LEPELLE-NKUMPI LOCAL MUNICIPALITY

BID DOCUMENT

BID NO: LNM020/2020/21 READVERT

REFURBSIHMENT AND UPGRADING OF LEBOWAKGOMO STADIUM

LEPELLE NKUMPI LOCAL MUNICIPALITY

CLOSING DATE: 17 AUGUST 2021

TECHNICAL ENQUIERIES	BIDDING RELATED ENQUERIES
TECHNICALSERVICES (PMU): **Mr Tebogo Phasha** **LEPELLE-NKUMPI LOCAL MUNICIPALITY** P/BAG X 07 **CHUENESPOORT** 0745 Tel: (015) 633 4556/7 Fax: (015) 632 4594	**SUPPLY CHAIN MANAGEMENT** **Mr. Jeffrey Pitseng** **LEPELLE-NKUMPI LOCAL MUNICIPALITY** P/BAG X 07 **CHUENESPOORT** 0745 Tel: (015) 633 4519 Fax: (015) 633 6896

NAME OF BIDDER (BIDDING ENTITY) : .....

TEL NUMBER : .....

FAX NUMBER : .....

CENTRAL SUPPLIER DATABASE NO : .....

BBBEE STATUS : .....

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

R……..……..…….. (In figures)

EXPANDED PUBLIC WORKS PROGRAMME
Creating opportunities towards human fullfilment

LEPELLE-NKUMPI LOCAL MUNICIPALITY

CONTRACT NO. LNM020/2020/21

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LEPELLE-NKUMPI LOCAL MUNICIPALITY

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REFURBISHMENT AND UPGRADING OF LEBOWAKGOMO STADIUM

PART T1

TENDERING PROCEDURES

Objections and complaints

Persons aggrieved by decisions or actions taken in the appointment of this tender or affected by the entire process of supply chain management system, may lodge within 14 days of the decision or action, a written objection or complaint against the decision or action to: The Municipal Manager, Private Bag X 07, Chuenespoort, 0745.To report any fraud; irregularities or corruption related incidents you may call our Anti Fraud Hotline number: 0800 20 50 53

TENDERING PROCEDURES

INDEX

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

PART T1.1

Tender Notice and Invitation to Tender

PART A INVITATION TO BID

YOU ARE HEREBY INVITED TO BID FOR REQUIREMENTS OF THE LEPELLE NKUMPI MUNICIPALITY					
BID NUMBER:	LNM020/2020/21	CLOSING DATE:	17 August 2021	CLOSING TIME:	11H00
DESCRIPTION	REFURBISHMENT AND UPGRADING OF LEBOWAKGOMO STADIUM				
THE SUCCESSFUL BIDDER WILL BE REQUIRED TO FILL IN AND SIGN A WRITTEN CONTRACT FORM (MBD7).					

BID RESPONSE DOCUMENTS MAY BE DEPOSITED IN THE BID BOX

SITUATED AT *(STREET ADDRESS*

LEPELLE-NKUMPI MUNICIPALITY
UNIT 170 BA, CIVIC CENTRE
LEBOWAKGOMO
0737

SUPPLIER INFORMATION				
NAME OF BIDDER				
POSTAL ADDRESS				
STREET ADDRESS				
TELEPHONE NUMBER	CODE		NUMBER	
CELLPHONE NUMBER				
FACSIMILE NUMBER	CODE		NUMBER	
E-MAIL ADDRESS				
VAT REGISTRATION NUMBER				
TAX COMPLIANCE STATUS	TCS PIN:		OR CSD No:	
B-BBEE STATUS LEVEL VERIFICATION CERTIFICATE [TICK APPLICABLE BOX]	☐ Yes ☐ No		B-BBEE STATUS LEVEL SWORN AFFIDAVIT	☐ Yes ☐ No

[A B-BBEE STATUS LEVEL VERIFICATION CERTIFICATE/ SWORN AFFIDAVIT (FOR EMES & QSEs) MUST BE SUBMITTED IN ORDER TO QUALIFY FOR PREFERENCE POINTS FOR B-BBEE]

ARE YOU THE ACCREDITED REPRESENTATIVE IN SOUTH AFRICA FOR THE GOODS /SERVICES /WORKS OFFERED?	☐Yes ☐No [IF YES ENCLOSE PROOF]	ARE YOU A FOREIGN BASED SUPPLIER FOR THE GOODS /SERVICES /WORKS OFFERED?	☐Yes ☐No [IF YES, ANSWER PART B:3]
TOTAL NUMBER OF ITEMS OFFERED	……	TOTAL BID PRICE	R……
SIGNATURE OF BIDDER	……	DATE	……

CAPACITY UNDER WHICH THIS BID IS SIGNED			
BIDDING PROCEDURE ENQUIRIES MAY BE DIRECTED TO:		TECHNICAL INFORMATION MAY BE DIRECTED TO:	
DEPARTMENT	Lepelle Nkumpi Municipality	CONTACT PERSON	Mr.Tebogo Phasha
CONTACT PERSON	Jeffrey Pitseng	TELEPHONE NUMBER	015 633 4557
TELEPHONE NUMBER	015 633 4531	FACSIMILE NUMBER	(015) 633 6896
FACSIMILE NUMBER	(015) 633 6896	E-MAIL ADDRESS	Malekate.phasha@lepelle-nkumpi.gov.za
E-MAIL ADDRESS	Jeffrey.pitseng@lepelle-nkumpi.gov.za		

MBD1

PART B TERMS AND CONDITIONS FOR BIDDING

1. BID SUBMISSION:
1.1. BIDS MUST BE DELIVERED BY THE STIPULATED TIME TO THE CORRECT ADDRESS. LATE BIDS WILL NOT BE ACCEPTED FOR CONSIDERATION. 1.2. ALL BIDS MUST BE SUBMITTED ON THE OFFICIAL FORMS PROVIDED–(NOT TO BE RE-TYPED) OR ONLINE 1.3. THIS BID IS SUBJECT TO THE PREFERENTIAL PROCUREMENT POLICY FRAMEWORK ACT AND THE PREFERENTIAL PROCUREMENT REGULATIONS, 2017, THE GENERAL CONDITIONS OF CONTRACT (GCC) AND, IF APPLICABLE, ANY OTHER SPECIAL CONDITIONS OF CONTRACT.
2. TAX COMPLIANCE REQUIREMENTS
2.1 BIDDERS MUST ENSURE COMPLIANCE WITH THEIR TAX OBLIGATIONS. 2.2 BIDDERS ARE REQUIRED TO SUBMIT THEIR UNIQUE PERSONAL IDENTIFICATION NUMBER (PIN) ISSUED BY SARS TO ENABLE THE ORGAN OF STATE TO VIEW THE TAXPAYER'S PROFILE AND TAX STATUS. 2.3 APPLICATION FOR THE TAX COMPLIANCE STATUS (TCS) CERTIFICATE OR PIN MAY ALSO BE MADE VIA E-FILING. IN ORDER TO USE THIS PROVISION, TAXPAYERS WILL NEED TO REGISTER WITH SARS AS E-FILERS THROUGH THE WEBSITE WWW.SARS.GOV.ZA. 2.4 FOREIGN SUPPLIERS MUST COMPLETE THE PRE-AWARD QUESTIONNAIRE IN PART B:3. 2.5 BIDDERS MAY ALSO SUBMIT A PRINTED TCS CERTIFICATE TOGETHER WITH THE BID. 2.6 IN BIDS WHERE CONSORTIA / JOINT VENTURES / SUB-CONTRACTORS ARE INVOLVED, EACH PARTY MUST SUBMIT A SEPARATE TCS CERTIFICATE / PIN / CSD NUMBER. 2.7 WHERE NO TCS IS AVAILABLE BUT THE BIDDER IS REGISTERED ON THE CENTRAL SUPPLIER DATABASE (CSD), A CSD NUMBER MUST BE PROVIDED.
3. QUESTIONNAIRE TO BIDDING FOREIGN SUPPLIERS

3.1. IS THE ENTITY A RESIDENT OF THE REPUBLIC OF SOUTH AFRICA (RSA)?	YES ☐	NO ☐
3.2. DOES THE ENTITY HAVE A BRANCH IN THE RSA?	YES ☐	NO ☐
3.3. DOES THE ENTITY HAVE A PERMANENT ESTABLISHMENT IN THE RSA?	YES ☐	NO ☐
3.4. DOES THE ENTITY HAVE ANY SOURCE OF INCOME IN THE RSA?	YES ☐	NO ☐
3.5. IS THE ENTITY LIABLE IN THE RSA FOR ANY FORM OF TAXATION?	YES ☐	NO ☐

IF THE ANSWER IS "NO" TO ALL OF THE ABOVE, THEN IT IS NOT A REQUIREMENT TO REGISTER FOR A TAX COMPLIANCE STATUS SYSTEM PIN CODE FROM THE SOUTH AFRICAN REVENUE SERVICE (SARS) AND IF NOT REGISTER AS PER 2.3 ABOVE.

NB: FAILURE TO PROVIDE ANY OF THE ABOVE PARTICULARS MAY RENDER THE BID INVALID. NO BIDS WILL BE CONSIDERED FROM PERSONS IN THE SERVICE OF THE STATE.

SIGNATURE OF BIDDER: ……

CAPACITY UNDER WHICH THIS BID IS SIGNED: ……

DATE: ……...

LEPELLE-NKUMPI LOCAL MUNICIPALITY

REFURBISHMENT AND UPGRADING OF LEBOWAKGOMO STADIUM

SUMMARY FOR BID OPENING PURPOSES

NAME OF BIDDING ENTITY: .....
.....

PHYSICAL STREET ADDRESS:	POSTAL ADDRESS:

TELEPHONE NUMBER.....:

FAX NUMBER : .....

E-mail ADDRESS .....:

CONTRACT PRICE : R.....
(Amount brought forward from the Form of Offer and Acceptance)*

Signed by authorised representative of the Bidding Entity: .....

DATE: ……

- Should any discrepancy occur between this figure and that stated in the Form of Offer and Acceptance, the latter shall take precedence and apply.

LEPELLE-NKUMPI LOCAL MUNICIPALITY

CONTRACT NO. LNM020/2020/21

REFURBISHMENT AND UPGRADING OF LEBOWAKGOMO STADIUM

INVITATION TO TENDER

Tenders are hereby invited from Contractors with necessary experience and compliance documents, have an active **CIDB grading of a minimum 4CE** and are in good standing with the South African Revenue Services.

Bid documents containing the Conditions of Bid are available and downloadable from the Municipal Website for free(Under Bids) and etenders portal.

All tenders and supporting documents shall be sealed in an envelope or package clearly marked **"Contract Number:** LNM020/2020/21**– REFURBISHMENT AND UPGRADING OF LEBOWAKGOMO STADIUM.**

Duly completed tenders shall be placed in the tender box situated at the main entrance of Lepelle-Nkumpi Municipality situated Civil Centre, Lebowakgomo Unit F, **not later than** 11h00 **on 17 August 2021**. No Fax or Late tenders will be accepted. The municipality shall adjudicate and award tenders in accordance with the Preferential Procurement Policy Framework Act 5/2000 and revised Preferential Procurement Regulation 2017on Pre –qualification criteria for preferential procurement,80/20 points system, where 80 points are for the price and 20 points for B-BBEE according to the said legislation and 100 points on Functionality.

The Tenderer must have a staff member who has completed, or, is registered for training towards, the NQF level 5 unit standard "Develop and Promote Labour Intensive Construction Strategies".

All Technical enquiries are to be directed to Mr. Tebogo Phasha on 015 633 4557.

MANKGA KG
MUNICIPAL MANAGER

LEPELLE-NKUMPI LOCAL MUNICIPALITY

CONTRACT NO. LNM020/2020/21

REFURBISHMENT AND UPGRADING OF LEBOWAKGOMO STADIUM

PART T1.2

TENDER DATA

LEPELLE-NKUMPI LOCAL MUNICIPALITY

CONTRACT NO. LNM020/2020/21

REFURBISHMENT AND UPGRADING OF LEBOWAKGOMO STADIUM

T1.2 TENDER DATA

The conditions of tender are the Standard Conditions of Tender as contained in Annexure F of the CIDB Standard for Uniformity in Construction Procurement (Jan 2009) as published in Government Gazette No: 31823, Board Notice 11 of 2008 of 30 February 2009. (See www.cidb.org.za).

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

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

Clause Number	
F.1.1	**The Employer is:** Lepelle-Nkumpi Local Municipality P/BAG X07 **CHUENESPOORT** 0745
F.1.2	The Tender documents issued by the Employer comprise the following documents: **THE TENDER** **Part T1 : Tendering Procedures** T1.1 Tender Notice and invitation to tender T1.2 Tender Data **Part T2: Returnable Documents** T2.1 List of Returnable documents T2.2 Returnable schedules

	THE CONTRACT **Part C1: Agreements and Contract Data** C1.1 Form of offer and acceptance C1.2 Contract Data C1.3 Performance guarantee C1.4 OHS **Part C2: Pricing Data** C2.1 Pricing Instructions C2.2 Bill of Quantities **Part C3: Scope of Work** C3 Scope of Work **Part C4: Site Information** C4 Site Information
F1.3	**Interpretation** The tender data and additional requirements contained in the tender schedules that are included in the returnable documents are deemed to be part of these tender conditions.
F.1.4	**The Employer is:**
	Lepelle-Nkumpi Local Municipality P/BAG X07 **CHUENESPOORT** 0745
F.1.5.1	**Reject or accept** The Employer may accept or reject any variation, deviation, tender offer, or alternative tender offer, and may cancel the tender process and reject all tender offers at any time before the formation of a contract. The employer shall not accept or incur any liability to a tenderer for such a cancellation and rejection, but will give written reasons for such action upon written request to do so.
F.2.1	**Eligibility** Only those tenderers who satisfy the following criteria are eligible to submit tenders:
F.2.1	Only those Tenderers who are registered with the CIDB, or are capable of being so prior to the evaluation of submissions, in a Contractor grading designation equal to or higher than a Contractor grading designation determined in accordance with the sum tendered, or a value determined in accordance with Regulation 25 (1B) or 25 (7A) of the Construction Industry Development Regulations, for a 4 **CE or higher** class construction work, are eligible to have their tenders evaluated.

	Joint Ventures are eligible to submit tenders provided that: 1. every member of the joint venture is registered with the CIDB; 2. the e lead partner has a Contractor grading designation in the 4 **CE**OR **higher** class of construction work; and 3. the combined Contractor grading designation calculated in accordance with the Construction Industry Development Regulations is equal to or higher than a contractor grading designation determined in accordance with the sum tendered for a 4 **CE or higher** class of construction work or a value determined in accordance with Regulation 25 (1B) of 25 (7A) of the Construction Industry Development Regulations. Only tenderers who employ staff which satisfy EPWP requirements are eligible to submit tenders. The Tenderer must have a staff member who has completed, or, is registered for training towards, the NQF level 5 unit standard "Develop and Promote Labour Intensive Construction Strategies".	
F.2.2	**Compensation of tendering** Accept that the Employer will not compensate the tenderer for any costs incurred in the preparation and submission of a tender offer, including the costs of any testing necessary to demonstrate that aspects of the offer satisfy requirements.	
F.2.3	**Check documents** Check the tender documents on receipt for completeness and notify the employer of any discrepancy or omission.	
F.2.4	**Confidentiality and copyright** Treat as confidential all matters arising in connection with the tender. Use and copy the documents issued by the employer only for the purpose of preparing and submitting a tender offer in response to the invitation.	
F.2.5	**Reference documents** Obtain, as necessary for submitting a tender offer, copies of the latest versions of standards, specifications, conditions of contract and other publications, which are not attached but which are incorporated into the tender documents by reference.	
F2.6	**Acknowledge Addenda** Acknowledge receipt of addenda to the tender documents, which the employer may issue, and if necessary apply for an extension of the closing time stated in the tender data, in order to take the addenda into account.	
F.2.7	The arrangements for a **compulsory site meeting** are:	
	Date:N/A **Starting time:**N/A	**Location:**N/A
F.2.10	**Pricing the tender** State the rates and prices in Rand.	

F.2.11	**Alterations to documents** Do Not make any alterations or additions to the tender documents, except to comply with instructions issued by the employer, or necessary to correct errors made by the tenderer. All signatories to the tender offer shall initial all such alterations. Erasures and the use of masking fluid are prohibited.
F.2.12	**Alternative tender offers** Alternative offers may be submitted only if a main tender offer, strictly in accordance with all the requirements of the tender documents, is also submitted. The alternative tender offer is to be submitted with the main tender offer together with a schedule that compares the requirements of the tender documents with the alternative requirements the tenderer proposes. Acceptance of an alternative tender offer will mean acceptance in principle of the offer. It will be an obligation of the contract 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.
F2.13.3	Tender offer communicated on paper shall be submitted as an original.
F.2.13.5	The Employer's address for delivery of Tender offers and identification details to be shown on each Tender offer package are:
	REFURBISHMENT AND UPFRADING OF LEBOWAKGOMO STADIUM (LEPELLE NKUMPI MUNICIPALITY)
	Closing date and time: Closing date: 17 AUGUST 2021 Closing Time: **11H00**
	Location of Tender box: Lepelle-Nkumpi Local Municipality, Civic Centre, Lebowakgomo Unit F.
	Physical address: Lepelle-Nkumpi Local Municipality, Civic Centre, Lebowakgomo Unit F.
F.2.13.9	Telephonic, telegraphic, telex, facsimile or e-mailed tender offers will not be accepted.
F.2.14	Accept that tender offers, which do not provide all the data or information requested completely and in the form required, may be regarded by the employer as non-responsive.
F2.15	The closing time for submission of tender offers is as mentioned in F.2.13.5 above and as stated in the Tender Notice and Invitation to Tender.
F.2.16	The Tender offer validity period is **90 Days**.
F.2.18	The tenderer shall, when requested by the Employer to do so, submit the 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 the eligibility requirements.
F2.20	The tenderer is required to submit a Performance Guarantee from an approved insurer within **14** days from appointment. A format is included in Part C1.3 of this

	document. The tenderer is to submit to the employer before formation of the contract, all securities, bonds, guarantees, policies and certificates of insurance required in terms of the conditions of contract identified in the contract data.
F.2.23	The tenderer is required to submit with his tender: (1) an original valid Tax Clearance Certificate issued by the South African Revenue Services; and (2) An original or certified copy of the Company / CC Registration. In case of Joint Venture – both companies / cc to submit registration documentation. (3) In case of Joint Venture – the Joint Venture Agreement.
F.3.4	The time and location for opening of the Tender offers are: Closing date: 17 AUGUST 2021 Closing Time: 11H00 Location: Lepelle-Nkumpi Local Municipality, Civic Centre, Lebowakgomo Unit F.
F3.9.1	Replace the contents of the clause with the following: Check responsive tender offers for arithmetical errors, correcting them in the following manner: *Where there is a discrepancy between the amounts in figures and in words, the amount in words shall govern.* *If a bill of quantities (or schedule of rates) apply and there is an error in the line item total resulting from the product of the unit rate and the quantity, the line item total shall govern and the rate shall be corrected. Where there is an obviously gross misplacement of the decimal point in the unit rate, the line item total as quoted shall govern, and the unit rate will be corrected.* *Where there is an error in the total of the prices either as a result of other corrections required by this checking process or in the tenderer's addition of prices, the total of the prices shall govern and the tenderer will be asked to revise selected item prices (and their rates if a bills of quantities applies) to achieve the tendered total of the prices.* Consider the rejection of a tender offer if the tenderer does not correct or accept the correction of his arithmetical errors in the manner described above.
F3.11	

LEPELLE-NKUMPI LOCAL MUNICIPALITY

CONTRACT NO. LNM020/2020/21

REFURBISHMENT AND UPGRADING OF LEBOWAKGOMO STADIUM

PART T1.3

Standard Conditions of Tender

Annex F

(Normative)

Standard Conditions of Tender

Note: 1 These Standard Conditions of Tender are identical to that contained In Annex F of *SANS* 294: *2004, Construction Procurement Processes, Procedures and Methods.*

2 Annex E of *SANS* 294, *Construction Procurement Processes, Procedures and Methods,* and SAICE's Practice Manual #1, *The use of South African National Standards in Construction Procurement* , provide guidance on referencing these Standard Conditions of Tender in procurement documents.

F.1 General

F.1.1 Actions

The employer and each tenderer submitting a tender offer shall comply with these conditions of tender. In their dealings with each other, they shall discharge their duties and obligations as set out in F.2 and F.3, timeously and with integrity, and behave equitably, honestly and transparently.

F.1.2 Tender Documents

The documents issued by the employer for the purpose of a tender offer are listed in the tender data.

F.1.3 Interpretation

F.1.3.1 The tender data and additional requirements contained in the tender schedules that are included in the returnable documents are deemed to be part of these conditions of tender.

F.1.3.2 These conditions of tender, the tender data and tender schedules which are only required for tender evaluation purposes, shall not form part of any contract arising from the invitation to tender.

F.1.3.3 For the purposes of these conditions for the calling for expressions of interest, the following definitions apply:

a) Comparative offer means the tenderer's financial offer after the factors of non-firm prices, all unconditional discounts and any other tendered parameters that will affect the value of the financial offer have been taken into consideration

b) corrupt practice means the offering, giving, receiving or soliciting of anything of value to influence the action of the employer or his staff or agents in the tender process; and

c) fraudulent practice means the misrepresentation of the facts in order to influence the tender process or the award of a contract arising from a tender offer to the detriment of the employer, including collusive practices intended to establish prices at artificial levels quality (functionality) means the totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs

F.1.4 Communication and employer's agent

Each communication between the employer and a tenderer shall be to or from the employer's agent only, and in a form that can be read, copied and recorded. Writing shall be in the English language.

The employer shall not take any responsibility for non-receipt of communications from or by a tenderer. The name and contact details of the employer's agent are stated in the tender data.

F.1.5 The employer's right to accept or reject any tender offer

F.1.5.1 The employer may accept or reject any variation, deviation, tender offer, or alternative tender offer, and may cancel the tender process and reject all tender offers at any time before the formation of a contract. The employer shall not accept or incur any liability to a tenderer for such cancellation and rejection, but will give written reasons for such action upon written request to do so.

F.1.5.2 The employer may not subsequent to the cancellation or abandonment of a tender process or the rejection of all responsive tender offers re-issue a tender covering substantially the same scope of work within a period of six months unless only one tender was received and such tender was returned unopened to the tenderer.

F.2 Tenderer's obligations

F.2.1 Eligibility

Submit a tender offer only if the tenderer satisfies the criteria stated in the tender data and the tenderer, or any of his principals, is not under any restriction to do business with employer.

F.2.2 Cost of tendering

Accept that the employer will not compensate the tenderer for any costs incurred in the preparation and submission of a tender offer, including the costs of any testing necessary to demonstrate that aspects of the offer satisfy requirements.

F.2.3 Check documents

Check the tender documents on receipt for completeness and notify the employer of any discrepancy or omission.

F.2.4 Confidentiality and copyright of documents

Treat as confidential all matters arising in connection with the tender. Use and copy the documents issued by the employer only for the purpose of preparing and submitting a tender offer in response to the invitation.

F.2.5 Reference documents

Obtain, as necessary for submitting a tender offer, copies of the latest versions of standards, specifications, conditions of contract and other publications, which are not attached but which are incorporated into the tender documents by reference.

F.2.6 Acknowledge addenda

Acknowledge receipt of addenda to the tender documents, which the employer may issue, and if necessary apply for an extension to the closing time stated in the tender data, in order to take the addenda into account.

F.2.7 Clarification meeting

Attend, where required, a clarification meeting at which tenderers may familiarize themselves with aspects of the proposed work, services or supply and raise questions. Details of the meeting@) are stated in the tender data.

F.2.8 Seek clarification

Request clarification of the tender documents, if necessary, by notifying the employer at least five working days before the closing time stated in the tender data.

F.2.9 Insurance
Be aware that the extent of insurance to be provided by the employer (if any) might not be for the full cover required in terms of the conditions of contract identified in the contract data. The tenderer is advised to seek qualified advice regarding insurance.

F.2.10 Pricing the tender offer
F.2.10.1 Include in the rates, prices, and the tendered total of the prices (if any) all duties, taxes (except Value Added Tax (VAT), and other levies payable by the successful tenderer, such duties, taxes and levies being those applicable 14 days before the closing time stated in the tender data.

F2.10.2Show VAT payable by the employer separately as an addition to the tendered total of the prices.

F.2.10.3 Provide rates and prices that are fixed for the duration of the contract and not subject to adjustment except as provided for in the conditions of contract identified in the contract data

F.2.10.4 State the rates and prices in Rand unless instructed otherwise in the tender data. The conditions of contract identified in the contract data may provide for part payment in other currencies.

F.2.11 Alterations to documents
Not make any alterations or additions to the tender documents, except to comply with instructions issued by the employer, or necessary to correct errors made by the tenderer. All signatories to the tender offer shall initial all such alterations. Erasures and the use of masking fluid are prohibited.

F.2.12 Alternative tender offers
F.2.12.1 Submit alternative tender offers only if a main tender offer, strictly in accordance with all the requirements of the tender documents, is also submitted. The alternative tender offer is to be submitted with the main tender offer together with a schedule that compares the requirements of the tender documents with the alternative requirements the tenderer proposes.

F.2.12.2 Accept that an alternative tender offer may be based only on the criteria stated in the tender data or criteria otherwise acceptable to the employer.

F.2.13 Submitting a tender offer
F.2.13.1 Submit a tender offer to provide the whole of the works, services or supply identified in the contract data and described in the scope of works, unless stated otherwise in the tender data.

F.2.13.2 Return all returnable documents to the employer after completing them in their entirety, either electronically (if they were issued in electronic format) or by writing in Mack ink.

F.2.13.3 Submit the parts of the tender offer communicated on paper as an original plus the number of copies stated in the tender data, with an English translation of any documentation in a language other than English, and the parts communicated electronically in the same format as they were issued by the employer.

F.2.13.4 Sign the original and all copies of the tender offer where required in terms of the tender data.

The employer will hold all authorized signatories liable on behalf of the tenderer. Signatories for tenderers proposing to contract as joint ventures shall state which of the signatories is the lead partner whom the employer shall hold liable for the purpose of the tender offer.

F.2.13.5 Seal the original and each copy of the tender offer as separate packages marking the packages as “ORIGINAL” and ”COPY”. Each package shall state on the outside the employer’s address and identification details stated in the tender data, as well as the tenderer’s name and contact address.

F.2.13.6 Where a two-envelope system is required in terms of the tender data, place and seal the returnable documents listed in the tender data in an envelope marked “financial proposal” and place the remaining returnable documents in an envelope marked “technical proposal”. Each envelope shall state on the outside the employer’s address and identification details stated in the tender data, as well as the tenderer‘s name and contact address.

F.2.13.7 Seal the original tender offer and copy packages together in an outer package that states on the outside only the employer‘s address and identification details as stated in the tender data.

F.2.13.8 Accept that the employer will not assume any responsibility for the misplacement or premature opening of the tender offer if the outer package is not sealed and marked as stated.

F.2.14 Information and data to be completed in all respects
Accept that tender offers, which do not provide all the data or information requested completely and in the form required, may be regarded by the employer as non-responsive.

F.2.15 Closing time
F.2.15.1 Ensure that the employer receives the tender offer at the address specified in the tender data not later than the closing time stated in the tender data. Proof of posting shall not be accepted as proof of delivery. The employer shall not accept tender offers submitted by telegraph, telex, facsimile or e-mail, unless stated otherwise in the tender data.

F.2.15.2 Accept that, if the employer extends the closing time stated in the tender data for any reason, the requirements of these conditions of tender apply equally to the extended deadline.

F.2.16 Tender offer validity
F.2.16.1 Hold the tender offer(s) valid for acceptance by the employer at any time during the validity period stated in the tender data after the closing time stated in the tender data.

F.2.16.2 If requested by the employer, consider extending the validity period stated in the tender data for an agreed additional period.

F.2.17 Clarification of tender offer after submission
Provide clarification of a tender offer in response to a request to do *so* from the employer during the evaluation of tender offers. This may include providing a breakdown of rates or prices and correction of arithmetical errors by the adjustment of certain rates or item prices (Or both). No change in the competitive position of tenderers or substance of the tender offer is sought, offered, or permitted.

Note: Sub-clause F.2.17 does not preclude the negotiation of the final terms of the contract with a preferred tenderer following a competitive selection process, should the Employer *elect* to do so.

F.2.18 Provide other material
F.2.18.1 Provide, on request by the employer, any other material that has a bearing on the tender offer, the tenderer’s commercial position (including notarized joint venture agreements), preferencing arrangements, or samples of materials, considered necessary by the employer for the purpose of a full and fair risk assessment. Should the tenderer not provide the material, or a satisfactory reason as

to why it cannot be provided, by the time for submission stated in the employer's request, the employer may regard the tender offer as non-responsive.

F.2.18.2 Dispose of samples of materials provided for evaluation by the employer, where required.

F.2.19 Inspections, tests and analysis
Provide access during working hours to premises for inspections, tests and analysis as provided for in the tender data.

F.2.20 Submit securities, bonds, policies, etc.
If requested, submit for the employer's acceptance before formation of the contract, all securities, bonds, guarantees, policies and certificates of insurance required in terms of the conditions of contract identified in the contract data.

F.2.21 Check final draft
Check the final draft of the contract provided by the employer within the time available for the employer to issue the contract.

F.2.22 Return of other tender documents
If so instructed by the employer, return all retained tender documents within 28 days after the expiry of the validity period stated in the tender data

F.2.23 Certificates
Include in the tender submission or provide the employer with any certificates as stated in the tender data.

F.3 The employer's undertakings

F.3.1 Respond to clarification
Respond to a request for clarification received up to five working days before the tender closing time stated in the Tender Data and notify all tenderers who drew procurement documents.

F.3.2 Issue Addenda
If necessary, issue addenda that may amend or amplify the tender documents to each tenderer during the period from the date that tender documents are available until seven days before the tender closing time stated in the Tender Data. If, as a result a tenderer applies for an extension to the closing time stated in the Tender Data, the Employer may grant such extension and, shall then notify all tenderers who drew documents.

