possession.</p> <p>13. Jumping from the Tipper Truck is not allowed, use the access provided by the manufacturer.</p> <p>14. Employees and/or supervisor approaching the Tipper Truck to speak to the operator, shall signal to the Tipper Truck operator before approaching to ensure the operator can see them, to make the machine safe for them to approach.</p>	<p>L4</p>	<p>A & PPE</p>	<p>Safety Officer & Supervisors & Construction Manager.</p>
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No	Activity Steps What you do, NOT how you do it	Hazards identified What can go wrong?	Risks Identified What damage, hurt or illness can occur?	Raw Risk Score	Control Measures (Safe Work Procedure)	Risk New score after control measures	HOC Ranking selected	Action By
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13	Levelling material with the Grader.	Incompetent tally man directing Grader. Poor housekeeping. Unsafe terrain.	Multiple fatality. Damage to property. Financial implications.	M9	<ol style="list-style-type: none"> Only competent Grader operator shall be allowed to operate the Grader. Under no circumstances must a Grader be given to any other person who is not authorized and appointed as an operator by the site manager to operate the Grader on site. The operator shall operate the Tipper Truck safely without risk to employees in the working area. Supervisor shall ensure that competent tally man is available to give directions to the Grader Operator. The Grader operator shall take instruction from the tally man, not from everyone around the working area. Housekeeping to be done as per client standard, ensure all sharp objects are removed from the working area. The Grader shall be operated on site at a speed not exceeding 30 km/h. The Grader operator shall watch-out for employees in the working area. Employees shall keep a safe distance from the Grader, by maintaining 3 meters rule. The Grader operator shall take 15 min break after 2 hour of work. 	L4	A & PPE	Safety Officer & Supervisors & Construction Manager.
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					11. We will ensure the correct PPE is worn at all times (safety boots, reflective jackets, leather gloves, flame retardant overalls, hard hat, safety glasses or goggles, dust mask and earplugs where necessary)			
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14	Offloading of cement at the required workplace on the road.	Incompetent tally man directing Grader. Poor housekeeping. Unsafe terrain.	Multiple fatality. Damage to property. Financial implications.	M9	<ol style="list-style-type: none"> Only competent truck driver shall be allowed to operate the Grader. Under no circumstances must the truck be given to any other person who is not authorized and appointed as a driver by the site manager to operate the truck on site. The driver shall operate the truck safely without risk to employees in the working area. Supervisor shall ensure that competent tally man is available to give directions to the truck driver. The truck driver shall take instruction from the tally man, not from everyone around the working area. Housekeeping to be done as per client standard, ensure all sharp objects are removed from the working area. The truck shall be driven on site at a speed not exceeding 30 km/h. 	L4	A & PPE	Safety Officer & Supervisors & Construction Manager.

					<p>8. The truck driver shall watch-out for employees in the working area.</p> <p>9. Employees shall keep a safe distance from the truck, by maintaining 3 meters rule.</p> <p>10. The truck driver shall take 15 min break after 2 hour of work.</p> <p>11. We will ensure the correct PPE is worn at all times (safety boots, reflective jackets, leather gloves, dust mask and ear plus where necessary)</p>			
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15	Opening of cement bags with shovels or spades.	Incompetent employees using Shovels or spades.	Hand and feet injuries. Minor/ Serious injuries (First Aid/Medical Treatment) Financial implications.	L4	1. Supervisor shall ensure that employees are competent. Toolbox talks may be utilized as a training session. 2. Supervisor shall ensure that spades or shovels used to open cement bags are inspected as per pre-use inspection checklist. 3. Ensure the correct PPE is worn at all times (safety boots, reflective jackets, pvc gloves, dust mask)	L1	A & PPE	Safety Officer & Supervisor
16	Spreading of cement with shovels or spades.	Cement dust inhalation.	Serious respiratory infection Serious skin infection Serious eye infection.	M6	Supervisor shall ensure that employees are competent and wearing dust masks. Toolbox talks may be utilized as a training session.	L1	A & PPE	Safety Officer & Supervisor

17	Milling Operation.	Incompetent operator and noise.	Multiple fatality. Damage to property. Hearing loss.		<p>1. Only competent Milling machine operator shall be allowed to operate the Milling machine.</p> <p>2. Under no circumstances must a Milling machine be given to any other person who is not authorized and appointed as an operator by the site manager to operate the Milling machine on site.</p> <p>3. The operator shall operate the Milling machine safely without risk to employees in the working area.</p> <p>4. Ear plugs must be worn near the milling operation.</p>	L1	A & PPE	Safety Officer & Supervisors & Construction Manager.
18	Refueling construction mobile plant.	Diesel spillage during refueling of mobile plant.	Minor/Serious environmental impact Financial implications.	H12	<p>1. Supervisor to ensure that refueling of construction mobile plants is only done through diesel bowser.</p>	L2	A & ENG	Supervisor & Safety Officer.

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					2. During refueling, drip trays shall be made available to prevent spills from contaminating the ground. 3. Supervisor shall ensure that correct MSDS is available and that employees are up to date with MSDS.			
19	Fire prevention and protection.	Fire.	Fatalities, serious burn wounds and damage to plant and equipment.	H12	We will ensure that: a. The risk of fire is avoided; b. Sufficient and suitable storage of flammables is provided; c. All employees are instructed in the use of the fire fighting equipment and know how to attempt to extinguish a fire; d. A sufficient number of employees are appointed and trained to act as an emergency team to deal with fires and other emergencies; e. A clearly audible, to all persons on site, siren or alarm is fitted and regularly tested.	M6	A	Safety Officer & Supervisors & Construction Manager.

19	Housekeeping	Building debris and material is a tripping hazard, can damage plant and a fire hazard.	Poor housekeeping may impact negatively on productivity, result in employees / persons tripping and falling or even cause a fire with subsequent asset damage and cost/claims as well as reputation exposures.	M9	<p>We will ensure that:</p> <p>a. Housekeeping is continuously implemented and maintained;</p> <p>b. Materials and equipment is properly stored;</p> <p>c. Scrap, waste and debris is removed off site regularly;</p> <p>d. Materials placed for use are placed safely and not allowed to accumulate or cause obstruction to the free-flow of pedestrians and vehicular traffic;</p> <p>e. Where practicable, construction sites are fenced off to prevent entry of unauthorised persons;</p>	L2	A	Safety Officer & Supervisors & Construction Manager.
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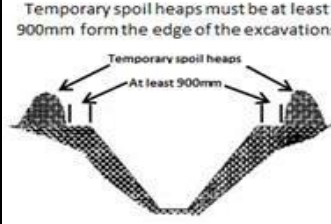
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20	Public health and safety.	Public wondering into site activity areas.	The disregard of the public's health and safety could result in injuries or even fatalities with associated claims and reputation risks.	M5	<p>We are responsible for ensuring that nonemployees affected by the construction work are made aware of the dangers likely to arise from said construction work as well as the precautionary measures to be observed to avoid or minimise those dangers. This includes among others:</p> <ul style="list-style-type: none"> a. Non- employees entering the site for whatever reason; b. The surrounding community; and c. Passers by the site. <p>Appropriate signage must be posted to this effect and all employees on site must be instructed to ensure that non-employees are protected at all times.</p> <p>All non-employees entering the site must receive site applicable induction into the hazards and risks and the control measures for these.</p>	L2	A & ENG	Safety Officer & Supervisors & Construction Manager.

	Site no 3. Heavy pedestrian traffic to and from the University.	Pedestrians criss-crossing the roadworks area of the site amongst moving site plant on their way to, or from the University.	There is a real possibility of fatal accidents when public is allowed to move amongst moving working plant.	H16	Pedestrians shall be contained in a proper barricaded walkway along one side of the roadworks. This will be done from the Sebasa road till the end of works at the University side. Danger tape shall be at least reflective netting. No danger tape shall be used. It only lasts in a proper state for half an hour. The walkway shall be wide enough to accommodate two way pedestrian traffic. At least 3 meters wide is adviseable. The Contractor shall put measures in place to ensure that no vehicles can enter and use the walkway. Barricading and the walkway itself shall be properly maintained at all times.	L4	E & ENG	Safety Officer & Supervisors & Construction Manager.
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21	Excavations.	Fall into excavations	Excavations excavated in an unsafe manner could collapse with subsequent injuries and fatalities or even damages to adjacent structures/services with resultant claims and costs. Excavations that are not suitably barricaded could result in employees, other persons, animals or even vehicles falling into them resulting in	H12	<p>All our excavation work will comply with the following:</p> <p>a. Excavation work will be carried out under the supervision of a competent person with at least two years practical experience in excavation work who has been appointed in writing.</p> <p>b. Before excavation work begins the stability of the ground will be evaluated.</p> <p>c. Whilst excavation work is being performed, we will take suitable and sufficient steps to prevent any person from being buried or trapped by a fall or dislodgement of material.</p> <p>d. No person may be required or permitted to work in an excavation that has not been adequately shored or braced.</p> <p>e. Where the excavation is in stable material or where the sides of the excavation are sloped back to at least the maximum angle of repose measured relative to the horizontal plane, shoring or bracing may be left out but only after written permission has been obtained from the appointed competent person.</p> <p>f. Shoring and bracing will be designed and constructed to safely support the sides of the excavation and prevent it from collapsing.</p>	L4	E & ENG & S & A	E	Safety Officer & Excavation Supervisor & Supervisors & Construction Manager.
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		Loads placed on sides of excavation.	damages, injuries or even fatalities.		<p>g. Where uncertainty exists regarding the stability of the soil the opinion of a competent professional engineer or professional technologist will be obtained, before excavation proceeds, whose opinion will be decisive. The opinion will be in writing signed by the engineer or technologist as well as the appointed excavation supervisor.</p> <p>h. No load or material may be placed near the edge of an excavation if it is likely to cause a</p>			
			Cave-ins may occur, engulfing workers.					

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					<p>collapse of the excavation, unless suitable shoring has been installed to be able to carry the additional load. Best practice requires a one meter clearance so as to reduce the pressure on the side walls as well as risk of material falling onto persons inside the excavation. The Construction Regulation requires 900mm.</p> <p>Temporary spoil heaps must be at least 900mm from the edge of the excavations</p>  <p>The diagram shows a cross-section of an excavation. Two spoil heaps are shown on either side of the excavation. Arrows point from the text 'Temporary spoil heaps' to each heap. Another arrow points from the text 'At least 900mm' to the gap between the two spoil heaps, indicating the required clearance from the excavation edge.</p> <p>i. Every excavation will be provided with means of access that will be within 6 metres of any employee within the excavation at any time. Should ladders be utilised for this purpose they should be duly secured.</p> <p>j. The location and nature of any existing services such as water, electricity, gas, telecommunication etc, shall be established before any excavation is commenced with and any service that may be affected by the excavation will be protected and made safe for employees working in or near in the excavation.</p> <p>k. Every excavation, including the shoring and bracing or any other method to prevent a possible collapse, will be inspected</p>				<p>Safety Officer & Excavation Supervisor & Supervisors & Construction Manager.</p> <p>Excavation Supervisor & Supervisors & Construction Manager.</p> <p>Safety Officer &</p>
	No escape routes.	Workers may be trapped and cannot escape.	H12			L4	E & ENG & S & A		
	Existing services.	Electrocution and possible drowning if services are damaged.	H12			L4	E & ENG & S & A		
	No checklists done on excavations.	Hazards won't be noted in time and can cause harm to workers.	H12			L4	E & ENG & S & A		


					<p>by the appointed competent person as follows:</p> <ul style="list-style-type: none"> • Daily before work commences • After every blasting operation 			
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				H12	<ul style="list-style-type: none"> After an unexpected collapse of the excavation or part thereof After substantial damage to any support After rain l. The results of any inspections will be recorded in a register kept on site in the health and safety file.	L4	E & ENG & S & A	Safety Officer & Excavation Supervisor & Supervisors & Construction Manager.
				H12	m. Every excavation accessible to the public or that is adjacent to a public road or thoroughfare or that threatens the safety of persons, will be adequately barricaded or fenced off, on all sides, to at least one meter high and as close to the excavation perimeter as practicable. All such excavations will also be provided with warning lights or visible boundary indicators after dark or when visibility is poor.	L4	E & ENG & S & A	Safety Officer & Excavation Supervisor & Supervisors & Construction Manager.

22	Transportation of employees	Falling off transportation and traffic accidents.	The unsafe transportation of employees could result in injuries and/or fatalities with subsequent costs and claims.	H12	<p>1. Any vehicle used to transport employees will have seats firmly secured and adequate for the number of employees to be carried.</p> <p>2. Regulation 247 of the National Road Traffic Act, Number 93 of 1996 (NRTA) stipulates that the principal contractor shall not allow employees to be transported in a vehicle unless the portion of the vehicle in which the employees are being conveyed is enclosed to a height of –</p> <p>a. at least 350 mm above the surface on which employees are seated; or</p> <p>b. at least 900 mm above the surface on which employees are standing,</p>	L4	A & ENG	Safety Officer & Supervisors & Construction Manager.
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				H12	<p>in a manner and with a material of sufficient strength to prevent employees from falling from such vehicle when it is in motion.</p> <p>3. Regulation 247 of the NRTA also stipulates that the principal contractor shall also not allow any employees to be conveyed in the goods compartment of a vehicle together with any tools or goods, except their personal effects, unless that portion in which the employees are being conveyed is separated by means of a partition, from the portion in which such goods are being conveyed.</p>	L4	A & ENG	Safety Officer & Supervisors & Construction Manager.