F.3.3 Return late tender offers
Return tender offers received after the closing time stated in the Tender Data, unopened, (unless it is necessary to open a tender submission to obtain a forwarding address), to the tenderer concerned.

F.3.4 Opening of tender submissions
F.3.4.1 Unless the two-envelope system is to be followed, open valid tender submissions in the presence of tenderers' agents who choose to attend at the time and place stated in the tender data. Tender submissions for which acceptable reasons for withdrawal have been submitted will not be opened.

F.3.4.2 Announce at the meeting held immediately after the opening of tender submissions, at a venue indicated in the tender data, the name of each tenderer whose tender offer is opened, the total of his prices, preferences claimed and time for completion, if any, for the main tender offer only.

F.3.4.3 Make available the record outlined in F.3.4.2 to all interested persons upon request.

F.3.5 Two-envelope system
F.3.5.1 Where stated in the tender data that a two-envelope system is to be followed, open Only the technical proposal of valid tenders in the presence of tenderers' agents who choose to attend at the time and place stated in the tender data and announce the name of each tenderer whose technical proposal is opened.

F.3.5.2 Evaluate the quality of the technical proposals offered by tenderers, then advice tenderers who remain in contention for the award of the contract of the time and place when the financial proposals will be opened. Open only the financial proposals of tenderers, who score in the quality evaluation more than the minimum number of points for quality stated in the tender

data, and announce the score obtained for the technical proposals and the total price and any preferences claimed. Return unopened financial proposals to tenderers whose technical proposals failed to achieve the minimum number of points for quality.

F.3.6 Nondisclosure
Not disclose to tenderers, or to any other person not officially concerned with such processes, information relating to the evaluation and comparison of tender offers, the final evaluation price and recommendations for the award of a contract, until after the award of the contract to the successful tenderer.

F.3.7 Grounds for rejection and disqualification
Determine whether there has been any effort by a tenderer to influence the processing of tender offers and instantly disqualify a tenderer (and his tender offer) if it is established that he engaged in corrupt or fraudulent practices.

F.3.8 Test for responsiveness
F.3.8.1 Determine, after opening and before detailed evaluation, whether each tender offer properly received:

a) complies with the requirements of these Conditions of Tender,

b) Has been properly and fully completed and signed, and

c) is responsive to the other requirements of the tender documents.

F.3.8.2 A responsive tender is one that conforms to all the terms, conditions, and specifications of the tender documents without material deviation or qualification. A material deviation or qualification is one which, in the Employer's opinion, would:

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. Reject a non-responsive tender offer, and not allow it to be subsequently made responsive by correction or withdrawal of the non-conforming deviation or reservation.

F.3.9 Arithmetical errors

F.3.9.1 Check responsive tender offers for arithmetical errors, correcting them in the following manner:

a) Where there is a discrepancy between the amounts in figures and in words, the amount in figures shall govern.

b) If bills of quantities (or schedule of quantities or schedule of rates) apply and there is an error in the line item total resulting from the product of the unit rate and the quantity, the line item total shall govern and the rate shall be corrected. Where there is an obviously gross misplacement of the decimal point in the unit rate, the line item total as quoted shall govern, and the unit rate shall be corrected.

c) Where there is an error in the total of the prices either as a result of other corrections required by this checking process or in the tenderer's addition of prices, the total of the prices shall govern and the tenderer will be asked to revise selected item prices (and their rates if bills of quantities apply) to achieve the tendered total of the prices.

F.3.9.2 Consider the rejection of a tender offer if the tenderer does not correct or accept the correction of his arithmetical errors in the manner described in F.3.9.1.

F.3.10 Clarification of a tender offer

Obtain clarification from a tenderer on any matter that could give rise to ambiguity in a contract arising from the tender offer.

F.3.11 Evaluation of tender offers

F.3.11.1 General

Appoint an evaluation panel of not less than three persons. Reduce each responsive tender offer to a comparative offer and evaluate it using the tender evaluation method that is indicated in the Tender Data and described below:

Method 1 : Financial offer	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, unless there are compelling and justifiable reasons not to do so.
Method 2 : Financial offer and preferences	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, unless there are compelling and justifiable reasons not to do so.
Method 3 : Financial offer and quality	1) Score quality, rejecting all tender offers that fail to score the minimum number of points for quality stated in the Tender data. 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, unless there are compelling and justifiable reasons not to do so.
Method 4 : Financial offer, quality and preferences	1) Score quality, rejecting all tender offers that fail to score the minimum number of points for quality stated in the Tender data. 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, unless there are compelling and justifiable reasons not to do so.

Score financial offers, preferences and quality, as relevant, to two decimal places.

F.3.11.2 Scoring Financial Offers

Score the financial offers of remaining responsive tender offers using the following formula:

N_{FO}	= W, x A where:
N_{FO}	= the number of tender evaluation points awarded for the financial offer.
W_1	= the maximum possible number of tender evaluation points awarded for the financial offer as stated in the Tender Data.
A	= a number calculated using either formulas 1 or 2 below as stated in the Tender Data.

Formula	**Comparison aimed at achieving**	**Option 1**	**Option 2**
1	Highest price or discount	$A = (1 + (\frac{P - Pm}{Pm}))$	A = P / Pm
2	Lowest price or percentage commission/fee	$A = (1 - (\frac{P - Pm}{Pm}))$	A = Pm / P

Where:

Pm = the comparative offer of the most favourable tender offer.
P = the comparative offer of tender offer under consideration.

F.3.11.3 Scoring for B-BBEE

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

EVALUATION PROCESS AND CRITERIA

The following evaluation process and criteria will be used to evaluate all bids submitted:

1. Administrative Compliance – Phase One

1.1 All bids duly lodged will be examined to determine compliance with bidding requirements and conditions. Bids with obvious deviations from the requirements/conditions, will be eliminated from further evaluation.

1.2 **Critical Criteria**:

- The bid must be properly received in a sealed envelope clearly indicating the description of the service and the bid number for which the bid is submitted.
- The bid must be deposited in the relevant bid box as indicated on the notice of the bid on or before the closing date and time of the bid.
- Tax Compliance Pin/ CSD number must be completed in MBD form 1
- Bid document must be completed in full and each page of the bid initialized or signed
- Alterations must be signed/initialized
- Copy of the company registration certificate must be submitted with the bid.
- Copy of BBBEE Certificate or original sworn affidavit must also be attached
- Certified copy of Identity document (ID) of all director (s)must be attached
- CIDB Grading 4CE OR Higher.
  - **Only local produce products will be considered, Local Content Annexures (C,D and E) must be fully completed with the line stipulated minimum threshold as stated below**

Short Description	Required Minimum Threshold for Local Production and Content
Electrical Cables	90%
Valves Products and Actuators	90%
Steel Products and Components of Construction	100%
Plastic Pipes and Fittings	100%

- Submission of a Joint Venture Agreement, where applicable, which has been properly signed by all parties.
- Complies with the requirements of the bid and technical specifications.
- Bidders to attach Authority for signatory in company letterhead - attach resolution
- Adheres to Pricing Instructions(e.g. Providing lump sums on quantified items in the BOQ)
- Letter of good standing from Department of Labour
- THE USE OF CORRECTION FLUID (TIPPEX) WILL AUTOMATICALLY INVALIDATE YOUR BID

- Bidders must attach the Statement of Municipal Rates on the municipality letterhead not older than 3 months for the company and all directors (if the Statement of Municipal Rates is not in the name of bidder and all directors affidavit from SAPS must be attached) or letter from Traditional Authority not older than 3 months for the company and all directors or a lease agreement for the company and all directors accompanied by Municipal rate letter of the Lessor.

  - The bid will be rejected if any municipal rates and taxes or municipal service charges owed by that bidder or any of its directors to the Municipality or Municipal entity, or to any other Municipality or Municipal entity are in arrears for more than three months (90 days)

- **Recovery of rates in arrears from tenants and occupiers**
  (1) If an amount due for rates levied in respect of a property is unpaid by the owner of the property after the date determined in terms of section *26(2),* the municipality may recover the amount in whole or in part from a tenant or occupier of the property, despite any contractual obligation to the contrary on the tenant or occupier. The municipality, may recover an amount only after the municipality has served a written notice on the tenant or occupier.
  (2) The amount a municipality may recover from the tenant or occupier of a property in terms of subsection (1) is limited to the amount of the rent or other money due and payable, but not yet paid, by the tenant or occupier to the owner of the property.
  (3) Any amount a municipality recovers from the tenant or occupier of the property must be set off by the tenant or occupier against any money owed by the tenant or occupier to the owner.
  The tenant or occupier of a property must, on request by a municipality, furnish the municipality with a written statement specifying all payments to be made by the tenant or occupier to the owner of the property for rent or other money payable on the property during a period determined by the municipality Proof of Municipal Rates and Taxes or letter for Tribal Authority or lease agreement must be attached (Not older than 3 months).

- Late bids shall not be admitted for consideration.

- **Recovery of rates in arrears from tenants and occupiers**
  (4) If an amount due for rates levied in respect of a property is unpaid by the owner of the property after the date determined in terms of section *26(2),* the municipality may recover the amount in whole or in part from a tenant or occupier of the property, despite any contractual obligation to the contrary on the tenant or occupier. The municipality, may recover an amount only after the municipality has served a written notice on the tenant or occupier.
  (5) The amount a municipality may recover from the tenant or occupier of a property in terms of subsection (1) is limited to the amount of the rent or other money due and payable, but not yet paid, by the tenant or occupier to the owner of the property.
  (6) Any amount a municipality recovers from the tenant or occupier of the property must be set off by the tenant or occupier against any money owed by the tenant or occupier to the owner.
  - The tenant or occupier of a property must, on request by a municipality, furnish the municipality with a written statement specifying all payments to be made by the tenant or occupier to the owner of the property for rent or other money payable on the property during a period determined by the municipality Proof of Municipal Rates and Taxes or letter for Tribal Authority or lease agreement must be attached (Not older than 3 months).

2. Functionality – Phase Two (100 points allocation)

The bidders who complied administratively are considered for further evaluation on ability to execute the project. The assessment of functionality will be done in terms of the evaluation criteria and minimum threshold as specified. A bid will be disqualified if it fails to meet the minimum threshold for functionality as per the bid invitation.

	Functionality	Points Allocation
	Company Experience (Certified copy of appointment letters & Completion certificates for similar project i.e. Sports Facilities and Stadiums qualifies points) Each appointment together with completion certificate carries 10 Points **Total**	 **Max 40**
	Management and key Staff (Site Agent) Certified copy of Qualifications to be attached • Technical Certificate (N6 Civil Engineering) FET College • Technical Diploma (N dip) University of Technology • Degree (B-Tech, B Eng ,B sc Civil) University or University of Technology • Professional registration ECSA/SACPMP (Pr. Techni, Pr CPM. Pr CM. Pr. Tech ,Pr. Eng **Total**	 10 15 20 25 **Max 25**
	Safety Officer: Certified copy of Qualifications to be attached • National Diploma In OHS **Total**	 10 **Max 10**
	Attached letter of intent from Registered financial institution with full details as guarantor in the amount of 10% as specified for surety purposes **Total**	5 **Max 5**
	Plant (attach certified copies of registration documents of plants or letter of intent to rent) NB. In terms of hiring of Plant, letter of intent to rent must be accompanied by certified copies of registration documents from the plant company.	

	Required Plant: TLB Water Tanker Roller Tipper Truck x 2 (2point each) Grader Excavator **Total**	 2 2 2 4 5 **5** **Max 20**
	Total Points Achievable	**100**
	Minimum Score required	**60**

F.3.12 Insurance provided by the employer

If requested by the proposed successful tenderer, submit for the tenderer's information the policies and/or certificates of insurance which the conditions of contract identified in the contract data, require the employer to provide.

F.3.13 Acceptance of tender offer

F.3.13.1 Accept tender offer only if the tenderer complies with the legal requirements stated in the Tender Data.

F.3.13.2 Notify the successful tenderer of the employer's acceptance of his tender offer by completing and returning one copy of the form of offer and acceptance before the expiry of the validity period stated in the tender data, or agreed additional period. Providing the form of offer and acceptance does not contain any qualifying statements, it will constitute the formation of a contract between the employer and the successful tenderer as described in the form of offer and acceptance.

F.3.14 Notice to unsuccessful tenderers

After the successful tenderer has acknowledged the employer's notice Of acceptance, notify other tenderers that their tender offers have not been accepted.

F.3.15. Prepare contract documents

If necessary, revise documents that shall form part of the contract and that were issued by the employer as part of the tender documents to take account of:

a) Addenda issued during the tender period,

b) Inclusion of some of the returnable documents,

c) Other revisions agreed between the employer and the successful tenderer, and

d) The schedule of deviations attached to the form of offer and acceptance, if any.

F.3.16 Issue final contract

Prepare and issue the final draft of contract documents to the successful tenderer for acceptance as soon as possible after the date of the employer's signing of the form of Offer and acceptance (including the schedule of deviations, if any). Only those documents that the conditions of tender require the tenderer to submit, after acceptance by the employer, shall be included.

F.3.17 Complete adjudicator's contract
Unless alternative arrangements have been agreed or otherwise provided for in the contract, arrange for both patties to complete formalities for appointing the selected adjudicator at the same time as the main contract is signed.

F.3.18 Provide copies of the contracts
Provide to the successful tenderer the number of copies stated in the Tender Data of the signed copy of the contract as soon as possible after completion and signing of the form of offer and acceptance.

LEPELLE-NKUMPI LOCAL MUNICIPALITY

CONTRACT NO. LNM020/2020/21

REFURBISHMENT AND UPGRADING OF LEBOWAKGOMO STADIUM

PART T2

LIST OF RETURNABLE DOCUMENTS

RETURNABLE DOCUMENTS

INDEX

END OF SECTION

PART T2.1

LIST OF RETURNABLE DOCUMENTS AND RETURNABLE SCHEDULES

LEPELLE-NKUMPI LOCAL MUNICIPALITY

CONTRACT NO. LNM020/2020/21

REFURBISHMENT AND UPGRADING OF LEBOWAKGOMO STADIUM

T2.2 RETURNABLE DOCUMENTS

RETURNABLE DOCUMENTS REQUIRED FOR TENDER EVALUATION PURPOSES

FORM A COMPULSORY ENTERPRISE QUESTIONNAIRE

In the case of a Joint Venture – This questionnaire is to be completed and submitted in respect of each partner.

1. **Name of Enterprise**: ……..

2. **VAT Registration number, if any**:…….

3. **CIDB Registration number**: …….

4. **Particulars of sole proprietors and partners in partnership:**

Name	Identity Number	Personal Income Tax Number

* Complete only if sole proprietor or partnership and attach separate page if more than 4 partners.

5. **Particulars of companies and close corporations:**

Company Registration Number: ..……..…..

Close Corporation Number : ……..

Tax reference Number : ……..

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 of director, manager, principal stakeholder or stakeholder in a company or close corporation is currently of has been within the last 12 months in the service of any of the following:

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

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

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

Name of Tenderer : …….....

Date : …….....

Signature :……...

Position : …….....

Full name of signatory : ……

ATTACH THE FOLLOWING DOCUMENTS HERETO

1. For Closed Corporations

   CK1 or CK2 as applicable (Founding Statement)

2. For Companies

   Shareholders register

3. For Joint Venture Agreements

   Copy of the Joint Venture Agreement between all the parties, as well as the documents in (1) or (2) of each Joint Venture member.

FORM B RECORD OF ADDENDA TO TENDER DOCUMENTS

We confirm that the following communication 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

Name of Tenderer : …….....

Date : …….....

Signature : ……...

Position : …….....

Full name of signatory : ……

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

PRO-FORMA FOR JOINT VENTURES:

Certificate of Authority for Joint Ventures

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 an any contract resulting from it on our behalf.

NAME OF FIRM	ADDRESS	DULY AUTHORISED SIGNATORY
Lead Partner: CIDB Reg No: ……		Signature: …….. Name: ……. Designation: ……..
  CIDB Reg No: ……		Signature: …….. Name: ……. Designation: ……..
  CIDB Reg No: ……		Signature: …….. Name: ……. Designation: ……..
  CIDB Reg No: ……		Signature: …….. Name: ……. Designation: ……..
  CIDB Reg No: ……		Signature: …….. Name: ……. Designation: ……..

ATTACH HERETO THE DULY SIGNED AND DATED ORIGINAL OR CERTIFIED COPY OF AUTHORITY OF SIGNATORY ON COMPANY LETTERHEAD

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

FORM E SCHEDULE OF PREVIOUS EXPERIENCE

Provide the following information on relevant previous experience (indicate specifically projects of similar or larger size and/or which is similar with regard to type of work. **This information is material to the award of the Contract.**

Description	Value (R) VAT excluded	Year(s) work executed	Reference		
			Name	Organisation	Tel no

Name of Tenderer : …….....

Date : …….....

Signature : ……...

Position : …….....

Full name of signatory : ……

FORM F SCHEDULE OF CURRENT PROJECTS

Provide the following information on current projects. **This information is material to the award of the Contract.**

Description	Value (R) VAT excluded	Date Appointed	Reference		
			Name	Organisation	Tel no

Name of Tenderer : …….....

Date : …….....

Signature : ……..

Position : …….....

Full name of signatory : …….....

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

FORM I PROPOSED KEY PERSONNEL

Please list the personnel that you intend to appoint on this contract.			
DESCRIPTION	**Name** of Full time member	Staff to be appointed on this contract	
		No of **Full Time** employment	No of **Part Time** employment
Contract Manager			
Site Agent			
Clerk			
Foreman			
Material			
Surveyor			
Operators			
Supervisor			
Labourers			
Other			
1.			
2.			

Name of Tenderer : …….....

Date : …….....

Signature : ……...

Position : …….....

Full name of signatory : ……

FORM J SCHEDULE OF PLANT AND EQUIPMENT

1. TRENCH EXCAVATION	NUMBER OF UNITS OWNED BY CONTRACTOR	NUMBER OF UNITS ALLOCATED TO THIS CONTRACT	
		OWNED	HIRED
2. EARTH MOVING EQUIPMENT			
3. CONSTRUCTION EQUIPMENT			
4. TRANSPORT			

Name of Tenderer : …….....

Date : …….....

Signature : ……...

Position : …….....

Full name of signatory : ……

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

FORM K SCHEDULE OF PROPOSED SUB-CONTRACTORS

NAME OF SUB-CONTRACTOR	FULL DESCRIPTION OF WORK TO BE PERFORMED BY SUB-CONTRACTOR

Name of Tenderer : …….....

Date : …….....

Signature : ……...

Position : …….....

Full name of signatory : ……

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

FORM L FINANCIAL REFERENCES

FINANCIAL STATEMENTS

I/We agree, if required, to furnish an audited copy of the latest set of financial statements together with my/our Directors' and Auditors' report for consideration by the Client.

DETAILS OF TENDERERS BANKING INFORMATION

I/We hereby authorise the Client/Engineer to approach all or any of the following banks for the purposes of obtaining a financial reference: you are also required to attach a financial reference letter stating bank rating from your financial institution,

BANK NAME	
ACCOUNT NAME :*(e.g. ABC Civil Construction cc)*	
ACCOUNT TYPE :*(e.g. Savings, Cheque etc)*	
ACCOUNT NO	
ADDRESS OF BANK	
CONTACT PERSON	
TEL. NO. OF BANK / CONTACT	
How long has this account been in existence:	0-6 months ☐ 7-12 months ☐ 13-24 months ☐ More than 24 months ☐ (Tick which is appropriate)

Name of Tenderer : ……....

Date : …….....

Signature : ……...

Position : …….....

Full name of signatory : …….

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

FORM M MBD 3.1 – 3.2

PRICING SCHEDULE – FIRM PRICES

(PURCHASES)

NOTE: **ONLY FIRM PRICES WILL BE ACCEPTED. NON-FIRM PRICES (INCLUDING PRICES SUBJECT TO RATES OF EXCHANGE VARIATIONS) WILL NOT BE CONSIDERED**

IN CASES WHERE DIFFERENT DELIVERY POINTS INFLUENCE THE PRICING, A SEPARATE PRICING SCHEDULE MUST BE SUBMITTED FOR EACH DELIVERY POINT

Name of Bidder …… Bid Number ……..

Closing Time ……. ….. Closing Date ……..

OFFER TO BE VALID FOR …… DAYS FROM THE CLOSING DATE OF BID.

ITEM NO.	QUANTITY	DESCRIPTION	BID PRICE IN RSA CURRENCY **(ALL APPLICABLE TAXES INCLUDED)

- Required by: …….
- At: …….
- Brand and Model ……
- Country of Origin …….
- Does the offer comply with the specification(s)? *YES/NO
- If not to specification, indicate deviation(s) ……
- Period required for delivery ……

*Delivery: Firm/Not firm

- Delivery basis …….

Note: All delivery costs must be included in the bid price, for delivery at the prescribed destination.
** "all applicable taxes" includes value- added tax, pay as you earn, income tax, unemployment insurance fund contributions and skills development levies.
*Delete if not applicable

MBD 3.2

PRICING SCHEDULE – NON-FIRM PRICES
(PURCHASES)

NOTE: PRICE ADJUSTMENTS WILL BE ALLOWED AT THE PERIODS AND TIMES SPECIFIED IN THE BIDDING DOCUMENTS.

IN CASES WHERE DIFFERENT DELIVERY POINTS INFLUENCE THE PRICING, A SEPARATE PRICING SCHEDULE MUST BE SUBMITTED FOR EACH DELIVERY POINT

Name of Bidder……	Bid number……
Closing Time …… ……	Closing Date

OFFER TO BE VALID FOR……DAYS FROM THE CLOSING DATE OF BID.

- Required by: ……

  At: ……..

- Brand and model……..…….

- Country of origin……..…….

- Does the offer comply with the specification(s)? *YES/NO

- Period required for delivery……

- Delivery: *Firm/Not firm

** ”all applicable taxes” includes value- added tax, pay as you earn, income tax, unemployment insurance fund contributions and skills development levies.

*Delete if not applicable

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

MBD 4

DECLARATION OF INTEREST

1. Any legal person, including persons employed by the state[1], or persons having a kinship with persons employed by the state, including a blood relationship, may make an offer or offers in terms of this invitation to bid (includes an advertised competitive bid, a limited bid, a proposal or written price quotation). In view of possible allegations of favouritism, should the resulting bid, or part thereof, be awarded to persons employed by the state, or to persons connected with or related to them, it is required that the bidder or his/her authorised representative declare his/her positionin relation to the evaluating/adjudicating authority where-

   - the bidder is employed by the state; and/or

   - the legal person on whose behalf the bidding document is signed, has a relationship with persons/a person who are/is involved in the evaluation and or adjudication of the bid(s), or where it is known that such a relationship exists between the person or persons for or on whose behalf the declarant acts and persons who are involved with the evaluation and or adjudication of the bid.

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

2.1 Full Name of bidder or his or her representative: ……

2.2 Identity Number:……...

2.3 Position occupied in the Company (director, trustee, shareholder[2], member): …….

2.4 Registration number of company, enterprise, close corporation, partnership agreement or trust: ……

2.5 Tax Reference Number: ……

2.6 VAT Registration Number: ……....

2.6.1 The names of all directors / trustees / shareholders / members, their individual identity numbers, tax reference numbers and, if applicable, employee / PERSAL numbers must be indicated in paragraph 3 below.

[1]"State" means –

(a) any national or provincial department, national or provincial public entity or constitutional institution within the meaning of the Public Finance Management Act, 1999 (Act No. 1 of 1999);
(b) any municipality or municipal entity;
(c) provincial legislature;
(d) national Assembly or the national Council of provinces; or
(e) Parliament.

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

2.7 Are you or any person connected with the bidder presently employed by the state? **YES / NO**

2.7.1 If so, furnish the following particulars:

Name of person / director / trustee / shareholder/ member:
Name of state institution at which you or the person connected to the bidder is employed :
Position occupied in the state institution:

Any other particulars:
……
……
……

2.7.2 If you are presently employed by the state, did you obtain the appropriate authority to undertake remunerative work outside employment in the public sector? **YES / NO**

2.7.2.1 If yes, did you attach proof of such authority to the bid document? **YES / NO**

(Note: Failure to submit proof of such authority, where applicable, may result in the disqualification of the bid.

2.7.2.2 If no, furnish reasons for non-submission of such proof:

……
……
……

2.8 Did you or your spouse, or any of the company's directors / trustees / shareholders / members or their spouses conduct business with the state in the previous twelve months? **YES / NO**

2.8.1 If so, furnish particulars:
……..
……..
……...

2.9 Do you, or any person connected with the bidder, have any relationship (family, friend, other) with a person employed by thestate and who may be involved with the evaluation and or adjudication of this bid? **YES / NO**

2.9.1 If so, furnish particulars.
……...
……..…
……

2.10 Are you, or any person connected with the bidder, aware of any relationship (family, friend, other) between any other bidder and any person employed by the state **YES/NO**

who may be involved with the evaluation and or adjudication of this bid?

2.10.1 If so, furnish particulars.

……
……
……

2.11 Do you or any of the directors / trustees / shareholders / members of the company have any interest in any other related companies whether or not they are bidding for this contract? **YES/NO**

2.11.1 If so, furnish particulars:

……
……
……

3 Full details of directors / trustees / members / shareholders.

Full Name	Identity Number	Personal Income Tax Reference Number	State Employee Number / Persal Number

4 DECLARATION

I, THE UNDERSIGNED (NAME)……

CERTIFY THAT THE INFORMATION FURNISHED IN PARAGRAPHS 2 and 3 ABOVE IS CORRECT.
I ACCEPT THAT THE STATE MAY REJECT THE BID OR ACT AGAINST ME SHOULD THIS DECLARATION PROVE TO BE FALSE.

…….. ……
Signature Date

…… ……
Position Name of bidder

DECLARATION FOR PROCUREMENT ABOVE R10 MILLION (ALL APPLICABLE TAXES INCLUDED)

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

1 Are you by law required to prepare annual financial statements for auditing? *YES/NO

1.1 If yes, submit audited annual financial statements for the past three years or since the date of establishment if established during the past three years.

……
……

2 Do you have any outstanding undisputed commitments for municipal services towards any municipality for more than three months or any other service provider in respect of which payment is overdue for more than 30 days?*YES/NO

2.1 If no, this serves to certify that the bidder has no undisputed commitments for municipal services towards any municipality for more than three months or other service provider in respect of which payment is overdue for more than 30 days.

2.2 If yes, provide particulars.

……
…….
* Delete if not applicable

3.Has any contract been awarded to you by an organ of state during the past five years, including particulars of any material non-compliance or dispute concerning the execution of such contract?

*YES/NO

3.1 If yes, furnish particulars

…….
…….
…….

4. Will any portion of goods or services be sourced from outside the Republic, and, if so, what portion and whether any portion of payment from the municipality / municipal entity is expected to be transferred out of the Republic?

*YES/NO

4.1 If yes, furnish particulars

……..
…….

CERTIFICATION

I, THE UNDERSIGNED (NAME)……**CERTIFY THAT THE INFORMATION FURNISHED ON THIS DECLARATION FORM IS CORRECT.**

I ACCEPT THAT THE STATE MAY ACT AGAINST ME SHOULD THIS DECLARATION PROVE TO BE FALSE.

…….. ……..
Signature Date

……..... …….
Position Name of Bidder

MBD 6.1

PREFERENCE POINTS CLAIM FORM IN TERMS OF THE PREFERENTIAL PROCUREMENT REGULATIONS 2017

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, DEFINITIONS AND DIRECTIVES APPLICABLE IN RESPECT OF B-BBEE, AS PRESCRIBED IN THE PREFERENTIAL PROCUREMENT REGULATIONS, 2017.

---

1. GENERAL CONDITIONS

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

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

1.2

a) The value of this bid is estimated to exceed/ **not exceed**R50 000 000 (all applicable taxes included) and therefore the **80/20**preference point system shall be applicable; or

b) Either the 80/20 or 90/10 preference point system will be applicable to this tender (*delete whichever is not applicable for this tender*).

1.3 Points for this bid shall be awarded for:

(a) Price; and

(b) B-BBEE Status Level of Contributor.

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

	POINTS
PRICE	80
B-BBEE STATUS LEVEL OF CONTRIBUTOR	20
Total points for Price and B-BBEE must not exceed	**100**

1.5 Failure on the part of a bidder to submit proof of B-BBEE Status level of contributor together with the bid, will be interpreted to mean that preference points for B-BBEE status level of contribution are not claimed.

1.6 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

(a) **"B-BBEE"** means broad-based black economic empowerment as defined in section 1 of the Broad-Based Black Economic Empowerment Act;

(b) "**B-BBEE status level of contributor"** means the B-BBEE status of an entity in terms of a code of good practice on black economic empowerment, issued in terms of section 9(1) of the Broad-Based Black Economic Empowerment Act;

(c) **"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 goods or services, through price quotations, advertised competitive bidding processes or proposals;

(d) **"Broad-Based Black Economic Empowerment Act"** means the Broad-Based Black Economic Empowerment Act, 2003 (Act No. 53 of 2003);

(e) **"EME"** means an Exempted Micro Enterprise in terms of a code of good practice on black economic empowerment issued in terms of section 9 (1) of the Broad-Based Black Economic Empowerment Act;

(f) **"functionality"** means the ability of a tenderer to provide goods or services in accordance with specifications as set out in the tender documents.