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				M9	muscular disorders. Record thereof shall be kept. The ergonomic factors of the movement and twist of the hand with each tie, has a very negative deteriorating effect on the wrist. It is culculated that on average during an eight hour shift, the steelfixer makes 800 twists with his wrist around the steel rods. Thus, the stress on the pulse and wrist is reduced considerably.	L1	E & PPE	Safety Officer & Supervisors & Construction Manager

	Not using the proper steelfixing plyers.	<p>Health: Using any plyers other than a steelfixing plyers puts excessive stress on the wrist and arm muscles, leaving them deteriorating by almost a third time quicker. The same comments as the above point is applicable.</p>	M9	<p>The only plyers the steelfixers shall allowed to use is a genuine steelfixing plyers.</p> 	L1	E & PPE	Safety Officer & Supervisors & Construction Manager
Lifting operations when placing fixed steel baskets in trenches and at colom bases.	Suspended loads falling.	<p>Safety: A suspended load falling can cause huge damage to plant and machinery.</p> <p>Safety: If a person is struck by a falling load, it can instantly kill him.</p>	H16	<p>No person shall stand or walk underneath a suspended load. No load shall be allowed to move over any person on site. The wissle method of warning people of a suspended load above shall be used. Toolbox talks shall be used to train staff on the whissle system and the hazards of suspended loads.</p>	M6	E & PPE	Safety Officer & Supervisors & Construction Manager
	Slings breaking or coming loose. Wrong slinging	<p>Safety: If any person on site takes any old sling and ties</p>		<p>The only person allowed to tie a load to any lifting equipment, shall be a competent appointed in writing, Rigger. No other person</p>			

		methods and using the wrong slings.	the load and off we go, disaster is		shall do so. A competent Rigger knows what sling to use for what load and how to rig the			
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			<p>about to strike. A suspended load falling can cause huge damage to plant and machinery. If a person is struck by a falling load, it can instantly kill him. The cost of such an accident is tremendous.</p>	H16	<p>lifting tackle. The Rigger shall be a competent trained person. Proof of his training shall be kept in the safety file.</p> <p>All lifting tackle, ropes, wire ropes, fibre slings, hooks, shackles, etc shall be inspected as per the schedule in the OHS Act. Proof of such inspections shall be available in the lifting tackle register on site.</p> <p>Slings found to be sub-standard shall be removed and destroyed immediately. Record thereof shall be in the lifting tackle register.</p>	M6	E & PPE	Construction Manager	Safety Officer & Supervisors &
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	Pouring concrete into foundation trenches, into column bases and shuttering boxes.	Readymix truck parks close to the trench side and can fall into excavations when cave-ins occur.	Safety: The weight of a fully loaded, double axill readymix truck, with concrete, is approximately 30 tons. (Info from Wearne Randfontein) Placing this strain on the sidewalls, with the vibration generated by the truck, may cause the sides of the excavation giving way and then we have a cave-in. The workers directing and placing the concrete inside the prepared excavation	M9	<p>The readymix truck shall park at least 3 meters from the sidewalls of the excavation. When excavating and placing the spoil heaps, the parking space and movement of the readymix truck, shall be taken into consideration.</p> <p>A rescue plan shall be in place for extracting and saving victims burried underneath cave-in soil in an excavation. The rescue plan shall be practiced at least every 3 months and record thereof shall be kept in the safety file. An emergency plan shall be designed and prepared to act as the guide on how to handle all anticipated emergencies on site. All the staff shall be trained in the emergency plan and proof thereof shall be kept in the safety file.</p> <p>Convenient and safe means of escape and access shall be provided to every excavation in which persons are required to work, and such access or escape route shall not be further than six meters from the point where</p>	L4	E & PPE	Safety Officer & Supervisors & Construction Manager
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			then have a huge possibility of being burried under the caved-in soil and dying.		any worker within the excavation is working.			

	Workers stand inside the concrete with shovels moving and directing the pouring concrete.	<ul style="list-style-type: none"> • Tripping & falling. • Concrete spatter. • Wet cement. 	<p>Safety: Workers stand inside the pouring concrete with their feet amongst the steel reinforcing. It is very easy to lose your balance and fall in the concrete. Feet are often caught between the reinforcing injuring legs, ankles and feet seriously.</p> <p>Workers can develop Dermatitis when constantly coming into contact with wet cement.</p> <p>Health: Concrete spatter can go into the eyes injuring the eyes. Normally a person is disorientated when they close their eyes if something like concrete enters the eye. This can cause them to lose their</p>	<p>L3</p> <p>L3</p> <p>L3</p>	<p>Workers standing inside the wet concrete shall be issued with gum boots to protect their legs from getting into contact with the wet concrete.</p> <p>Workers exposed to wet cement shall be taken for a medical test to determine whether they have developed dermatitis and they shall be treated by proper doctors.</p> <p>A risk assessment shall be conducted by the principle contractor's to determine exactly what kind of eye protection to implement for workers where they have the risk of concrete splatter in their eyes.</p>	<p>L1</p> <p>L1</p> <p>L1</p>	<p>PPE</p> <p>PPE</p> <p>PPE</p>	<p>Safety Officer & Supervisors & Construction</p> <p>Manager</p> <p>Safety Officer & Supervisors & Construction</p> <p>Manager</p>
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	 538		balance and fall. Concrete spatter contains sand particles that can damage the eye if not properly cared for.					

	Assembling formwork using shuttering.	<ul style="list-style-type: none"> • Heavy panels falling. • Nipping of fingers. • Manual lifting too heavy. 	<p>Safety: These shutter panels are long and quite large. They are usually assembled on two tressles. When manhandling them they often slip from the hands of the workers and injure the lower body, specially legs and feet. When attaching panels to each other fingers and hands can be caught between the panels, nipping the hand or finger. This is very painfull and can be very forcefull crushing hand bones.</p> <p>Health: Muscle strain from too heavy manual lifting of panels can cause muscles being torn and serious permanent back injuries.</p>	<p>H12</p> <p>L2</p>	<p>Rather have an extra hand working in the team that assembles the formwork. If they are too little men, the chance of injury is increased. Your own PPE risk assessment will show what PPE will be prescribed for hand protection. Our suggestion is leather gloves. Again, workers shall be sent for medicals to do a fitness test. Training shall be provided on the ergonomics of manual handling.</p>	<p>L4</p> <p>L1</p>	<p>E & PPE</p> <p>E & PPE</p>	<p>Safety Officer & Supervisors & Construction Manager</p> <p>Safety Officer & Supervisors & Construction Manager</p>
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			Health: When covering the inside of the panels with shutter oil, bare skin can be contaminated with the shutter oil which can also cause serious Dermatitis, increasing the chances of contracting it over prolonged contamination.	L4	No person shall be allowed to come into contact with shutter oil without his/her skin being properly protected from contamination. Your risk assessment will indicate what protection to wear.	L4	E & PPE	Safety Officer & Supervisors & Construction Manager

	Lifting column formwork, placing and stabilising it.	Boxed panels are unstable. It cannot stand on its own.	Safety: The panels, if assembled in a box form, is very heavy and usually more than 6 meters in height or, when upright, more than 6 meters high. It cannot stand on its own and are usually supported with stays that keep it upright and in place. If it falls over, it can seriously hurt a person, quite possible cause someone's death.	H12	Care shall be taken with the lifting operations and with the placing of the panel on the exact right spot. It shall be done mechanically. The rigging shall be done by a competent, appointed in writing, Rigger. The box shall be stabilized properly with at least one stay of sturdy design on each side, holding it in place. It shall be listed on your temporary works register and checklists.	M6	E & PPE	Safety Officer & Supervisors & Construction Manager
		Box is not plumb (level)	Financial: If the box is not plumb it will cause the column not to be straight. It will have to be	M6	The principal contractor shall make 100% sure that the shuttered boxes are absolutely plumb before casting.	L2	E & PPE	


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		Suspended loads falling.	<u>Safety:</u> A suspended		No person may stand or walk underneath a suspended load. No load may be allowed to move over any person on site. The wistle method of warning people of a suspended load above may be used.	M6	E & PPE	

	Lifting operations when placing boxed shuttering panels in their place on the column bases.		load falling can cause huge damage to plant and machinery. Safety: If a person is struck by a falling load, it can instantly kill him.	H12					Safety Officer & Supervisors & Construction Manager
	Preparation for pouring concrete into boxed shuttering.								

		Slings braking or coming loose. Wrong slinging methods and using the wrong slings.	Safety: If any person on site takes any old sling and ties the load and off we go, disaster is about to strike. A suspended load falling can cause huge damage to plant and machinery. If a person is struck by a falling load, it can instantly kill him. The cost of such an accident is tremendous.	H12	<p>The only person allowed to tie a load to any lifting equipment, is a competent appointed in writing, Rigger. No other person may do so. A competent Rigger knows what sling to use for what load and how to rig the lifting tackle.</p> <p>All lifting tackle, ropes, wire ropes, fibre slings, hooks, shackles, etc must be inspected as per the schedule in the OHS Act. Proof of such inspections must be available in the lifting tackle register on site.</p>	M6	E & PPE	Safety Officer & Supervisors & Construction Manager
		Shuttering boxes may "kick" and break open when concrete is placed inside them.	Safety: If by some means the column shuttering breaks open and the concrete washes out, workers may be seriously injured. All the concrete will be wasted and money lost.	L4	<p>The principal contractor shall appoint a temporary works designer in writing to design, inspect and approve the erected boxed shuttering (temporary works) on site, before casting the concrete.</p> <p>The principal contractor shall insure that all shuttering work (temporary works) are done under close supervision of the above appointed person.</p>	L1	E & PPE	

Safety Officer & Supervisors & Construction Manager								
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					The principal contractor shall not cast concrete, until authorization in writing has been given by the appointed competent temporary works designer. The formwork must be inspected immediately before, during and after the placement of concrete, after inclement weather and at least on a daily basis, until the shuttering has been removed and the results have been recorded in a register and made available on site.	L1	E & PPE	Safety Officer & Supervisors

	<p>Pouring concrete into boxed shuttering.</p> 	Falling from height.	<p>Safety: During the pouring operations, workers will be working high (6 meters) at the opening of the shuttering and controlling the bucket. Getting pushed by the bucket, losing balance is a real possibility. Serious injuries can be sustained, even death.</p>	H12	<p>No person shall stand on a ladder at that height, assisting with the guiding of the bucket and pouring of the concrete. Scaffolding shall be built around the shuttering. The platform shall be packed full of footboards. Yes, there will be an opening where the shuttering is. That opening shall be covered by shutterboard that is strengthened and so placed to cover the opening this opening cover shall be used over and over again at all the columns.</p> <p>The scaffolding shall be inspected and declared safe for use by the principal's appointed scaffold Inspector, before it shall be used. The scaffolding shall have handrails. All persons working in this operation shall also wear safety harnesses.</p> <p>All workers working at heights shall be trained in working at heights. Proof of such training shall be in the safety file. The Contractor shall design a fall protection plan and shall adhere to it. Safety harnesses shall be issued to all staff working on scaffolding. They shall be trained in the use thereof and proof of such</p>	M6	E & PPE	<p>Safety Officer & Supervisor & Construction</p>
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						Residual		
No	Activity Steps What you do, NOT how you do it	Hazards identified What can go wrong?	Risks Identified What damage, hurt or illness can occur?	Raw Risk Score	Control Measures (Safe Work Procedure)	Risk New score after control measures	HOC Ranking selected	Action By
					training shall be kept in the safety file. Each safety harness shall be recorded on a register and inspected daily by a competent person on a relevant checklist. Proof thereof shall be kept in the safety file.			

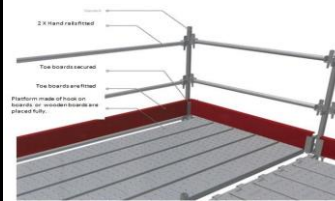
	Removing shuttering.	Falling from height. Nipping of fingers. Panels falling. Manual lifting panels are too heavy for one person. Concrete not settled.	Safety: During the dismantling operations, workers will be working at a height of at least 6 meters. Getting pushed by the rigged load, loosing balance is a real possibility. Serious injuries can be sustained, even death. If the concrete hasn't settled yet, the concrete will fall off and this is a huge expense to do it all over again. When manually trying to lift or hold in place the loosened two halves of the shuttering, workers may let it fall because of the heavy weight. Hand injuries from uncontrolled movement and	H12	Shuttering shall not be allowed to simply fall to the ground, It shall be slowly let down and controlled by either a crane or some mechanical device. If panels are dismantled one by one, piece by piece, there shall be enough workers to share the load to prevent it from falling. Constant supervision shall be present. You shall make sure there are enough workers to share the load of the heavy shuttering panels. The shuttering shall not be removed until the Temporary designer has given permission in writing to remove the shuttering.	M6	E & PPE	Safety Officer & Supervisors & Construction Managers
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						Residual		
No	Activity Steps What you do, NOT how you do it	Hazards identified What can go wrong?	Risks Identified What damage, hurt or illness can occur?	Raw Risk Score	Control Measures (Safe Work Procedure)	Risk New score after control measures	HOC Ranking selected	Action By

			bumping of the shutters is eminent. Back injuries may occur when manual handling too heavy pieces alone or with too little help.					
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	Scaffolding use	Fall from scaffolding. Scaffold collapse	<p>Safety: Scaffolding that is not erected and assembled according to official drawings, poses a hazard of being unsafe, of inferior quality and strength, to withstand required loads. Structures are all built to the specifications of drawings. But somehow scaffolding are not. One can easily recognize scaffolding that was built without drawings. No handrails, platforms are not packed full of boards, it's not stable, not braced and never has any safe means of access.</p>	H12	<p>All scaffolding on site shall have drawings and shall be assembled according to the drawings. All scaffolding on site, whether completed or not, certified safe or not, shall be listed on a register. When a scaffolding structure has been assembled and certified safe for use and a sign posted to indicate it is safe for use, it shall be handed over to the Supervisor of the team who is going to work on it. This shall be done in writing. All scaffolding on register shall be inspected daily, or if any changes on the structure was made. The checklist shall be signed by the person doing the check and signed off by management. Any discrepancies noted shall immediately be actioned and action taken shall be noted on the checklist. No discrepancy shall be carried over to the next days checklist. Your scaffolding shall have some kind of identification on them to identify them.</p> <p>You shall post symbolic signs on your scaffold structures, at least the following:</p> <ul style="list-style-type: none"> ■ Safe/unsafe for use ■ Warn the workers that this is hard hat area <p>The principal contractor must have the</p>	M6	E & PPE	<p>Safety Officer & Supervisors & Construction Manager</p>
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			<p>Falling from heights, as already mentioned, causes more deaths than any other activity on a construction site. Falling from and falling scaffolding is a big culprit in the deaths and serious injuries.</p>	<p>H12</p>	<p>following competent persons appointed in writing when they have scaffolding on site:</p> <ul style="list-style-type: none"> • Scaffold Supervisor • Scaffold Team Leader • Scaffold Inspector • Scaffold Erectors <p>Competent, in short, means that the above persons shall have accredited certificates as per the safety standards incorporated for this purpose into the OHS Act Regulations under section 44 of the Act. (SANS 10085-1:2004, Edition 1.1)</p> <p>Each scaffold structure shall be numbered to enable someone to identify the scaffold as per your scaffold register.</p> <p>Your scaffold supervisor shall hand over the scaffolding structure to the person who requested the scaffold. The handover will be done after a thorough inspection of the scaffold. The scaffold supervisor shall hand over a signed certificate to the person who shall in turn sign the certificate as proof of accepting the scaffold structure as safe and secure.</p> <p>Scaffolding shall at least be of the standard shown here.</p>	<p>M6</p>	<p>E & PPE</p>	<p>Safety Officer & Supervisors & Construction Manager</p>
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**Residual**

No	Activity Steps What you do, NOT how you do it	Hazards identified What can go wrong?	Risks Identified What damage, hurt or illness can occur?	Raw Risk Score	Control Measures (Safe Work Procedure)	Risk New score after control measures	HOC Ranking selected	Action By
					<p>Symbolic safety signs that comply with the requirements for MV 3 ("Head protection shall be worn") of SANS 1186-1 and of size at least 205 mm × 205 mm shall, if not already required in terms of general site signage, shall be placed at or be attached to the nearest entry point to the scaffolding.</p> <p>Symbolic safety signs shall be used to warn the public, and shall either be attached to the entry point to the scaffolding, or be placed at a prominent position. The symbolic safety signs shall be the appropriate of the following types (see SANS 1186-1):</p> <ul style="list-style-type: none"> a) to warn the public of scaffolding operations (general warning of hazard); b) to warn the public of suspended scaffolding operations; c) to prevent workers from using incomplete scaffolding; and d) to advise workers that scaffolding is safe for use. 			

					<p>All scaffolding shall be carefully inspected by a person competent in scaffolding supervision, erection and maintenance at least once a week.</p> <p>All scaffolding shall be inspected immediately after inclement weather, after any mishap resulting in jarring, tilting or overloading, after alterations, and before dismantling to ensure that ties are at suitable positions for safe dismantling.</p> <p>Special attention shall be given to the condition of cables, ropes, winches, hoists, ties, baseplates and access ladders.</p> <p>The results of all inspections shall be recorded in the scaffold inspection register</p>			
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						Residual		
No	Activity Steps What you do, NOT how you do it	Hazards identified What can go wrong?	Risks Identified What damage, hurt or illness can occur?	Raw Risk Score	Control Measures (Safe Work Procedure)	Risk New score after control measures	HOC Ranking selected	Action By

	Traffic accommodation. Setting up the bypasses/temporary roads and placing the traffic signs. (Circle and access roads)	Public traffic.	Active public/traffic - workers placing signs can be struck by traffic and seriously injured or even killed.	H12	<p>The truck loaded with the traffic signs must park well off the tarred surface of the road, safely out of the way of the traffic on the road.</p> <p>The workers may only get off the vehicle and offload the truck from the back and the left side of the truck. Toolbox Talks must be done at the start of operations on site, explaining this rules to all the workers.</p> <p>Every employee must wear a high visibility reflective bib when working on site. This will make them more visible to oncoming traffic.</p> <p>No employee may talk on their cellphones when working on the road or in the road reserve. People tend to not concentrate on surroundings and start walking and wondering around when talking on the cellphones. There are documented cases where road workers has wondered in front of oncoming traffic.</p>	M6	E & PPE	Safety Officer & Supervisors & Construction Manager
			Placing the wrong signs with the wrong distances between them may cause confusion amongst motorists. Not reducing speed at the planned set distances may cause serious accidents. This may also leave The Client at risk of criminal and civil suits.	M6	Before placing the signs and setting up the GoStop, the team supervisor shall be briefed by the Construction Manager and will make sure that the supervisor understands that the signs must be placed strictly according to the lay-out plan. The lay-out will be physically checked and approved by the resident Engineer.	L4	E & PPE	Safety Officer & Supervisors & Construction Manager




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	Placing Flagpersons to warn the traffic	Untrained Flag persons	<p>Using sub-standard signs that is in a bad state, or cheap signs that isn't made to specifications, may also cause motorists not to be able to properly read, assess and react to the signs. This of course may be the cause of serious accidents.</p> <p>Placing Flagpersons that are not properly trained or not trained at all, places motorists and workers at risk of making and being in an accident. Incompetent Flagpersons tend not to enthusiastically flag down traffic. Tired Flagpersons tend to just stand there with their flags and not wave it after a few hours on duty. They loose their effectiveness.</p>	<p>M6</p> <p>M6</p>	<p>Signs that is in a bad state and potentially not readable will be discarded of immediately. The Resident Engineer and all of management must alert the traffic Officer immediately when a redundant sign is discovered. Cheap signs that is inferior and even smaller that that specified in the bill will not be allowed on site. Only signs that is made to specifications will be bought for the site.</p> <p>The principal contractor shall not appoint a Flagperson that is not trained and in posession of proof of training. We have our own internal training that we do with Flagpersons. Each Flagperson signs an attendance register after being trained.</p> <p>The training shall be done by an accredited service provider and they shall keep training records in the safety file. They will also be trained in the standard flagging techniques as described in the SARTSM, figure 13.23 of detail 13.23.1.</p> <p>They will always have fresh cold water and encouraged to drink a lot of water to prevent heat exhaustion. All Flagpersons must be issued with wide brimmed hats to protect them from the sun.</p> <p>During daytime, at least two Flagpersons will be provided at each Go-Stop station, one Flagperson athe first speed reduction point at</p>	<p>L4</p> <p>L4</p>	<p>E & PPE</p> <p>E & PPE</p>	<p>Construction Manager</p> <p>Safety Officer & Supervisors &</p>
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			Flagpersons step onto the tar and are run over by traffic.						Safety Officer & Supervisors & Construction Manager
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						Residual		
No	Activity Steps What you do, NOT how you do it	Hazards identified What can go wrong?	Risks Identified What damage, hurt or illness can occur?	Raw Risk Score	Control Measures (Safe Work Procedure)	Risk New score after control measures	HOC Ranking selected	Action By
				M6	<p>600 meters from the Go-Stop station, and the other roving Flagperson at least 100 meters behind the last vehicle in the queue to indicate to the traffic to stop. At nighttime all Flagpersons and robot operators will be equipped with a suitable visibly strobe, and torch at each GoStop station. No Flagperson will be on duty for more than 10 hours per 24 hour day.</p> <p>In terms of lateral clearance and safety, Flagpersons will stand on the shoulder of the lane of traffic that is being controlled and under no circumstances will Flagpersons be permitted to stand within the traffic lane. In order to ensure maximum visual impact for the travelling public, Flagpersons will stand alone.</p>	L4	E & PPE	Safety Officer & Supervisors & Construction Manager

	Advance warning area at the Circle	No clear instructions and information to motorists.	Motorists are not sure what is expected of them and make fatal mistakes. If the instructions via the traffic signs are not clear, motorists also get confused. The transition area is a critical area, this is where motorists are expected to switch lanes. If the deliniators are too far apart, it doesn't indicate clearly the route to follow and again, mistakes can	M6	Signage shall be clear, as indicated on the layout plan. The robot will always work. A backup battery will be available to ensure the robot is in a working condition. Deliniators will be placed as a "barrier," at least 1 meter apart. Placed at an angle it appears to the motorist as a barricade with no huge gaps to drive through. They will now follow the deliniator line into the transition area, following the correct route. The speed limit is 40 km/h from then on. The signage shall be inspected daily and replace all broken deliniators. Our lay-out plan has been tested on other sites and has proven it's happen with serious consequences.	L2	E & PPE	Safety Officer & Supervisors & Construction Manager
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			close proximity of public traffic are sometimes not clearly visible to motorists. We have heard drivers saying, "but I didn't see him."		<p>All employees shall be issued with high visibility reflective vests.</p> 			<p>Safety Officer & Supervisors & Construction Manager</p>
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	Placing toilets on site.		<p>On a road site it is very difficult to spot and identify who the actual employees are. Members of the public can wonder around on site amongst our employees without anyone knowing. They can be seriously hurt.</p> <p>Hygiene on site and personal hygiene are neglected on sites concerning mobile toilets. They are not cleaned daily and not emptied regularly. Chemical agent is not added to the tank. A deoderant agent is not added to the water in the toilet flush tank. Employees tend to make a huge mess of the toilet, seats are wet, toilet paper on the floor, the toilet is not flushed, etc. There is only one toilet and must be used by both men and ladies.</p>	L4	<p>Any person spotted on site not wearing his/her reflective bib is a suspected member of the public. Action must be taken immediately by management and Safety Reps on site. Everyone must make sure that only employees are in the workzone.</p> <p>The OHS Act and the Construction Regulation 2014 stipulates that one toilet must be provided for every 30 persons. The OHS Act also stipulate that toilets must be demarcated "Male" and "Female." Bearing this in mind, we will supply two toilets at each Go-Stop station. Two toilets will also be placed with each group in the workzone. The robot operator will do a daily toilet inspection checklist on the toilets at the Go-Stop stations. The safety Representative of each group of workers in the workzone will do their checklists on the toilets at their group.</p> <p>Toolbox Talks shall be held to educate the employees on personal and toilet hygiene.</p>	L1	E & PPE	<p>Safety Officer & Supervisors & Construction Manager</p>
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No	Activity Steps What you do, NOT how you do it	Hazards identified What can go wrong?	Risks Identified What damage, hurt or illness can occur?	Raw Risk Score	Control Measures (Safe Work Procedure)	Residual	HOC Ranking selected	Action By
						Risk New score after control measures		
	Placing water on site.	Ambient atmospheric temperature.	Heat exhaustion is a real threat on site in the African sun. Physical work on a road construction contract, in the hot sun, makes you lose a lot of water in the form of perspiration. We need to replenish our body water regularly. Often, clean, cold drinking water is not supplied to employees on site. Heat exhaustion can be fatal.	L4	Clean, cold drinking water shall be supplied to every group working in the workzone. The water issue and heat exhaustion will also be a Toolbox Talk topic from time to time.	L1	E & PPE	Safety Officer & Supervisors & Construction Manager

(i)

C3.3.3.2 ENVIRONMENTAL MANAGEMENT PLAN**CONTENTS**

C3.3.3.2.1	SCOPE
C3.3.3.2.2	DEFINITIONS
C3.3.3.2.3	IDENTIFICATION OF ENVIRONMENTAL ASPECTS AND IMPACTS
C3.3.3.2.4	LEGAL REQUIREMENTS
C3.3.3.2.5	ADMINISTRATION OF ENVIRONMENTAL OBLIGATIONS
C3.3.3.2.6	TRAINING
C3.3.3.2.7	ACTIVITIES/ASPECTS CAUSING IMPACTS
C3.3.3.2.8	ENVIRONMENTAL MANAGEMENT OF CONSTRUCTION ACTIVITIES
C3.3.3.2.9	RECORD KEEPING
C3.3.3.2.10	COMPLIANCE AND PENALTIES
C3.3.3.2.11	MEASUREMENT AND PAYMENT

C3.3.3.2.1 SCOPE

This environmental management programme (EMP) sets out the methods by which proper environmental controls are to be implemented by the contractor. The duration over which the contractor's controls shall be in place cover the construction period of the project as well as the limited time after contract completion defined by the General Conditions of Contract, and the project specifications, as the defects notification period (maintenance period).

The provisions of this EMP are binding on the contractor during the life of the contract. They are to be read in conjunction with all the documents that comprise the suite of documents for this contract. In the event that any conflict occurs between the terms of the EMP and the project specifications or Record of Decision, the terms herein shall be subordinate.

The EMP is a dynamic document subject to similar influences and changes as are brought by variations to the provisions of the project specification. Any substantial changes shall be submitted to the UNIVERSITY OF VENDA in writing for approval.

The EMP identifies the following:

Construction activities that will impact on the environment.

Specifications with which the contractor shall comply in order to protect the environment from the identified impacts.

Actions that shall be taken in the event of non-compliance.

C3.3.3.2.2 DEFINITIONS

Alien Vegetation: alien vegetation is defined as undesirable plant growth which shall include, but not be limited to, all declared category 1 and 2 listed invader species as set out in the Conservation of Agricultural Resources Act (CARA) regulations. Other vegetation deemed to be alien shall be those plant species that show the potential to occupy in number, any area within the defined construction area and which are declared to be undesirable.

Construction Activity: a construction activity is any action taken by the contractor, his subcontractors, suppliers or personnel during the construction process as defined in the South African National Roads Agency Limited and National Roads Act, 1998 (Act No. 7, 1998)

Environment: environment means the surroundings within which humans exist and that could be made up of -

- the land, water and atmosphere of the earth;
- micro-organisms, plant and animal life;
- any part or combination of (i) and (ii) and the interrelationships among and between them; and
- the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

Environmental Aspect: an environmental aspect is any component of a contractor's construction activity that is likely to interact with the environment.

Environmental Impact: an impact or environmental impact is the change to the environment, whether desirable or undesirable, that will result from the effect of a construction activity. An impact may be the direct or indirect consequence of a construction activity.

Record of Decision: a record of decision is a written statement from the Limpopo Department of Economic Development, Environment and Tourism, that records its approval of a planned undertaking to improve, upgrade or rehabilitate a section of road and the mitigating measures required to prevent or reduce the effects of environmental impacts during the life of a contract.

Road Reserve: the road reserve is a corridor of land, defined by co-ordinates and proclamation, within which the road, including access intersections or interchanges, is situated. A road reserve may, or may not, be bounded by a fence.

Road Width: for the purposes of the EMP, the road width is defined as the area within the road reserve i.e. fence line to fence line, but also includes all areas beyond the road reserve that are affected by the continuous presence of the road, e.g. a reach of a water course.

C3.3.3.2.3 IDENTIFICATION OF ENVIRONMENTAL ASPECTS AND IMPACTS

The contractor shall identify likely aspects before commencing with any construction activity. Examples of environment aspects include:

- waste generation
- stormwater discharge
- emission of pollutants into the atmosphere
- chemical use operations
- energy use operations
- water use operations
- use of natural resources
- noise generation

Thereafter the contractor shall programme his work in such a way that each cause and effect of a construction activity is also identified and the activity planned so as to prevent any impact from happening. If prevention is not practicable, or in the event of mishap or misapplication, the contractor shall provide plans and measures for the engineer's approval, which will limit and contain the magnitude, duration and intensity of the impact. The contractor shall demonstrate that he/she is capable of carrying out any repair and reinstatement of the damaged environment. These requirements shall be concurrent with the time constraints to produce an approved construction programme according to subclause 8.3 as amended by Particular Condition of the general conditions of contract and clause B1204 of these project specifications.

Listed below are some environmental impacts that could adversely alter an aspect of the environment through usual construction activities:

Pollution of atmosphere, soil or water

Destruction or removal of fauna and flora and effect on biological diversity

Deformation of the landscape

Soil erosion

Destruction of historical/heritage sites

Effect on the built environment

Effect on agricultural land and wetlands

General good construction practice will play an important role in avoiding the occurrence of an Impact. The contractor's attention is drawn, in this regard, to C1008. Environmental Management of Construction Activities

C3.3.3.2.4 LEGAL REQUIREMENTS

a) General

Construction will be according to the best industry practices, as identified in the project documents. This EMP, which forms an integral part of the contract documents, informs the contractor as to his duties in the fulfilment of the project objectives, with particular reference to the prevention and mitigation of environmental impacts caused by construction activities associated with the project. The contractor should note that obligations imposed by the EMP are legally binding in terms of environmental statutory legislation and in terms of the additional conditions to the general conditions of contract that pertain to this project. In the event that any rights and obligations contained in this document contradict those specified in the standard or project specifications then the latter shall prevail.

b) Statutory and other applicable legislation

The contractor is deemed to have made himself conversant with all legislation pertaining to the environment, including provincial and local government ordinances, which may be applicable to the contract.