(g) **"prices"** includes all applicable taxes less all unconditional discounts;

(h) **"proof of B-BBEE status level of contributor"** means:

1) B-BBEE Status level certificate issued by an authorized body or person;

2) A sworn affidavit as prescribed by the B-BBEE Codes of Good Practice;

3) Any other requirement prescribed in terms of the B-BBEE Act;

(i) **"QSE"** means a qualifying small business enterprise in terms of a code of good practice on black economic empowerment issued in terms of section 9 (1) of the Broad-Based Black Economic Empowerment Act;

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

3. POINTS AWARDED FOR PRICE

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

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

80/20 **or** **90/10**

$$Ps = 80\left(1 - \frac{Pt - P\min}{P\min}\right) \quad \text{or} \quad Ps = 90\left(1 - \frac{Pt - P\min}{P\min}\right)$$

Where

Ps = Points scored for price of bid under consideration

Pt = Price of bid under consideration

Pmin = Price of lowest acceptable bid

4. POINTS AWARDED FOR B-BBEE STATUS LEVEL OF CONTRIBUTOR

4.1 In terms of Regulation 6 (2) and 7 (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	6	14
4	5	12
5	4	8
6	3	6
7	2	4
8	1	2
Non-compliant contributor	0	0

5. BID DECLARATION

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

6. B-BBEE STATUS LEVEL OF CONTRIBUTOR CLAIMED IN TERMS OF PARAGRAPHS 1.4 AND 4.1

6.1 B-BBEE Status Level of Contributor: . = ……(maximum of 10 or 20 points)

(Points claimed in respect of paragraph 7.1 must be in accordance with the table reflected in paragraph 4.1 and must be substantiated by relevant proof of B-BBEE status level of contributor.

7. SUB-CONTRACTING

7.1 Will any portion of the contract be sub-contracted?

(***Tick applicable box***)

YES		NO	

7.1.1 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 or QSE
(Tick applicable box)

YES		NO	

v) Specify, by ticking the appropriate box, if subcontracting with an enterprise in terms of Preferential Procurement Regulations,2017:

Designated Group: An EME or QSE which is at last 51% owned by:	EME √	QSE √
Black people		
Black people who are youth		
Black people who are women		
Black people with disabilities		
Black people living in rural or underdeveloped areas or townships		
Cooperative owned by black people		
Black people who are military veterans		
OR		
Any EME		
Any QSE		

8. **DECLARATION WITH REGARD TO COMPANY/FIRM**

8.1 Name of company/firm:……..

8.2 VAT registration number:……..……

8.3 Company registration number:……..……..……..

8.4 TYPE OF COMPANY/ FIRM

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

[TICK APPLICABLE BOX]

8.5 DESCRIBE PRINCIPAL BUSINESS ACTIVITIES

……
……
……
……..

8.6 COMPANY CLASSIFICATION

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

[*TICK APPLICABLE BOX*]

8.7 MUNICIPAL INFORMATION

Municipality where business is situated: ……

Registered Account Number: ……

Stand Number:…….

8.8 Total number of years the company/firm has been in business:……

8.9 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 contributor indicated in paragraphs 1.4 and 6.1 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 paragraphs 1.4 and 6.1, 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 contributor 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) recommend that the bidder or contractor, its shareholders and directors, or only the shareholders and directors who acted on a fraudulent basis, be restricted by the National Treasury 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 1. …….. 2. ……	…… SIGNATURE(S) OF BIDDERS(S) DATE: …….. ADDRESS …….. …….. ……..

CONTRACT FORM - RENDERING OF SERVICES

THIS FORM MUST BE FILLED IN DUPLICATE BY BOTH THE SERVICE PROVIDER (PART 1) AND THE PURCHASER (PART 2). BOTH FORMS MUST BE SIGNED IN THE ORIGINAL SO THAT THE SERVICE PROVIDER AND THE PURCHASER WOULD BE IN POSSESSION OF ORIGINALLY SIGNED CONTRACTS FOR THEIR RESPECTIVE RECORDS.

PART 1 (TO BE FILLED IN BY THE SERVICE PROVIDER)

1. I hereby undertake to render services described in the attached bidding documents to (name of the institution)……. in accordance with the requirements and task directives / proposals specifications stipulated in Bid Number…….. at the price/s quoted. My offer/s remain binding upon me and open for acceptance by the Purchaser during the validity period indicated and calculated from the closing date of the bid.

2. The following documents shall be deemed to form and be read and construed as part of this agreement:
   (i) Bidding documents, *viz*
   - Invitation to bid;
   - Tax clearance certificate;
   - Pricing schedule(s);
   - Filled in task directive/proposal;
   - Preference claims for Broad Based Black Economic Empowerment Status Level of Contribution in terms of the Preferential Procurement Regulations 2011;
   - Declaration of interest;
   - Declaration of Bidder's past SCM practices;
   - Certificate of Independent Bid Determination;
   - Special Conditions of Contract;

   (ii) General Conditions of Contract; and
   (iii) Other (specify)

3. I confirm that I have satisfied myself as to the correctness and validity of my bid; that the price(s) and rate(s) quoted cover all the services specified in the bidding documents; that the price(s) and rate(s) cover all my obligations and I accept that any mistakes regarding price(s) and rate(s) and calculations will be at my own risk.

4. I accept full responsibility for the proper execution and fulfilment of all obligations and conditions devolving on me under this agreement as the principal liable for the due fulfillment of this contract.

5. I declare that I have no participation in any collusive practices with any bidder or any other person regarding this or any other bid.

6. I confirm that I am duly authorised to sign this contract.

NAME (PRINT) ……..…….

CAPACITY ……..…….

SIGNATURE ……..…….

NAME OF FIRM …..…….

DATE ……..…….

WITNESSES

1 ……..……..

2 ……..……..

DATE: ……..

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

CONTRACT FORM - RENDERING OF SERVICES

PART 2 (TO BE FILLED IN BY THE PURCHASER)

1. I……..in my capacity as ……..……accept your bid under reference number ……dated……for the rendering of services indicated hereunder and/or further specified in the annexure(s).

2. An official order indicating service delivery instructions is forthcoming.

3. I undertake to make payment for the services rendered in accordance with the terms and conditions of the contract, within 30 (thirty) days after receipt of an invoice.

DESCRIPTION OF SERVICE	**PRICE (ALL APPLICABLE TAXES INCLUDED)**	**COMPLETION DATE**	**B-BBEE STATUS LEVEL OF CONTRIBUTION**	**MINIMUM THRESHOLD FOR LOCAL PRODUCTION AND CONTENT (if applicable)**

4. I confirm that I am duly authorised to sign this contract.

SIGNED AT …… ON ……..

NAME (PRINT) …….

SIGNATURE …….

OFFICIAL STAMP

WITNESSES

1 ……

2 ……

DATE: ……..

FORM P MBD 8

DECLARATION OF BIDDER'S PAST SUPPLY CHAIN MANAGEMENT PRACTICES

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

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

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

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

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

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

4.2	Is the bidder or any of its directors listed on the Register for Tender Defaulters in terms of section 29 of the Prevention and Combating of Corrupt Activities Act (No 12 of 2004)? **The Register for Tender Defaulters can be accessed on the National Treasury's website (www.treasury.gov.za) by clicking on its link at the bottom of the home page.**	Yes ☐	No ☐
4.2.1	If so, furnish particulars:		
4.3	Was the bidder or any of its directors convicted by a court of law (including a court of law outside the Republic of South Africa) for fraud or corruption during the past five years?	Yes ☐	No ☐
4.3.1	If so, furnish particulars:		

Item	Question	Yes	No
4.4	Does the bidder or any of its directors owe any municipal rates and taxes or municipal charges to the municipality / municipal entity, or to any other municipality / municipal entity, that is in arrears for more than three months?	Yes ☐	No ☐
4.4.1	If so, furnish particulars:		
4.5	Was any contract between the bidder and the municipality / municipal entity or any other organ of state terminated during the past five years on account of failure to perform on or comply with the contract?	Yes ☐	No ☐
4.7.1	If so, furnish particulars:		

CERTIFICATION

I, THE UNDERSIGNED (FULL NAME) ……..……..……CERTIFY THAT THE INFORMATION FURNISHED ON THIS

DECLARATION FORM 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**

DECLARATION CERTIFICATE FOR LOCAL PRODUCTION AND CONTENT

This Municipal Bidding Document (MBD) must form part of all bids invited. It contains general information and serves as a declaration form for local content (local production and local content are used interchangeably).

Before completing this declaration, bidders must study the General Conditions, Definitions, Directives applicable in respect of Local Content as prescribed in the Preferential Procurement Regulations, 2011 and the South African Bureau of Standards (SABS) approved technical specification number SATS 1286:201x.

1. General Conditions

1.1. Preferential Procurement Regulations, 2011 (Regulation 9.(1) and 9.(3) make provision for the promotion of local production and content.

1.2. Regulation 9.(1) prescribes that in the case of designated sectors, where in the award of bids local production and content is of critical importance, such bids must be advertised with the specific bidding condition that only locally produced goods, services or works or locally manufactured goods, with a stipulated minimum threshold for local production and content will be considered.

1.3. Regulation 9.(3) prescribes that where there is no designated sector, a specific bidding condition may be included, that only locally produced services, works or goods or locally manufactured goods with a stipulated minimum threshold for local production and content, will be considered.

1.4. Where necessary, for bids referred to in paragraphs 1.2 and 1.3 above, a two stage bidding process may be followed, where the first stage involves a minimum threshold for local production and content and the second stage price and B-BBEE.

1.5. A person awarded a contract in relation to a designated sector, may not sub-contract in such a manner that the local production and content of the overall value of the contract is reduced to below the stipulated minimum threshold.

1.6. The local content (LC) as a percentage of the bid price must be calculated in accordance with the SABS approved technical specification number SATS 1286: 201x as follows:

$$LC = 1 - \left(\frac{x}{y}\right) \times 100$$

Where
x imported content
y bid price excluding value added tax (VAT)

Prices referred to in the determination of x must be converted to Rand (ZAR) by using the exchange rate published by the South African Reserve Bank (SARB) at 12:00 on the date, one week (7 calendar days) prior to the closing date of the bid as required in paragraph 4.1 below.

1.7. A bid will be disqualified if:

- the bidder fails to achieve the stipulated minimum threshold for local production and content indicated in paragraph 3 below; and.

- this declaration certificate is not submitted as part of the bid documentation.

2. Definitions

2.1. **"bid"** includes advertised competitive bids, written price quotations or proposals;

2.2. **"bid price"** price offered by the bidder, excluding value added tax (VAT);

2.3. **"contract"** means the agreement that results from the acceptance of a bid by an organ of state;

2.4. **"designated sector"** means a sector, sub-sector or industry that has been designated by the Department of Trade and Industry in line with national development and industrial policies for local production, where only locally produced services, works or goods or locally manufactured goods meet the stipulated minimum threshold for local production and content;

2.5. **"duly sign"**means a Declaration Certificate for Local Content that has been signed by the Chief Financial Officer or other legally responsible person nominated in writing by the Chief Executive, or senior member / person with management responsibility(close corporation, partnership or individual).

2.6. **"imported content"** means that portion of the bid price represented by the cost of components, parts or materials which have been or are still to be imported (whether by the supplier or its subcontractors) and which costs are inclusive of the costs abroad, plus freight and other direct importation costs, such as landing costs, dock duties, import duty, sales duty or other similar tax or duty at the South African port of entry;

2.7. **"local content"** means that portion of the bid price which is not included in the imported content, provided that local manufacture does take place;

2.8. **"stipulated minimum threshold"** means that portion of local production and content as determined by the Department of Trade and Industry; and

2.9. **"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.

3. The stipulated minimum threshold(s) for local production and content for this bid is/are as follows:

Description of services, works or goods	Stipulated minimum threshold
__Electrical Cables_____	90%
__Valves Products and Actuators_____	90%
__Steel Products and Components of Construction	100%
____Plastic Pipes and Fittings_____	100%

4. Does any portion of the services, works or goods offered have any imported content? YES / NO

4.1 If yes, the rate(s) of exchange to be used in this bid to calculate the local content as prescribed in paragraph 1.6 of the general conditions must be the rate(s) published by the SARB for the specific currency at 12:00 on the date, one week (7 calendar days) prior to the closing date of the bid.

The relevant rates of exchange information is accessible on www.reservebank.co.za.

Indicate the rate(s)of exchange against the appropriate currency in the table below:

Currency	**Rates of exchange**
US Dollar	
Pound Sterling	
Euro	
Yen	
Other	

NB: Bidders must submit proof of the SARB rate (s) of exchange used.

LOCAL CONTENT DECLARATION BY CHIEF FINANCIAL OFFICER OR OTHER LEGALLY RESPONSIBLE PERSON NOMINATED IN WRITING BY THE CHIEF EXECUTIVE OR SENIOR MEMBER/PERSON WITH MANAGEMENT RESPONSIBILITY (CLOSE CORPORATION, PARTNERSHIP OR INDIVIDUAL)

IN RESPECT OF BID No. .....
ISSUED BY: (Procurement Authority / Name of Municipality / Municipal Entity):
.....

NB The obligation to complete, duly sign and submit this declaration cannot be transferred to an external authorized representative, auditor or any other third party acting on behalf of the bidder.

I, the undersigned, ……..... (full names),
do hereby declare, in my capacity as …… ……..
of .....(name of bidder entity), the following:

(a) The facts contained herein are within my own personal knowledge.

(b) I have satisfied myself that the goods/services/works to be delivered in terms of the above-specified bid comply with the minimum local content requirements as specified in the bid, and as measured in terms of SATS 1286.

(c) The local content has been calculated using the formula given in clause 3 of SATS 1286, the rates of exchange indicated in paragraph 4.1 above and the following figures:

Bid price, excluding VAT (y)	R
Imported content (x)	R
Stipulated minimum threshold for Local content (paragraph 3 above)	
Local content % as calculated in terms of SATS 1286	

If the bid is for more than one product, a schedule of the local content by product shall be attached.

(d) I accept that the Procurement Authority / Municipality /Municipal Entity has the right to request that the local content be verified in terms of the requirements of SATS 1286.

(e) I understand that the awarding of the bid is dependent on the accuracy of the information furnished in this application. I also understand that the submission of incorrect data, or data that are not verifiable as described in SATS 1286, may result in the Procurement Authority / Municipal / Municipal Entity imposing any or all of the remedies as provided for in Regulation 13 of the Preferential Procurement Regulations, 2011 promulgated under the Policy Framework Act (PPPFA), 2000 (Act No. 5 of 2000).

SIGNATURE: _____ **DATE:** _____

WITNESS No. 1 _____ **DATE:** _____

WITNESS No. 2 _____ **DATE:** _____

MBD 9

CERTIFICATE OF INDEPENDENT BID DETERMINATION

1 This Municipal Bidding Document (MBD) must form part of all bids[1] 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 Municipal Supply Regulation 38 (1) prescribes that a supply chain management policy must provide measures for the combating of abuse of the supply chain management system, and must enable the accounting officer, among others, to:

a. take all reasonable steps to prevent such abuse;

b. reject the bid of any bidder if that bidder or any of its directors has abused the supply chain management system of the municipality or municipal entity or has committed any improper conduct in relation to such system; and

c. cancel a contract awarded to a person if the person committed any corrupt or fraudulent act during the bidding process or the execution of the contract.

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

5 In order to give effect to the above, the attached Certificate of Bid Determination (MBD 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.

MBD 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 Municipality / Municipal Entity)

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

I certify, on behalf of:_____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

6. The bidder has arrived at the accompanying bid independently from, and without consultation, communication, agreement or arrangement with any competitor. However communication between partners in a joint venture or consortium[3] will not be construed as collusive bidding.
7. In particular, without limiting the generality of paragraphs 6 above, there has been no consultation, communication, agreement or arrangement with any competitor regarding:
    (a) prices;
    (b) geographical area where product or service will be rendered (market allocation)
    (c) methods, factors or formulas used to calculate prices;
    (d) the intention or decision to submit or not to submit, a bid;
    (e) the submission of a bid which does not meet the specifications and conditions of the bid; 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.

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

…… ……

Signature Date

…… ……

Position Name of Bidder

LEPELLE-NKUMPI LOCAL MUNICIPALITY

CONTRACT NO. LNM020/2020/21

REFURBISHMENT AND UPGRADING OF LEBOWAKGOMO STADIUM

C. THE CONTRACT

Part C1: Agreements and Contract Data

C1.1 Form of Offer and Acceptance
C1.2 Contract Data
C1.3 Form of Guarantee
C1.4 OHS

END OF SECTION

PART C1.1

Form of Offer and Acceptance

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:

……

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

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

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

……
…… 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.

Signature(s) _____ _____

Name(s) _____ _____

Capacity _____ _____

For the tenderer_____
(Name and address of organisation)

Name & Signature of Witness

_____ _____
Name Date

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 1 Agreements and Contract Data (which includes this Agreement)
Part 2 Pricing Data
Part 3 Scope of Work
Part 4 Site information

and drawings and documents or parts thereof, which may be incorporated by reference into Parts 1 to 4 above.
Deviations from and amendments to the documents listed in the Tender Data and any addenda thereto listed in the Tender Schedules as well as any changes to the terms of the Offer agreed by the Tenderer and the Employer during this process of offer and acceptance, are contained in the Schedule of Deviations attached to and forming part of this Agreement. No amendments to or deviations from said documents are valid unless contained in this Schedule, which must be duly signed by the authorised representative(s) of both parties.

The 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 fully completed original copy of this document, including the Schedule of Deviations (if any). Unless the Tenderer (now Contractor) within five days of the date of such receipt notifies the Employer in writing of any reason why he cannot accept the contents of this Agreement, this Agreement shall constitute a binding contract between the parties.

Signature(s) _____ _____

Name(s) _____ _____

Capacity _____ _____

For the tenderer _____

(Name and address of organisation)

Name & Signature of Witness

_____ _____

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

3 Subject

Details

4 Subject

Details

5 Subject

Details

6 Subject

Details

By the duly authorised representatives signing this Schedule of Deviations, the Employer and the Tenderer agree to and accept the foregoing Schedule of Deviations as the only deviations from and amendments to the documents listed in the Tender Data and addenda thereto as listed in the Tender Schedules, as well as any confirmation, clarification or change to the terms of the Offer agreed by the Tenderer and the Employer during this process of Offer and Acceptance. It is expressly agreed that no other matter whether in writing, oral communication or implied during the period between the issue of the tender documents and the receipt by the Tenderer of a completed signed copy of this Agreement shall have any meaning or effect in the contract between the parties arising from this Agreement.

Signature(s) _____ _____

Name(s) _____ _____

Capacity _____ _____

For the tenderer _____
(Name and address of organization)

Name & Signature of Witness

_____ _____
Name Date

FOR THE EMPLOYER

Signature(s) _____ _____

Name(s) _____ _____

Capacity _____ _____

For the tenderer _____
(Name and address of organisation)

Name & Signature of Witness

_____ _____
Name Date

LEPELLE-NKUMPI LOCAL MUNICIPALITY

CONTRACT NO. LNM020/2020/21

REFURBISHMENT AND UPGRADING OF LEBOWAKGOMO STADIUM

PART C1.2

Contract Data

C1.2 CONTRACT DATA

PART 1: DATA PROVIDED BY THE EMPLOYER

CONDITIONS OF CONTRACT

The Conditions of Contract are the *General Conditions of Contract for Construction Works (2010) 2ND Edition,* published by the South African Institution of Civil Engineering. Private Bag x200, Halfway House, 1685. Is applicable to this contract and is obtainable from www.saice.org.za.

The following contract specific data, referring to the General Condition of Contract for Construction Works, Second Edition, 2010, are applicable to this contract:.

PART 1: Data provided by the Employer

Clause	Data
1.1.1.1.13	The Defects Liability Period is 12 months.
1.1.1.1.15	The Name of the Employer is **Lepelle-Nkumpi Local Municipality**
1.1.1.1.26	Pricing Strategy is **fixed Contract.**
1.2.1.2	The address of the Employer is: Private Bag x07 **CHUENESPOORT,** **0745** Telephone: 015 633 4500 Facsimile: 015 633 6896
1.1.1.16 **1.2.1.2**	The address of the Employer is: Private Bag x07 **CHUENESPOORT,** **0745** Telephone: 015 633 4500 Facsimile: 015 633 6896
5.3.1	The documentations required before commencement with works execution are: Healthy and Safety Plan (Ref to Clause 4.3) Initial Programme (Ref to Clause 5.6) Security/Gurantee (Ref to Clause 6.2) Insurance (Ref to Clause 8.6) 25% local SMMES breakdown plan And other requirements
5.3.2	The time to submit documentation required before commencement with works execution is 14 days.
5.8.1	The non-working days are Sundays and the special non-working days are official builder's holiday plus all statutory public holidays. The year-end break commences on 15th December and the first Monday of the

	subsequent year.
5.13.1	The penalty for failing to complete the works is **0.05% of the total contract value per calendar day.**
6.2	The Form of Guarantee is to contain the wording of the proforma document included in the General Conditions of Contract (Pro-forma included in section C1.3 to this document).
6.2	The liability of the guarantee shall be **10** %.
6.5.1.2.3	The percentage allowance to cover overhead charges is **10%**
6.10.1.5	The percentage advance on materials not yet built into the Permanent Works is **80** %.
6.10.3	The limit of retention money is **10** % of the contract value.`
8.6.1.1.2	The value of the materials supplied by the Employer to be included in the insurance sum is nil.
8.6.1.1.3	The amount to cover professional fees for repairing damage and loss to be included in the insurance sum is nil.
8.6.1.3	The indemnity for liability insurance shall be applicable.
	The Works shall be completed within **Five (05) Months**.
5.12.2.2	**The additional clauses to the General Conditions of Contract are:** Extensions of time in respect of clause 42 in respect of abnormal rainfall shall be calculated using the following formula for each calendar month or part thereof: $V = (Nw - Nn) + \frac{(Rw - Rn)}{X}$ Where: V = Extension of time in calendar days in respect of the calendar month under consideration. Nw = Actual number of days during the calendar month on which a rainfall of 10 mm or more has been recorded. Nn = Average number of days in the relevant calendar month , as derived from existing rainfall records, on which a rainfall of 20mm or more has been recorded for the calendar month. Rw = Actual average rainfall in mm recorded for the calendar month under consideration. Rn = Average rainfall in mm for the calendar month as derived from existing rainfall records as stated in the Site Information. For purposes of the Contract Nn, Rn, X and Y shall have those values assigned to them in the South African Weather Service's rainfall records of the nearest station to the site. If V is negative and its absolute value exceeds Nn, then V shall be taken as equal to minus Nn. The total extension of time shall be the algebraic sum of all monthly totals for the period under consideration, but if the total is negative the time for completion shall not be reduced due to subnormal rainfall. Extensions of time for part of a month shall be

	calculated using pro rata values of Nn and Rn. This formula does not take account flood damage which could cause further or concurrent delays and will be treated separately as far as extension of time is concerned. The factor (Nw – Nn) shall be considered to represent a fair allowance for variations from the average in the number of days during which rainfall exceeds 10 mm. The factor (Rw-Rn) shall be considered to represent a fair allowance for variations from the average in the number of days during which the rainfall did not exceed 10 mm but wet conditions prevented or disrupted work. For the purpose of applying the formula, accurate rain gauging shall be taken at a suitable point on the Site and the Contractor shall at his own expense, take all necessary precautions to ensure that rain gauges cannot be interfered with by unauthorized persons.
5.12.2.2	A delay caused by inclement weather conditions will be regarded as a delay only if, in the opinion of the Engineer, all progress on an item or items of work on the critical path of the working programme of the contractor has been brought to a halt. Delays on working days only (based on a five-day working week) will be taken into account for the extension of time, but the Contractor shall make provision in his programme of work for an expected delay of "n"" working days caused by normal rainy weather, for which he will not receive any extension of time, where "n" equals …… days. Extension of time during working days will be granted to the degree to which actual delays, as defined above, exceed the number of "n" workings days.

PART 1: DATA PROVIDED BY THE CONTRACTOR

The Contractor is advised to read the *General Conditions of Contract for Construction Works (2010)2nd Edition*, published by the South African Institution of Civil Engineering, in order to understand the implications of this Data which is required to be completed.

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

Clause	Data
1.1.1.9 **1.2.1.2**	The **Contractor** is: Name: …… The Address of the Contractor is: Address (physical): …… …….. Address (postal): …….. Telephone: ……. Facsimile: …… E-mail: ……..
6.5.1.2.3	The percentage allowance to cover overhead charges is 14%.

	The Works are to be completed within,,,,,,,,,,,,,,,,,,,, weeks.

PART 1: DATA PROVIDED BY THE CONTRACTOR

The Contractor is advised to read the *General Conditions of Contract for Construction Works (2010)2nd Edition*, published by the South African Institution of Civil Engineering, in order to understand the implications of this Data which is required to be completed.

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

Clause	Data
1.1.1.9	The **Contractor** is: Name: ……
1.2.1.2	The Address of the Contractor is: Address (physical): …… …….. Address (postal): …….. Telephone: ……. Facsimile: …… E-mail: ……..……..
6.5.1.2.3	The percentage allowance to cover overhead charges is 14%.
	The Works are to be completed within ,,,,,,,,,,,,,,,,,,,,weeks.

LEPELLE-NKUMPI LOCAL MUNICIPALITY

CONTRACT NO. LNM020/2020/21

REFURBISHMENT AND UPGRADING OF LEBOWAKOMO STADIUM

PART C1.3

Contract Data

Annexure A: Form of Guarantee

GUARANTEE FOR EXECUTION OF THE CONTRACT

Employer	:	**Lepelle-Nkumpi Local Municipality** **P/BAG X07** **CHUENESPOORT** **0745**	Contractor	: …….. …….. …….. …….. ……..

Amount of Guarantee: To be equal to 10 percent of the Tender Sum

---

I/WE the undersigned, duly acting on behalf of the Company that is described below, do hereby bind the said Company to the Employer that is described above, as surety or co-principal debtor *in solidum* for the due performance, fulfilment and completion of the Contract by the Contractor that is described above, and we hereby undertake, on behalf of the Company to pay on demand at the above mentioned address

- any loss or damage which the Employer may sustain
- as well as any penalties or claims and legal costs to which the Employer may become entitled by reason of the non-fulfilment or breach of the terms of the Contract by the Contractor

always provided that the liability of the Company under this guarantee shall not exceed the guaranteed amount that is described above.

On behalf of the Company I/we do hereby renounce all benefits from the legal exceptions *non numeratae pecuniae, non causa debiti excussionis et divisionis* and all other exceptions which might or could be pleaded against the validity of this guarantee, the meaning whereof we declare ourselves to be fully acquainted with.

On behalf of the Company, I/we do hereby agree that this guarantee shall be irrevocable and shall remain in full force and effect during the term of the Contract, either until the date of issue of a Certificate of Completion for the whole or the final portion of the Works by the Engineer, or until any liability of the Contractor which has arisen before such date in terms of the Conditions of Contract has been satisfied, whichever is the later.

I/we do further agree and declare

- that all admissions and acknowledgements of indebtedness by the Contractor shall be binding on the Company,
- that the indebtedness of the Contractor to the Employer shall at all times be determined and proved by a written certificate of the Chief Executive Officer, or by any other person acting in such capacity,

0

- that such certificate shall be binding on the Company and shall be conclusive proof of the amount of the Company's indebtedness, and that such certificate annexed to this guarantee will be valid as a liquid document against the Company in a competent court in the Republic of South Africa,
- that the Employer shall, without reference and/or notice to us, have complete liberty of action to act in any manner authorised and/or contemplated by the terms of the Contract, and/or to agree to any modifications, variations or alterations to the Works, or to any extensions of the Due Completion Date for the Works under the Contract, and that the rights of the Employer under this guarantee shall in no way be prejudiced nor the liability of the Company be in any way reduced by reason of any steps or concessions which the Employer may take, make, give, concede or agree to under the Contract.
- that the Employer shall be entitled, without prejudice to any of its rights under this guarantee, to give time to and compound with, release from liability or to make any other arrangement with the

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Contractor, its assigns, its liquidators or its judicial managers, and that any such actions shall not exonerate the Company from any portion of its liability under this guarantee.

- this guarantee is neither negotiable nor transferable, purports to the payment of money only and should be returned to the Company upon payment, completion or cancellation whichever occurs earlier.

Name of Company: _____

The Company chooses as its *domicilium citandi et executandi,* and for the purpose of the service of any notices and legal processes the following address:

Address to be entered _____

THUS DONE AND SIGNED AT _____ on _____ 20_____.

On behalf of the Company _____

In his capacity as _____

On behalf of the Company _____

In his capacity as _____

In the presence of the following witnesses:

Witness No 1:

_____ _____

Name Signature

Witness No 2:

_____ _____

Name Signature

LEPELLE-NKUMPI LOCAL MUNICIPALITY

CONTRACT NO. LNM020/2020/21

REFURBISHMENT AND UPGRADING OF LEBOWAKGOMO STADIUM

PART C1.4

Contract Data

Annexure B: Health and Safety Specifications by Employer

C1.4 AGREEMENT IN TERMS OF THE OCUPATIONAL HEALTH AND SAFETY ACT, 1993 (ACT NO 85 OF 1993)

C1.4 AGREEMENT IN TERMS OF THE OCUPATIONAL HEALTH AND SAFETY ACT, 1993 (ACT NO 85 OF 1993)

THIS AGREEMENT made at _____

on this the _____ day of _____ in the year _____***between*** *THE LEPELLE-NKUMPI LOCAL MUNICIPALITY****(hereinafter called "the Employer") of the one part, herein represented by***

in his capacity as _____

and

_____

(hereinafter called "the Mandatory") of the other part, herein represented by

_____

in his capacity as

_____

WHEREAS the Employer is desirous that certain works be constructed, viz, CONTRACT NO: LNM 020/2020/21–REFURBISHMENT AND UPGRADING OF LEBOWAKGOMO STADIUM. (LEPELLE NKUMPI MUNICIPALITY)

_____

and has accepted a Bid by the Mandatory for the construction, completion and maintenance of such Works and whereas the Employer and the Mandatory have agreed to certain arrangements and procedures to be followed in order to ensure compliance by the Mandatory with the provisions of the Occupational Health and Safety Act, 1993 (Act 85 of 1993);

NOW THEREFORE THIS AGREEMENT WITNESSETH AS FOLLOWS:

1 The Mandatory 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 Approval Certificate issued in terms of Clause 5.16.1 of the General Conditions of Contract (hereinafter referred to as "the GCC"),

(b) the date of termination of the Contract in terms of Clauses 9.1of the GCC.