C3.3.3.2.5 ADMINISTRATION OF ENVIRONMENTAL OBLIGATIONS

a) Appointment of a Designated Environmental Officer (DEO)

For the purposes of implementing the conditions contained herein, the contractor shall submit to the engineer for approval the appointment of a nominated representative of the contractor as the DEO for the contract. The request shall be given, in writing, at least fourteen days

before the start of any work clearly setting out reasons for the nomination, and with sufficient detail to enable the engineer to make a decision. The engineer will, within seven days of receiving the request, approve, reject or call for more information on the nomination. Once a nominated representative of the contractor has been approved he/she shall be the DEO and shall be the responsible person for ensuring that the provisions of the EMP are complied with during the life of the contract. The engineer will be responsible for issuing instructions to the contractor where environmental considerations call for action to be taken. The DEO shall submit regular written reports to the engineer, but not less frequently than once a month.

The engineer shall have the authority to instruct the contractor to replace the DEO if, in the engineer's opinion, the appointed officer is not fulfilling his/her duties in terms of the requirements of the EMP or this specification. Such instruction will be in writing and shall clearly set out the reasons why a replacement is required.

There shall be an approved DEO on the site at all times.

b) Administration

Before the contractor begins each construction activity the DEO shall give to the engineer a written statement setting out the following:

The type of construction activity.

Locality where the activity will take place.

Identification of the environmental aspects and impacts that might result from the activity.

Methodology for impact prevention for each activity or aspect.

Methodology for impact containment for each activity or aspect.

Emergency/disaster incident and reaction procedures.

Treatment and continued maintenance of impacted environment.

The contractor may provide such information in advance of any or all construction activities provided that new submissions shall be given to the engineer whenever there is a change or variation to the original.

The engineer may provide comment on the methodology and procedures proposed by the DEO, but he shall not be responsible for the contractor's chosen measures of impact mitigation and emergency/disaster management systems. However, the contractor shall demonstrate at inception and at least once during the contract that the approved measures and procedures function properly.

c) Good Housekeeping

The Contractor shall undertake "good housekeeping" practices during construction as stated in clause 1217 of the COLTO Standard Specifications for Roads and Bridges and subclauses 4.3.1 and 4.3.2 of the General Conditions of Contract. This will help avoid disputes on responsibility and allow for the smooth running of the contract as a whole. Good housekeeping extends beyond the wise practice of construction methods that leaves production in a safe state from the ravages of weather to include the care for and preservation of the environment within which the site is situated.

C3.3.3.2.6 TRAINING

The designated environmental officer (DEO) must be conversant with all legislation pertaining to the environment applicable to this contract and must be appropriately trained in environmental management and must possess the skills necessary to impart environmental management skills to all personnel involved in the contract.

The contractor shall ensure that adequate environmental training takes place. All employees shall have been given an induction presentation on environmental awareness. Where possible, the presentation needs to be conducted in the language of the employees. The environmental training should, as a minimum, include the following:

- The importance of conformance with all environmental policies
- The environmental impacts, actual or potential, of their work activities;
- The environmental benefits of improved personal performance;
- Their roles and responsibilities in achieving conformance with the environmental policy and procedures and with the requirement of the Agency's environmental management systems, including emergency preparedness and response requirements;
- The potential consequences of departure from specified operating procedures;
- The mitigation measures required to be implemented when carrying out their work activities.

In the case of permanent staff the contractor shall provide evidence that such induction courses have been presented. In the case of new staff (including contract labour) the contractor shall inform the engineer when and how he/she intends concluding his environmental training obligations.

C3.3.3.2.7 ACTIVITIES/ASPECTS CAUSING IMPACTS

A list of possible causes of environmental impacts that occur during construction activities is given in Table 7/1: Aspects or Activities that Cause Environmental Impacts during Construction Activities, which is to be found at the end of this part. This list is not exhaustive, and shall be used for guideline purposes only.

C3.3.3.2.8 ENVIRONMENTAL MANAGEMENT OF CONSTRUCTION ACTIVITIES

a) Site Establishment

i) Site Plan

The contractor shall establish his construction camps, offices, workshops, staff accommodation and testing facilities on the site in a manner that does not adversely affect the environment. However, before construction can begin, the contractor shall submit to the engineer for his approval, plans of the exact location, extent and construction details of these facilities and the impact mitigation measures the contractor proposes to put in place.

The plans shall detail the locality as well as the layout of the waste treatment facilities for litter, kitchen refuse, sewage and workshop-derived effluents. The site offices should not be sited in close proximity to steep areas, as this will increase soil erosion. Preferred locations would be flat areas along the route. If the route traverses water courses, streams and rivers, it is recommended that the offices, and in particular the ablution facilities, aggregate stockpiles, spoil areas and hazardous material stockpiles are located as far away as possible from any water course as possible. Regardless of the chosen site, the contractor's intended mitigation measures shall be indicated on the plan. The site plan shall be submitted not later than the first site meeting. Detailed, electronic colour photographs shall be taken of the proposed site before any clearing may commence. These records are to be kept by the engineer for consultation during rehabilitation of the site. Read with COLTO Specification 1302(a), 1402 (e).

ii) Vegetation

The contractor has a responsibility to inform his staff of the need to be vigilant against any practice that will have a harmful effect on vegetation.

The natural vegetation encountered on the site is to be conserved and left as intact as possible. Vegetation planted at the site shall be indigenous and in accordance with instructions issued by the engineer. Only trees and shrubs directly affected by the works, and such others as may be indicated by the engineer in writing, may be felled or cleared. In wooded areas where natural vegetation has been cleared out of necessity, the same species of indigenous trees as were occurring, shall be re-established.

The project specification for the rehabilitation of the grass cover shall be strictly adhered to. Any proclaimed weed or alien species that propagates during the contract period shall be cleared by hand before seeding. (Read in conjunction with COLTO Specification 5801(b), 5802(b), (c), (d) and (e), 5804, 5805, 5806 and 5807). Fires shall only be allowed in facilities or equipment specially constructed for this purpose. A firebreak shall be cleared and maintained around the perimeter of the camp and office sites.

iii) Rehabilitation

The area where the site offices were erected will require rehabilitation at the end of the contract. All construction material, including concrete slabs and braai areas shall be removed from the site on completion of the contract.

iv) Water for human consumption

Water for human consumption shall be available at the site offices and at other convenient locations on site.

All effluent water from the camp / office sites shall be disposed of in a properly designed and constructed system, situated so as not to adversely affect water sources (streams, rivers, pans dams etc). Only domestic type wastewater shall be allowed to enter this drain.

v) Heating and Cooking fuel

The contractor shall provide adequate facilities for his staff so that they are not encouraged to supplement their comforts on site by accessing what can be taken from the natural surroundings. The contractor shall ensure that energy sources are available at all times for construction and supervision personnel for heating and cooking purposes.

b) Sewage treatment

Particular reference in the site establishment plan shall be given to the treatment of sewage generated at the site offices, site laboratory and staff accommodation and at all localities on the site where there will be a concentration of labour. Sanitary arrangements should be to the satisfaction of project management, the local authorities and legal requirements.

Safe and effective sewage treatment will require one of the following sewage handling methods: septic tanks and soak-aways, dry-composting toilets such as “enviro loos”, or the use of chemical toilets which are supplied and maintained by a subcontractor. The type of sewage treatment will depend on the geology of the area selected, the duration of the contract and proximity (availability) of providers of chemical toilets. Should a soak-away system be used, it shall not be closer than 800 metres from any natural water course or water retention system. The waste material generated from these facilities shall be serviced on a regular basis. The positioning of the chemical toilets shall be done in consultation with the engineer. Read with COLTO Specifications 1402(g) and 1404(a).

Toilets and latrines shall be easily accessible and shall be positioned within walking distance from wherever employees are employed on the works. Use of the veld for this purpose shall not, under any circumstances, be allowed.

Outside toilets shall be provided with locks and doors and shall be secured to prevent them from blowing over. The toilets shall also be placed outside areas susceptible to flooding. The contractor shall arrange for regular emptying of toilets and shall be entirely responsible for enforcing their use and for maintaining such latrines in a clean, orderly and sanitary condition to the satisfaction of the engineer.

c) Waste Management

The contractor's intended methods for waste management and waste minimisation shall be implemented at the outset of the contract. All personnel shall be instructed to dispose of all waste in the proper manner.

i) Solid Waste

Solid waste shall be stored in an appointed area in covered, tip proof metal drums for collection and disposal. A refuse control system shall be established for the collection and removal of refuse to the satisfaction of the engineer. Disposal of solid waste shall be at a Department of Water Affairs and Forestry (DWAF) licensed landfill site or at a site approved by DWAF in the event that an existing operating landfill site is not within reasonable distance from the site offices and staff accommodation. No waste shall be burned or buried at or near the site offices, nor anywhere else on the site, including the approved solid waste disposal site. Read with COLTO Specification 1404(a).

ii) Litter

No littering by construction workers shall be allowed. During the construction period, the facilities shall be maintained in a neat and tidy condition and the site shall be kept free of litter.

Measures shall be taken to reduce the potential for litter and negligent behaviour with regard to the disposal of all refuse. At all places of work the contractor shall provide litter collection facilities for later safe disposal at approved sites. (Read with COLTO Specification 1302(b)).

iii) Hazardous waste

Hazardous waste such as bitumen, tar, oils etc. shall be disposed of in a Department of Water Affairs and Forestry approved landfill site. Special care shall be taken to avoid spillage of tar or bitumen products such as binders or pre-coating fluid to avoid water-soluble phenols from entering the ground or contaminating water.

Under no circumstances shall the spoiling of tar or bituminous products on the site, over embankments, in borrow pits or any burying, be allowed. Unused or rejected tar or bituminous products shall be returned to the supplier's production plant. Any spillage of tar or bituminous products shall be attended to immediately and affected areas shall be promptly reinstated to the satisfaction of the engineer.

d) Control at the workshop

The contractor's management and maintenance of his plant and machinery will be strictly monitored according to the criteria given below, regardless whether it is serviced on the site (i.e. at the place of construction activity or at a formalised workshop).

i) Safety

All the necessary handling and safety equipment required for the safe use of petrochemicals and oils shall be provided by the contractor to, and used or worn by, the staff whose duty it is to manage and maintain the contractor's and his subcontractor's and supplier's plant, machinery and equipment.

ii) Hazardous Material Storage

Petrochemicals, oils and identified hazardous substances shall only be stored under controlled conditions. All hazardous materials e.g. tar or bitumen binders shall be stored in a secured, appointed area that is fenced and has restricted entry. Storage of tar or bituminous products shall only take place using suitable containers to the approval of the engineer.

The contractor shall provide proof to the engineer that relevant authorisation to store such substances has been obtained from the relevant authority. In addition, hazard signs indicating the nature of the stored materials shall be displayed on the storage facility or containment structure. Before containment or storage facilities can be erected the contractor shall furnish the engineer with details of the preventative measures he proposes to install in order to mitigate against pollution of the surrounding environment from leaks or spillage. The preferred method shall be a concrete floor that is bunded. Any deviation from the method will require proof from the relevant authority that the alternative method proposed is acceptable to that authority. The proposals shall also indicate the emergency procedures in the event of misuse or spillage that will negatively affect an individual or the environment.

iii) Fuel and Gas Storage

Fuel shall be stored in a secure area in a steel tank supplied and maintained by the fuel suppliers.. An adequate bund wall, 110% of volume, shall be provided for fuel and diesel areas to accommodate any leakage spillage or overflow of these substances. The area inside the bund wall shall be lined with an impervious lining to prevent infiltration of the fuel into the soil. Any leakage, spillage or overflow of fuel shall be attended to without delay.

Gas welding cylinders and LPG cylinders shall be stored in a secure, well-ventilated area.

iv) Oil and Lubricant Waste

Used oil, lubricants and cleaning materials from the maintenance of vehicles and machinery shall be collected in a holding tank and sent back to the supplier. Water and oil should be separated in an oil trap. Oils collected in this manner, shall be retained in a safe holding tank and removed from site by a specialist oil recycling company for disposal at approved waste disposal sites for toxic/hazardous materials. Oil collected by a mobile servicing unit shall be stored in the service unit's sludge tank and discharged into the safe holding tank for collection by the specialist oil recycling company.

All used filter materials shall be stored in a secure bin for disposal off site. Any contaminated soil shall be removed and replaced. Soils contaminated by oils and lubricants shall be collected and disposed of at a facility designated by the local authority to accept contaminated materials.

e) Clearing the Site

In all areas where the contractor intends to, or is required to clear the natural vegetation and soil, either within the road reserve, or at designated or instructed areas outside the road reserve, a plan of action shall first be submitted to the engineer for his approval.

The plan shall contain a photographic record and chainage/land reference of the areas to be disturbed. This shall be submitted to the engineer for his records before any disturbance/stockpiling may occur. The record shall be comprehensive and clear, allowing for easy identification during subsequent inspections.

The contractor shall be responsible for the re-establishment of grass within the road reserve boundaries for all areas disturbed during road construction. This includes, for example, service

roads, stockpile areas, stop/go facilities, windrows and wherever material generated for, or from, road construction has to be stored temporarily or otherwise within the road reserve, or at designated or instructed areas outside the road reserve. This responsibility shall extend until expiry of the defects notification period.

f) Soil Management

i) Topsoil

Topsoil shall be removed from all areas where physical disturbance of the surface will occur and shall be stored and adequately protected. The contract will provide for the stripping and stockpiling of topsoil from the site for later re-use. Topsoil is considered to be the natural soil covering, including all the vegetation and organic matter. Depth may vary at each site. The areas to be cleared of topsoil shall include the storage areas. All topsoil stockpiles and windrows shall be maintained throughout the contract period in a weed-free condition. Weeds appearing on the stockpiled or windrowed topsoil shall be removed by hand. Soils contaminated by hazardous substances shall be disposed of at an approved Department of Water Affairs and Forestry waste disposal site. (Read with COLTO Specifications 3104(a), 5802(a), (g), 5804(a), (b) and (c)). The topsoil stockpiles shall be stored, shaped and sited in such a way that they do not interfere with the flow of water to cause damming or erosion, or itself be eroded by the action of water. Stockpiles of topsoil shall not exceed a height of 2m, and if they are to be left for longer than 6 months, shall be analysed, and if necessary, upgraded before replacement. Stockpiles shall be protected against infestation by weeds.

The contractor shall ensure that no topsoil is lost due to erosion – either by wind or water. Areas to be topsoiled and grassed shall be done so systematically to allow for quick cover and reduction in the chance of heavy topsoil losses due to unusual weather patterns. The contractor's programme shall clearly show the proposed rate of progress of the application of topsoil and grassing. The contractor shall be held responsible for the replacement, at his own cost, for any unnecessary loss of topsoil due to his failure to work according to the progress plan approved by the engineer. The contractor's responsibility shall also extend to the clearing of drainage or water systems within and beyond the boundaries of the road reserve that may have been affected by such negligence.

ii) Subsoil

The subsoil is the layer of soil immediately beneath the topsoil. It shall be removed, to a depth instructed by the engineer, and stored separately from the topsoil if not used for road building. This soil shall be replaced in the excavation in the original order it was removed for rehabilitation purposes.

g) Drainage

The quality, quantity and flow direction of any surface water runoff shall be established prior to disturbing any area for construction purposes. Cognisance shall be taken of these aspects and incorporated into the planning of all construction activities. Before a site is developed or expanded, it shall be established how this development or expansion will affect the drainage pattern. Recognised water users / receivers shall not be adversely affected by the expansion or re-development. No water source shall be polluted in any way due to proposed changes.

Streams, rivers, pans, wetlands, dams, and their catchments shall be protected from erosion and 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 or tar products.

The contractor shall submit to the engineer his proposals for prevention, containment and rehabilitation measures against environmental damage of the identified water and drainage systems that occur on the site. Consideration shall be given to the placement of sedimentation ponds or barriers where the soils are of a dispersive nature or where toxic fluids are used in the construction process. The sedimentation ponds must be large enough to contain runoff so that they function properly under heavy rain conditions.

h) Earthworks and Layerworks

This section includes all construction activities that involve the mining of all materials, and their subsequent placement, stockpile, spoil, treatment or batching, for use in the permanent works, or temporary works in the case of deviations. Before any stripping prior to the commencement of construction, the contractor shall have complied with the requirements of sections C1008 (e) and C1008 (g). In addition, the contractor shall take cognisance of the requirements set out below.

i) Quarries and borrow pits

The contractor's attention is drawn to the requirement of the Department of Minerals and Energy, that before entry into any quarry or borrow pit, an EMP for the establishment, operation and closure of the quarry or borrow pit shall have been approved by the Department. It is the responsibility of the contractor to ensure that he is in possession of the approved EMP or a copy thereof, prior to entry into the quarry or borrow pit. The conditions imposed by the relevant EMP are legally binding on the contractor and may be more extensive and explicit than the requirements of this specification. In the event of any conflict occurring between the requirements of the specific EMP and these specifications the former shall apply. The cost of complying with the requirements shall be deemed to be included in existing rates in the Bill of Quantities. (Read with COLTO Specification 3100 and 3200).

ii) Excavation, hauling and placement

The contractor shall provide the engineer with detailed plans of his intended construction processes prior to starting any cut or fill or layer. The plans shall detail the number of personnel and plant to be used and the measures by which the impacts of pollution (noise, dust, litter, fuel, oil, sewage), erosion, vegetation destruction and deformation of landscape will be prevented, contained and rehabilitated. Particular attention shall also be given to the impact that such activities will have on the adjacent built environment. The contractor shall demonstrate his "good housekeeping", particularly with respect to closure at the end of every day so that the site is left in a safe condition from rainfall overnight or over periods when there is no construction activity. (Read with COLTO Standard Specification clauses 1217 and 3309)

iii) Spoil sites

The contractor shall be responsible for the safe siting, operation, maintenance and closure of any spoil site he uses during the contract period, including the defects notification period. This shall include existing spoil sites that are being re-entered. Before spoil sites may be used proposals for their locality, intended method of operation, maintenance and rehabilitation shall be given to the engineer for his approval. The location of these spoil sites shall have signed approval from the affected landowner before submission to the engineer. No spoil site shall be located within 500m of any watercourse. A photographic record shall be kept of all spoil sites for monitoring purposes. This includes before the site is used and after re-vegetation.

The use of approved spoil sites for the disposal of hazardous or toxic wastes shall be prohibited unless special measures are taken to prevent leaching of the toxins into the surrounding environment. Such special measures shall require the approval of the relevant provincial or national authority. The same shall apply for the disposal of solid waste generated from the various camp establishments. The engineer will assist the contractor in obtaining the necessary approval if requested by the contractor.

Spoil sites will be shaped to fit the natural topography. These sites shall receive a minimum of 75mm topsoil and be grassed with the recommended seed mixture. Slopes shall not exceed a vertical: horizontal ratio of 1:3. Only under exceptional circumstances will approval be given to exceed this ratio. Appropriate grassing measures to minimise soil erosion shall be undertaken by the contractor. This will include both strip and full sodding. The contractor may motivate to the engineer for other acceptable stabilising methods. The engineer may only approve a completed spoil site at the end of the defects notification period upon receipt from the contractor of a landowner's clearance notice and an engineer's certificate certifying slope stability (Read with COLTO standard Specifications clause 1214). The contractor's costs incurred in obtaining the necessary certification for opening and closing of spoil sites shall be deemed to be included in the tendered rates for spoiling.

iv) Stockpiles

The contractor shall plan his activities so that materials excavated from borrow pits and cuttings, in so far as possible, can be transported direct to and placed at the point where it is to be used. However, should temporary stockpiling become necessary, the areas for the stockpiling of excavated and imported material shall be indicated and demarcated on the site plan submitted in writing to the engineer for his approval, together with the contractor's proposed measures for prevention, containment and rehabilitation against environmental damage.

The areas chosen shall have no naturally occurring indigenous trees and shrubs present that may be damaged during operations. Care shall be taken to preserve all vegetation in the immediate area of these temporary stockpiles. During the life of the stockpiles the contractor shall at all times ensure that they are:

- Positioned and sloped to create the least visual impact;
- Constructed and maintained so as to avoid erosion of the material and contamination of surrounding environment; and
- Kept free from all alien/undesirable vegetation.

After the stockpiled material has been removed, the site shall be re-instated to its original condition. No foreign material generated / deposited during construction shall remain on site. Areas affected by stockpiling shall be landscaped, top soiled, grassed and maintained at the contractor's cost until clearance from the engineer and the relevant Authority is received.

Material milled from the existing road surface that is temporarily stockpiled in areas approved by the engineer within the road reserve, shall be subject to the same condition as other stockpiled materials. Excess materials from windrows, in-situ milling or any detritus of material from road construction activities may not be swept off the road and left unless specifically instructed to do so in the contract drawing or under instruction from the engineer

In all cases, the engineer shall approve the areas for stockpiling and disposal of construction rubble before any operation commences and shall approve their clause only when they have been satisfactorily rehabilitated. (Read with COLTO Specification 3203 and 4306).

v) Blasting activities

Wherever blasting activity is required on the site (including quarries and/or borrow pits) the contractor shall rigorously adhere to the relevant statutes and regulations that control the use of explosives. In addition, the contractor shall, prior to any drilling of holes in preparation for blasting, supply the engineer with a locality plan of the blast site on which shall be shown the zones of influence of the ground and air shock-waves and expected limits of fly-rock. The plan shall show each dwelling, structure and service within the zones of influence and record all details of the dwellings/structures/services including existing positions, lengths and widths of cracks, as well as the condition of doors, windows, roofing, wells, boreholes etc. The contractor, alone, shall be responsible for any costs that can be attributed to blasting activities, including the collection of fly-rock from adjacent lands and fields. The submission of such a plan shall not in any way absolve the contractor from his responsibilities in this regard. The contractor shall also indicate to the engineer the manner in which he intends to advertise to the adjacent communities and/or road users the times and delays to be expected for each individual blast.

i) Batching sites

Asphalt plants are considered scheduled processes listed in the second schedule to the Atmospheric Pollution Prevention Act, 1965 (Act No. 45 of 1965). Should the use of an asphalt plant be considered on site, the contractor shall be responsible to obtain the necessary permit from the Department of Environmental Affairs and Tourism, regardless of where they are sited.

Crushing plants and concrete batching plants, whether sited inside or outside of defined quarry or borrow pit areas, shall be subject to the requirements of the Department of Minerals and Energy legislation as well as the applicable industrial legislation that governs gas and dust emissions into the atmosphere. Such sites will be the subject of regular inspections by the relative authorities during the life of the project. In addition, the selection, entry onto, operation, maintenance, closure and rehabilitation of such sites shall be the same as for those under section C1008(h)(iii), with the exception that the contractor shall provide additional measures to prevent, contain and rehabilitate against environmental damage from toxic/hazardous substances. In this regard the contractor shall provide plans that take into account such additional measures as concrete floors, bunded storage facilities, linings to drainage channels and settlement dams. Ultimate approval of these measures shall be from the relevant national authority, as shall approval of closure. The engineer will assist the contractor in his submissions to the relevant authority.

Effluent from concrete batch plants and crusher plants shall be treated in a suitable designated sedimentation dam to the legally required standards to prevent surface and groundwater pollution. The designs of such a facility should be submitted to the engineer for approval.

The contractor shall invite the relevant department to inspect the site within 2 months after any plant is commissioned and at regular intervals thereafter, not exceeding 12 months apart

j) Spillages

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 tar or bituminous products. In the event of a spillage, the contractor shall be liable to arrange for professional service providers to clear the affected area.

Responsibility for spill treatment lies with the contractor. The individual responsible for, or who discovers a hazardous waste spill must report the incident to his/her DEO or to the engineer. The Designated Environmental Officer will assess the situation in consultation with the engineer and act as required. In all cases, the immediate response shall be to contain the spill. The exact treatment of polluted soil / water shall be determined by the contractor in consultation with the DEO and the engineer. Areas cleared of hazardous waste shall be re-vegetated according to the engineer's instructions

Should water downstream of the spill be polluted, and fauna and flora show signs of deterioration or death, specialist hydrological or ecological advice will be sought for appropriate treatment and remedial procedures to be followed. The requirement for such input shall be agreed with the engineer. The costs of containment and rehabilitation shall be for the contractor's account, including the costs of specialist input.

k) Areas of Specific Importance

Any area, as determined and identified within the project document as sensitive or of special interest within the site shall be treated according to the express instructions contained in these specifications or the approved EMP. The contractor may offer alternative solutions to the engineer in writing should he consider that construction will be affected in any way by the hindrance of the designated sensitive area or feature. However, the overriding principle is that such defined areas requiring protection shall not be changed. Every effort to identify such areas within the site will have been made prior to the project going out to tender. The discovery of other sites with archaeological or historical interest that have not been identified shall require ad hoc treatment.

i) Archaeological Sites

If an artefact on site is uncovered, work in the immediate vicinity shall be stopped immediately. The contractor shall take reasonable precautions to prevent any person from removing or damaging any such article and shall immediately upon discovery thereof inform the engineer of such discovery. The South African Heritage Research Agency (SAHRA) is to be contacted who will appoint an archaeological consultant. Work may only resume once clearance is given

in writing by the archaeologist. (Read with COLTO General Condition of Contract Subclause 4.24 as amended by Particular Condition).

ii) Graves and middens

If a grave or midden is uncovered on site, or discovered before the commencement of work, then all work in the immediate vicinity of the graves/middens shall be stopped and the engineer informed of the discovery. SAHRA should be contacted and in the case of graves, arrangements made for an undertaker to carry out exhumation and reburial. The Employer will be responsible for attempts to contact family of the deceased and for the site where the exhumed remains can be re-interred. (Read with COLTO General Conditions of Contract Subclause 4.24 as amended by Particular Condition).

l) Noise Control

The contractor shall endeavour to keep noise generating activities to a minimum. Noises that could cause a major disturbance, for instance blasting and crushing activities, should only be carried out during daylight hours. Compliance with the appropriate legislation with respect to noise, shall be mandatory.

Should noise generating activities have to occur at night the people in the vicinity of the drilling shall be warned about the noise well in advance and the activities kept to a minimum.

m) Dust Control

Dust caused by strong winds shall be controlled by means of water spray vehicles. Dust omission from batching plants shall be subject to the relevant legislation and shall be the subject of inspection by the relevant office of the Department of Minerals and Energy.

n) Alien Vegetation

The contractor shall be held responsible for the removal of alien vegetation within the road reserve disturbed during road construction. This includes, for example, service roads, stockpile areas, stop/go facilities, windrows and wherever material generated for or from road construction has been stored temporarily or otherwise within the road reserve. This responsibility shall extend for the duration of the defects notification period.

C3.3.3.2.9 RECORD KEEPING

The engineer and the DEO will continuously monitor the contractor's adherence to the approved impact prevention procedures and the engineer shall issue to the contractor a notice of non-compliance whenever transgressions are observed. The DEO should document the nature and magnitude of the non-compliance in a designated register, the action taken to discontinue the non-compliance, the action taken to mitigate its effects and the results of the actions. The non-compliance shall be documented and reported to the engineer in the monthly report.

Copies of any record of decision or EMP's for specific borrow pits or quarries used on the project shall be kept on site and made available for inspection by visiting officials from the employer or relevant environmental departments.

C3.3.3.2.10 COMPLIANCE AND PENALTIES

The contractor shall act immediately when such notice of non-compliance is received and correct whatever is the cause for the issuing of the notice. Complaints received regarding activities on the construction site pertaining to the environment shall be recorded in a dedicated register and the response noted with the date and action taken. This record shall be submitted with the monthly reports and a verbal report given at the monthly site meetings.

Any avoidable non-compliance with the above-mentioned measures shall be considered sufficient ground for the imposition of a penalty

The following penalties shall apply for environmental violations:

a) Unnecessary removal or damage to trees

- | | | |
|---|---|------------------|
| • 2600mm girth or less | : | R 5 000 per tree |
| • Greater than 2600mm, but less than 6180mm girth | : | R10 000 per tree |
| • Greater than 6180mm girth | : | R30 000 per tree |

b) Serious violations:

- | | | |
|--|---|-------------------------------|
| • Hazardous chemical/oil spill and/or dumping in non-approved sites. | : | R10 000 per incident |
| • General damage to sensitive environments. | : | R 5 000 per incident |
| • Damage to cultural and historical sites. | : | R 5 000 per incident |
| • Uncontrolled/unmanaged erosion (plus rehabilitation at contractor's cost). | : | R1 000 to R5 000 per incident |
| • Unauthorised blasting activities. | : | R 5 000 per incident |
| • Pollution of water sources. | : | R 10 000 per incident |

The engineer's decision with regard to what is considered a violation, its seriousness and the penalty imposed shall be final.

c) Less serious violations:

• Littering on site.	:	R1 000 per incident
• Lighting of illegal fires on site.	:	R1 000 per incident
• Persistent or un-repaired fuel and oil leaks.	:	R1 000 per incident
• Excess dust or excess noise emanating from site.	:	R1 000 per incident
• Dumping of milled material in side drains or on grassed areas:	:	R1 000 per incident
• Possession or use of intoxicating substances on site. :	:	R 500 per incident
• Any vehicles being driven in excess of designated speed limits.	:	R 500 per incident
• Removal and/or damage to flora or cultural or heritage objects on site, and/or killing of wildlife.	:	R2 000 per incident
• Illegal hunting.	:	R2 000 per incident
• Urination and defecation anywhere except in designated areas.	:	R 500 per incident

The engineer's decision with regard to what is considered a violation, its seriousness and the penalty imposed shall be final. The calculation shall include allied construction activities in the same way as the calculation of reduced payments under section 8200. The imposition of such a penalty shall not preclude the relevant provincial or national authority from applying an additional penalty in accordance with its statutory powers. Any non-compliance with the agreed procedures of the EMP is a transgression of the various statutes and laws that define the manner by which the environment is managed.