3 The Mandatory declares himself to be conversant with the following:

(a) All the 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:

(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 mandataries, and

(iv) Subsection 37(2) relating to the purpose and meaning of this Agreement.

(b) The procedures and safety rules of the Employer as pertaining to the Mandatory and to all his subcontractors.

4 In addition to the requirements of Clause 8 of the GCC and all relevant requirements of the above-mentioned Volume 3, the Mandatory agrees to execute all the Works forming part of this Contract and to operate and utilise all machinery, plant and equipment in accordance with the Act.

5 The Mandatory is responsible for the compliance with the Act by all his subcontractors, whether or not selected and/or approved by the Employer.

6 The Mandatory warrants that all his and his subcontractors' workmen are covered in terms of the Compensation for Occupational Injuries and Diseases Act, 1993 which cover shall remain in force whilst any such workmen are present on site. A letter of good standing from the Compensation Commissioner to this effect must be produced to the Employer upon signature of the agreement.

7 The Mandatory undertakes to ensure that he and/or subcontractors and/or their respective employers will at all times comply with the following conditions:

(a) The Mandatory shall assume the responsibility in terms of Section 16.1 of the Occupational Health and Safety Act. The Mandatory shall not delegate any duty in terms of Section 16.2 of this Act without the prior written approval of the Employer. If the Mandatory 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 Mandatory 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 issue of any formal inquiry conducted in terms of section 32 of the Occupational Health and Safety Act into any incident involving the Mandatory and/or his employees and/or his subcontractors.

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

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

SIGNED FOR AND ON BEHALF OF THE EMPLOYER:

WITNESS 1 .....……

NAME 1 .....……
(IN CAPITALS)

SIGNED FOR AND ON BEHALF OF THE MANDATORY:

WITNESS 1 .....……
.

NAME 1 .....……
(IN CAPITALS)

LEPELLE-NKUMPI LOCAL MUNICIPALITY

CONTRACT NO. LNM020/2020/21

REFURBISHMENT AND UPGRADING OF LEBOWAKGOMO STADIUM

PART C2

Pricing Data

PART C2: PRICING DATA

CONTENTS

PAGE

PART C2.1

Pricing Instruction

PRICING INSTRUCTIONS

1. The General Conditions of Contract, the Contract Data, Standard Specifications For Roads and Bridge Works for State Road Authorities (including the Project Specifications) and the Drawings shall be read in conjunction with the Bill of Quantities.

2. a. The Schedule comprises items covering the Contractor's profit and costs of general liabilities and of the construction of temporary and permanent Works.

   b. Although the Tenderer is at liberty to insert a rate of his own choosing for each item in the Schedule, his attention is drawn to the fact that the Contractor has the right, under various circumstances, to payment for additional works carried out and that the Engineer is obliged to base his assessment of the payment to be paid for such additional work on the rates inserted in the Schedule by the Contractor.

   c. Clause 8 of each Standardized Specification and the measurement and payment clause of each Particular Specification, read together with the relevant clause of the Project Specification, set out what ancillary or associated activities are included in the rate for the operations specified.

3. Descriptions in the Schedule of Quantities are abbreviated. The schedule has been drawn up generally in accordance with the ‘’Standard Specifications for Roads and Bridge Works for State Road Authorities, 1998 Edition". Should any requirement of the measurement and payment clause of the applicable Standardized Specification, or the Project Specification, or the Particular Specification(s) conflict with the terms of the Schedule or, when relevant ‘’Standard Specifications for Roads and Bridge Works for State Road Authorities, 1998 Edition", the requirement of the Standardized, Project or Particular Specification, as applicable, shall prevail.

4. Unless otherwise stated, items are measured net in accordance with the Drawings, and no allowance has been made for waste.

5. The prices and rates to be inserted in the Schedule of Quantities are to be the full inclusive prices to the Employer for the work described under the several items. The prices and rates shall be exclusive of Value Added Tax. Such prices shall cover all costs and expenses that may be required in and for the construction of the work described, and shall cover the cost of all general risks, liabilities, and obligations set forth or implied in the documents on which the tender is based.

6. A price or rate is to be entered, in **BLACK INK**, against each item in the Schedule of Quantities.

7. In the event of the Tenderer failing to price any item it will be held that the Tenderer has made adequate allowance under other items for all labour, material and costs required for the execution, not only of the quantum of work covered by the unpriced item but also for any increase in the said quantum which may have to be undertaken during the course of the Contract.

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

9. An amount or rate shall be entered against each item in the Bill of Quantities, whether or not quantities are stated. An item against which no amount or rate is entered will be considered to be covered by the other amounts or rates in the Bill.

10. The Bidder shall also fill in a rate against the items where the words "rate only" appear in the amount column. Although no work is foreseen under these items and no quantities are consequently given in the quantity column, the bidded rates shall apply should work under these items actually be required.

11. Should the Bidder group a number of items together and bid one sum for such group of items, the single bidded sum shall apply to that group of items and not to each individual item, or should he indicate against any item that full compensation for such item has been included in another item, the rate for the item included in another item shall be deemed to be nil.

12. The bidder rates, prices and sums shall, subject only to the provisions of the Conditions of Contract, remain valid irrespective of any change in the quantities during the execution of the Contract.

13. The quantities of work as measured and accepted and certified for payment in accordance with the Conditions of Contract, and not the quantities stated 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 certified for payment.

    Ordering of materials are not to be based on the Bill of Quantities, but only on information issued for construction purposes.

14. 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 Standardized, Project or Particular Specifications
Quantity	:	The number of units of work for each item
Rate	:	The payment per unit of work at which the Bidder bids to do the work
Amount	:	The quantity of an item multiplied by the bidded rate of the (same) item
Sum	:	An amount bidded 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

15 The units of measurement indicated in the Bill of Quantities are metric units. The following abbreviations may appear 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
kW	=	kilowatt
kN	=	kilonewton
kg	=	kilogram
t	=	ton (1 000 kg)
%	=	per cent
MN	=	meganewton
MN-m	=	meganewton-metre
PC Sum	=	Prime Cost Sum
Prov Sum	=	Provisional Sum

PART C2.2

BILL OF QUANTITIES

TENDER NO: LNM020/2020/21

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

LEPELLE-NKUMPI LOCAL MUNICIPALITY

CONTRACT NO. LNM020/2020/21

REFURBISHMENT AND UPGRADING OF LEBOWAKGOMO STADIUM

PART C3.1
Description of Works

C3.1 DESCRIPTION OF THE WORKS

C3.1.1 MISCELLANEOUS

The Project Specifications form an integral part of the Contract Documents and supplement the Standard Specifications.

In the event of any discrepancy with a part or parts of the Standard Specifications, the Schedule of Quantities or the drawings, the Particular or Project Specifications shall take precedence.

The Standard Specifications, which form part of this contract, have been written to cover all phases of work normally required for building contracts, and they may therefore cover items not applicable to this particular contract.

C3.1.2 THE SITE

The project comprises the **REFURBISHMENT AND UPGRADING OF LEBOWAKGOMO STADIUM**

The description of the project as described in this section is merely an outline of the contract works and shall not be regarded as limiting to the amount of work to be done by the Contractor under this contract.

The brief scope of work is as follows:

- Site Establishment
- De-bushing and Site Clearance
- Soccer Pitch Earthworks
- Soccer Pitch Irrigation
- Borehole Development and Equipping
- Electrification
- Additional Storage (PVC Tank)
- Grasing
- Ablution Block Refurbishment
- Tennis, Netball and Volleyball Court Resurfacing
- Soccer Pitch Stormwater
- Flood Lights

Dealing with existing services including water pipes, electrical and Telkom cables and existing sewer lines form part of the works.

No housing is available for the Contractor's employees and the Contractor shall make his own arrangements for housing his employees or transporting them to and from the site. The Contractor is in all respects responsible for the housing and transporting of his employees and for the arrangement thereof, and no extension of time due to any delays resulting from this will be granted.

No housing is required for the Engineer. Other facilities such as an office, telephone, name board, survey equipment, and any relevant services required for the Engineer are described under the relevant sections.

The tenderers are to tender for the community hall by completing all the bills of quantities. A valid bid shall be a completed bill of quantities with a total after VAT, corresponding with the amount recorded in the offer of acceptance.

C3.1.2.5 CIDB Rating

The tender notice calls for a minimum CIDB grading of **4CE.** A bid with a CIDB rating not complying with what is specified shall be regarded as non-responsive.

CONTRACT NO. LNM020/2020/21

REFURBISHMENT AND UPGRDING OF LEBOWAKGOMO STADIUM

PART C3.2

Particular Specifications

PART C3.2.1

Particular Specification

(read with PW371-A)

This specification falls under the Scope of Work as defined in *Standard for Uniformity in Construction Procurement,* published by the Construction Industry Development Board (CIDB), and is based on national or international standards, where such exist.

Works: **REFURBISHMENT AND UPGRADING OF LEBOWAKGOMO STADIUM** Ref no: **LNM020/2020/21**

 NOTE TO THE COMPILER

> Make an office print-out of this part of PW371 for marking up during documentation.

> Delete irrelevant clauses and add variations or additional requirements where necessary. Do not change heading numbers – they should correllate with PW371-A.

> Choose the desired attribute or value where choices are separated with a double space-slash-double space. Delete unwanted attribute(s) or value(s). Asterisk (*) denotes the preferred attribute or value.

> The specification data for SANS 2001 standards as listed in this publication is for guidance only. See Annex A of the relevant standard for the full list of specification data, and follow instructions when required.

>Where the reader is directed to <see drawings>, ensure the relevant item is shown in the drawings.

> Dimensions presented are preferred dimensions according to the relevant SANS standard. Check availability or other dimensions with manufacturers/suppliers.

> Delete all guidance notes (framed text) on completion (click just outside frame on text box and press <delete>).

> Print out and hand in with drawings.

 NOTE TO THE TYPIST

> Text in this document is “styled”. All styles are listed in the Quickstyle box at the top of your screen under the HOME tab. Use the same styles throughout, and do not create new styles.

>Heading 1 has autonumbering on (to keep footer text intact).

> Heading 2 and 3 styles have autonumbering “off” in order to be consistent with Part A. You have to number these headings manually.

> To update the Table of Contents, click anywhere on the table to highlight and press F9.

TABLE OF CONTENTS

Project Specification

The Project Specifications, consisting of two parts, form an integral part of the Contract and supplement the Standard Specifications.

Part A contains the Standard Specifications.

Part B contains variations, amendments and additions to the Standard Specifications and, if applicable, the Particular Specifications.

Part C contains the Additional Specification references.

In the event of any discrepancy between a part or parts of the Standard or Particular Specifications and the Project Specifications, the Project Specifications shall take precedence. In the event of a discrepancy between the Specifications (including the Project Specifications) and the drawings and *I* or the Schedule of Quantities, the discrepancy shall be resolved by the Engineer before the execution of the work under the relevant item.

The Standard Specifications, which form part of this contract, have been written to cover all phases of work normally required for road contracts, and they may therefore cover items not applicable to this particular contract.

5.1 Project Specification

PART A:

5.5.1 STANDARD SPECIFICATIONS

(a) The following specifications shall apply for the construction of the Works.

(i) The COLTO Standards & Specifications for Road Bridge Works for State 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 / Halfwayhouse
Becker Street / 1685
Midrand

Tel : (011) 805-5947
Fax : (011) 805-5971

Contact Person : Angeline Aylward

(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*”.

5.5.2 PROJECT SPECIFICATIONS RELATING TO STANDARD SPECIFICATIONS

5.5.2.1 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 LI in the project specifications.

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

5.5.3 PROJECT SPECIFICATIONS: ADDITIONAL SPECIFICATIONS

This part of the project specifications deals with matters relating to the additional specifications to the standard specifications, consisting of the following:

- Requirements of The Occupational Health And Safety Act Regulations
- Environmental Management Plan
- Provision of Structured Training
- Requirements of Extended Public Works Programme

These “Additional Specifications” are not bound into this document and can be obtained from the Employer.

PS-2 DESCRIPTION OF THE SITE AND ACCESS

2.1 Location of site

The project site is situated East of the Lebowakgomo Town.
The centre of the site has the following approximate coordinates:

- Latitude: 24° 18' 52.12"S
- Longitude: 29° 29' 24.72"E

2.2 Access to site

The site can be accessed through the R518 Road from the Lebowakgomo town heading East, turning Right (Southerly direction) into Pekwa Street. The Site is located in Pekwa Street.

PS-3 DETAILS OF THE WORKS

The works are fully described in the contract drawings, bill of quantities and are again summarized above in item 1.3 Extent of the Works.

PS-4 CONSTRUCTION AND MANAGEMENT REQUIREMENTS

4.1 General

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

Certain aspects however require further attention as described hereafter.

4.1.7 Drawings (Read with SANS 1921 – 1: 2004 clauses 4.1.7; 4.1.11 and 4.1.12)

The reduced drawings which form part of the tender documents shall be used for tendering purposes only.

4.2 Responsibilities for design and construction

Only the Engineer is allowed to perform design functions.

4.3 Planning and Programme (Read with SANS1921-1:2004 clause 4.3)

The project programme submitted during tender, as amended and approved by the Engineer shall be the contractual programme.

4.4 Quality Assurance (QA) (Read with SANS 1921 – 1: 2004 clause 4.4)

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

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

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

The Contractor shall pay special attention to the management and disposal of water and stormwater on the site. It is essential that the works or parts thereof are kept dry and properly drained.

Claims for delay and for repair of damage caused to the works as a result of the Contractor's failure to properly manage rain and surface water, will not be considered.

4.11 Testing (Read with SANS 1921 – 1 : 2004 clause 4.11)

Process control

The Contractor shall arrange for all tests required for process control to be done. The cost of process control is deemed to be included in the rates, and no special pay item is provided for such.

Acceptance control

The process control test results submitted by the Contractor for approval of materials and workmanship will be taken into account by the Engineer in his appraisal for acceptance. However, the Engineer shall commission further acceptance control testing by a commercial laboratory of his choice. The cost of such acceptance control testing is carried by the Employer.

4.12 Site Establishment (Read with SANS 1921 - 1 : 2004 clause 4.14)

Contractor's camp site and depot

A full-time site camp is allowed.

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

The Contractor shall provide security watchmen for the contract as he deems fit at no extra cost for the Employer. The Contractor must ensure that all his employees as well as the employees of his subcontractors are able to identify themselves as members of the construction team.

Accommodation of Employees

The Contractor shall make his own arrangements to house his employees and to transport them to site. No additional payment shall be made for transport of labour to and from site, and the rates shall be deemed to include the cost of transportation.

No informal housing or squatting will be allowed on the site.

The Contractor shall provide the necessary ablution facilities at his camp site and the site of the works for the use of his employees.

4.13 Survey beacons (Read with SANS 1921 - 1: 2004 clause 4.15)

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

4.14 Existing Services (Read with SANS 1921 - 1: 2004 clause 4.17)

Existing services known to the Employer are indicated on the drawings. The positions of services are indicative and the exact location thereof shall be confirmed by the Contractor by exposing the services through careful hand excavation. The approval of the Engineer shall be

obtained prior to any hand excavation.

4.15 Health and Safety (Read with SANS 1921 - 1: 2004 clause 4.18)

4.15.1 General statement

It is a requirement of this contract that the Contractor shall provide a safe and healthy working environment and to direct all his activities in such a manner that his employees and any other persons, who may be directly affected by his activities, are not exposed to hazards to their health and safety. To this end the Contractor shall assume full responsibility to conform to all the provisions of the Occupational Health and Safety Act No 85 and Amendment Act No181 of 1993, and the OHSA 1993 Construction Regulations 2003 issued on 18 July 2003 by the Department of Labour.

For the purpose of this contract the Contractor is required to confirm his status as mandatory and employer in his own right for the execution of the contract by entering into an agreement with the Employer in terms of the Occupational Health and Safety Act in the form as included in section C1.2.4

Health and Safety Specifications and Plans

(a) Employer's Health and Safety Specification
The Employer's Health and Safety Specification is included in Part E of the Project Specifications.

(b) Tenderer's Health and Safety Plan
The Tenderer shall submit before commencement of his works his own documented Health and Safety Plan for the execution of the works under the contract. His Health and Safety Plan must comply with the employer’s specification, at least cover the following:

(i) a proper risk assessment of the works, risk items, work methods and procedures in terms of Regulations 7 to 28;
(ii) pro-active identification of potential hazards and unsafe working conditions;
(iii) provision of a safe working environment and equipment;
statements of methods to ensure the health and safety of subcontractors, employees and visitors to the site, including safety training in hazards and risk areas (Regulation 5);
monitoring health and safety on the site of works on a regular basis, and keeping of records and registers as provided for in the Construction Regulations;
details of the Construction Supervisor, the Construction Safety Officers and other competent persons he intends to appoint for the construction works in terms of Regulation 6 and other applicable regulations; and
details of methods to ensure that his Health and Safety Plan is carried out effectively in accordance with the Construction Regulations 2003.

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

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

Cost of compliance with the OHSA Construction Regulations

The rates and prices tendered by the Contractor shall be deemed to include all costs for conforming to the requirements of the Act, the Construction Regulations and the Employer's Health and Safety Specification as applicable to this contract.

Should the Contractor fail to comply with the provisions of the Construction Regulations, he will be liable for penalties as provided in the Construction Regulations and in the Employer's Health and Safety Specification.

PS-5 EXTENSION OF TIME DUE TO ABNORMAL RAINFALL

The formula below shall be used to calculate separately the delay for each calendar month or part thereof. It shall be calculated each month during the period referred to in the general conditions of contract as the time for completion of the works (including any extension thereof that may have been granted), or until the issue date of the certificate or practical completion, whichever is the shorter period. The delay calculated for a given month shall be used to determine the interim extension of time granted for that month. At the end of the applicable period referred to above, the aggregate of the monthly delays will be taken into account for the final determination of the total extension of time for the contract:

$$V = \frac{(Nw - Nn) + (Rw - Rn)}{X}$$

If any value of V is negative and its absolute value exceeds Nn, then V shall be equal to minus Nn.

The delay for a part of a month shall be calculated by substituting pro rata values for the variables in the equation.

The symbols shall have the following meanings:

V = Delay due to rain in calendar days in respect of the calendar month under consideration.

Nw = Actual number of days in the calendar month on which a rainfall of Y mm or more per day has been recorded.

Rw = Actual rainfall in mm for the calendar month under consideration.
Nn = Average number of days in the relevant calendar month (as derived from existing rainfall records provided in the project specifications) on which a rainfall of Y mm or more per day has been recorded.

Rn = Average rainfall in mm for the calendar month, as derived from the rainfall records supplied in the project specification.

X = 20, unless otherwise provided in the project specifications.

Y = 10, unless otherwise provided in the project specifications.

The total delay that will be taken into account for the determination of the total extension of time for the contract shall be the algebraic sum of the monthly totals for the period under consideration. But if the grand total is negative, the time for completion shall not be reduced on account of abnormal rainfall. The total extension of time for any calendar month shall not exceed (Nc – Nn) calendar days, where Nc= number of calendar days in the month under consideration.

The factor (Nw – Nn) shall be considered to represent a fair allowance for variations from the average for the number of days during which rainfalls equals or exceeds Y mm per day.

The factor (Rw – Rn) ÷ X shall be considered to represent a fair allowance for variations from the average for the number of days during which rainfall does not equal or exceed Y mm per day, but when wet conditions prevent or disrupt work.

This formula does not take into account any flood damage, which could cause further or concurrent delays and which should be treated separately in so far as extension of time is concerned.

Accurate rain gauging shall be taken at a suitable point on the site daily at 08:00 unless otherwise

agreed to by the engineer, and the contractor shall, at his own expense, take all necessary precautions to ensure that the rain gauges cannot be interfered with by unauthorised persons.Existing rainfall records, fromStellenbosch rainfall station are available from the South African Weather Service.

PS-6 CONTRACTORS RESPONSIBILITY

The Contractor undertakes to render the Services in a proper and workman like manner during the currency of this Agreement and warrants to the Employer that it has the necessary skill and expertise to do so in a competent, professional and on a cost effective basis.

Without derogating from the generality of the provisions of clause 2.1, the Contractor shall at its cost, in rendering the Services:

adhere to directions given to it by the Employer's General managers at the Operations in relation to the utilisation of the Machinery for the purpose contemplated in this Agreement;

ensure that the Machinery is maintained in good order and condition during the currency of this Agreement;

be liable for all loss or damage of whatsoever nature caused to the Machinery for whatsoever reason and shall forthwith repair/replace any damaged Machinery so as to not interrupt the rendering of the Services;

comply with all obligations imposed upon it by any law in relation to the manning and operation of the Machinery and in particular those obligations imposed upon it in terms of the provisions of, inter alia, the Site Instructions and Rules, HSEC SOP and the Compensation for Occupational Injuries and Diseases Act, 1993;

ensure that it has at all times the required Machinery available to render the Services;

at all times comply with relevant legislation relating to coal processing plants, environmental issues and health and safety concerns;

at all relevant times have all permits required in terms of any law or regulation for the operation of the Machinery in terms of this Agreement;

be responsible for the prevention of all spillage of oils, fuels, greases and other deleterious matter from the Machinery, whether operated by it or its sub-contractors and in respect of any such spillage or deposition which may occur, the Contractor shall be responsible for and bear the costs of clearing all resultant pollution to the reasonable satisfaction of The Employer and any relevant authority;

ensure that those persons utilised by it in the rendering of the Services (including but not limited to its employees, sub-contractors, agents and the like) are trained, experienced, competent and efficient in their respective trades and occupations;

ensure that all machine operators are in possession of valid operator certificates (if required in terms of any relevant legislation) from the effective date of their appointment and duly maintain such certificates;

furnish the Employer with such reports in relation to the rendering of the Services as and when so required by the Employer or when so required in terms of any relevant legislation;

attend any meetings reasonably called by the Employer from time to time;

not use the land forming part of the Operations for any purpose whatsoever other than for the rendering of the Services and shall place any facilities and the like as may be required for itself and its employees only on those portions of the Operations as may be approved by the Employer;

take all reasonable precautions to prevent the outbreak of fire;

ensure that a pre use or some such similar record book be kept for each piece of the Machinery, which book shall record, but not limited to the following information:
Operator's name.
Operator's employee number.
The date and the time when the shift commenced and ended.
The opening and closing meter reading for every shift.
each pre use checklist must be signed off by the Contractor's nominated supervisor at the Operations on a daily basis.

PS-7 PARTICIPATING OPERATION

7.1 The service will be provided by the contractor to the following site:

Malamulele Stadium grounds

PS-8 PROJECT TEAM

8.1 The Contractor is responsible to ensure that enough people are employed to execute the Service thoroughly and properly, based on the following project team.

NAME	DESIGNATION FOR THE CONTRACTOR	PROJECT TEAM
Refer to returnable schedules		Contracts Manager
		Site Agent

PS-9 SITE CONDITIONS

9.1 The prevailing climate at the Site is warm and wet summers and cool and dry winters. Fog may occur during the early hours of the morning during winter.
9.2 The Contractor is expected to take climatic conditions into account in his planning.
9.3 A Geotechnical investigation report is included with the tender document.
PS-10 WORKING HOURS

The Contractor shall determine the required working hours and shift structures which will meet the deliverables requirements.

10.1 The limitations on maximum hours of overtime must be adhered to as defined in the Basic Conditions of Employment Act, Act 75 of 1997.

PS-11 HEALTH AND SAFETY

In performing the Works the Contractor shall meet the requirements of the Employer’s Health and Safety standards and have due regard for the guidelines set out in the “Contractor’s Pack” that needs to be completed before commencement of the Contract. The Contractor acknowledges that it has made adequate provision in its unit rates to accommodate all such requirements and guidelines.

PS-12 SITE DISESTABLISHMENT

15.1 All structures including fencing and like erected by the Contactor as part of its site establishment shall, upon the termination or cancellation of the Agreement, must be removed by Contractor at his own cost
PS-13 CONTRACTOR’S PERSONNEL

13.1 General
The Contractor shall ensure that there are, at any given time, sufficient personnel on site to ensure a safe and efficient working environment.

13.2 The Contractor's Representative

The Contractor shall appoint a competent representative, that shall in turn be appointed by the Employer under the Mine, Health and Safety Act. This person shall report to the Employer and shall be responsible for the entire conduct and execution of the Contractor's Scope of Work.

13.3 Other Senior Personnel

13.3.1 The Contractor shall provide details of all the Senior Personnel nominated for the project together with information on their qualifications and relevant experience. The Employer reserves the right to reject any or all of these persons if their qualifications or experience are, in his sole opinion, inadequate. The Employer reserves the right to have any person removed from site without having to give any reason and without recourse by the Contractor.

13.3.2 The Contractor shall be obliged to ensure that such persons so nominated shall as far as reasonably possible be employed on the project until completion, and, no Senior Personnel shall be transferred off the project without the written consent of the Employer.

13.4 Qualifications:-

The Contractor shall ensure that the following minimum recognized qualifications are applicable for the various positions:

13.4.1 Safety Officer,

Valid First Aid Certificate;

13.4.2 Operators of self-propelled mobile machines

Certificate issued after compliance with requirements of Regulation and approved by the Employer's induction program.

PSA GENERAL

PSA1 Approval of Material (Subclause 3.1)

The Contractor must supply to the Engineer the test results of samples from stockpiles of proposed construction materials on site.

The Contractor shall be responsible for the cost of all failures on test samples and acceptance testing.

PSA2 Accommodation of Traffic (Sub-clause 5.2)

PSA2.1 General

The Contractor shall ensure that all access routes which are affected by the Works and/or Temporary Works are kept in a safe condition for pedestrian and vehicular traffic.

The Contractor shall organise his work so as to reduce the inconvenience to traffic to a minimum, and no public road shall be completely closed without prior approval.

The Contractor shall provide and maintain in proper condition all necessary barricades, lights, warning signals and all direction signs necessary to enable traffic to flow in both directions. He shall provide flagmen at all deviations and/or obstructions.

All signs shall be in both official languages and all traffic signs and control of traffic shall be in accordance with the South African Road Traffic Signs Manual.

The Contractor shall liaise with and co-operate with the relevant Traffic authorities wherever the works affect existing roads. The Contractor shall sign an indemnity clearing the Local Authority, as applicable, from all liabilities in respect of excavations and works on or adjacent to trafficked roads.

PSA2.2 Measurement and payment

PSA2.2.1 Accommodation of traffic Unit : Sum

Payment for this item shall include for all work necessary to comply with this Project Specification not covered by the specific pay items below. Subject to the provisions of 8.2.3 and 8.2.4, payment of incremental amounts (calculated by the division of the tendered sum by the number of months required to complete the site activities for which the relevant sum was tendered) will be authorised in each of the subsequent progress certificates until the sum tendered has been paid.

PSA2.2.2 Working alongside Residential Roads (Trenching falling outside roadway) Unit : m

PSA2.2.3 Working within Residential Roads (Trenching falling within roadway) Unit : m

Payment for the above items shall be deemed to be full compensation for the following:

a) The maintenance of existing roads and any deviations or temporary sections of road during the period of the contract.

b) Supply, erection, moving and all subsequent re-use on site, including maintenance, removal to store and final removal of all barricades, barriers, signs and flashing lamps.

c) Supply, installation, moving and all subsequent re-use on site, including maintenance, removal to store and final removal of all drums and cones.

d) Provision and maintenance of pedestrian and vehicular access across trenches or

ditches to dwellings.

PSA3 Approved Laboratories (Subclause 7.2)

The Contractor in conjunction with the Engineer's Representative shall execute day to day testing such as, P.I's, gradings, CBR's, MOD's, densities, air tests gravity sewers, pressure tests for water mains, etc. Accurate records of all control testing shall be kept by the Contractor and copied to the Engineer on a regular basis. In addition, control testing as well as more sophisticated testing shall be done by a Laboratory chosen by the Engineer.

The Contractor shall ascertain that his site staff are capable of executing his quality control testing as required by the various sections of the Specifications. The Engineer's site staff shall witness and verify the Contractor's testing.

PSA3.1 Payment procedure for acceptance testing

Costs for his quality control testing shall be borne by the Contractor. Cost for control testing by the Engineer's laboratory excluding failures shall ultimately be borne by the Employer.

The procedure for payment of the Engineer's Control Testing will be as follows;

- The Engineer's laboratory will invoice the Contractor with all acceptance testing costs including successful tests.

- The Contractor shall be reimbursed for all successful acceptance tests via the monthly Payment Certificates.

PSA4 Dealing with Water on Works

The site is situated within a predominantly winter rainfall area.

In addition to the requirements of Subclause 5.5 of SABS 1200 A - 1986 General, the Contractor shall design, construct and maintain all drains and other temporary works necessary for the dewatering and flood protection of the permanent works. All methods of dewatering and flood protection shall be to the approval of the Engineer.

Having served their purpose, all temporary works shall be removed, backfilled or levelled such that the operation of the works shall not be affected in any way.

The Contractor shall be responsible for and shall repair at his expense any damage to the foundations, structures or any part of the works caused by floods, water of failure of any part of the dewatering and flood protection works.

The cost of all flood protection and dewatering measures shall be included in the relevant items in Section 1 of the Schedule of Quantities.

PSA5 Method of Measurement (Subclause 8.1.1)

The quantities listed in the Schedule of Quantities do not govern final payment. Payment to the Contractor will be made only for the actual quantities of contract items performed in accordance with the plans and specifications and if upon completion of the construction, these actual quantities show either an increase or decrease from the quantities given in the Schedule of Quantities the rates and prices contained in the Schedule of Quantities will prevail.

PSA6 As-Built Information

As the works are progressing, the Contractor shall mark on his drawings, after checking the information, all as-built details and submit them to the Engineer's Representative for approval on a weekly basis. Payment shall be made under "Contractual Requirements."

The Contractor must make an allowance in this contractual requirement to have all services surveyed and forwarded to the Engineer in an electronic format. A Completion Certificate will only be issued

once the Engineer has accepted as-built information.