Failure to redress the cause shall be reported to the relevant authority for them to deal with the transgression, as it deems fit.

C3.3.3.2.11 MEASUREMENT AND PAYMENT

The cost of complying to this specification shall be deemed to be included in the rates tendered for this project.

Item	Unit
C100.01 Penalty for unnecessary removal or damage to trees for the following diameter sizes	
(a) 2600mm girth or less	number (No)
(b) Greater than 2600mm, but less than 6180mm girth	number (No)
(c) Greater than 6180mm girth	number (No)

The unit of measurement shall be the number of trees by diameter size removed unnecessary or damaged. The penalty rates applied shall be those stated in clause C3.5.2.10.

Item	Unit
C100.02 Penalty for serious violations	
(a) Hazardous chemical/oil spill and/or dumping in non-approved sites	number (No)
(b) General damage to sensitive environments	
(c) Damage to cultural and historical sites	number (No)
(d) Pollution of water sources	number (No)
(e) Unauthorised blasting activities	number (No)

- (f) Uncontrolled/unmanaged erosion
per incident, depending on environment impacts, plus
rehabilitation at contractor's cost) number (No)

The unit of measurement for C100.02 (a) to (f) shall be the number of serious violation incidents. The penalty rates to be applied shall be those stated in clause C3.5.2.10.

Item	Unit
C100.03 Penalty for less serious violations	
• Littering on site	number (No)
• Lighting of illegal fires on site	number (No)
• Persistent or un-repaired fuel and oil leaks	number (No)
• Excess dust or excess noise emanating from site	number (No)
• Dumping of milled material in side drains or on grassed areas	number (No)
• Possession or use of intoxicating substances on site	number (No)
• Any vehicles being driven in excess of designated speed limits	number (No)
• Removal and/or damage to flora or cultural or heritage objects on site, and/or killing of wildlife	number (No)
• Illegal hunting	number (No)
• Urination and defecation anywhere except in designated areas	number (No)

The unit of measurement shall be the number of less serious violation incidents. The penalty rates applied shall be those stated in clause C3.5.2.10.

The engineer's decision with regard to what is considered a violation, its seriousness and the penalty imposed shall be final. The calculation shall include allied construction activities in the same way as the calculation of reduced payments under section 8200. The imposition of such a penalty shall not preclude the relevant provincial or national authority from applying an additional penalty in accordance with its statutory powers. Any non-compliance with the agreed procedures of the EMP is a transgression of the various statutes and laws that define the manner by which the environment is managed.

Failure to redress the cause shall be reported to the relevant authority for them to deal with the transgression, as it deems fit.

Table 1: Mechanisms that Cause Environmental Impacts during Construction Activities

SECTION	CONTENTS	ENVIRONMENTAL IMPACTS				
		POLLUTION TYPE	DEFORMATION OF LANDSCAPE	SOIL EROSION	ALIEN VEGETATION	SENSITIVE AREAS (to be completed by compiler)
1300	Camp Establishment	Waste treatment Hazardous waste Water supply Spillage Storage	Selection of site Preserve indigenous vegetation Preserve topsoil	Selection of site Preserve indigenous vegetation Preserve topsoil	Preserve indigenous vegetation Preserve topsoil Management of weeds	
1400	Housing, Offices and laboratories	Waste treatment Hazardous waste Water supply Spillage Storage Noise/lights	Selection of site Preserve indigenous vegetation Preserve topsoil Demarcate sensitive areas	Selection of site Preserve indigenous vegetation Preserve topsoil	Preserve indigenous vegetation Preserve topsoil Management of weeds	
1500	Accommodation of Traffic	Waste treatment Hazardous waste Water supply Spillage Storage Noise/lights Dust control	Selection of site Preserve indigenous vegetation Preserve topsoil Demarcate sensitive areas Maintenance of windrows	Selection of site Preserve indigenous vegetation Preserve topsoil	Preserve indigenous vegetation Preserve topsoil Management of weeds	
1600	Overhaul	Spillage Storage Noise/lights Dust control Exhaust fumes Washing waste	Turning circles Parking areas	Restrict access to sensitive areas	Protection of indigenous vegetation Preserve topsoil	

SECTION	CONTENTS	ENVIRONMENTAL IMPACTS				
		POLLUTION TYPE	DEFORMATION OF LANDSCAPE	SOIL EROSION	ALIEN VEGETATION	SENSITIVE AREAS (to be completed by compiler)
1700	Clearing and grubbing	Waste treatment Hazardous waste Water supply Noise /lights Dust control	Selection of site Preserve indigenous vegetation Preserve topsoil	Selection of site Preserve indigenous vegetation Preserve topsoil	Protection of indigenous vegetation Preserve topsoil	
2100 2400	- Drainage	Waste treatment Hazardous waste Water supply Spillage Storage	Selection of site Preserve indigenous vegetation Preserve topsoil	Selection of site Preserve indigenous vegetation Preserve topsoil	Preserve indigenous vegetation Preserve topsoil Management of weeds	
3100	Borrow pits	Waste treatment Hazardous waste Water supply Spillage Storage	Selection of site Preserve indigenous vegetation Preserve topsoil	Selection of site Preserve indigenous vegetation Preserve topsoil	Preserve indigenous vegetation Preserve topsoil Management of weeds	
3200	Stockpiling	Waste treatment Hazardous waste Water supply Spillage Storage	Selection of site Preserve indigenous vegetation Preserve topsoil	Selection of site Preserve indigenous vegetation Preserve topsoil	Preserve indigenous vegetation Preserve topsoil Management of weeds	
3300	Mass Earthworks	Waste treatment Hazardous waste Water supply	Selection of site Preserve indigenous vegetation	Selection of site Preserve indigenous vegetation	Preserve indigenous vegetation Preserve topsoil	

SECTION	CONTENTS	ENVIRONMENTAL IMPACTS				
		POLLUTION TYPE	DEFORMATION OF LANDSCAPE	SOIL EROSION	ALIEN VEGETATION	SENSITIVE AREAS (to be completed by compiler)
		Spillage Storage	Preserve topsoil	Preserve topsoil	Management of weeds	
3400 3900	- Pavement layers	Waste treatment Hazardous waste Water supply Spillage Storage Noise / lights Dust control	Selection of site Preserve indigenous vegetation Preserve topsoil Demarcate sensitive areas Maintenance of windrows	Selection of site Preserve indigenous vegetation Preserve topsoil	Preserve indigenous vegetation Preserve topsoil Management of weeds	
4100	Asphalt works / sealing operations	Waste treatment Hazardous waste Water supply Spillage Storage Noise / lights Dust control Smoke control Storage of materials	Selection of site Preserve indigenous vegetation Preserve topsoil Turning circles Parking areas	Selection of site Preserve indigenous vegetation Preserve topsoil	Preserve indigenous vegetation Preserve topsoil	
5000	Ancillary roadworks	Waste treatment Hazardous waste Water supply Spillage Storage	Selection of site Preserve indigenous vegetation Preserve topsoil	Selection of site Preserve indigenous vegetation Preserve topsoil	Preserve indigenous vegetation Preserve topsoil Management of weeds	
6000	Structures	Waste treatment Hazardous waste Water supply Spillage Storage	Selection of site Preserve indigenous vegetation Preserve topsoil	Selection of site Preserve indigenous vegetation Preserve topsoil	Preserve indigenous vegetation Preserve topsoil Management of weeds	

SECTION	CONTENTS	ENVIRONMENTAL IMPACTS				
		POLLUTION TYPE	DEFORMATION OF LANDSCAPE	SOIL EROSION	ALIEN VEGETATION	SENSITIVE AREAS (to be completed by compiler)
7000	Concrete pavements etc	Waste treatment Hazardous waste Water supply Spillage Storage	Selection of site Preserve indigenous vegetation Preserve topsoil	Selection of site Preserve indigenous vegetation Preserve topsoil	Preserve indigenous vegetation Preserve topsoil Management of weeds	

C3.3.3.3 PROVISION OF STRUCTURED TRAINING**CONTENTS**

- C3.3.3.3.1 SCOPE
- C3.3.3.3.2 GENERIC TRAINING
- C3.3.3.3.3 ENTREPRENEURIAL SKILLS TRAINING
- C3.3.3.3.4 MEASUREMENT AND PAYMENT

C3.3.3.3.1 SCOPE

This specification covers the requirements for the provision of structured training to be arranged by the contractor over the period of this contract.

C3.3.3.3.2 GENERIC TRAINING

C3.3.3.3.2.1 The contractor shall, from the commencement of the contract, implement a structured progressive training programme.

C3.3.3.3.2.2 Training shall be at or by an approved accredited organisation and shall be delivered by suitably qualified and experienced trainers.

C3.3.3.3.2.3 The contractor shall be responsible for the provision of everything necessary for the delivery of the generic training programme, including the following:

- (a) A suitable venue with sufficient furniture, lighting and power.
- (b) All necessary stationery consumables and study material.
- (c) Transport of the students (as necessary).

C3.3.3.3.2.4 Generic training courses shall commence within one month of possession of site and be completed before the end of the contract period. The Training Schedule should form part of the section 12 programme to be approved by the Engineer at the start of the project.

C3.3.3.3.2.5 The contractor's training programme shall be subject to the approval of RAL and the contractor shall if so instructed by RAL alter or amend the programme and course content if a need is identified once the contract commences.

C3.3.3.3.2.6 The contractor shall keep comprehensive records of the training given to each student and whenever required shall provide copies of such records to the engineer. At the successful completion of each course each student shall be issued with a certificate indicating the course contents as proof of attendance and completion.

In addition to the above, a monthly return shall be submitted by the contractor. An example of the form is illustrated in Part C5 of this document (form RDP 11 (E))

C3.3.3.3.3 ENTREPRENEURIAL SKILLS TRAINING

C3.3.3.3.3.1 Small contractors, subcontractors and the Project Steering Committee (PSC) will be entitled to receive a structured training programme, which will comprise both management skills as well as business development skills.

C3.3.3.3.3.2 The contractor shall closely monitor the performance of all small subcontractors in the execution of their contracts and shall identify all such subcontractors who, in his opinion, display the potential to benefit from structured training as may be provided for in the contract and where required by the engineer, shall make recommendations in this regard. The final list of candidates will be decided between the contractor and the engineer.

C3.3.3.3.3.3 The training will be delivered by trainers who are accredited by the Civil Engineering Training Scheme (CEITS) or other institutions recognised by the Department of Labour. Accredited training refers to both the trainers as well as to the training material.

C3.3.3.3.3.4 The contractor shall facilitate in the delivery thereof, by instructing and motivating the subcontractor regarding attendance and participation therein.

C3.3.3.3.3.5 The contractor shall further make all reasonable efforts to co-ordinate the programming of the subcontractor's work with that of the delivery of the structured training.

C3.3.3.3.3.7 The contractor shall be responsible for the provision of everything necessary for the delivery of the entrepreneurial training programme, including the following:

- (a) A suitably furnished venue (if required) with lighting and power.
- (b) All necessary consumables, stationery and study material.
- (c) Transport of the subcontractors (as necessary).

C3.3.3.3.3.7 All entrepreneurial training shall take place within normal working hours.

C3.3.3.3.3.8 The contractor's training programme shall be subject to the approval of RAL and the contractor shall if so instructed by RAL alter or amend the programme and course content if a need is identified once the contract commences.

C3.3.3.3.3.10 The contractor shall keep comprehensive records of the training given to each subcontractor and whenever required shall provide copies of such records to the engineer. At the successful completion of each course each subcontractor shall be issued with a certificate indicating the course contents as proof of attendance and completion.

In addition to the above, a monthly return shall be submitted by the contractor. An example of the form to be used is illustrated in Part C5 of this document, (form RDP 12 (E)).

C3.3.3.3.4 MEASUREMENT AND PAYMENT

ITEM

UNIT

E12.05 Provision for accredited training

(a) Generic skills

Provisional sum

(b)	Entrepreneurial skills	Provisional sum
(c)	Handling cost and profit in respect of sub-item E12.05(a) and (b) above	percentage (%)
(d)	Training venue (only if required)	lump sum

The prime cost sums are provided to cover the actual costs (including wages and the daily PSC reimbursement) for attendance of accredited training courses as agreed with the engineer and shall be expended in accordance with the provisions of sub-clause 48(2) of the general conditions of contract. The tendered percentage in sub-item E12.05 (c) is a percentage of the amount actually spent under sub-items E12.05(a) and (b) which shall include full compensation for the contractor's handling cost, profit, mentoring, record keeping, reporting and all other costs in connection therewith.

The lump sum tendered for E12.05(d) shall include full compensation for the provision of the training venue, for all necessary lighting, power, furniture, stationery, consumables and study material and for transportation of the students to and from the training venue.

Payment of the lump sum will be made after the provision of all the accredit training, issuing of all certificates and submission of all records as specified in the document.

C3.3.3.4 PROVISION OF THE TEMPORARY WORKFORCE

CONTENTS

C3.3.3.4.1 SCOPE

C3.3.3.4.2 INTERPRETATIONS

C3.3.3.4.3 PERMITTED SOURCES OF TEMPORARY WORKERS

C3.3.3.4.4 EMPLOYMENT RECORDS TO BE PROVIDED

C3.3.3.4.5 VARIATIONS IN WORKER PRODUCTION RATES

C3.3.3.4.6 TRAINING OF THE TEMPORARY WORKFORCE

C3.3.3.4.7 RECRUITMENT AND SELECTION PROCEDURES

C3.3.3.4.8 TERMS AND CONDITIONS PERTAINING TO THE EMPLOYMENT OF THE TEMPORARY WORKFORCE

C3.3.3.4.9 LABOUR RELATIONS AND WORKER GRIEVANCE PROCEDURES

C3.3.3.4.10 THE SUBCONTRACTORS' WORKFORCES

C3.4.3.4.11 MEASUREMENT AND PAYMENT

C3.3.3.4.1 SCOPE

This Specification covers the provisions and requirements relating to the provision of the temporary workforce. Reference is also made to the Basic Conditions of Employment Act (Act 75 of 1997) with specific reference to the Sectoral Determination 2: Civil Engineering Sector

C3.3.3.4.2 INTERPRETATIONS

C3.3.3.4.2.1 Supporting documents

The Tender Rules, Conditions of Contract, Standard and Project Specifications, Drawings and statutory minimum requirements relating to the employment and remuneration of labour shall *inter alia* be read in conjunction with this Specification.