PSA8 DAYWORKS

This Daywork Schedule will be used at the discretion of the Engineer for valuation of extra work which cannot conveniently be valued at rates submitted in the Schedule of Quantities. The rates entered for labour and materials shall be inclusive of overhead charges and profit, site supervision of staff, insurance, holidays with pay and use and maintenance of small hand tools and non-mechanical plant, travelling allowances, other emoluments and allowances.

PSD EARTHWORKS

PSD1 Classification for Excavation Purposes (Subclause 3.1)

Delete SABS 1200 D Subclause 3.1 and replace as follows:

PSD1.1 Method of classifying (Subclause 3.1.1)

The Contractor may use any method he chooses to excavate any class of material but his chosen method of excavation shall not determine the classification of the excavation. The Engineer or his Representative will decide on the classification of the materials. In the first instance the classification will be based on inspection of the material to be excavated and on the criteria given in PSD 1.2 (a) and (b).

In the application of this classification, no differentiation shall be made between "bulk" or "restricted excavations".

For excavation and compaction purposes, the sandy material shall be classified as sand in terms of PSDB4.

PSD1.2 Classes of excavation (subclause 3.1.2)

All material encountered in any excavations for any purpose including restricted excavation will be classified as follows:

a) Hard rock excavation

Hard rock excavation shall be excavation in material (including undercomposed boulders exceeding 0,17 cubic metres in individual volume) that cannot be efficiently removed without blasting, wedging and splitting or by pneumatic means.

Intermediate Excavation

No payment will be made for Intermediate Excavation. All intermediate material will be considered as Soft Excavation and will be paid for under Soft Excavation.

c) Soft excavation

Soft excavation shall be all material not falling into the category of hard rock.

PSD2 Compaction

All sand fill shall be compacted to 100% Mod AASHTO.

PSD3 Blasting

In addition to the provisions of SABS 1200 Section D: Earthworks Clause 5.1.1.3 the following shall apply:

PSD3.1 Overbreak

The Contractor shall make good at his own expense any additional excavation necessitated by the shattering of rock in excess of the following overbreak allowances:

a) Overbreak in the width: nil

b) Overbreak in the depth: 150 mm below invert level.

PSD3.2 Excavation of rock by blasting

In addition to complying with the provisions of Clause 5.1.1.3 above, the Contractor shall record for the information of the Engineer the spacing and loading of the charge in each blast and monitor the velocities but compliance with this or any other requirement will not relieve the Contractor of any responsibility in terms of the contract. The Contractor shall not carry out blasting within 10 m of any service or within 25 m of any building.

Blasting patterns will be designed by experts to limit the particle velocities to the following:

a) At services: 50 mm/sec peak particle velocity.

b) At any building: 25 mm/sec peak particle velocity.

The velocities shall be monitored at the service and building closest to the blast on each occasion and a copy of the recordings given to the Resident Engineer.

Preblast surveys including photographs shall be taken of buildings within 50 metres of the blast and written confirmation obtained from the owner. All this work shall be undertaken by the Contractor at his own expense.

PSD4 FREEHAUL (SUBCLAUSE 5.2.5.1)

All haulage on the Contact shall be regarded as freehaul.

PSDB EARTHWORKS (PIPE TRENCHES)

PSDB1 Classes of Excavation (Subclause 3.1)

Add:

"Notwithstanding the provision of this Sub-clause the excavation of material will be classified as specified in Clause PSD 1.

Where for reasons of inaccessibility or any other reason that excavation cannot be carried out by mechanical means, and where so directed by the Engineer, the trench shall be excavated by hand."

The final classification of material will be at the discretion of the Engineer or his representative.

PSDB2 Special Water Hazards (Subclause 5.1.2.2)

In addition to the Contractor's responsibilities for dealing with water, as set out in PSA4, the Engineer may order the Contractor to place a crushed stone bedding layer (minimum thickness 150 mm) on the trench bottom.

Should the trench bottom conditions remain unstable due to the nature of the soil and the degree of saturation, the Engineer may order the Contractor to install a filter fabric on the trench bottom prior to the provision of the stone layer. After placing the stone bedding, the filter fabric shall be folded over the stone with a minimum overlap of 300 mm to form an enclosed drain. The specified

bedding material shall then be used to bed the pipe.

The Contractor shall only provide and lay the stone bedding layer and filter fabric after receipt of the written order to do so from the Engineer.

PSDB2.1 Measurement and payment

The cost of dealing with water as specified in Subclause PSA4 will be held to have been included in the tendered sums for excavation and under the relevant items in the Preliminary and General section of the Schedule of Quantities.

a) Stone Bedding in water-logged conditions

Where the use of a layer of crushed stone in the trench bottom has been authorised by the Engineer, it will be measured by volume calculated according to the length multiplied by the minimum base width and specified thickness.

The tendered rate shall cover the cost of all additional excavation and preparation of the trench bottom to accommodate the layer of stone, the removal of unsuitable material, the supply and placing of a 150 mm thick layer of stone over at least the specified width and all related activities in order to produce a stable platform.

b) Geotextile filter fabric

Where the Engineer has authorised the use of geotextile filter fabric, this shall be measured by area as:

2 x (specified minimum base width + 300 mm) x nett length.

The tendered rate shall include the cost of supply, placing and losses as a result of overlaps and over excavated trench widths.

PSDB3 Minimum Base Width (Subclause 5.2)

A side allowance of 300 mm on each side will be applicable to pipes of diameter less than 125 mm. Minimum widths for ducting and cables shall be as required on the relevant drawings.

PSDB4 Compaction (Subclause 5.7)

All trenches shall be backfilled and compacted to 100% of Modified AASHTO density in sand and not less than 93% in the case of cohesive materials. There will be no separate payment for compaction in road reserves as specified in SABS 1200 DB item 8.3.3.3.

Sand is defined as material that conforms to the following:

% passing :	4,74 mm sieve	95% min
	0,425 mm sieve	50% min
	0,075 mm sieve	10% max

Plasticity Index : Non Plastic

PSDB5 Shoring

Shoring will be measured and paid for in areas where the sides are unstable and widening of

the trench is not possible, impractical or uneconomic. The onus is on the Contractor to request the Engineer to order shoring. The order for shoring shall be given in writing and shall not unreasonably be withheld.

Shoring of unstable trench sides will be measured per linear metre of trench shored whether both sides of the trench are shored or not and irrespective of the depth of the trench.

The rate shall include full compensation for all plant labour and materials required to provide the shoring and shall include for the additional inconvenience of working in a shored trench, and for any damage or replacement of the shoring after blasting, and for widening the trench to accommodate the shoring and walling.

PSDB6 Blasting

The provisions in PSD3 shall apply.

PSDB7 BACKFILL TO PREFABRICATED CULVERTS

The material used shall be selected material of at least subbase quality or such lower quality as may be permitted by the engineer.

Backfilling alongside and over all culverts shall be placed at optimum moisture content and compacted in layers not exceeding 150 mm after compaction to a density of at least the density required for the material in adjoining layers of fill, subgrade and subbase. The density of backfilling excavations made in natural ground shall be at least 90% of modified AASHTO density.

Backfilling shall be carried out simultaneously and equally on both sides of the culvert to prevent unequal lateral forces from occurring. The tendered Rate shall include full compensation for supplying selected material of subbase quality from approved sources including a free haul of 1 km.

PSDK GABIONS AND PITCHING

PSDK1 Materials (Clause 3.1)

PSDK1.1 Quality (Clause 3.1.1.1)

The stone shall be clean, hard, un-weathered and free from fissures and flaking. It shall have a relative density of 2.65 and should pass the requirements of the standard specification in terms of size, durability and finish.

PSDK1.2 SIZE (Clause 3.1.1.2)

No stone shall be of a size such that it will pass through a ring of diameter 88mm.

No stone shall be of a size:

exceeding 250mm, and at least 85% of the stones shall be of a size equal to or exceeding 120mm, in the case of gabion boxes, and;
exceeding 150mm, and at least 85% of the stones shall be of a size equal to or exceeding 100mm, in the case of mattresses.

PSDK1.3 Gabion Cages (Clause 3.1.3)

Unless otherwise shown on the drawings, gabion boxes shall consist of double twisted, hexagonal wire mesh of nominal 80mm mesh, with 4,4mm o/d frame wire and 3,7 mm o/d mesh wire, complete with partitions at 1m centres. All wire to be mild steel to SABS 1580 – 1993, zinc coated by hot dip galvanising to SABS 675 – 1993 and heat bonded with heavy duty PVC coating of nominal 0,5mm wall thickness.

Mattresses shall consist of double twisted, hexagonal wire mesh of nominal 80mm mesh, with 4,0 mm o/d frame and 3,5mm o/d mesh wire, complete with partitions at 1m centres. All wire to be mild steel to SABS 1580 – 1993, zinc coated by hot dip galvanising to SABS 675 – 1993 and heat bonded with heavy duty PVC coating of nominal 0,5mm wall thickness.

PSDK1.4 Geotextile (Clause 3.1.4)

The geotextile liner shall be Bidim A4 or similar approved.

PSDK2 CONSTRUCTION (Clause 5)

PSDK2.1 Rockfilling (Clause 5.2.4)

The mattresses used for channel lining are to be filled by spreading random rock particles (quality and size as specified in PSDK1.1 and PSDK1.2) starting from the bottom of the channel and moving up the slope. The mattress should be slightly overfilled to allow for settlement

PSDM EARTHWORKS (ROADS, SUBGRADE)

PSDM1 Use of Material (Subclause 5.2.2.3)

PSDM1.1 After completion of the bulk earthworks operation, sandy material cut from roads shall be used in the following order:

a) As compacted fill in roads.
b) As backfill to pipe trenches.
c) As fill in low erven indicated by the Engineer.
d) Spread evenly over erven and public places indicated by the Engineer.

Spoil onto selected areas indicated by the Engineer.
To create embankment as shown on landscape drawing

PSDM1.2 The Contractor shall so organise his work that excavation from the road reserves is placed directly to uncompacted or compacted fill and no additional payment shall be made for stockpiling unless instructed by the Engineer in writing.

PSDM2 BORROW FILL

The material shall not contain any rock fragments with a maximum dimension exceeding 500 mm.

Whenever practical, fill shall be placed in successive layers parallel to the final road surface.

PSG CONCRETE (STRUCTURAL)

PSG1 Concrete Specification

PSG1.1 Mixing water

Only potable water shall be used for mixing water.

PSG1.2 Cement

100% LASROPC shall be used as specified in SABS 471 (1971) as amended. Any variations to these are subject to the Engineers approval.

PSG1.3 Aggregates

The maximum aggregate size shall be 25 mm. Malmesbury shales may be used provided the free sodium alkali content in the concrete mix does not exceed 2,1 kg/m3.

PSG1.4 Admixtures

Admixtures are permitted subject to the Engineers' approval.

PSG1.5 Batching plant

All concrete shall be weight batched.

PSG1.6 Vibrators

All concrete shall be compacted by vibrators and a spare vibrator in working order shall be available for use at all times.

PSG1.7 Concrete mix design

Watertight concrete

40 MPa concrete with the minimum and maximum cement contents of 325 kg/m3 and 400 kg/m3 respectively shall be used. The water cement ratio shall not exceed 0,50 All concrete mix designs shall be approved by the Engineer in advance.

The mix design and casting procedure shall be approved by the Engineer prior to casting.

Cubes shall be taken on all pours in accordance with SABS 1200. Payment shall be included in the rate tendered for the supply of concrete. Where cubes are not taken during a pour no payment shall be made for that pour.

PSL MEDIUM PRESSURE PIPELINES

PSL1 Materials (Clause 3)

(a) Pipes (Subclause 3.1)

Water mains shall be uPVC Class 12 pipes with Z-lock couplings to SABS 966 as indicated. Only full length pipes bearing the SABS mark will be acceptable. Cut pipes shall only be used at pipe junctions to position valves and specials as shown in the drawings. When laying the pipes the markings shall be visible from above.

The cost of cutting and trimming the pipes shall be included in the rates for laying and jointing of pipelines.

(b) Pipe Specials (Subclause 3.3)

Pipe specials shall conform in all respects with the requirements of the latest edition of the relevant Standard Specification listed below:-

SABS 62
SABS 534
SABS 546
SABS 719

(d) Polyethylene Pipes (Subclause 3.7.2)

High density polyethylene (HDPE) pipes to SABS 533 Type IV Class 10 jointed with compression fittings or "Polycop" pipes with copper fittings shall be required as shown on the relevant drawings.

(e) Bolts and Nuts (Clauses 3.8.3 and 3.8.4)

Bolts and nuts shall comply with SABS 135 and be hot dip galvanised or cadmium plated.

PSL2 Corrosive Soil (Subclause 3.9.6)

Cast iron detachable and flanged joints together with their bolts shall be treated as specified in subclause 3.9.6 or other means approved by the Engineer. This treatment shall also apply to bolts and flanges used in the construction of valves and hydrants. No separate payment will be made for the treatment specified.

PSL3 Valves (Subclause 3.10)

(a) Isolation valves

Valves shall conform with all relevant sections of SABS 664 (1974) and SABS 665 (1981) specifications and subsequent amendments.

Valves shall be “Downright” Class 16 cast iron valves with non-rising spindles and closing to the left.

(b) Air Valves

Vent-o-Mat type.

PSL4 Fire Hydrants (Subclause 3.10)

Fire Hydrants shall have a cast iron bodyand shall be provided with a V-thread gunmetal outlet of 65 mm diameter with cast iron cap with safety chain.

Test Pressure: 2MPa Working Pressure: 1,38MPa.

Fire hydrants are to be bolted on to the flanged tee-end of a cast iron tee-piece with plan ends suitable for coupling to a pressure pipe. The fire hydrant and box are to be positioned in line with the water main uPVC.

PSL5 Surface Boxes (Subclause 3.11.6)

Surface boxes shall be to SABS 558. Cover and frame for valve surface boxes to be blue polymer concrete as manufactured by AV Mouldings for Stellenbosch Municipality. Cover and frame for hydrant boxes to be yellow polymer concrete Type 5 by AV Mouldings.

No separate payment will be made for the marking or painting of cast iron surface boxes.

PSL6 Construction (Clause 5)

PSL6.1 Depths and Cover (Subclause 5.1.4)

Pressure mains shall be laid so that the cover to the top of the pipe barrel from finished surface level is generally, but not less than 800 mm in roads and 600mm elsewhere.

Where the minimum clearance between pipe crossings would be less than 150 mm the main shall be laid beneath the service crossed at an invert level which allows for the minimum clearance. The main shall be laid horizontally at this level for a distance of at least 1,0 m on either side of the centreline of the service crossed and then revert to the minimum cover as specified in subclause 5.1.4.2.

No decrease in cover or clear space between the pipe barrels as specified will be permitted unless otherwise instructed by the Engineer in writing.

PSL6.2 Jointing (Subclause 5.2)

(a) Flexible couplings

All uPVC pipes shall be jointed to each other by means of the "Z-lock" system. All steel pipes, specials and cast-iron fittings shall be jointed to each other or pipes as detailed by means of Viking Johnson couplings or cast-iron short collar joints.

(b) Flange Jointing

With reference to SABS 1123-1977, the specifications for flange drilling shall be Table 16.

PSL6.3 Thrust Blocks (Subclause 5.5)

All bends and tees shall be provided with 20 MPa concrete thrust blocks to prevent movement of the special concerned.
The block shall be cast so that the pipe and the fitting joints are accessible for repair.

Unless otherwise ordered, the minimum bearing area of the thrust block against the face of the trench measured in a vertical plane shall be as detailed on the drawings.

The thrust face of thrust blocks shall be cast against solid, undisturbed material in the trench walls.

PSL7 Standard Hydraulic Pipe Test (Subclause 7.3)

The Contractor shall do the required test in the presence of the Engineer. All test pressures shall be taken as 1500 kPA. The pipelines shall be tested before construction of the basecourse and before the attachment of the saddles.

Test pressures shall be maintained for a minimum of 3 hours with the pump operating and circulating the water in the container. The surface area of the container shall be sufficiently small to measure the maximum allowable leakage accurately.

No payment for pipe laying will be made prior to testing, disinfecting and acceptance of pipelines.

PSL8 Connection to Existing Mains

The Contractor shall liaise with the relevant Local Authority in this respect and give the required notice of the connection date in order that the Local Authority may attend if necessary.

PSL8.1 Measurement and payment

PSL8.1.1 Connection to existing mains Unit : No

The rate shall cover the cost of liaison with Local Authority, excavating to expose the existing main,

the removal of thrust block and/or end cap, breaking into existing main if necessary, dealing with water, completing the connection, backfilling, disposal of surplus material and making good to the satisfaction of the Engineer.

Fittings required for the connection will be measured and paid for elsewhere.

PSL9 STERILISATION OF MAINS

The Contractor shall properly disinfect the mains with an approved substance before they are put into service. All dirt shall be removed by flushing prior to disinfecting.

Water samples shall be submitted to the Engineer for bacteriological testing after the reticulation has been disinfected. The lines shall be properly flushed prior to connection into the existing system.

The Contractor shall be responsible for the provision and costs of all water used for flushing.

PSLB BEDDING (PIPES)

PSLB1 Bedding (Subclause 3.3)

PSLB1.1 General

uPVC and HDPE pipes are to be considered as flexible and bedding details suitable for flexible pipes shall be used throughout. (Class C).

Sand, as specified in PSDB4 shall be suitable for use as bedding material.

PSLC CABLE DUCTS

PSLC1 Scope (Clause 1)

Drawing numbered LC-1 is replaced by the standard details in so far as telecommunication ducts are concerned. The Contractor is referred to Standard Drawings and specific conditions relating to Telkom ducts included herewith.

PSLC2 Ducts (Subclause 3.1)

Telkom ducts shall be 110 mm dia green core flow pipes and will be supplied by the contractor. The Contractor shall liaise with Telkom regarding the delivery of pipes.

Electricity ducts shall be 110 mm and 160 mm diameter uPVC Class 4 pipes supplied by the Contractor.

PSLC3 Telephone Cable Ducts (Subclause 3.2.2)

Bedding for telephone ducts crossing roadways shall be stabilised using cement constituting 5% of the mixture by volume.

PSLC4 Trench Widths and Depths (Subclause 5.1.1.2)

Delete paragraph (a) and replace with :

a) 650 mm for telephone services.

Delete paragraphs (b) and (c) and replace with :

b) 800 mm for all electric cables,

Add the following :

Where this specified depth is such that the level of the duct conflicts with other service pipes, the Engineer will modify the duct depth so as to pass over or under the service pipe.

PSLC5 Road Crossings (Subclause 5.8)

Add the following to Subclause 5.8

Ducts together with draw wires shall be laid at right angles across road carriageways unless otherwise indicated on the drawings and shall extend 1,0 m beyond the edge of the road or sidewalk in the case of electrical ducts and as indicated on the drawings in the case of Telkom ducts, or as directed by the Engineer.

PSLC6 Duct Route Markers (Subclause 5.9)

Position to be Marked (Subclause 5.10)

The following to be read in conjunction with Subclauses 5.9 &5.10 :

Notwithstanding the method of marking specified in Subclause 5.9 and the positions to be marked specified in Subclause 5.10, the Contractor shall mark the position and type of all ducts on kerbs by cutting the following symbols 5 mm deep into the concrete surface with an angle grinder.

E for electricity ducts
T for Telkom ducts.

After the symbols have been cut a number of notches shall be cut next to the symbol indicating the number of ducts laid. The symbol and figure shall be painted with an approved red paint.

After the laying of road kerbs and channels the Contractor shall re-excavate the duct trench at the ends of the ducts before marking the position of the duct crossing. The subsequent backfilling of the duct ends shall not be carried out until the Engineer has inspected and approved the position of the markings. The tolerance on marking shall be such that when a line is strung over the centre of the markings the centre of the duct or duct group shall be within 150 mm either side of the line.

PSLC7 Cable Markers (Subclause 8.2.8)

Add the following to the last paragraph of Subclause 8.2.8 :

The tendered rate shall also include for all costs involved in sealing and marking duct ends and the re-excavation and backfilling for marking purposes.

PSLC8 Cement Treated Bedding

The unit of measurement shall be the Cubic metre.

The tendered rate shall cover the provision of 1200 LB 8.2.1 and shall include for the supply and mixing of the cement as specified in PSLC 3.

PSLD SEWERS

PSLD1.1 uPVC Pipe (Subclause3.1.5)
uPVC structured-wall sewers, Class 34 to shall be acceptable for 160 mm dia mains.
Heavy duty uPVC solid wall sewers, Class 34 to SABS 791 shall be used for 110mm dia house connections.

PSLD9 Manholes, Chambers, etc (Subclause 3.5)

PSLD9.1 Precast manholes (subclause 3.5.2 and 3)

Precast concrete manholes shall be acceptable provided that dolomitic aggregate be used and joints between rings be watertight. Chimneys in manholes will not be allowed. Precast bases (six way bases) will not be allowed unless the contractor liase with the Local Authority for acceptance of use.

PSLD9.2 Step irons (subclause 3.5.7)

Step irons shall be manufactured from a polymeric polypropylene with a 12mm dia high tensile strength core.

PSLD9.3 Manhole covers and frames (subclause 3.5.8)

Notwithstanding the requirements of Subclause 3.5.8 all covers shall be Type 2A with circular frame bases in accordance with SABS 558 and shall be embossed with the relevant wording.

PSLD10 Tests (Subclause 7.2)

All acceptance tests shall be carried out in the presence of the Engineer in accordance with the air test. All manholes will be tested separately for water tightness.

PSLD11 Measurement and Payment (Subclause 8.2.3)

PSLD11.1 Manholes

Depth of manholes shall be defined as the distance from the top of the cast iron cover to the lowest pipe invert level of the manhole.

PSLD12 Connection to Existing Sewer (Subclause 8.2.11)

The Contractor shall connect to existing manholes and pipelines at the positions indicated on the drawings.

PSLD12.1 Measurement and payment

PSLD12.1.1 Connection to existing sewers Unit : No

The rate for this item will include for excavation, backfilling, breaking into the manhole, dealing with the existing flow, connecting and modifying the benching, ensuring no foreign matter enters the existing sewer and making good to the Engineer's satisfaction.

PSLD13 Anchor Blocks to sewers (Subclause 8.2.7) Unit : m3

The rate for this item will include for excavation, disposal of surplus, encasing and form work for sewers on a slope steeper than 1 :10.

PSLE STORMWATER DRAINAGE

PSLE1 Concrete Pipes (Subclause 3.1)

Pipes for stormwater drainage shall be reinforced concrete Type SC Class 100D as scheduled, with ogee joints Interlocking joints shall be wrapped with a 500 mm wide geofabric Bidim A2 or approved equivalent strip overlapping at least 300 mm.

PSLE2 PREFABRICATED CHAMBERS AND SHAFTS (SUBCLAUSE 3.4.2)

Brick manholes may be used for depths up to 2.0 m as an alternative to precast concrete manholes.

The maximum length of the shaft shall be 600 mm.

PSLE3 MANHOLE COVERS, GRID INLETS ETC (SUBCLAUSE 3.4.3)

Notwithstanding the requirements of Subclause 3.4.3 and the Specification drawings bound in the document, covers and frames shall be Type 2B in roads and Type 4 in other areas in accordance with SABS 558, unless otherwise specified. Catchpits will have Type 9D covers and frames.

PSLE4 MEASUREMENTS AND PAYMENT (SUBCLAUSE 8.2)

PSLE4.1 Supply and Install Manholes (Subclause 8.2.8)

For measurement and payment purposes the depth of a manhole is defined as the depth from the top of the cover to the pipe invert level to the manhole.

PSMJ SEGMENTED PAVING (SABS 1200 MJ)

PSMJ3 MEASUREMENT AND PAYMENT

PSMJ3.1 Construction of Paving Complete Unit:m2

Notwithstanding the provisions of SABS 1200 MJ subclause 8.2.2 the rate shall also cover the cutting of units to fit edge restraints and rolling to lock-up condition.

PSMK KERBING AND CHANNELLING

PSMK1 Bedding Material (Subclause 3.9)

All bedding and backing for kerbs shall be 15 MPa/19 mm concrete.

PSMK2 Precast Concrete Kerbing and Channelling (Subclause 5.2)

Provision shall be made for expansion joints of width 10 mm at intervals not exceeding 20 m.

Joints shall be filled with suitable silicone or polysulphide sealant.

Add to Subclause 5.2 the following:

Notwithstanding the fact that vertical curves have not been specified where changes of grade of up to 2% occur, the kerbs and channels shall be laid to levels based on a minimum vertical curve length of 20 m.

No change in grade shall be applied on kerbs in bellmouths unless specific levels are indicated.

PSMM ANCILLARY ROADWORKS

PSMM1 General (Subclause 3.2.1)

Road traffic signs shall be purchased from an approved manufacturer and shall be fabricated in accordance with the South African Road Traffic Signs Manual and as specified below.

PSMM2 Reflective Material (Subclause 3.2.9)

Add to clause 3.2.9 the following:

Non reflective material shall conform to the respective quality requirements, apart from the reflective quality requirements, of CKS 191.

PSMM3 Supports (Subclause 5.2.1.1)

Posts shall be fabricated 75 mm outside dia 3 mm steel tubing to SABS 657.

The posts shall be straight with a smooth finished surface free rust, scale, grease or foreign matter.

Posts shall be suitably drilled to permit the sign plates or frames being firmly fixed to the posts by at least two (2) M12 galvanised steel bolts, complete with fibre washers.

The open ends of all posts shall be closed either by the use of standard fittings or by welding on a mild steel plate.

After the posts have drilled, all welding completed, and all sharp edges rounded off and smoothed down they shall be zinc coated using the 'hot-dip' process in accordance with SABS Specifications 763 'Hot-dip' (Galvanised) Zinc coating".

Should any modifications be made to posts after galvanising, the posts shall be completely regalvanised as described above.

PSMM4 Backing Plates and Boards (Subclause 5.2.1.2)

All Regulatory and Danger Warning sign plates and Information signs having a width of 1,5 metres or less shall be NS 4-H6 or SIC-H4 aluminium alloy plates with a thickness of not less than 2 mm and shall conform to BS 1470. The plates shall be stiffened by means of aluminium reinforcement to BS 1476 HE19WP, rivetted to the back of the sign by means of 5 mm diameter aluminium rivets spaced at 200 mm or less from one another.

PSMM5 Installation of Road Signs (Subclause 5.2.4)

Steelwork which is to be cast or grouted into concrete shall be cleaned of loose rust, scale, oil or any other material which may in the opinion of the Engineer impair the bond between the concrete and the steel.

The posts for road traffic signs shall be placed in holes of not less than nought comma nine metres (0,9 m) in depth and shall be embedded in well compacted Class 10 concrete to the full depth of the hole and a minimum of 400 mm x 400 mm.

The top level of concrete shall be seventy-five millimetres (75 mm) below ground level. Traffic signs shall be securely and firmly fixed to the posts by means of M12 bolts.

Road traffic signs erected in place shall be true to the required dimensions, free from buckles or dents, shall be vertical in the required position and shall have a neat workmanlike appearance.

STANDARD SPECIFICATIONS FOR BUILDING WORK

BUILDING CONSTRUCTION SPECIFICATIONS

Except as hereinafter provided for, the Building Construction specifications to be used on this Contract shall comprise the following:

SECTION EC RESTRICTED EARTHWORKS SECTION ZB CONCRETOR
SECTION ZC BRICKLAYER / BLOCKLAYER SECTION ZD PLASTERER, PAVIOR AND TILER SECTION ZE CARPENTER ANDJOINER
SECTION ZEA PREFABRICATED TIMBER ROOFTRUSSES
SECTION ZG ROOF AND WALL CLADDING AND RAINWATER ITEMS SECTION ZH PLUMBER AND DRAINLAYER
SECTION ZI GLAZIER
SECTION ZJ PAINTER
SECTION ZK ASPHALTER AND WATERPROOFER SECTION ZL IRONMONGER AND METALWORKER
SECTIONZ LA ALUMINIUM WINDOWS, DOORS AND SHOP FRONTS SECTION ZN KITCHEN CUPBOARD UNITS AND SINK/CUPBOARD UNITS SECTION ZS TERMITEPROOFING
SECTION ZX DOOR SIGNS AND NUMBERPLATES
SECTION LA MINOR FABRICATED STEEL AND OTHER METALWORK

SECTION EC: RESTRICTED EARTHWORKS

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SECTION EC: RESTRICTED EARTHWORKS

EC1. SCOPE

This section covers generally the excavation and backfilling for pipework, drains, ducts and associated minor structures such as manholes and inlet and outlet structures to culverts.

Included also in this section are restricted excavation for paths or open channels for access or drainage purposes, and the construction of narrow fills of small cross section, all of which normally require the use of either plant of small capacity, such as trench excavators and hand guided compaction equipment.

Insofar as they are included in this Document, Standard Specification Section EE shall cover, respectively, earthworks in bulk, and for major structures.

EC2. MATERIALS

EC2.1 TOPSOIL

Topsoil is the upper layer of the existing soil (prior to the commencement of earthworks) that contains organic material and other substances suitable for supporting plant growth.

EC2.2 HARD

Hard is any material which, in the opinion the Engineer, can be removed only by systematic drilling and blasting, and incidental boulders or detached fragments of solid rock of over 0,2 cubic metres in volume.

If the Contractor considered that any material should be classified as hard, he shall request the Engineer to examine the material before continuing with the excavation, and shall at his own expense provide such assistance, in terms of plant or labour, as the Engineer may require for his examination of the material. Material shall only be classified as hard when the Engineer has given his agreement in writing, and after a full record of the amount of hard material has been agreed upon. No consideration will be given to the re-classification of any material as hard subsequent to its excavation.

EC2.3 SOFT

All other material not classified as hard shall be classified as soft.

The Contractor shall be at liberty to use any means at his disposal, including drilling and blasting, for dislodging material which has not been agreed as hard, but he will only be paid at the rates tendered for soft material.

EC2.4 SELECTEDBACKFILL

Unless selected backfill is defined elsewhere in the document, it shall consist of a granular, non-cohesive material that passes a 37,5mm sieve and that is free of organic and other deleterious materials.