C3.3.3.4.2.1.2 Definitions and abbreviations

For the purposes of this specification, the definitions given in the Conditions of Contract, the Standard Specifications and the Project Specifications, together with the following additional definitions shall, unless the context dictates otherwise, apply:

- (a) "Key Personnel" means all contracts managers, site agents, materials and survey technicians, trainers, supervisors, foremen, skilled plant operators, artisans and the like, and all other personnel in the permanent employ of the Contractor or Subcontractor who possess special skills and/or who play key roles in the Contractor's or Subcontractor's operation
- (b) "Project Committee" means a committee consisting of the Employer, the Engineer, the Contractor, (or their nominated representatives) as well as representatives of the

temporary workforce, which is convened from time to time at the discretion of the Engineer, for the purposes of acting as an avenue for effective communication and liaison between all the parties referred to, in all matters pertaining to the Contract

- (c) "Subcontractor" means any person or group of persons in association, or firm, or body corporate (whether formally constituted or otherwise) not being the Contractor, to whom specific portions or aspects of the Works are sublet or subcontracted by the Contractor in accordance with the provisions of the Contract
- (d) "Worker" for the purposes of this Specification means any person, not being one of the Contractor's key personnel, nor any key personnel of any Subcontractor, who is engaged by the Contractor, a Subcontractor or the Employer to participate in the execution of any part of the Contract Works and shall include unskilled labour, semi-skilled and skilled labour, clerical workers and the like
- (e) "Workforce" means the aggregate body comprising all workers and shall, unless the context dictates otherwise, include the workforces of the Contractor and all Subcontractors
- (f) "Project Steering Committee (PSC)" means a committee comprising mainly of representatives (to a maximum of 10) of the affected communities with additional members from RAL, the Contractor, Consultants and the University. The PSC convenes at least once a month as well as when the need so dictates, for the purpose of recruiting labour for the project, to address community issues and for acting as an avenue for effective communication and liaison between all the parties.
- (g) "Liaison Officer" means a local representative of the temporary workforce, duly appointed through the PSC processes, to act on behalf of the workers and through whom all matters pertaining to the temporary workforce can be channelled.

C3.3.3.4.2.1.3 Status

Where any provisions or requirements of this Specification are in conflict with anything elsewhere set out in the Contract, the provisions and requirements of this Specification shall take precedence and prevail.

C3.3.3.4.3 PERMITTED SOURCES OF TEMPORARY WORKERS

The Contractor shall as far as possible make optimum use of the human resources outside his own workforce and the workforces of all subcontractors. The temporary workforce that is to be used in the execution of the Works in terms of Part C3 may consist of the workers of local communities, and shall not be bound to one particular community.

C3.3.3.4.4 EMPLOYMENT RECORDS TO BE PROVIDED

- (a) The Contractor shall maintain accurate and comprehensive records of all workers engaged on the Contract and shall provide the Engineer at monthly intervals from the commencement of the Contract, with interim records substantiating the actual numbers of employment opportunities that shall have been generated to date and the amounts actually paid in respect thereof. Such interim records shall be in a RAL approved format. An example of the forms to be used is illustrated in Part C5 of this document, (forms RDP 9 and 10 (E)).

- (b) The Contractor shall, on completion of the Contract, and as a pre-requisite event to the release of any retention money in terms of the Conditions of Contract, provide the Engineer with copies of the Terms of Employment as well as independently audited documentary evidence of the total number of temporary and permanent employment opportunities actually generated during the Contract.

C3.3.3.4.5 VARIATIONS IN WORKER PRODUCTION RATES

Notwithstanding anything to the contrary as may be stated in or inferred from any other provision of this Contract, the Contractor shall not be entitled to any additional payment or compensation whatever, in respect of any differences as may result between the production rates actually achieved by workers in the course of the execution of the Contract Works and those production rates on which he has based his tender.

C3.3.3.4.6 TRAINING OF THE TEMPORARY WORKFORCE

- (a) Selected members of the workforce are to be provided with structured training in accordance with the provisions of Part C3.4.3.3.
- (b) The Contractor shall make all necessary allowances in his programme of work to accommodate and facilitate the delivery of such structured training and shall comply fully with the requirements of Part C3.4.3.3.
- (c) The provision of structured training as described in Part C3.4.3.3. shall not relieve the Contractor of any of his obligations in terms of the Conditions of Contract and the Contractor shall remain fully liable for the provision, at his own cost, of all training of the workforce, additional to that as provided for in Part C3.4.3.3, as may be necessary to achieve the execution and completion of the works strictly in accordance with the provisions of the Contract.

C3.3.3.4.7 RECRUITMENT AND SELECTION PROCEDURES

C3.3.3.4.7.1 The Project Steering Committee, though the assistance of the Social Facilitator and the Contractor, shall be responsible for the recruitment and selection of the Community Liaison Officer and the workers to constitute the temporary workforce.

C3.3.3.4.7.2 The Contractor shall advise the Engineer in writing of the numbers of each category of temporary worker which he requires, together with the personal attributes which he considers desirable that each category of worker shall possess (taking due cognisance of the provisions of the Contract relating to training).

C3.3.3.4.7.3 The Social Facilitator shall take the necessary actions to advertise within the affected local communities comprising the personnel resources, the fact that temporary employment opportunities exist and the time and place where recruiting will occur

C3.3.3.4.7.4 The Social Facilitator shall record in writing, the details of all persons applying for employment, including *inter alia*:

- (a) Name, Identity Number, Date of Birth, age and sex
- (b) Marital status and number of dependants

- (c) Qualifications and previous work experience (whether substantiated or not)
- (d) On the job training programmes attended
- (e) Period since last economically active
- (f) Preference for type of work or task.

C3.3.3.4.7.5 The selection of workers from amongst the applicants should take into cognizance the Contractor's requirements for the workforce and the provisions of the contract in regard to the provision of training to the workforce and in accordance with the following principle:

- (a) No potential temporary worker shall be precluded from being employed by the Contractor on the execution of the Works, by virtue of his lack of skill in any suitable operation forming part of the Works, unless -
 - (i) all available vacancies have been or can be filled by temporary workers who already possess suitable skills, or
 - (ii) the Time for Completion allowed in the Contract, or the remaining portion of the Contract Period (as the case may be) is insufficient to facilitate the creation of the necessary skills.
- (b) Preference shall be given to the unemployed and single heads of households.
- (c) The Contractor shall, in so far as is reasonably practicable, give priority to accommodating the applicants' expressed preferences regarding the types of work for which they are selected.
- (d) The selection process shall not be prejudicial to youth (over the age of fifteen years) and women. The Contractor should strive to achieve the participation target for employment set for this project which is 60% female and 20% youth.

C3.3.3.4.7.6 After making the selection, the Social Facilitator shall forward the list in writing and without undue delay, to the Engineer for record keeping.

C3.3.3.4.7.7 The provisions of this clause shall apply *mutatis mutandis* in respect of the selection of additional or replacement members of the workforce as may be necessary from time to time during the Contract.

C3.3.3.4.7.8 The Contractor shall, after appointing his temporary workforce, arrange at his own cost for the appointment of the Liaison Officer as representative of the workforce to act on their behalf with regards to all matters pertaining to the workforce.

C3.3.3.4.8 TERMS AND CONDITIONS PERTAINING TO THE EMPLOYMENT OF THE TEMPORARY WORKFORCE

C3.3.3.4.8.1 All temporary workers engaged in accordance with the provisions of Part A of the Project Specifications, shall be employed on the terms and conditions of employment as are consistent with those as set out in this Contract. The Contractor shall implement and adhere strictly to such terms and conditions relating to the employment of the temporary workforce, and subject only to the provisions of this Contract, shall not employ any temporary worker on terms and conditions which are less favourable to the worker or inconsistent with the standards and norms generally applicable to temporary workers in the Civil Engineering Industry and applicable to the particular area. Refer to the Contract of Employment drafted/published by Department of Labour.

C3.3.3.4.8.2 RATE OF REMUNERATION. The Contractor shall pay to all workers engaged in terms of the contract, not less than the applicable gazetted minimum rate of remuneration in terms of the Sectorial Determination 2: Civil Engineering Sector.

The remuneration of the CLO shall be paid monthly at the rate equivalent to Task Grade 3 in accordance with the provisions of the Basic Conditions of Employment Act, No. 75 of 1997, Amendment i.t.o Sectorial Determination 2: Civil Engineering Sector, South Africa

Compensation for transport for the members of the Project Steering Committee shall be made at a rate of R75 / month. This will cover for transport cost to and from the PSC meeting, site meeting and any other meeting deemed necessary to fulfil their obligations.

C3.3.3.4.8.3 NON-PAYMENT OF LABOURERS. Under this contract it is expected of the Main Contractor to ensure that all labourers are paid in time on a monthly basis, whether they are employed by him/her directly or by any of his/her subcontractors. In the event of non-compliance, the employer reserves the right to use any remedies available at its disposal.

C3.3.3.4.9 LABOUR RELATIONS AND WORKER GRIEVANCE PROCEDURES

C3.3.3.4.9.1 The Contractor, as the Employer of the workforce, shall be fully responsible for the establishment and maintenance at his own cost, of satisfactory labour relations on site and the resolution of all grievances of temporary workers as may occur. Refer to Disciplinary Procedures for Small Business drafted/published by Department of Labour.

C3.3.3.4.9.2 The Contractor shall at all times adhere to the accepted norms and standards of labour relations prevailing generally in the Civil Engineering Construction Industry and shall conduct himself in a fair and reasonable manner, within the constraints as may be imposed upon him by the terms of the Contract.

C3.3.3.4.9.3 In the event of any temporary worker engaged by the Contractor in terms of the Contract, being aggrieved with regard to his Terms of Employment, working conditions and training, he shall have the right, at his discretion, to be supported in any inquiry or disciplinary hearing or investigation instituted by the Contractor in terms of Subclause C3.4.3.4.9.2 above, by one member of the temporary workforce and one member of the Project Committee, which persons shall be nominated by the worker.

C3.3.3.4.9.4 In the event of any grievance not being satisfactorily resolved through the application of normal dispute resolution procedures in accordance with Sub clauses C3.3.3.4.9.2 and C3.4.3.4.9.3, then either the Contractor or the worker concerned may require that the matter be referred to the Project Committee for further consideration, with a view to facilitate the resolution thereof.

C3.3.3.4.10 THE SUBCONTRACTORS' WORKFORCES

C3.3.3.4.10.1 The provisions of this Part C shall apply *mutatis mutandis* to the workforces employed by all subcontractors engaged by the Contractor and the Contractor shall be fully responsible for ensuring, at his own cost, that the terms of every subcontract agreement entered into are such as to facilitate the application of these provisions in respect of the workforces of all subcontractors.

C3.3.3.4.10.2 The Contractor shall at his own cost and to the extent necessary, assist and monitor all subcontractors in the application of the provisions of this Specification, and shall, in terms of the Conditions of Contract, remain fully liable in respect of the acts, omissions and neglects of all subcontractors, in respect of the application of the provisions of this Specification.

C3.3.3.4.11 MEASUREMENT AND PAYMENT

The Contractor will not be separately reimbursed or compensated in respect of the provision of the workforce and creation of temporary employment opportunities and all the Contractor's costs associated with compliance with the provisions of this part of the Project Specifications shall, except to the extent provided for in Part C3.4.3.3. as relevant, be deemed to be included in the rates tendered for the various items of work listed in the Schedule of Quantities.

C3.4 MANAGEMENT

C3.4.1 MANAGEMENT MEETINGS

The following meetings will be required as minimum for the management of the contract.

- (a) Monthly client site meeting (using standard agenda for management control).
- (b) Technical meetings as required for each phase of the work.
- (c) Monthly safety meetings in terms of the OHS requirements.
- (d) Weekly progress meetings

C3.4.2 QUALITY CONTROL

Contractor to supply details of quality plan and procedures. These shall include:

- Accommodation of traffic.
- Inspection and test plans.
- Approval process.
- Hold-points.
- Milestones.

Tender No: IN/09/2022

FOR UNIVERSITY OF VENDA

ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)

PART C4: SITE INFORMATION

C4.1	SITE INFORMATION.....	C.602
C4.2	LOCALITY PLAN	C.604

Tender No: IN/09/2022

FOR UNIVERSITY OF VENDA

ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)

C4.1 SITE INFORMATION

C4.1.1 General

The site is located within the town of Thohoyandou near the southern boundary of the University of Venda (UNIVEN), Limpopo Province. The approximate coordinates of the site are 22° 59' 04.40" S and 30° 26' 43.00" E.

The proposed development extends from the R524, through a green fields area where no other development has taken place to the University of Venda. The access road extends from the north west to the south east with the bridge and culvert structures located along the route.

The site crosses a small stream, culvert structure, and a large flood plain, bridge structure, with a variety of vegetation along the route ranging from tall grass to reeds to dense trees.

The Thohoyandou area is seen to be underlain by sandstone, basalts and tuff of the Soutpansberg Supergroup. The Basalts and tuff of this sort are known to be intruded by diabase dykes but from the available data such intrusions do not appear to be present in the area. Refer to Figure 2 in the Geotechnical Report in Annexure C5.3 which indicate the geology of the area.

Ground water conditions

Groundwater seepage was encountered in the lower areas at the proposed structures (TP2) and in the alluvial flood plain (TP4 to 6). This is indicative of a shallow water table in the flood plain which is to be expected. During periods of increased rainfall during summer months, the probability of an increase and a rise in the localised groundwater table may occur.

C4.1.2 Materials Investigation

A total of six test pits were investigated and profiled. Deep investigation was also conducted by means of geotechnical boreholes, one on each embankment of the proposed bridge structure and two at the new culvert structure. Refer to the Geotechnical Report in Annexure C5.4.

C 4.1.3 Availability of construction materials

A number of quarries are available into the area supplying different aggregates to the construction industry. One such quarries details are given below. it is the tenderer's responsibility to source material that meets the requirements of COLTO.

Louis Trichardt: 082 330 7652

Email: louist@wearne.co.za

Fax: 086 549 7727

GPS: S23.04794 E29.85489

C4.1.4 Services

There are a number of properties and fences that are affected by the new gravel road alignment. The majority consist of agricultural land taken up by the gravel road servitude but there is a brick yard fence and stockpile area at km1+100 that will be affected. There is also an Eskom pole at km1+360 that must be relocated outside the road reserve.

C4.1.5 Traffic counts

The majority of the project consists of green fields, therefor, no traffic count data were considered.

C4.1.6 Climatic conditions

The area has a Weinert N-value of >5.

C4.1.7 Topography

The topography of the area consists of a flat to rolling terrain.

C4.1.8 Geotechnical report

Available on request from the Engineer.

Tender No: IN/09/2022

FOR UNIVERSITY OF VENDA

ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)

C4.2 LOCALITY PLAN



Tender No: IN/09/2022

FOR UNIVERSITY OF VENDA

ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)

PART C5: ANNEXURES

C5.1	PROFORMA DOCUMENTS	C.607
C5.2	GUIDELINES FOR THE IMPLEMENTATION OF LABOUR INTENSIVE INFRASTRUCTURE PROJECTS UNDER THE EXPANDED PUBLIC WORKS PROGRAMME (EPWP)THE FOLLOWING IS A LIST OF CONTRACT DRAWINGS INCLUDED IN A SEPARATE VOLUME ENTITLED "PART 5.2: CONTRACT DRAWINGS." – A2 BOOK OF DRAWINGS.....	C.619
C5.3	GEOTECHNCIAL REPORT	C.620
C5.4	CONTRACT DRAWINGS	C.621

Tender No: IN/09/2022

FOR UNIVERSITY OF VENDA

ROADS INFRASTRUCTURE: UNIVEN TO PUNDA MARIA ROAD(R524)

C5.1 PROFORMA DOCUMENTS

The following is a list of proforma documents and examples that are required to be completed by the successful tenderer.

C5.1.1	RETENTION MONEY GUARANTEE PROFORMA.....	C.608
C5.1.2	EXAMPLE OF EME/QSE DECLARATION AFFIDAVIT.....	C.610
C5.1.3	FORM RDP 9(E) : CONTRACT EMPLOYMENT REPORT	C.612
C5.1.4	FORM RDP 10(E) : EMPLOYMENT OF SUPERVISORY STAFF REPORT	C.613
C5.1.5	FORM RDP 11(E) : GENERIC TRAINING REPORT	C.614
C5.1.6	FORM RDP 12(E) : ENTREPRENEURIAL TRAINING REPORT	C.615
C5.1.7	FORM RDP 13(E) : ENGINEERING TRAINING REPORT	C.616
C5.1.8	FORM RDP 14(E) : COMMUNITY LIAISON MEETING REPORT	C.617

C5.1.1 RETENTION MONEY GUARANTEE PROFORMA

EXAMPLE

UNIVERSITY OF VENDA
Private Bag X5066
Thohoyandou
0950

FOR INFORMATION ONLY:
This Guarantee is not to be
completed and signed by the
Guarantor.
A separate form will be issued
to the successful Tenderer

Notes to Tenderer

1. This pro forma is for information only. The successful tenderer's guarantor will need to reproduce it without amendment, omission or addition for completion and lodgement with the Employer.
2. The tenderer's guarantee will have to be on letterheads indicating the contact details of the guarantor, shareholders/board of directors, guarantee number and the company registration number.

CONTRACT No. DHET/2019/21/01
FOR
UNIVEN TO PUNDA MARIA ROAD(R524)

The guarantee is issued on behalf of

Registration No

(hereinafter referred to as "the Contractor") in connection with the above mentioned contract (hereinafter referred to as "the Contract").

Whereas you have agreed that the Contractor may provide a guarantee in lieu of the retention monies provided for under the Contract.

Now therefore we, the undersigned, being duly authorised to represent the

.....

(full name of guarantor) registration number

undertake to pay you such amounts as you may from time to time demand from us, immediately upon receipt of a written demand from you.

1. Each demand shall be in writing and delivered to us at
or such other address as we shall in writing notify to you.
2. Our liability to make the payments herein referred to shall be unconditional and not be affected or diminished by any disputes, claims or counterclaims between you and the Contractor.
3. Our aggregate liability under this guarantee is limited to
(R.....) and is restricted to payment of monies only.

4. This guarantee shall expire on the date on which the last of the retention monies, which but for this guarantee would have been retained by you, becomes payable to the Contractor.
5. This guarantee is neither negotiable nor transferable and must be returned to us against final payment of our aggregate liability or on the date of the expiry of the guarantee in terms of Clause 4 (above), whichever is the earlier.

Signed atfor and on behalf of
on this the day of in the year

GUARANTOR:

AS WITNESS:

1. 2.

NAME(Print): NAME(Print):

ADDRESS ADDRESS

.....

.....

C5.1.2 EXAMPLE OF EME/QSE DECLARATION AFFIDAVIT

1. Name of EME/QSE firm :
- Postal address :
- Physical address of Head Office:
- Telephone no. : Fax no
Cell no :
- Contact person :
- VAT registration no. :

2. Type of firm (tick as appropriate)
 - Partnership.....
 - One person business/sole trader.....
 - Close corporation: registration no.....
 - Date of registration.....
 - Company: registration no.....
 - Pty Ltd: registration no.....

[ATTACH LATEST CIPRO PRINTOUT TO PROVE ABOVE INFORMATION]

3. Principal Business Activities :.....
4. Service/work to be performed on this contract:
5. CIDB registration no (if applicable):

[ATTACH LATEST CIDB INFORMATION AS PROOF]

5. EME/QSE status (mark the appropriate category)
 - 5.1. Total full time equivalent of paid employees:
 - 5.2. Total Annual turnover:
 - 5.3. Total gross asset value (fixed property excluded):

[ATTACH CONFIRMATION LETTER OF AUDITOR OR INCOME STATEMENT TO SUBSTANTIATE AND PROVE ABOVE INFORMATION]

8. Declaration

I,,
 being duly authorised to sign on behalf of the firm, affirm that the EME/QSE status as
 stated above and the information as furnished is true and correct.

Signature

Name (print)

Date

Signed on behalf of (print name)

Address

.....

Telephone no.

Commissioner of Oath

Date

Note: In the case of a Company a certificate of authority for signatory must be provided.

EXAMPLE

C5.1.3 FORM RDP 9(E) : CONTRACT EMPLOYMENT REPORT

CONTRACT NO.....

REPORT ON EMPLOYMENT ON THE ABOVE CONTRACT FOR THE MONTH OF _____ 2011										
NAME OF COMPANY OR FIRM AND VENDOR NUMBER	AGE OF COMPANY OR FIRM	EMPLOYMENT GROUP	EMPLOYMENT							
			MALE	FEMALE	TOTAL	PERSON/HOURS			VALUE (RAND)	
						MALE	FEMALE	TOTAL	MALE	FEMALE
		Unskilled (US)								
		Semi-Skilled (SS)								
		Skilled (SK)								
		Lab.Tech (LT)								
		Surveyor (SUR)								
		Eng. Tech (ET)								
		Engineer (EN)								
		Admin (AD)								
		Others (o)								

									TOTALS	
									GRAND TOTALS	

EXAMPLE**C5.1.4 FORM RDP 10(E) : EMPLOYMENT OF SUPERVISORY STAFF REPORT****CONTRACT NO.....**

REPORT ON THE EMPLOYMENT OF SUPERVISORY STAFF ON THE ABOVE CONTRACT FOR THE MONTH OF _____ 2011				
POSITION HELD	NAME	PDI	NON-PDI	TOTAL
Site Agent				
Senior Materials Technician				
Senior Surveyor				
Earthworks Surveyor				
Compaction Supervisor				
Surfacing Supervisor				
Structures Supervisor				
Others: - List				

TOTALS				

EXAMPLE

C5.1.5 FORM RDP 11(E) : GENERIC TRAINING REPORT

CONTRACT NO.....

REPORT ON GENERIC TRAINING ON THE ABOVE CONTRACT FOR THE MONTH OF									2011	
DATES OF TRAINING COURSES		EMPLOYER OF TRAINEE		NAME OF TRAINING INSTITUTE OR IF IN-HOUSE WRITE IH	ATTENDANCES				TOTAL COST OF TRAINING PER TYPE OF TRAINING	
					NUMBER ATTENDING		CERTIFICATES AWARDED			
START	FINISH	NAME	VENDOR NO.		MALE	FEMALE	MALE	FEMALE	MALE	FEMALE

							TOTAL			
							TOTAL ALL TRAINEES			

EXAMPLE**C5.1.6 FORM RDP 12(E) : ENTREPRENEURIAL TRAINING REPORT**

CONTRACT NO.....

REPORT ON ENTREPRENEURIAL TRAINING ON THE ABOVE CONTRACT FOR THE MONTH OF 2011										
DATES OF TRAINING COURSES		EMPLOYER OF TRAINEE		NAME OF TRAINING INSTITUTE OR IF IN-HOUSE WRITE IH	ATTENDANCES				TOTAL COST OF TRAINING PER TYPE OF TRAINING	
START	FINISH	NAME	VENDOR NO.		NUMBER ATTENDING		CERTIFICATES AWARDED		MALE	FEMALE
					MALE	FEMALE	MALE	FEMALE		

EXAMPLE

C5.1.7 FORM RDP 13(E) : ENGINEERING TRAINING REPORT

CONTRACT NO.....

REPORT ON ENGINEERING TRAINING ON THE ABOVE CONTRACT FOR THE MONTH OF 2011										
DATES OF TRAINING COURSES		EMPLOYER OF TRAINEE		NAME OF TRAINING INSTITUTE OR IF IN-HOUSE WRITE – IH	ATTENDANCES				TOTAL COST OF TRAINING PER TYPE OF TRAINING	
START	FINISH	NAME	VENDOR NO.		NUMBER ATTENDING		CERTIFICATES AWARDED		MALE	FEMALE
					MALE	FEMALE	MALE	FEMALE	MALE	FEMALE

									TOTAL	
									TOTAL ALL TRAINEES	

EXAMPLE**C5.1.8 FORM RDP 14(E) : COMMUNITY LIAISON MEETING REPORT****CONTRACT NO.....**

REPORT ON COMMUNITY LIAISON MEETINGS ON THE ABOVE CONTRACT FOR THE MONTH OF _____ 2011						
DATE OF MEETING	COMPANY/FIRM OR ORGANISATION RESPONSIBLE FOR ARRANGING THE MEETING		NUMBER OF COMMUNITY MEMBERS PRESENT	DURATION OF MEETING (hours)	TOTAL COST OF THE MEETING	COMMENTS
	NAME	VENDOR NO.				

[Type here]

C5.2 GUIDELINES FOR THE IMPLEMENTATION OF LABOUR INTENSIVE INFRASTRUCTURE PROJECTS UNDER THE EXPANDED PUBLIC WORKS PROGRAMME (EPWP) THE FOLLOWING IS A LIST OF CONTRACT DRAWINGS INCLUDED IN A SEPARATE VOLUME ENTITLED “PART 5.2: CONTRACT DRAWINGS.” – A2 BOOK OF DRAWINGS.

[Type here]

C5.3 GEOTECHNICAL REPORT

Available on request from the Engineer.

[Type here]

C5.4 CONTRACT DRAWINGS

The following is a list of contract drawings included in a separate volume entitled “Part 5.4: Contract Drawings.” – A2 book of drawings.

DRAWING NUMBER	DRAWING DESCRIPTION
KEY PLAN	
20737-COVER	DRAWING COVER
20737-KP-01	KEY PLAN, LOCALITY PLAN & LIST OF DRAWINGS
TYPICAL CROSS SECTIONS	
20737-TC-01	TYPICAL CROSS SECTIONS AND BASIC PAVEMENT DESIGN
GEOMETRIC LAYOUT PLANS	
20737-LP-01	LAYOUT PLAN SHEET 1 OF 3
20737-LP-02	LAYOUT PLAN SHEET 2 OF 3
20737-LP-03	LAYOUT PLAN SHEET 2 OF 3
LONGITUDINAL SECTIONS	
20737-LS-01	LONGITUDINAL SECTION SHEET 1 OF 3
20737-LS-02	LONGITUDINAL SECTION SHEET 2 OF 3
20737-LS-03	LONGITUDINAL SECTION SHEET 3 OF 3
DESIGN CROSS SECTION	
20737-DCS-01	DESIGN CROSS SECTION SHEET 1 OF 3
20737-DCS-02	DESIGN CROSS SECTION SHEET 2 OF 3
20737-DCS-03	DESIGN CROSS SECTION SHEET 3 OF 3
SETTING OUT PLAN	
20737-SO-01	SETTING OUT PLAN SHEET 1 OF 3
20737-SO-02	SETTING OUT PLAN SHEET 2 OF 3
20737-SO-03	SETTING OUT PLAN SHEET 3 OF 3

ROAD MARKINGS AND SIGNAGE PLAN	
20737-RM-01	MARKINGS AND SIGNAGE PLAN SHEET 1 OF 3
20737-RM-02	MARKINGS AND SIGNAGE PLAN SHEET 2 OF 3
20737-RM-03	MARKINGS AND SIGNAGE PLAN SHEET 3 OF 3
ACCOMMODATION OF TRAFFIC	
20737-AT-01	ACCOMMODATION OF TRAFFIC PLAN SHEET 1 OF 3
20737-AT-02	ACCOMMODATION OF TRAFFIC PLAN SHEET 2 OF 3
20737-AT-03	ACCOMMODATION OF TRAFFIC PLAN SHEET 3 OF 3
SHIFTING OF SERVICES PLAN	
20737-SS-01	SHIFTING OF SERVICES PLAN SHEET 1 OF 3
20737-SS-02	SHIFTING OF SERVICES PLAN SHEET 2 OF 3
20737-SS-03	SHIFTING OF SERVICES PLAN SHEET 3 OF 3
STANDARD DETAILS	
20737-SD-01	KERBING, SEGMENTED PAVING AND KERB OUTLET INTO SIDE DRAIN
20737-SD-02	TYPICAL DETAIL OF CONCRETE SIDE DRAINS AND CHANNELS
20737-SD-03	DETAIL OF CONCRETE DRAIN AT DISH INLET
20737-SD-04	TYPICAL DETAILS OF BEDDING
20737-SD-05	TYPICAL DETAIL OF PIPECULVERT INLET AND OUTLET STRUCTURES
20737-SD-06	TYPICAL DETAIL OF GABION MATTRESSES
20737-SD-07	TYPICAL DETAIL OF CONCRETE CHUTES ON HIGH FILLS
20737-SD-08	TYPICAL DETAIL OF DOWNCHUTES
20737-SD-09	TYPICAL DETAIL OF DOWNCHUTES
20737-SD-10	TYPICAL DETAIL OF A PRECAST BOX CULVERTS