EC2.5 SELECTEDFILL

Unless otherwise detailed in the Project Specification or on the drawings, selected fill is the top 150mm thick layer of bulk fill that shall have a maximum P.1. of 12, a minimum G.M. of 0,75, and a minimum strength equal to a C. B.R. of 10 at the required compacted density.

EC3. EQUIPMENT

The Contractor shall maintain on the site in good working order adequate equipment for carrying out the required work in a safe and efficient manner in accordance with these Specifications and the conditions of his Contract.

EC4. CONSTRUCTION

EC4.1 GENERAL

The Contractor shall be fully responsible for the execution of the work in accordance with all requirements of the Central and Local Authorities. He shall be fully responsible for the provision, erection, and maintenance of all temporary signs required by and to the satisfaction of the authorities and the Engineer.

The work shall be carried out in a manner which, in the opinion of the Engineer, will cause a minimum of inconvenience to others.

Where the Works are crossed by rights of way, or by any other permanent accesses, the Contractor shall provide and maintain temporary accesses by means of safe and protected paths, roads, bridges, or any other requirements all to the satisfaction of the Engineer.

EC4.2 CLEARING OFSITE

Before commencement of any earthworks, the Contractor shall remove all debris and coarse vegetation over such widths that are adequate to ensure that undesirable material cannot contaminate material that is to be used subsequently, and to allow for access alongside the excavations.

The widths to be cleared shall be to the Engineer's approval. Material cleared shall be burned, carted away, buried or otherwise disposed of to the approval of the Engineer.

EC4.3 REMOVAL OFTOPSOIL

Where required the Contractor shall remove the topsoil over the areas indicated and to the required depths in order to prepare for excavation, filling, or other construction, or to obtain suitable material for supporting vegetation on fill or cut surfaces.

Any material that is suitable and required for use as topsoil shall be kept separate and used as directed immediately in its final position or stockpiled. The remainder of the material removed shall be spread to waster or otherwise disposed of as directed by the Engineer.

EC4.4 USE OF EXPLOSIVES

The Contractor shall be responsible for the acquisition, transport, custody and use of explosives on the Contract and shall comply with the requirements of the Explosives Act of

1956 and Regulations and all amendments thereto and to the requirements of the South African Police.

Copies of all returns, reports and applications to, and licences, permits and authorities issued by such Statutory Bodies shall be furnished to the Engineer by the Contractor. Nothing contained in this Contract nor any approval or instruction by the Engineer shall relieve the Contractor of any of his obligations and responsibilities under any Statutory Acts or Regulations existing or introduced during the period of contract.

The Contractor shall be responsible for the sitting, erection, fencing, and maintenance and licensing of explosives and detonator magazines, required for the satisfactory performance of the Contract. Proposals for the sitting shall in the first instance be submitted to and receive the approval of the Engineer prior to any approach being made to the authorities concerned.

The Contractor shall be responsible for the guarding of magazines in terms of any regulations which may be in force or come into force during the period of contract and shall comply with any instructions given from time to time by any Statutory or Local Authority in this connection.

The Contractor shall accept all risks and liability resulting from any blasting operations which he may conduct on the site. All blasting shall be carried out by a fully qualified surface blaster who shall observe all of the relevant requirements of the current Explosives Act.

If, in the opinion of the Engineer, blasting would be a danger to the public, property or services, or is being carried out in a reckless manner, or justified complaints are received concerning blasting operations, the Engineer may order all blasting operations to cease. The Contractor shall have no claim by reason of such order.

All costs incurred in the acquisition storage, transport and use of explosives shall be deemed to be covered by the rates inserted against the relevant items in the Schedule of Quantities.

EC4.5 EXCAVATION

Excavation shall in general be carried out by the Contractor to suit the programme approved by the Engineer, and in the most efficient manner to ensure the expeditious completion of the Works.

Excavation for pipe trenches shall be undertaken progressively along the route of the pipeline and the haphazard opening of trenches along various sections of the Works will not be permitted.

Where trenches cross roads, however, excavations, pipe laying, and backfilling shall be carried out before the final shaping and compaction of the base course and preferably the sub- base, or such other road layer as may be specified in the Project Specifications or required by the Engineer, even if the pipes in these sections have to be laid ahead of the rest of the work.

The Contractor shall keep the length of open trenches to the minimum practicable. No trench excavation shall be allowed to remain open for more than fourteen days before backfilling is completed. The Contractor may, however, be allowed to undertake advance excavation of hard material.

Excavations shall be done accurately to line and level. Those that are to remain permanently open, and those for drains that are designed to be laid in trench conditions, as specified elsewhere, shall be carried out with the tolerances specified in Clause EC 5. In addition, the bottoms of excavations that are to remain permanently open shall be trimmed to ensure that water can drain freely and without ponding. The bottoms of trenches for drains and ducts shall be trimmed as specified elsewhere in this document.

Unless otherwise specified elsewhere in this document or on the drawings, pipe trench dimensions for payment purposes shall be the following:
Depth : 100mm lower than the required invert level of the pipe.
Widths : For pipes with an outside diameter of up to 300mm :600.

For pipes with outside diameters exceeding 300mm and up to 1000mm: 1,9 x outside diameter.

For pipes with outside diameters exceeding 1000mm: outside diameter + 900mm.

Pipe trenches may be enlarged locally at the joints to provide adequate clearance for jointing. No additional payment will be made for the extra excavation required at the joints and the cost will be considered to be included in the schedule of rates for excavation.

Should the Contractor carry any excavation deeper than specified, he shall at his own cost refill the excess excavation with concrete or suitable compacted material as directed by the Engineer.

In areas where a high incidence of solid rock is encountered, trench widths for pipes may, with the permission of the Engineer, be reduced, in which case the reduced width will[be used in the calculation of excavation quantities.

EC4.6 EXCAVATION FOR WORKING SPACE

Unless specifically ordered, all excavations for structure, manholes, valve boxes and chambers, etc., shall be measured to the net external dimensions. Should working space be required such as where external formwork is necessary, due to the nature of the excavated material, the Engineer may approve additional excavation for working space.

EC4.7 DEWATERING

Suitable arrangements shall be made for the dewatering and keeping dry of all excavations to the satisfaction of the Engineer and until construction is completed. The Contractor shall be responsible for preventing the ingress of storm water flow into the excavation and for the construction of all necessary drainage channels and sumps, for the supply and running of pumps, and for everything necessary for the exclusion of water from the excavations, whether such water arises from storm water or seepage.

Where the bottoms of excavations are softened through the Contractor's failure to comply with the above, the soft material shall be removed and replaced with Class 10/38 concrete or suitable compacted material to the satisfaction of the Engineer, all at the Contractor's expense.

The Contractor shall take full responsibility for the disposal of water from the excavations.

EC4.8 TIMBERING ANDSHORING

The Contractor shall provide all the necessary timbering, strutting and shoring required in order to ensure the safety of the excavations, and shall secure any structures or roads adjacent to the Works. Such precautionary work shall be to the approval of the Engineer. Approval by the Engineer of any such precautionary work shall not indemnify the Contractor against any claims or in any way relieve the Contractor of his responsibility under the Contract with regard to the safety of excavations or adjoining structures.

Timbering and shoring shall be arranged in such a way that obstruction of the work to be carried out will be kept to a minimum.

EC4.9 SELECTION AND DISPOSAL OF MATERIALS FROMEXCAVATIONS

It is essential that all materials obtained from excavations shall be used to the best advantage in the construction of the Works, and the onus shall be on the Contractor to ensure that no material is used incorrectly.

The Contractor shall keep apart excavated materials of different quality that are suitable as backfill at various levels.

Any material that is unsuitable for backfill or is surplus after backfilling has been completed shall be spread to waste within a radius of 20m or loaded and carted to spoil as ordered by the Engineer.

The onus shall be on the Contractor to ensure that no material is wasted or used incorrectly and he shall be expected to replace at his own expense any material that has been misplaced by him.

EC4.10 EXCAVATIONS TO BEPASSED

In no case shall concrete, backfilling or pipe laying be carried out in an excavation before the consent of the Engineer has been obtained.

The Contractor shall advise the Engineer whenever any excavations are ready for inspection, and when it is necessary to cover up the work. In default of such notice, the Engineer shall have the right to instruct that the foundations be uncovered by the Contractor and re-instated without extra charge.

EC4.11 OVERBREAK

In cases where concrete has to be cast against excavated faces in hard material, the over- excavation shall be classified as over-break. Overbreak shall be backfilled with concrete a shown on the drawing or as instructed by the Engineer.

EC4.12 BACKFILLING

No backfilling shall commence before the Works to be covered have been inspected and approved by the Engineer.

All backfilling shall be done in layers not exceeding 150mm and shall be carried out simultaneously and equally on both sides of the pipe or structure to avoid unequal lateral forces.

Materials for backfilling at any level (other than "Selected Backfill" or "Granular Bedding Material") shall be of the same quality and be compacted to the same density as the material at the same level adjacent to the backfill, with a required minimum density of 90% modified AASHTO. Backfill material shall not contain any hard lumps of material exceeding 100mm in greatest dimension, nor shall it contain roots or other objects that may have a deleterious effect on the standard of the backfill.

Should there be insufficient suitable backfill material available from the excavation; the Contractor shall import a suitable material as instructed by the Engineer.

Generally, backfill shall be mounded to a height of 80mm above general ground level to allow for settlement and to prevent scouring.

EC4.13 FILL

Before place any material in a particular fill, all preparatory work such as site clearing, removal of topsoil, where ordered by the Engineer, shall be completed.

Fills shall be constructed in layers approximately parallel to the finished levels and compacted in layers not exceeding 150mm in thickness to the densities specified and shall be finished to conform with the final levels as shown on the drawings or as directed by the Engineer.

Should the Contractor, for any reason, place fill outside the lines specified, he shall at his own expense carry out any cutting, removal, trimming or other operations necessary to restore the finished earthworks to the specified lines and levels. No additional payment will be made for over-filling or for carrying out any remedial measures.

In wet weather conditions the construction operations shall be suspended temporarily if the conditions are such that proper placing and compaction of materials cannot be achieved.

EC4.14 MOISTURECONTROL

Material shall be compacted at the optimum moisture content for Modified AASHTO. Maximum Dry Density with an allowable tolerance of plus one percent or minus two percent of moisture by mass of dry material. Should the material be too wet, due to rain or any other cause, it shall be allowed to dry out to a moisture content conforming to the above requirement before compaction proceeds.

EC5. TOLERANCES

Where measured trench widths are specified for pipes and drains the depth up to a point 500mm above the drain, may not exceed the width specified by more than 100mm, as increasing the trench width would cause overloading of the pipe or drain.

Levels shall not vary by more than 25 mm from those specified, nor may the actual grade vary from that specified by more than 10% of the specified grade.

The finished outlines of permanent cuts or fills shall nowhere vary by more than 50mm from the lines shown on the drawings.

The compacted thickness of any layer shall nowhere exceed the specified thickness by more than 10%.

EC6. TESTING

EC6.1 GENERAL

The Contractor shall be fully responsible for the quality of all work produced, both in respect of materials used and of workmanship, and shall carry out sufficient control tests as the Engineer considers are necessary to ensure that all work is carried out in accordance with the Specifications.

The Contractor shall provide adequate staff, equipment and facilities for carrying out such tests. Should the Engineer at any time consider that the staff, equipment, or facilities are

Inadequate, he may instruct the Contractor to cease further work until such time as any deficiency has been remedied.

All results shall be reported to the Engineer on approved forms within one working day after the minimum period of time required to carry out the relevant tests. Any further work or covering up of work before tests have been carried out, or before their results are available, may only be done with the Engineer's approval and at the Contractor's risk, but all remedial work shall be carried out at the Contractor's expense and to the Engineer's satisfaction.

No separate payment will be made to the Contractor for any test required of him, and all costs shall be deemed to be included in the tendered rates.

Should the Contractor fail to carry out any of the tests required of him, the Engineer may arrange for such tests to be carried out at the Contractor's expense. All costs of such tests shall be deducted from any payment moneys due to the Contractor.

The Engineer will carry out such additional check testing as he considers necessary, but this fact will in no way relieve the Contractor of his obligations as specified herein.

EC6.2 SOILTESTS

All testing shall be carried out in accordance with the methods specified in the latest revision of the "Standard Methods of Testing Materials", and annexure thereto, as issued by the Department of Transport.

If so specified in the Project Specification, the Contractor shall equip himself to carry out the following tests.
Indicators, consisting of sieve analysis and determination of Atterberg constants.
Modified AASHTO moisture-density tests.
Determination of in-place densities and moisture contents.

EC6.3 TESTFREQUENCIES

The Contractor shall be required to carry out in-place density tests at frequencies ordered by the Engineer.

EC7. MEASUREMENT ANDPAYMENT

EC7.1 GENERAL

Before commencement of construction of any new portion of the Works, the Contractor shall ascertain, together with the Engineer whether sufficient information is available from the drawings or from existing surveys to enable full measurement to be made of that portion of the Works, and shall indicate in writing whether such information is acceptable to him.

Should the available information be insufficient or unacceptable to either the Engineer or the Contractor, further surveys shall be carried out by the Engineer and the Contractor together, to allow for full agreement of all the necessary information to be made in writing before the start of construction. Any assistance required to be provided by the Contractor shall be at his own expense.

Excavation in excess of the specified dimensions or authorized by the Engineer shall not be measured for payment.

EC7.2 EXCAVATION

Depending on the description in the Schedule of Quantities the unit of measurement for excavation shall be the cubic meter (m3) to the dimensions as specified or lineal meter(m) for different pipe sizes.
Where depth ranges are schedules, each rate shall apply to the full measured depth of trench lying within the relevant depth range. Payment shall distinguish between trench excavation and excavation for minor structures such as manholes, catch pits, etc. Excavation for "hard" material shall be paid extra over that for soft and shall apply irrespective of depth.

The tendered prices shall include for all excavation, for trimming the bottom of the excavation, for disposal of excess or unsuitable material within a radius of 20m from its original position for keeping excavations safe and for

any other operations necessary to complete the Works as specified.

The tendered prices for excavation shall also include for site clearances, where this is not measured under a separate payment item.

EC7.3 LOAD EXCAVATED MATERIAL AND CART TOSPOIL

Surplus or unsuitable material from excavation which the Engineer orders to be loaded and carted to spoil shall be measured per cubic metre (m3). Wherever possible the quantities shall be measured from cross sections taken in place before loading, but if acceptable to the Engineer, the quantities may be calculated from a load count of the haul units, with 70% of the measured volume of the haul units being accepted as the equivalent volume in cut before loading.

The tendered price shall include for loading, hauling within a free-haul distance of one kilometre, dumping, spreading, shaping and trimming of the spoil dumps all to the satisfaction of the Engineer.

EC7.4 OVERBREAK

The unit of measurement shall be the square meter (m2), the quantity being based on the net surface area of the structure in direct contact with the surfaces of hard material.

Payment shall include for all trimming, cleaning and backfilling, distinction being made between the various classes of concrete required.

EC7.5 BACKFILL

The unit of measurement shall be the cubic meter (m3') of backfill material in place after compaction, the quantity being calculated from the dimensions of backfill as shown on the drawings, or as ordered by the Engineer.

Payment shall distinguish between backfill and selected backfill, furthermore distinction shall be made between backfill material obtained from the excavation and backfill material imported on Instruction from the Engineer. The free-haul distance on imported backfill material shall be one kilometre. Payment shall include for all placing, watering and compaction to the specified density.

EC7.6 FILL

The unit of measurement shall be the cubic meter (m3) of material in place after compaction, the quantity being calculated from the dimensions of fill as shown on the drawings or ordered by the Engineer.

Payment for fill shall include for all costs of procuring and furnishing within a free-haul distance of one kilometre, placing, watering, compacting, shaping and trimming the material to the specified cross sections. Payment shall distinguish between fill and selected fill.

EC7.7 OVERHAUL

Overhaul shall be measured per cubic metre-kilometre (m3-km), and shall be computed as the product of the measured volume of material hauled further than the free-haul distance and the additional distance (to the nearest 0,1 km over the free-haul distance) hauled, all with the Engineer's agreement. The haul distance shall be the distance from the centre of volume of

the material in place before excavation to the centre of volume of the material in place after disposal in accordance with the Specifications, the Drawings, or the Engineer's Instructions, and measured along the shortest practicable haul route, as determined by the Engineer. The volume of material measured for overhaul shall be taken from the applicable volume measurements for spoil, backfill or fill as specified in Clauses EC 7.3, EC 7.5 and EC7.6.

The prices tendered for overhaul shall include for all costs involved through the haulage of materials over and above the free-haul distance.

SECTION ZB: CONCRETE

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SECTIONZB: CONCRETOR

ZB1. SCOPE

This section of the Specification covers all aspects of concrete work including various grades of mass and reinforced concrete, pre-cast concrete, formwork and steel reinforcing, as well as the supply of all materials and labour.

ZB2. MATERIALS

ZB2.1 STANDARDS

All materials used in the Works shall comply in all respects with the following standard specifications, the latest issues of which shall be held to apply:
SABS 82 & BS4466 : Bending dimensions of bars for concrete reinforcement
SABS471 : Portland Cement and rapid-hardening cement
SABS626 : Portland blast furnace cement
SABS831 : Portland cement PC15FA
SABS878 : Ready-mixed concrete
SABS920 : Steel bars for concrete reinforcement
SABS973 : Standard form of specification for concrete work
SABS1083 : Aggregates from natural sources
BS915 : High Alimina cement
CKS158 : Welded wire mesh for concrete reinforcement
National Building Regulations

ZB2.2 CEMENT

All cement used in the Works shall be of the type specified and approved by the Engineer. Where any particular type is not specified it shall be taken to be ordinary Portland cement or PC15FA. All cements shall comply with the relevant standards above.

ZB2.3 WATER

Water shall be clean and free from injurious amounts of acids, alkalis, sugar and other organic substances. Water suitable for drinking purposes shall be acceptable. If so required by the Engineer, the suitability of water shall be proved by tests carried out by an approved laboratory.

ZB2.4 AGGREGATES

Both the coarse aggregate (stone) and fine aggregate (sand) shall comply with the requirements of SABS 1083. Aggregates shall be obtained from approved sources which shall not be changed without the written consent of the Engineer.

When tested in accordance with the above Specification, the following requirements shall also apply:
Soundness
Fine aggregate : maximum loss5%
Coarse aggregate : maximum loss15%
Shrinkage
0,05% maximum

ZB2.5 ADDITIVESORADMIXTURES

The Contractor will be permitted to use such additives or admixtures as may be necessary to achieve the required consistency of the concrete subject to the prior approval of the Engineer.

ZB2.6 REINFORCEMENT

All steel reinforcement shall, at the time of placing of the concrete, be free from loose rust, scale, oil and other coatings which might reduce the bond between the steel and the concrete or initiate corrosion of the reinforcement.

ZB2.7 STORAGE OFMATERIALS

ZB2.7.1 Cement

Cement which is stored on site shall be kept under cover that provides adequate protection against moisture and other factors which may promote deterioration.

When the cement is supplied in 50kg sacks, the sacks shall be closely and neatly stacked to a height not exceeding 12 sacks and arranged so that they can be used in the order in which they were delivered to the site. The sack shall not be stacked directly on concrete floors.

Storage of cement in bulk in silos or similar containers shall be permitted provided that the cement drawn for use is measured by mass and not by volume.

Cement shall not be kept in storage for longer than 6 weeks without the Engineer's permission.

Different types of cement shall be stored separately.

ZB2.7.2 Aggregates

Aggregates of different nominal sizes shall be stored separately and in such a way that segregation is avoided.

Intermixing of different materials and contamination by foreign matter shall be avoided.

ZB2.7.3 Steel Reinforcement

Steel reinforcement shall be stacked off the ground and, in aggressive environments, protection shall be provided in the form of sheds or tarpaulins.

ZB2.7.4 Storage Capacity

The storage capacity and the amount of material stored (whether cement, aggregates steel or water) shall be sufficient to ensure that no interruptions to the progress of the Works are occasioned by lack of materials.

ZB2.7.5 Deteriorated Material

Material that has deteriorated, or that has been contaminated or otherwise damaged, shall not be used in concrete. Such material shall be removed from the site without delay.

ZB3. EQUIPMENT

The Contractor shall provide and maintain in good working order, adequate equipment for carrying out the required work in accordance with this specification in a safe and efficient manner.

ZB3.1 BATCHINGPLANT

Batching or dry constituents of a concrete mix shall be done by mass using suitable batching equipment capable of determining the required mass within an accuracy of 3%. Mixing water may be measured either by mass or by using a flow meter with an accuracy of 3% or better.

ZB3.2 MIXERS

The concrete mixer(s) shall be of adequate capacity to cope with the maximum sizes of casts required. Unless otherwise approved, mixing shall be carried out in a mechanical batch-mixer of approved type and capable of producing a uniform distribution of ingredients throughout the batch. A standby mixer shall be available for immediate use or the mixing plant shall consist of at least two mixing units.

The Engineer shall have the right to stop the use of any mixer, the blades or paddles of which have, in his opinion, been worn, bent or otherwise rendered ineffective by any build-up of hardened concrete until such time as they have been replaced, repaired or properly cleaned.

ZB3.3 HANDLINGEQUIPMENT

The equipment supplied shall be capable of handling the quantities of concrete involved without undue delay. Mixed concrete shall be discharged from the mixer and transported to its final position in such a manner that segregation, loss of ingredients and adulteration are prevented and that the mix is of the required workability at the point and time of placing.

Standby hoists or cranes shall be provided where applicable.

ZB3.4 VIBRATORS

The Contractor shall supply an adequate number of suitable vibrators, including provision for standby units, to ensure that all concrete is adequately vibrated and that the placing of concrete is not delayed due to a short supply of vibrators.

The Engineer shall have the right to refuse permission for the casting of concrete if, in his opinion, vibrators of suitable quality or numbers are not available on site.

ZB4. CONSTRUCTION

ZB4.1 RECORDS

The Contractor shall maintain written records that provide the following information:
Date on which each section concreted, time was taken to place and the position of the section in the Works.
Daily maximum and minimum temperatures and general weather conditions.
Nature of samples and dates on which they were taken, including identifying marks.
Results of tests on samples taken.

ZB4.2 REINFORCEMENT

ZB4.2.1 Bending

Reinforcing bars shall be bent to the dimensions shown on the working drawings and in accordance with SABS 82. No hand straightening of reinforcing will be permitted. Bars requiring straightening shall only be straightened by a machine made for that particular purpose. The straightened bars shall have not kinks or waves.

The bending and re-straightening of bars partially built in will not be permitted. Except as allowed for below, all bars shall be bent cold and bending shall be done slowly, a steady, even pressure being used without jerk or impact.

If approved, hot bending of bars of diameter at least 32mm shall be permitted, provided that the bars do not depend for their strength on cold working. When hot bending is approved, the bars shall be heated slowly to a cherry red heat (not above 843°C) and after bending shall be allowed to cool slowly in air. Quenching with water shall not be permitted.

ZB4.2.2 Fixing

Reinforcement shall be secured against displacement by tying at intersections with 1, 6 or 1,25 mm diameter annealed wire or by the use of suitable clips, or if permitted by the Engineer, by welding. It shall be supported in its correct position by handlers or saddles, and aligned by chairs and spacers of approved design and material. Where such hangers, saddles, chairs or spacers are of steel they will be detailed on the drawings or in bending schedules.

ZB4.2.3 Cover

The minimum cover of concrete over reinforcement shall be as shown on the working drawings. Where this is not indicated, the minimum thickness of the cover, measured from the outside of a bar of diameter 'd' mm shall be not less than the appropriate value, or greater of the appropriate values, as relevant, provided column 2 of Table 4-1.

TABLE 4-1: COVER TO REINFORCEMENT		
No.	TYPE OF CONSTRUCTION	Minimum cover (mm)
1.	General Over all bars including ties, stirrups and all secondary reinforcement	15 or d
2.	Ribbed floors and roofs	15 or d
No.	TYPE OF CONSTRUCTION Ribs and slabs	Minimum cover (mm) 15 or d
3.	Slabs and walls: (a) Normal Exposed to water pressure Slabs laid on ground; external walls	 15 or d 25 25
4.	Main bars in:	
	Columns Beams: end cover beyond hooks Beams: at other surfaces Members not elsewhere specified	40 or d 25 or 2d 25 or d 25 or 2d
5.	Surfaces in contact with backfilling: (a) Bars of dia. up to and including 16mm	 40

	(b) Bars of dia. over 16mm	50
6.	Surfaces of footing or other members cast in contact with the ground or on a blinding layer	75

ZB4.2.4 Splicing

Splicing or joining of reinforcing bars shall be made only as and where shown on the working drawings or as otherwise approved.

The length of the overlap in a splice shall be not less than that shown on the working drawings.

ZB4.2.5 Protection of Exposed Bars

If left exposed for future bonding of extensions to the Works, reinforcement shall be protected from corrosion as specified by the Engineer.

ZB4.3 SHUTTERING

ZB4.3.1 Design

Shuttering shall be so designed and constructed that the concrete can be properly placed and compacted and that the required shapes, levels, and dimensions shown on the working drawings are maintained.

The shuttering and joints shall be capable of resisting the dead load, pressure of the wet concrete, wind forces, and all other superimposed loads and forces.

Wedges and clamps shall be used in preference to nails. Special care shall be taken if the concrete is to be compacted by vibration.

Joints in forms shall be tight enough to prevent leakage of cement paste.

The Contractor is required to make his own camber allowances for any deflection of formwork which is likely to arise during construction.

ZB4.3.2 Finish

The quality of the finished surface of the concrete shall be as shown on the working drawings or as otherwise specified, and the type of shuttering used shall be adequate to provide such finishes. Concrete faces shall be sound and solid, free from honeycombing and excrescence.

The finished surfaces of concrete shall, be rough or smooth as called for on the drawings and as described below.
RoughFinish
Rough finishes will normally be called for where they will not be left permanently exposed; the surface texture is unimportant provided that the concrete is sound.
Smooth Finish
Smooth finishes will be called for on exposed concrete faces where a good standard of surface finish is required. The faces shall have a smooth texture such as is left by the use of planed timber, with all board and panel marks lined up in a regular manner.
Open Concrete Surfaces
Horizontal or near horizontal, upward facing concrete surfaces which are not to be measured as formed faces will be described as open surfaces and shall be finished as follows:
- On completion of placing and compaction of concrete, the surface shall be struck off with a template and tamped with a screed board to give a dense concrete skin true to the required lines and levels. Such finishing shall not be considered to be a special finish and the work involved shall be deemed to be included as part of the placing operation.

Special surface treatment, where required, shall be carried out as follows:
"Wood float finish" : Floating shall be done only after the concrete has hardened
Sufficiently and may be done by hand or machine. Care shall be taken that the concrete is worked no more than is necessary to produce a uniform sand paper surface free from screed marks.
"Steel float finish" : Trowelling shall not commence until the moisture film has disappeared and the concrete has hardened sufficiently to prevent excess laitance from being worked to the surface. The surfaces shall be travelled under firm pressure to a glossy texture and left free from trowel marks.

ZB4.3.3 Foundation Paper

Where the Engineer approves of the casting of the foundation against the sides of an excavation in material other than sound rock, he will require the Contractor to fix foundation paper against the sides of the excavation to provide a clean impervious surface against which to cast the concrete. Such foundation paper shall be two-ply brown paper reinforced with a bituminised cotton mesh between the layers of paper. It shall be of sufficient durability to withstand the force of the concrete during placing without tearing.

ZB4.3.4 Drip Moulds and Sharp Edges

Where required, drip moulds shall be provided. Drip moulds shall be formed from 20 mm quadrant or 12 mm half-rounds unless otherwise indicated on the drawings.
All sharp edges inside the forms shall be provided with 25 mm x 25 mm triangular fillets, unless otherwise shown on the drawings or directed by the Engineer.

ZB4.3.5 Ties

Any metal ties and securing devices used to hold the formwork must be a type which can be later withdrawn, and the holes left must be completely filled with mortar; any metal parts left in the concrete must not be closer than 50 mm from any finished face.

ZB4.3.6 Preparation of Shuttering

Surfaces that are to be in contact with fresh (wet) concrete shall be so treated (by coating with a non-staining mineral oil or other approved material or, in the case of timber forms, by thoroughly wetting the surface) as to ensure easy release and non-adhesion to shutters during stripping.

If any substance other than water is used, every precaution shall be taken to avoid contamination of the reinforcement.

ZB4.3.7 Re-use of Shuttering

Before re-use, all shuttering shall be reconditioned, and all shutter surfaces that are to be in contact with the concrete shall be thoroughly cleaned without unduly damaging the surfaces of the shutter.

ZB4.3.8 Openings

Where necessary for the proper placing of the concrete, temporary openings for cleaning, inspection or placing purposes shall be provided.

ZB4.3.9 Removal of Shuttering

Shuttering shall not be removed before the concrete has attained sufficient strength to support its own mass and any loads that may be imposed on it. This condition shall be assumed to require the shuttering to remain in place, after placing of the concrete, for the appropriate minimum period of time given in Table 4-2.

However, where the concrete strength is confirmed by tests on cubes manufactured and tested in accordance with Clause ZB 6.1 shuttering supporting cast in-situ concrete in flexure may be struck when the cube strength is 10 MPa or twice the stress to which it will then be subjected, whichever is the greater, provided that such earlier striking will not result in unacceptable deflections due to shrinkage, creep etc.

Shuttering shall be removed carefully so that shock and damage to the concrete are avoided.

Weather may be regarded as 'normal' when atmospheric temperatures adjacent to the concrete as measured by a maximum and minimum thermometer, do not fall below 15'C, and as 'cold' when temperatures measured similarly, fall below 5'C.

When minimum temperatures are between these values, stripping times should be inter- mediate between the periods specified.

TABLE 4-2: REMOVAL OF SHUTTERING: MINIMUM TIMES			
	Portland cement and	Rapid hardening Portland cement and	Portland blast

Type of structural member of shuttering	Portland cement 15		rapid hardening Portland cement 15		furnace cement	
	Normal Weather	Cold Weather*	Normal Weather	Cold Weather*	Normal Weather	Cold Weather*
1. Beam sides and unloaded columns	9 hrs	16 hrs	5 hrs	10 hrs	14 hrs	24 hrs
2. Slabs with props left under	4 days	7 days	2 days	4 days	6 days	10 days
3.Beamsoffitswithpropsleft under and ribs of a ribbed floor construction	7 days	12 days	3 days	5 days	10 days	7 days
4. Slab props	10 days	17 days	5 days	9 days	10 days	17 days
5. Beam props	14 days	28 days	7 days	12 days	14 days	28 days
6. Free standing arches and walls	2 days	4 days	1 day	2 days	3 days	5 days

*Shorter periods may be used for section of thickness at least 300mm.

ZB4.4 CONCRETEQUALITY

ZB4.4.1 Classes of Concrete

The following classes of concrete using Portland cement shall be used, as indicated on the drawings.

STRENGTH CONCRETE			
Class of concrete slab a/b	Minimum 28 days strength (MPa)	Slumb limits	Max. agg. size (mm)
30/19	30	25-75	19.0
25/19	25	25-75	19.0
20/19	20	25-75	19.0
15/19	15	25-75	19.0
15/38	15	25-75	37.5
10/19	10	25-75	19.0
10/38	10	25-75	37.5

In the above concrete class notation - class a/b. "a" denotes the minimum 28 day strength and "b" the maximum aggregate size.

PRESCRIBED MIX CONCRETE						
Class of concrete slab a/b	Estimated 28 days strength (MPa)	Slumb limits mm	Max. agg. size (mm)	Concrete Kg	Total aggregated m^3	Maximum total water (1)
1:3:6/38	15	25-75	37.5	50	0.30	42
1:4:8/38	8	25-75	37.5	50	0.40	50

In the above class notation, class alb, "a" denotes the nominal mix proportions of cement, sand and stone by volume and "b"' the maximum aggregate size.

ZB4.4.2 Mix Design

Before the start of any concrete work on the site, the Contractor shall supply to the Engineer, for his approval, samples of the constituent materials of the concrete and a statement of the mix proportions which he proposes to use for each class of concrete.

The samples shall be accompanied by evidence that they comply with the requirements of Clause ZB 2. The statement of mix proportions shall be accompanied by a concrete mix design prepared in accordance with the recommendations given in Appendix G (Design of Concrete Mixes) of SABS 973-1970 "Standard Form of Specification for Concrete Work". The value of "F" (Table G2 in Appendix G) to be used shall be1,000.

Where the concrete production facility has a record based on at least 30 consecutive strength tests representing similar materials and conditions to those expected, the strength used as a basis for selecting proportions shall exceed the required minimum 28 days strength by 1,000 x the standard deviation of these results. Where the standard deviation exceeds 4,0 MPa or if a suitable record of strength test performance is not available, proportions shall be selected to produce an average strength at least 8,25 MPa higher than the minimum 28 day strength. The amount by which the average strength must exceed the minimum 28-day strength, may be reduced to an appropriate level below 8,25 MPa after sufficient test data becomes available from the Works to indicate the degree of quality control actually achieved. Any such modification of material proportions must be - approved in writing by the Engineer prior to such modification being implemented on the Works.

Volume batching will normally be used for prescribed mix concrete but small variations in the stated quantities of materials may be necessary to improve workability and shall be allowed for in the rates.

ZB4.4.3 Consistency and Workability

Slump measurement taken in accordance with ZB 6.5 shall comply with the values specified for concrete in the previous sub-clause. Other methods for determining consistency are permissible, if approved.

The concrete shall be of such a workability that it can readily be compacted into the corners of the formwork and around reinforcement without segregation of the materials or excessive 'bleeding' of free water at the surface.

ZB4.5 BATCHING AND MIXING OFMATERIALS

ZB4.5.1 Measuring

Cement
Cement supplied in standard sacks shall be assumed to contain 50 kg. All cement taken from bulk storage containers and from partially used sacks shall be batched by mass, the weighing device having an accuracy within 2 percent of the mass of cement required for the batch.
Water
Mixing water for each batch shall be measured, either by mass or by volume, to an accuracy of within 3 percent.
Aggregates
Batching shall be by mass. Weighing devices shall be maintained in good order and shall have an accuracy of within 3 percent. Each size of aggregate shall be weighed.
Additives
Where additives are used, they shall be measured by a dispenser, approved by the Engineer, which shall deliver accurately in one operation the dose required for one batch of concrete.
Note: In the case of small and/or unimportant structures volume batching may be used for concrete up to a 28-day cube strength of 20 MPa, provided the written approval of the Engineer is obtained beforehand. In this case the quantity of cement in the mix shall be increased by 25 kg per cubic metre of concrete over and above the quantity which would have been used when batching aggregates by mass.

ZB4.5.2 Mixing

Note: The requirements of SABS 878 shall apply in preference to those given in this clause if concrete is delivered to the site 'ready mixed'.
General
Mixing of materials for concrete shall be conducted by an experienced operator. Unless otherwise approved, mixing shall be carried out in a mechanical batch-mixer of an approved type.
Charging the Mixer
The sequence of charging shall be approved and, unless otherwise instructed, the same sequence shall be maintained.
The volume of the mixed material per batch shall not exceed the manufacturer's rated capacity of the mixer.
Mixing and Discharge
The period of mixing shall be measured from the time when all the materials are in the drum until the commencement of discharge. This period shall be at least 1½ minutes for each batch of 1,5m3 or less, and shall be increased by 20 seconds for each additional cubic meter or fraction thereof. During this period the drum shall be rotated at the speed recommended by the manufacturer of the mixer.
Discharge shall be so carried out that there is no segregation of the materials in the mix. The mixer shall be emptied completely before it is re-charged.

Maintenance and Cleaning of Mixer
If the mixer has stopped running for any period in excess of 30 minutes, it shall be thoroughly cleaned out, particular attention being paid to the removal of any build-up of materials in the drum, in the loader, and around the blades or paddles. Worn or bent blades and paddles shall be replaced.
Before any concrete is mixed, the inner surfaces of the mixer shall be cleaned and all hardened concrete shall be removed.

ZB4.6 PLACING

ZB4.6.1 General

The Contractor shall give the Engineer at least 24 hours notice of his intention to place concrete to enable the Engineer to check the shuttering and reinforcement. No concrete shall be placed without the prior approval of the Engineer. The concrete shall be placed within one hour from the time of discharge from the mixer and re-tempering by the addition of water or other material shall not be allowed. The forms to be filled shall be clean internally. All excavations and other contact surfaces of an absorbent nature shall be left damp, but no free water shall be permitted to remain on these surfaces.

Where concrete has to be placed on a soft foundation, a blinding layer of lean concrete is to be placed beneath the structural concrete, this blinding layer to be placed immediately the excavation has been completed and approved. Payment for the cost of placing the blinding layer, where ordered, will be made under the appropriate items in the Schedule of Quantities.

Wherever possible the concrete shall be deposited vertically into its final position. In all cases segregation or displacement of reinforcement and other embedded items shall be prevented by using proper methods of placing the concrete.

The working of deposited concrete (whether by means of vibrators or otherwise) to cause it to flow laterally shall be prohibited. The concrete shall be brought up in horizontal layers of compacted thickness not exceeding 450mm and 'heaping' shall be avoided.

Where chutes are used to convey the concrete, their slopes shall be such as not to cause segregation and suitable spouts or baffles shall be provided for the discharge of the concrete.

Concrete shall not be allowed to fall freely through a height of more than 1,5 m, and it shall not be placed in water (standing or running) unless so approved.

Concrete shall only be placed during daylight hours unless proper lighting arrangements have been made and lights are in working order by midday. Furthermore workers shall not be allowed to work double shifts and the Contractor shall provide a new and rested shift for night work.

ZB4.6.2 Concrete with Plums

In plain concrete of thickness not less than 300 mm, hard, clean stone "plums" of mass 15 to 55 kg may, if approved, be used to displace concrete up to a maximum of 20 percent of the volume of the concrete. Such "plums" shall have no adhering films or coatings, while no plum shall have a dimension greater than one-third of the smallest dimension of the concrete member or 300 mm whichever is less. Each plum shall be surrounded by at least 75 mm of concrete.

ZB4.6.3 Pumping of Concrete

Pumping of concrete shall be allowed only after approval by the Engineer of the methods proposed by the Contractor. Samples of pumped concrete shall be taken at the discharge end of the pipe.

ZB4.6.4 Compaction

The concrete shall be fully compacted by approved means during and immediately after placing. It shall be thoroughly worked against the shuttering and around reinforcement and other embedded fittings without displacing them.

The concrete shall be free from honey-combing and planes of weakness. Successive layers of the same lift shall be thoroughly blended together.

Compaction shall be carried out by mechanical vibration or (if approved) by spading, rodding, or forking. Over-vibration resulting in segregation, surface laitance, or leakage (or any combination of these) shall not be allowed.

ZB4.6.5 Joints

Construction Joints
Concreting shall be carried out continuously up to the construction joints shown on the working drawings or as approved, except that if, because of an emergency (such as a breakdown of the mixing plant or the occurrence of unsuitable weather) concreting has to be interrupted, a construction joint shall be formed at the place of stoppage in the manner which will least impair the durability, appearance, and proper functioning of the concrete. In general keyways shall be formed in all horizontal and vertical construction joints.
Construction joints that are visible on the surface where smooth face formwork is used, shall be constructed with special care to obtain a perfectly straight line. In order to achieve this, a fillet shall be attached to the shuttering to define the straight line at the junction of the old and the new concrete. In general these straight lines will be either horizontal or vertical except where otherwise directed by the Engineer.
All vertical construction joints shall be formed against adequate shuttering or bulkheads which shall be placed square across the member in which the joint is to be formed.
The Engineer shall approve the method adopted for forming all construction joints, one of the following methods being adopted, as relevant
Construction joints when concrete is less than 3 days old
The surface of the concrete shall be brushed with a steel wire brush or sandblasted, swept clean, and thoroughly wetted and horizontal and sloping joints shall be covered with a 10 mm thick layer of mortar composed of cement and sand mixed in the same ratio as the cement and sand in the concrete mixture. This mortar shall be freshly mixed and placed immediately before the placing of the new concrete.

Construction joints when concrete is more than 3 days old
The procedure given in (i) above shall be followed, except that the old surface shall be prepared and kept continuously wet for a minimum of 24 hours before the placing of the mortar and new concrete.
Epoxy type resins may be used for bonding at construction joints provided that full details thereof are submitted to the Engineer for his approval. The surface of the older concrete shall be clean and dry and pre-treated as stipulated by the manufacturer. The bonding agent shall be applied in accordance with the

manufacturers' instructions and the fresh concrete placed within the period recommended by the manufacturer.
Construction joints at tops of columns
The procedure for brushing and cleaning given in (i) above shall be followed before the steel reinforcement of the floor to be cast on the columns is placed in position.
Contraction and expansion joints
In joints ordered to be formed as sealed contraction joints, the face of the joint in the concrete slab or block cast first shall be formed with a smooth face. The concrete of the adjacent slab or block shall be cast directly against this face. A groove shall be formed at the exposed edge of the joint and sealed with an approved compound or insertion seal. Alternatively, the Contractor may, subject to the approval of the Engineer as to details of the method, form sealed contraction joints in slabs by means of accurately formed or sawn dummy joints. The groove of the dummy joint shall have a depth one third of the thickness of the slab.
In joints ordered to be formed as sealed expansion joints, approved compressible sheets shall be supplied and placed to allow freedom for the adjacent concrete slabs or blocks to expand. The exposed edges of the joints shall be sealed with an approved compound.
In joints which are not ordered to be sealed, the face of the concrete of the slab or block first formed shall be painted with two coats of approved bituminous paint before the adjoining slab or block is concreted.
Where water stops are ordered, they shall be continuous strips of rubber, plastic, or other approved material, and fixed across water retaining joints. Special care must be taken to ensure that the concrete is well worked against the embedded parts of the strips and is free from honeycombing. All necessary precautions must be taken to protect waterstops from physical damage and from light and heat. Waterstops shall comply with the requirements of Clause

ZB4.6.6 Curing and Protection

Formwork shall be retained in position for the appropriate period given in ZB 4.3.9, and, as soon as it is practicable in the opinion of the Engineer, all concrete shall be protected from contamination and loss of moisture by one or more of the following methods:
Ponding the exposed surfaces by means of water, except' where atmospheric temperatures are less than5°C.
Covering with sand, sawdust, or mats made of moisture-retaining material, and keeping the covering continuously wet.
Continuous spraying of the exposed surfaces with water.
Covering with a waterproof or plastic sheeting firmly anchored at the edges.
Using an approved curing compound applied in accordance with the manufacturer's instructions.
Whatever method of curing is adopted, its application shall not cause staining, contamination, or marring of the surface of the concrete.

The curing period shall be at least 5 days for concrete made with ordinary Portland cement at least 2 days for that made with rapid-hardening Portland cement, and at least 7 days if Portland blast furnace cement is used. When atmospheric temperatures are below 5°C, these minimum curing periods shall be extended by 72, 36, and 72 hours respectively.

ZB4.6.7 Adverse Weather Conditions

Cold Weather
When the surrounding atmospheric temperature falls below 5°C, effective measures shall be taken to ensure that the temperature of the concrete from the time of placing until it has hardened to the approval of the Engineer, is maintained at 10- 25°C. All surfaces shall be protected from ice or frost damage.
Hot Weather
When the surrounding atmospheric temperature is over 32°C, the temperature of the concrete when deposited shall not be allowed to exceed this figure. Stockpiles of aggregates and all metal contact surfaces shall be shielded from the direct rays of the sun or cooled by spraying with water.

ZB4.7 CONSTRUCTIONDETAILS

ZB4.7.1 Holes, Chases and Fixing Blocks

No holes or chases other than those shown on the working drawings or approved by the Engineer, shall be cut or otherwise formed in the concrete.

No blocks for the attachment of fixtures shall be embedded in the concrete unless approved by the Engineer.

ZB4.7.2 Pipes and Conduits

No pipes or conduits other than those shown on the working drawings shall be embedded in the concrete without approval. The clear space between any such pipes and the clear distance between such a pipe and any reinforcement shall be at least 40mm or the maximum size of the coarse aggregate plus 5mm, whichever is greater. The amount of concrete cover over pipes and fittings shall be at least25mm.

ZB4.7.3 Waterstops

Rubber or PVC waterstops shall be of material and pattern approved by the Engineer. The waterstops shall be precision moulded or extruded to the required section and shall be free from porosity or other imperfections. Surface defects shall not exceed 1,5mm in depth or 6mm in greatest lateral dimension.

Where joints in waterstops cannot be factory made, site joints shall be made to the manufacturer's instructions. In PVC waterstops, only butt joints, square to the longitudinal axis and heat fused, will be allowed. Where crossings, T- or V-junctions occur, these elements shall be factory made and jointed into the system with standard butt joints.

Waterstops shall be provided with tags by means of which they can be held securely in position during concreting.

ZB4.7.4 Patching

After removal of the forms, if the concrete shows any serious defect, the Contractor shall, on instructions from the Engineer, remove all defective concrete and replace it (at his own cost) to the satisfaction of the Engineer. No patching shall be carried out by the Contractor without the prior approval of the Engineer.

ZB4.7.5 Wall Ties (refer BRICKLAYER Specification for tie details)

Where brickwork must be built against concrete walls, beams or columns, anchors shall be cast into concrete as follows:
For brick linings : galvanised wire ties shall be cast minimum 75 mm into concrete, at least four per square metre.
For end on junctions of brick walls : galvanised hoop iron ties shall be cast minimum
150 mm into columns every 450 mm of height per half brick skin (staggered in height where more than one half brick skin

ZB5. TOLERANCES

Reinforcement shall be positioned as shown on the working drawings and maintained in those positions within the tolerances given in Table 5-1 as follows:

TABLE 5-1:TOLERANCES		
Position of reinforcement		Tolerance (mm)
1.	Main and distribution bars in slabs: spacing between any two adjacent bars	± 10
2.	Main bars in beams, slabs or ribs, placed at:	
	(a) depths up to and including 300mm	± 5
	(b) depths over 300mm and up to and including 600mm	± 10
	(c) depths over 600mm	± 10
3.	Stirrups, spacing	± 10
4.	Vertical bars in columns	± 5
5.	Bars in walls	± 5
6.	Bars in footings	± 20
7.	Longitude location of bend and ends of bars	± 50

Notwithstanding the above tolerances, the minimum amount of cover on reinforcing bars as specified in Table 4-1 of the Specification must be maintained.

The tolerances applicable to completed concrete work in general and shuttering in particular shall be as per Table 5-2 below:

TABLE 5-2: CONCRETE WORK		
Position		Tolerance (mm) *
1.	Depth of slaps and thickness of walls	± 5
2.	Cross-sectional dimensions of beams, ribs and columns Dimensions up to500mm Larger dimensions for each additional 250mm (or part thereof) add to tolerance	± 5 3

TABLE 5-2: CONCRETE WORK		
Position		Tolerance (mm) *
3.	Variation from plumb of columns: Height up to4,5m Greater height: for each additional 3m (or part thereof) add to tolerance	 ± 5 3
4.	Footings: on width and depth	± 25
		- 10

* These tolerances apply only to structural elements.

The maximum angular deviation from intended lines shall be 1 in 300 for smooth shuttering and 1 in 100 for rough shuttering. Abrupt irregularities for example, between adjacent panels of formwork shall not in any instance exceed 3mm for smooth shuttering and 5mm for rough shuttering.

ZB6. TESTING

ZB6.1 COMPRESSIVE STRENGTH

During the time in which each class of concrete is being placed, samples of the concrete shall be taken at the rate of at least one sample from each 75 m' or daily whichever is the more frequent. In certain circumstances the Engineer may reduce this requirement at his discretion. A group of at least six 150 mm test cubes shall be made from each sample. Three of these cubes shall be tested at or within 7 days as agreed by the Engineer in order to establish the probable 28 day strength of the remaining three cubes. Each group of test. Cubes shall be deemed to represent the whole of the concrete from which the sample was taken and shall be identifiable with the concrete, Appendix C.

The procedure for sampling, making the test cubes, curing, storing and testing, and the moulds used, shall be in accordance with Chapter 5 : Plain and Reinforced Concrete of the South African Standard Building Regulations, AppendixC.

The Contractor shall provide at least 12 moulds, and if so required by the Engineer, additional moulds, should the rate of concreting warrant them. The Contractor shall provide for transportation of test cubes and cores of concrete or shotcrete to a suitable laboratory approved by the Engineer where they will be crushed.

ZB6.2 COMPRESSIVE STRENGTHFAILURE

Concrete from which test cubes have been prepared shall be considered as having failed to meet the specification if the average compressive strengths (each calculated from the results of tests on at least three cubes) at the age(s) specified in Clause ZB 4.3.1 is less than the appropriate values given in column 2, Table 6-1.

If in calculating an average strength it is found that the difference between the highest and the lowest individual cube strengths exceeds 20% of the average strength of the three cubes, the result shall be discarded.

TABLE 6-1: COMPRESSIVE STRENGTH	
Number of consecutive tests within 28 days on any on class of concrete	Percentage of specified minimum strength
1	82
2	88
3	95
4	98
5 or more	100

ZB6.3 PROCEDURE IN THE EVENT OFFAILURE

If, in terms of ZB 6.2, the concrete is considered by the Engineer to have failed to comply with the Specification, the Engineer shall have the right to require that any or all of the following measures shall be taken by, and at the cost of the Contractor:

The materials or proportions of the mixture shall be changed.

The periods of time for removal of formwork given in Clause ZB 4.3.9 shall be extended (provided that the extensions shall not exceed the periods given in ZB 4.3.9 by more than 28 days) until such time as cores, drilled from the portions of the structure containing the concrete which failed and tested in accordance with the methods described in the South African Standard Building Regulations, Chapter 5, show that the strength of the concrete has satisfied the strength requirements.

(If the results of the tests on cores taken in terms of (b) above indicate that, despite the additional periods of time allowed, the concrete does not satisfy the specified requirements, the Engineer will decide whether he requires full scale load tests to be carried out in terms of Regulation 5, Chapter 5, of the South African Standard Building Regulations.

If the load tests are in the opinion of the Engineer, impracticable or if a tested portion of the structure fails to pass the tests, the Contractor shall, on the instructions of the Engineer, replace or strengthen by approved means each portion that failed or that contains concrete that failed, as relevant.

ZB6.4 GRADINGANALYSIS

If so ordered by the Engineer, a grading analysis shall be made for each 40 m' of fine aggregate to be used, and for each 75 m of the coarse aggregate to be used. The analysis shall be made by the method given in SABS 1083.

ZB6.5 DETERMINATION OFCONSISTENCY

When the slump test is used to measure the consistency of the concrete mix, it shall be carried out by the method given in SABS878.

ZB6.6 COSTS OFTESTS

The costs of all tests described in this section of the Specification shall be borne by the Contractor.

ZB7. MEASUREMENT ANDPAYMENT

ZB7.1 CAST IN-SITU CONCRETE

For all grades of concrete, whether reinforced or unreinforced measurements shall be made on a cubic metre (m^3) basis, calculated from the net dimensions shown on the drawings or variations thereof instructed or authorised by the Engineer. In the case of foundations, or other portions of the structure where the depth is not fixed on the drawings, the concrete shall be measured as the product of the net horizontal area of the concrete as shown on the drawings and the height based upon the agreed levels or depths.

In the measurement of concrete no deduction will be made for chamfers of less than 50 mm in width, nosings, bolts, reinforcement and the like.

Concrete used for blinding layers shall be measured per square metre, the minimum thickness being stated.

The rates for concrete shall include for supplying and a storage of all materials, provision of labour and plant, forming construction joints (but not contraction and expansion joints shown on the drawings), galvanised wall ties where necessary, keyways, all incidental work, curing, testing of materials, provision of slump cones, etc.

ZB7.2 PRECASTCONCRETE

The supply of various types and sizes of precast concrete members or elements shall each be measured and paid for separately per number.

The tendered rate for each precast element shall include for the supply of all materials, including formwork and reinforcing, the complete manufacturing, transport and storage.

ZB7.3 JOINTS

Where contraction or expansion joints are scheduled in the Schedule of Quantities, they shall be measured as reflected in the Schedule, and rates tendered shall include for the supply of all materials and for all work and formwork involved in forming and sealing thejoints.

ZB7.4 WATERSTOPS

Waterstops shall be measured and paid for per lineal metre for the various types and sizes.

The tendered rates shall include for materials and all labour necessary for fixing and jointing and the additional labour required in compacting around the waterstops.

ZB7.5 CONCRETE SURFACEFINISHES

The rates tendered for floor slab concrete and blinding shall include for screeding of the surface to the required shape and level.

Where steel or wood trowelling is required, it shall be measured and paid per square metre (m^2).

All exposed faces of concrete shall be sound and solid, free from defects. The cost of all remedial work to the requirements of the Engineer is deemed to be included in the concrete rates inserted in the Schedule of Quantities.

No separate measurement will be made for the finishing of surfaces against shuttering other than the measurement made for shuttering as scheduled.

ZB7.6 SHUTTERING

All shuttering for producing rough and smooth surfaces shall be measured on the net area of concrete surface exposed after the removal of the forms.

Payment for shuttering shall be deemed to include full compensation for the supply, erection and subsequent removal, if possible, of all false work, staging and shuttering and rubbing down concrete after removal where smooth surfaces are required.

Where specified formwork described as to provided smooth finished concrete shall be provided with chamfers on all concrete arises, re-entrant corners and drip moulds. Shuttering for construction joints whether shown on the drawings or not, shall not be separately measured and shall be included in the tendered rates for measured work.

The cost of all remedial work that may be required to bring concrete work to proper line is to be borne by the Contractor.

No payment will be made for shuttering necessitated on account of over-excavation.

ZB7.7 FOUNDATIONPAPER

Foundation paper shall be measured per square metre (m2) of the surface area of the concrete cast against it. Payment shall include for the supply of the material and fixing it into position.

ZB7.8 REINFORCEMENT

Steel reinforcement shall be measured and paid for per kilogram (kg) calculated from the actual length shown on the drawings, including hooks, bends, etc., and the nominal diameter of the bar. The unit of measurement for high tensile mesh reinforcement shall be the square metre of the reference mesh reinforcement in place and the quantity shall be calculated from the net area covered by the mesh excluding laps.

The rates entered into the Schedule shall include for all supply, bending, waste, fixing into position, spacers, and tying wire or other binding devices. Supporting steel shall be measured with reinforcing steel.

ZC1 SCOPE

This section of the Specification covers all aspects of brickwork and concrete blockwork including building in of various items, reinforcing of brickwork and blockwork, etc., as well as the supply of all materials and labour.

ZC2 MATERIALS

ZC 2.1 Standards

All materials used in the following standard specifications, the latest issues of which shall be held to apply:

SASS28 Metal ties for cavity walls
SABS227 Burnt clay masonry units
SABS471 Portland cement and rapid-hardening Portland cement SABS1215/1984 Concrete building blocks
SASS626 Portland blast-furnace cement
SASS831 Portland cement 15 and rapid hardening Portland cement15 BS1200 Building sands from natural sources Portland Cement Concrete Masonry Association The Masonry Manual

ZC 2.2 Masonry Units

ZC2.2.1General
Bricks shall be free from cracks, chips or other defects and:

At least one end of 20% of the bricks shall have the same general colour and texture as the faces.

Special care shall be exercised in loading, stacking and handling facebricks as no damaged bricks shall be used and bats may only be used where required to obtain bond.

General purpose stock bricks or common bricks shall have minimum average compressive strength of 7MPa unless otherwise specified. Where stock bricks are required for load bearing walls or foundations then compressive strength shall be a MPa.

Facing bricks shall be of the type, origin and colour as specified in the Schedule of Quantities or on the drawings and shall be selected for uniformity of dimension and colour.

Satisfactory proof of load bearing capacity of bricks offered shall be submitted before deliveries are made to the site.

For samples, 6 units of each type of brick shall be submitted to the Engineer for approval. All subsequent deliveries shall be to the standard of the approved samples.

All bricks which, in the opinion of the Engineer, do not comply, with the abovementioned requirements, shall be removed from the site forthwith at the Contractor's cost.

ZC2.2.2Burnt Clay Brick

Burnt clay bricks shall comply with SABS 227 and:

Engineering bricks shall be of high compressive strength and durability, 49 MPa minimum average strength and selected for their uniformity of dimension and shape. Bricks shall be clay, and pressed or wire cut. Water absorption after a 24 hour test shall not exceed 12% by mass.

Facing bricks shall have a minimum average compressive strength of 28 MPa. Bricks shall be clay, and pressed to wire cut. Water absorption after a 24 hour test shall not excess 12% by mass. Bricks shall have sharp clean and well defined arises.

General purpose stock bricks or common bricks suitable for general building work shall be clay, pressed or wire cut, even in size, smooth in texture and with sharp well defined arises. Water absorption after a 24 hour test shall not exceed 14% by mass.

ZC2.2.3Concrete or Cement Based Bricks

Cement based bricks shall comply with SABS 987 and attention is specifically drawn to the following:

After strength curing bricks must be left to dry for four to six weeks to minimise subsequent shrinkage.

Bricks must NOT be wetted before laying. Mortars must have a high water retention.
ZC2.2.4Precast Concrete Building Blocks

Precast concrete building blocks shall comply with SABS 1215-1984 and publication "The Masonry Manual" (Concrete Masonry Association) in all respects. Samples of each type of block to be used shall be submitted to the Engineer for approval and all subsequent deliveries shall be to the standard of the approved samples.

All building blocks which, in the opinion of the Engineer, do not comply with the abovementioned requirements shall be removed from the site forthwith at the Contractor's cost.

ZC 2.3 Cement

Cement used in masonry shall comply with the requirements of SABS 471, SABS 626 and SABS 831.

ZC 2.4 Fine Aggregate (Sand)

Fine aggregates used in mortar shall be naturally occurring sand or consisting of crushed rock or gravel, or a combination thereof with naturally occurring sand being hard, clean and free from dust, shale, clay, loam roots and other impurities.
Fine mortar aggregates shall comply in all respects with SS 200 and be well graded from
mm down in accordance with Table 10 therein or Table 11 where specified for reinforced brickwork.

ZC 2.5 Water
Water shall be clean and free from injurious amounts of acids, alkalis, sugar and other organic substances. Water suitable for drinking purposes shall be acceptable. If so required by the Engineer, the suitability of water shall be proved by tests carried out by an approved laboratory.

ZC 2.6 Mortar

Mortar shall, unless otherwise specified, be class A mortar and shall consist of 1 part Portland cement, one part hydrated lime and to 6 parts of sand by volume for normal brickwork. Mortar for foundations, Iintols and for all load bearing walls higher than 3000 mm shall be class S mortar and shall consist of 1 part Portland cement, 1/4 part hydrated lime and four parts sand. The ingredients shall be measured in proper gauge boxes on a timber of steel mixing platform with water added and thoroughly mixed in to obtain a uniform consistency throughout. The mortar shall be mixed in with fresh mortar. Alternatively, mixing may be by means of an approved mechanical batch mixer.

In the case of a cement-milled slag mortar, the sand and slag shall be mixed first and then the cement added.

Cement mortar shall be used within two hours of the first contact of the cement with water. No mortar which is older than two hours or has begun to set shall be used.

ZC 2.7 Wall Ties

Metal wall ties in brickwork and blockwork shall be, galvanised crimped steel, single wire type, 4 mm diameter minimum, complying in all respects with SASS 28.

Ties to cavity walls shall be PWD butterfly type (not modified type).

Stainless steel twist type wall ties shall be used for walls subject to corrosion attach or as directed.

ZC 2.8 Reinforcement

Wall reinforcement shall consist of two 3,15 mm diameter longitudinal wires at appropriate centres for the thickness of the wall and with 2,80 mm diameter cross wires welded to the longitudinal wires at 300mm centres. All wire used shall be of high tensile steel-

ZC 2.9 Roof Ties

Roof ties shall be 1,6 mm galvanised hoop iron, 32 mm wide, ends bent at right angles (50 mm) for building into brick joints and length to suit for 8 building courses into brickwork or casting into concrete slabs or beams and left projecting sufficiently to wrap around and spike to rafters of roof trusses.

ZC 2.10Concrete to Brickwork Ties

End on junctions of brick walling to concrete are to be tied to the concrete by means of 1,,6 x 32 x 500 mm galvanised hoop iron ties.

Brick linings to concrete are to be tied with 4 mm diameter crimped galvanised wire ties to SABS 28.

ZC 2.11Quarry Tiles

Quarry tiles for cills shall be "Coronation" brand or equal approved, hard burnt of colour to match facing bricks, even in shape and size, free from chips, cracks, twists or blemishes and uniform in colour. Sizes shall be as stated in the schedule and on the drawings.

ZC 2.12Asbestos-cement Cills

Asbestos-cement cills, shall, unless otherwise specified be 20 mm pressed asbestos- cement in natural colour and of approved manufactured.

ZC 2.13Airbricks

Airbricks shall be terra-cotta with copper vermin-proofing gauze for coastal conditions. (colour to match facing brick where relevant) and cast plaster for internal use where walls are to be plastered, all of approved manufacture.

ZC 2.14Storage of Materials

Cement and aggregates shall be stored in such a manner as to prevent deterioration or contamination by foreign matter, damp and chemicals spilled on the ground or which may settle out of the atmosphere.

Perishable materials likely to be damaged by exposure shall be stored under cover.

ZC3 EQUIPMENT

The Contractor shall provide and maintain in good working order, adequate equipment for carrying out the required work in accordance with this specification in a safe and efficient manner.

ZC4 CONSTRUCTION

ZC 4.1 Brickwork Generally

All brickwork shall be laid in stretcher bond, plumb and true to line. Mortar beds shall be 10 mm thickness, unless otherwise described, and are not to exceed 12 mm in thickness and no four successive joints shall rise more than 40 mm (for 10 mm joints). Clay bricks are to be well wetted (saturated in hot weather) with water before being laid and the course of bricks laid last shall be well wetted before fresh bricks are bedded upon it. Concrete bricks must NOT be wetted before laying. Bricks shall be well buttered and laid on a full bed of mortar and joints shall be flushed up. Bricks in foundation walling are to be extra hard. Beam filling is to be built to eaves 106 mm thick and the space between beam filling and roof covering shall be filled with a stiff mixture of 1 to 3 cement mortar tightly pressed in. The brickwork shall be carried up in a uniform manner, no one section being raised more than 1 200 mm above another section at one time and no brickwork is to be carried marathon 4 courses above immediately adjoining or intersecting brickwork. Block bonding or toothed and keyed construction will only be allowed in alterations to existing work.

Internal walls shall be carried up two courses above ceiling level and all gable walls shall be carried up against the underside of roofing, cut to rake as required and flushed up with 1 to 3 cement mortar. The joints of all walls to be plastered or tiled shall be raked 12 mm to form key for plaster.

One-brick walls (230 mm) built stretcher bond in two skins shall be tied together with galvanised wall ties staggered not more than 1 m apart horizontally and every fourth course vertically with extra ties at reveals and openings etc. as may be necessary. Brick linings to concrete walls shall similarly be tied together, while galvanised hoop iron ties cast into concrete columns, shall be built into the joints of butting brick walls as specified. Where specifically required e.g. coastal areas, the outer face of the inner skin of all external one-brick walls above damp course level shall be waterproofed before the outer skin is built up. The face to be treated shall be bagged over until all crevices are filled. When thoroughly dry the face shall be twice coated with an approved liquid bituminous compound and worked around wire ties to produce an unbroken waterproof coating.

Where called for on; the drawings, wall and concrete ceiling surfaces shall be bag washed with a wet sack dipped in liquid cement grout whilst the mortar in the

brickwork joints is still soft until all joints and crevices are eventually tilled. Projections of concrete shall be rubbed off and any defects shall be made good in cement mortar.

ZC 4.2 Cavity Walls

Cavity walls unless otherwise described, shall be built with two 106 mm thicknesses of brickwork in stretcher bond with 50 mm, cavity between and tied together with galvanised wall ties spaced at not more than 1 m centres apart at every third course of brickwork and staggered. The cavities shall be carried up from top of foundation concrete level to wall plate level. Cavities shall be kept free from all rubbish, mortar droppings. Projecting mortar and suitable bricks shall be left out temporarily to affect cleaning. The cavity shall be filled up solid with concrete between foundation and floor dampproof course level and for six courses wall plate level.

At door, window and other openings. the cavities shall be stopped back 106 mm from heads, jambs and sills of openings. Weep holes shall be formed at every fourth stretcher at the base of the cavity.

ZC 4.3 Reinforced Brickwork

Brickwork over door and window openings shall be reinforced with welded wall reinforcement placed in each course of brickwork over openings for a minimum of 4 courses or as shown on the drawings. Reinforced brickwork shall continue at least one and a half bricks on either side of the opening. Where two or more openings are less than 675 mm apart, the reinforced brick lintels shall be continuous over all such openings and their dividing piers, plus 1½, brick bearing at both extreme ends.

Brick lintols in cavity walls which are exposed to the weather shall have a continuous damp- proof course built into the outer skin of the wall immediately above the lintol to cove the top of the lintol, raked up one course and carried through the innerskin.

Where called for on the drawings, brickwork shall be reinforced with wall reinforcement laid in every fourth course of all brick walling or as directed by the Engineer. The reinforcement shall be built in truly central to the wall and all longitudinal laps shall not be less than 450 mm. Reinforcement in half-brick walls shall be built 106 mm into main crosswalls.

ZC 4.4 Face Brickwork

All facings shall be kept clean during the progress of the work and face-brick surfaces with mortar spattering will not be accepted. Unless otherwise specified, the horizontal and vertical joints shall be pointed and finished with a round key joint and both rubbed smooth as the building work proceeds.

The various colours of the face bricks shall be selected and mixed at random to prevent portions of the face work showing a preponderance of one colour. Where sufficient storage is available on site the full quantity of face bricks required for the works (or such quantity as to keep supply well advanced of construction) shall be delivered to site.

ZC 4.5 Fairface Brickwork

Where called for on the drawings and in the Schedule of Quantities, internal walls shall be of smooth stock-bricks, built fair and kept clean during construction and jointed as in Clause ZC4.4

ZC 4.6 Concrete Blockwork Generally

Concrete blockwork construction shall be in accordance with the Portland Cement Institute publication "Concrete Building Construction".

Blocks which shall not be wetted before laying shall be laid in stretcher bond, plumb and true to line. Joints shall not be more than 10 mm thick. The blockwork shall be carried up

in a uniform manner with no one section being raised more than one metre above another section at one time unless otherwise shown on the drawings. Blockwork shall be built hard up against door frames, windows, etc., and shall be built solid with cement mortar between foundation and floor dampproof course level, around door and window frames and under wall plate level. All blockwork shall be kept clean during the progress of the work and the cores kept clear of falling surplus mortar. Intersecting walls, except corners, may be built flush against each other with a 10 mm joint between and tied together with brick reinforcement 500 mm long at 400 mm vertical distance apart.

All walls not to be plastered shall be built fair with smooth blocks, the joints shall be pointed and finished with a round key, and the work shall be kept clean during construction. Joints of all walls to be plastered shall be raked out to form a key.

Wall please carrying roof trusses shall be bolted or tied to solid built eaves blockwork while lintol blocks, reinforced with steel bars and filled with concrete, shall be used over doorways, windows, etc., all according to the manufacturer's instructions.

ZC 4.7 Reinforced Blockwork

Were called for on the drawings blockwork shall be reinforced with wall reinforcement laid in every course of all block walling or as directed by the Engineer.

ZC 4.8 Precast Prestressed Concrete Lintols

Approved precast prestressed concrete lintols of suitable size of the thickness of the wall and the width of the opening shall be used over openings in plastered and bagged walls. Wherever possible the minimum bearing for precast prestressed lintols, at their ends and over intermediate supports, shall be:

for openings not exceeding 600 mm -1Yz brick (115mm)
for openings exceeding 600mm -1 brick (230mm)

Where this requirement necessitates a total lintel length exceeding 6,6 m, a joint may be introduced centrally over an intermediate pier in a position to be approved by the Engineer. Such joints shall be stiffened by the introduction of welded wall reinforcement as specified, in ZC 4.3, and extending a minimum of 300 mm on either side of the joint,
i.e. 600 mm minimum total length.

ZC 4.9 Concrete to Brick Ties

At end on junctions of brick walls with concrete columns or walls brickwork is to have galvanised hoop iron ties built into the joints of each ½ brick skin at maximum 8 course height intervals alternately to each skin or at 4 course height intervals if single skin only. Ties are to be cast into concrete at course heights by tacking L-shaped ties to inside face of shutters and bending down ends for building in after shutters stripped or shot fixing to concrete with approved nails and strength of shot to provide adequate fixing.

Galvanised crimped wire ties for fiXing of brick linings to concrete are to be cast minimum 75 mm deep into concrete at brick course heights (four per square metre staggered), bent down after shutters stripped and built into brickwork.

ZC 4.10Roof Ties

Build roof ties minimum 8 course into brickwork or bend under reinforcement and cast into concrete beams or slab at truss positions, bend around upper truss members and spike and clench to timber with 63 mm wire nails. (See notes re submission of drawings for fabrication designed roof trusses under Carpenter specification - in order to obtain timeous information on tie position setting out).

ZC 4.11Airbricks

Where airbricks are shown on the drawings, neat openings shall be formed in the brickwork or. blockwork for the building in of vermin-proof terra-cotta airbricks externally. Cast plaster airbricks shall be used internally where walls

are to be plastered.

ZC 4.12Quarry Tile Cills

Quarry tiles shall be soaked in water for 24 hours before being laid. Cills shall be laid and pointed in class B (1-1/4-4) cement mortar, set level internally and sloping externally and projecting not more than 25 mm beyond face of wall.

Quarry tiles shall be thoroughly cleaned after laying.

Tiles shall be centered and cut or spaced so that not less than a three quarter wide tile occurs in any cill.

ZC 4.13Asbestos-Cement Cills

These cills shall be neatly cut and fitted between reveals and set to project slightly and bedded and pointed in class B (1-1/4-4) cement mortar. All cills to be fitted with standard minimum 3 x 15 x 100 mm mild steel 4 times bent anchoring brackets self-tap screwed to underside at maximum 400 mm centres (maximum 75 mm from ends) and external cills shall be slightly sloping.

ZC 4.14Sundries

Rough and fair cutting shall be performed as required and the brickwork or blockwork fitted around structural steelwork. Face brickwork shall be carefully cut and fitted when next to other finishings.

Chases shall be lett or formed in brickwork for edges of concrete floors, roofs, staircases, etc. Vertical chases shall be provided in brickwork and blockwork wherever required for pipes, conduits, switch boxes, distribution boards,etc.

Over sailing courses, corbels, etc., shall be built where required.

Ends of cills, thresholds, step joints, etc., shall be built in, cut or pinned in cement mortar where required.

Steel windows to be built into walls shall be set plumb and true with the cill bar resting on wedges to ensure that it is perfectly level. All lugs shall be bolted up tights and built in solid as walling proceeds, the channel frame of the window being caulked; tight with class B (1-1/4-4) cement mortar, pointed up neatly all round and madewatertight.

Pressed steel door frames shall be securely strutted when placed in position for buildlnq on to prevent distortion of any kind during building in. The frames shall be built solid into the walls and grouted solid at back with 12:3 cement mortar as the work proceeds and properly pointed all round.

Timber door frames and windows to be built into walls shall be primed before building in and set plumb and true. The underside of each vertical to the door frames shall be provided with a 12 mm diameter steel peg projecting 75 mm from the bottom of the frame and these pegs shall be securely grouted into the floor threshold. 2 mm thick hoop iron cramps 40 mm wide, screwed to frames shall be built 450 mm .into walls with ends turned up, four cramps to each jamb. At flush junctions of walls and frames a V-joint shall, be ruled between frame and wall rendering. The junctions between timber frames or windows and face brickwork or unrendered concrete on external faces shall be sealed by pointing around the timber frames with an approved polysulphide based waterproofing compound finished off in a neat and workman like manner.

All necessary openings for ends of timber, gratings, cramps, holdfasts, dowels, wood plugs and slips for fixing joiner's work, hoop iron ties, etc. , shall be formed built in with 1:3 cement mortar, and made good with properly performed rough and fair cutting.

Hoop iron roof ties shall generally be built 750mm into walls.

Brickwork and blockwork shall be cut away and made good atter all trades.

ZC5 TOLERANCES

Tolerances for clay brick dimensions, strength, warpage and efflorescence shall be as SASS 227.

Tolerances for concrete block dimensions, strength, warpage and drying shrinkage shall be as SASS 527.

Permissible deviations in the final finished surfaces to the degree of accuracy required will be applied to linear dimensions, position, verticality, level, squareness and bow.

The degree of accuracy may be one of the following:

Degree of accuracy III for use where a high degree of accuracy is unnecessary e.g. mass storage warehouse walls and floors.
Degree of accuracy II for what is commonly called "goodwork".
Degree of accuracy I where the use of special, as opposed to normal, methods and/or materials is required.

Over a distance of 2400 mm as in the table hereunder.

Abrupt changes in a continuous surface - over a short distance maximum say 300 mm - shall be 40% of that specified under 5.3.3

ZC 5.1 Table of Permissible Deviations

Item	Finish	Permissible deviation for degree of accuracy			Corobrick Brick Classification Guide
		III (mm)	II (mm)	I (mm)	
ZC 5.1.1	Stock brickwork				
	- against earth	20	15	10	NFX
	- to receive plaster	17	10	7	NFP
	- to be bagged	13	8	5	NFP
	- fairface	8	5	3	FBS
ZC 5.1.2	Face brickwork with bricks				
	- generally uniforn in shape and size	8	5	3	FBS
	- high degree of uniformity in shape and size	5	3	2	FNX
	Non-uniform in shape	13	8	5	FBA
ZC 5.1.3	Out of alignment with				
	adjoining finishes on	4	3	15	
	projecting items	3.5	2.5	1	
	(windows and door frames)	5	3.5	2	
ZC 5.1.4	Out of verticality of perps				

Item	Finish	Permissible deviation for degree of accuracy			Corobrick Brick Classification Guide
		III (mm)	II (mm)	I (mm)	
	(dependent on bond)	40	15	5	
ZC 5.1.5	Out of alignment	2.5	2	1.5	FBS
	horizontally top edge to	2	1.5	1	FBX
	top edge adjoining bricks	3	2.5	2	FBA
ZC 5.1.6	Out of trueness vertically	2.5	2	1.5	FBS
	(top edge to lower edge	2	1.5	1	FBX
	Of next course)	3	2.5	2	FBA
ZC 5.1.7	Squareness of rooms overall - measured on the				
	Diagonals *	20	10	5	
ZC 5.1.8	Out of square or true of a corner or angle measured				
	300mm from the angle *	7	4	2	

*

A similar degree of accuracy will be required to irregular shaped rooms. The governing factor shall be the general appearance and it may be necessary or acceptable to depart from the above guidelines if required.

ZC6 TESTING

ZC 6.1 Compressive Strength

Determination of the minimum average compressive strength of clay bricks and concrete blocks shall be in accordance with SASS 227 and SASS 527 respectively and at frequencies required by the Engineer.

ZC 6.2 Costs of Tests

The costs of tests described above shall be borne by the Contractor who shall be deemed to have included these costs in the scheduled rates for brickwork or blockwork.

ZC7 MEASUREMENT ANDPAYMENT

The unit of measurement for all brickwork and blockwork shall be the square metre (m') of the specified type and thickness laid. The measurement of the work will be taken net, with door and window openings deducted, but will include for lintels, airbricks, etc.

The rates tendered for ordinary brickwork or blockwork shall be inclusive of supply of bricks or blocks, testing, all plumbing of corners and faces, linings, levelling, ruling of joints, forming reveals and openings, cutting where necessary but not specially scheduled, supply and building in wall plugs, wall ties, etc., hoisting to various levels, soaking all bricks in water before laying, any selecting of face-bricks on site to maintain an even texture when laid and for cleaning down with spirits of salts all facework on completion. Face brickwork and fairface brickwork or blockwork will be paid for extra over and above ordinary brickwork or blockwork.

ZD1 SCOPE

This section of the Specification covers all aspects of plastering, paving and tiling as well as the supply of all materials and labour.

ZD2 MATERIALS

ZD 2.1 Standards

All materials used in the Works shall comply in all respects with the following standard specifications, the latest issues of which shall be held to apply:

SABS22 : Glazed ceramic wall tiles and fittings.
SABS471 : Portland cement and rapid-hardening Portland cement. SABS523 : Limes for use in building.
SABS581 : Semi-flexible vinyl floor tiles. SABS786 : Flexible vinyl flooring.
SABS070 : The laying of thermoplastic and similar types of flooring. SABS1083 : Aggregates from natural sources.
SABS1199 : Building sands from natural sources.

ZD 2.2 Cement

Cement used for plastering and paving shall comply with the requirements of SABS 471.

ZD 2.3 Fine Aggregate (Sand)

Aggregate used in plaster and screed shall be naturally occurring sand or consisting of crushed rock or gravel, or a combination thereof with naturally occurring sand being hard, clean and free from dust, shale, clay, loam, roots and other impurities and shall comply in all respects with BS 1199 for plaster and SABS 1083 for screed.

Fine aggregate for granolithic shall consist of evenly graded particles (granular not flaky), of granite, whinestone or quartzitic stone, all of which will pass a 6 mm test sieve, approximately 40 percent by weight of which will pass a 3 mm sieve, and none of which will pass a 0,15 mm sieve. It is to be free from clay, animal, vegetable or other organic matter and is to comply with such tests as may be required by the Engineer.

Samples of aggregate, proposed to be used, must on no account be used until passed by the Engineer.

ZD 2.4 Water

Water shall be clean and free from injurious amounts of acids, alkalis, sugar and other organic substances. Water suitable for drinking purposes shall be acceptable. [f so required by the Engineer, the suitability of water shall be proved by tests carried out by an approved laboratory.

ZD 2.5 Glazed Ceramic Tiles

Glazed ceramic wall tiles shall be 150 x 150 mm first grade tiles including arris rounded capping and angle tiles of approved manufacture, free from chips, cracks, twists, warping, discoloration or other defects, either white or of specified colour, equal to the sample to be submitted and complying with SABS 22. The tiles shall be delivered to the site in unopened containers as packed by the manufacturer and each tile shall have the following information impressed on the back: The name, trade name or registered trade mark of the manufacturer and the date of manufacture or other suitable batch identification.

ZD 2.6 Quarry Tiles

Quarry tiles for floors shall be "Coronation" brand or equal approved hard burnt dark brown, even in shape and size, free from chips, cracks, twists or blemishes and uniform in colour.

ZD 2.7 Resilient Floor Coverings

All material shall be delivered to site in unopened containers and all from the same lot for colour consistency. Each container shall be marked with the manufacturer's name, trade name or both, the name of the material, the thickness and colour, the quantity in the container and the identification number of the batch or run.

Vinyl asbestos floor tiles shall be of approved manufacture, 250 x 250 x 2 mm thick and be grease, oil and alkali resistant.

Vinyl floor sheeting shall be of approved manufacture 900 mm wide x 2 mm thick with welded joints and be grease, oil and alkali resistant.

Vinyl skirting shall be approved and from the same manufacturer as the tiles and sheeting. It shall be top set cover skirting, 1 DO mm high, with performed internal and external corner pieces as required.

Bitumen impregnated felt floor sheeting with smooth surface shall be Mastipave or equal approved, 900 mm wide x 2 mm thick fixed to the floor with adhesive.

Adhesives shall be as recommended by the manufacturer.

Colours and patterns shall be selected from the manufacturers standard colour samples by the Engineer or be as shown on the drawings.

ZD 2.8 Paving, Slabs and Kerbing

Paving slabs shall be 450 X 450 X 50 mm thick precast non-slip surface concrete slabs and kerbing units shall be 915 X 300 X 75 mm thick precast kerbing, all to the approval of the Engineer.

ZD 2.9 Storage of Materials

Cement and aggregates shall be stored in such a manner as to prevent deterioration or contamination by foreign matter, damp and chemicals spilled on the ground or which may settle out of the atmosphere. Perishable materials likely to be damaged by exposure shall be stored undercover.

ZD3 EQUIPMENT

The Contractor shall provide and maintain in good working order, adequate equipment for carrying out the required work in accordance with the specification in a safe and efficient manner.

ZD4 CONSTRUCTION

ZD 4.1 Plastering

Cement plaster shall, unless otherwise specified, consist of 1 part Portland cement to 5 parts of sand by volume. The ingredients shall be measured in proper gauge boxes on a steel or timber mixing platform with water added and thoroughly mixed in to obtain a uniform consistency throughout. Cement plastering mixes shall be used within two hours of the first contact of the cement with water. All plaster remaining after this period shall be discarded and not retempered.

Between the time of the construction of the brick, concrete or other base and the commencement of the plastering, an adequate interval of time must elapse to ensure that the sub-structure has properly dried out. All surfaces are to be thoroughly brushed down to remove dust and loose particles and cleaned of grease and soot. Brick walls which are to be plastered are to be prepared by having the joints raked out to form a key. Concrete surfaces which are to be plastered are to be prepared by roughening (hacking if necessary), or having a slurry composed of one part by volume of cement to two-and-a-half parts by volume, of coarse sand vigorously thrown on by means of a trowel or other suitable device to form the thinnest possible layer and left an adequate period, but not less than two days, until hard and dry before plaster is applied. Both brickwork and concrete are to be properly wetted with water to adjust the suction before plaster is applied.

Where skin coat type finishing plasters (e.g. "Rhinolite") are to be applied to surfaces care is to be taken to ensure that non-ferrous metal surfaces are to be suitably treated or priced prior to the application of the finishing type plaster.

All one-coat cement plastering shall be executed in a 1:5 cement mortar and wood floated smooth unless steel towelling is particularly specified. All plaster undercoats to receive glazed tiling shall be scored and roughened to provide a key for the tiles. Where fine roughcast finish is called for, this shall be applied to one coat cement plaster with a proper "Tyrolean" spattering device in such a way that even thickness of finish is attained throughout the surface without blank spots and patches. Where two-coat putty or other similar type finishing plaster finish is specified, this shall comprise a 1:5 cement plaster undercoat finished with a skim coat of the finishing plaster properly applied in accordance with the recommendations of the specific manufacturer to obtain a smooth steel towelled finish.

The surfaces of all smooth plastering are to be even and true and free from breaks or tool marks, and in textured plaster, to be regular. All plaster is to be floated smooth unless otherwise particularly specified. All external angles are to be clean and sharp or slightly rounded as directed. All damaged or defective plasterwork is to be made good and the whole left in perfect condition. Should any of the plasterwork show signs of efflorescence, blistering, cracking, crazing, flaking, grinning, peeling, pitting, popping or blowing, or of any other defects during the period of maintenance, such defective work is to be made good and if necessary, the wall in which it occurs, must be entirely stripped and replastered and the whole cost together with the cost of repainting, etc., necessary, shall be borne by the Contractor.

Where required, plaster shall be finished flush with the faces of all switch and plug boxes, the interiors of which shall be kept free from plaster. Plaster surfaces shall be plumb with jambs and reveals formed square. A V-joint shall be made where a junction between concrete and brickwork occurs and at flush junctions of walls and windows and doorframes. V-joints shall be made with an adjustable jointer, the centre blade of which shall be hard on the brickwork to ensure that the plaster is cut through.

No plastering work will be permitted until the electric conduit and boxes and all plumbing pipes chased in walls are completed and the window frames have been packed with mortar.

Conduits, water pipes, etc. are to be firmly fixed into position in chases minimum 6 mm below rough adjoining surfaces and firmly grouted it into position and keyed to take finish.

ZD 4.2 Floor Screeding

Floor screeds shall be composed of 1:3 cement mortar, and shall be measured off and mixed to the method specified for plaster mixes. Preparatory to the application of the screed, the concrete sub-floor shall be well soaked with water and coated with the thinnest practicable layer of (a) in the case of a concrete surface which is rough enough to ensure a good bond -a grout of neat cement well brushed on, and (b) in the case of a concrete surface which is not rough enough to ensure a good bond -with a slurry composed of one part by volume of cement to two-and-a-half parts by volume of coarse sand vigorously thrown on by means of a trowel or other suitable device. The screed shall be laid before the grout or slurry has set.

The screed shall be well compacted and rammed-in with a wooden punner and finished off level with a wood float or steel trowel as particularly specified, and then left to mature, being protected from injury during this period.

All screeds to receive special floorings shall be laid, surfaced and cleaned off or washed to the satisfaction of the specialist executing such flooring.

ZD 4.3 Granolithic Surfacing

Granolithic is to be in two coats, the undercoat being of a thickness of 9 mm less than the finished thickness, composed of one part by volume of cement to three parts by volume of aggregate, the finishing coat being 9 mm thick, composed of one part by volume of cement to two parts by volume of aggregate.

The water-cement ratio is to be kept as low as possible (not to exceed 0,45) compatible with workability. The finishing coat is to be wood floated and steel trowelled to a smooth finish. Excessive towelling shall be avoided and dusting on of dry cement shall not be allowed.

The granolithic shall be floated on to ordinary concrete within 12 hours of latter being laid, otherwise the concrete surfaces shall be thoroughly hacked, cleaned, watered and afterwards treated with cement slurry which shall be allowed to set, or treated with an approved bonding agent, as may be directed, before the granolithic paving is laid.

The surface of all granolithic paving shall be kept damp for a period of at least 7 days after laying, by thickly covering with wet sand or sawdust, hessian or polythene membrane kept moist by frequent sprinkling with water.

The granolithic paving as described shall be not less than 20 mm thick, finished to fall as shown on drawings and the applied area shall not exceed 9,0 m for anyone placing. Thresholds shall be finished with granolithic 25 mm thick, treads 25 mm thick, and risers 20 mm thick, including rounded nosings and readings. Panels with neat straight surface v- joints and suitable material to break contact between panels formed against each other, shall be laid alternately and staggered and joints to panels shall coincide with any joints in the concrete sub-floor.

Excessive trowelling shall be avoided and dusting on of dry cement shall not be allowed. Any excess of bleed water is to be removed.

For monolithic granolithic where shown on the drawings, the mixture specified above shall be sprinkled dry whilst the concrete floor slab is still wet and soft, at the rate of 10 kg of mixture per m. This mixture shall be tamped in with a wood float and trowelled twice with a steel trowel to a smooth fine finish, and the surface shall be coated after the floor is dry, with a single application of 10% solution of silicate of soda.

Light duty non-slip surfaces to fioors and stair treads for pedestrian traffic shall where called for, be formed using carborundum, "Alundum" or approved equal, with a 1 to 7 IM1 grading, spread at the rate of 1 kg per m of paving. The surfacing shall be tamped in with a wood float and trowelled to a smooth finish before the granolithic has set, but maintaining the non- slip surface.

Heavy duty non-slip granolithic flooring shall where called for, be formed with "Alundum" topping , or approved equal, placed on the green concrete, mixed in the proportions tabulated below, or as recommended by the manufacturers. The coarse "Alundum" shall be well soaked in water and mixed with the granite chip pings. The heavy duty granolithic shall be finished off with fine "Alundum", with grading 1 to 7 mm, as specified above for light duty non-slip surfaces.

Material Cement	By Mass	By Volume
Cement	50 kg	1,0m³
Granite sand (grading 0,3 to 3mm)	25 kg	0.5m³
Granite chippings (grading 3 to 10mm)	90 kg	1.6m³
Coarse "Aludum" (grading 7 to 14 mm)	11kg	0.1m³

Coloured granolithic paving shall be a two coat application laid in one operation comprising an un tinted first coat, plus a tinted finishing coat of not less than 5 mm thickness applied immediately to the first coat, giving a combined thickness as specified. The colour pigment complying with BS 1014, shall be thoroughly mixed with the cement in such proportion as will give the finished surface and colour specified. The tinted finishing coat shall be composed of two parts by volume of aggregate to one part of cement with pigment, which shall in no case exceed 10% of the mass of the cement. The granolithic shall be thoroughly compacted and finished with a steel float. Dusting on of colouring pigment shall not be permitted under any circumstances.

Edges next to walls and partitions shall be finished with 20 mm thick projecting skirting 75 mm high, with rounded or splayed top edges and small cove at the junction with the flooring unless otherwise instructed by the Engineer.

Any granolithic paving laid which does not comply with this specification shall be taken up by the Contractor and relaid at his own expense.

Floors of showers and changing rooms shall be formed with light duty non-slip surfaces and shall be grooved for drainage as shown on the drawings.

ZD 4.4 Tiling

Wall tiles shall be set 3 mm beyond plaster, with straight continuous joints in both directions and set on and including a bed of 1:4 cement mortar and fixed in accordance with SABS 0107. Tiling shall be returned into reveals of openings and on to window sills, and shall be butted at internal angles and external angles shall have ground splayed edges to form mitred external angle, unless otherwise especified.

Where quarry or other ceramic tiles are specified for floors, these shall be bedded in cement mortar laid on the floor screed with continuous joints not exceeding 6 mm, unless otherwise specified.

Two mixes are to be used:

Mix A - 2 parts course river sand, 2 parts pitor building sand to 1 part cement with sufficient moisture added so that when the mixture is compressed by hand it clings together in a ball, but when the ball is punctured by the finger then the mixture with separate or collapse back to its loose state.

Mix B-1: part plaster sand, 1: part pit sand to 1: part cement mixed to a creamy consistency (where very dense fined day tiles are to be used on floors then the measures of sand shall be reduced to 1 instead of 1: as above).

Spread and lay base screed using mix A tamping firmly and screeding to lines, levels and falls as required in the finished floor (minimum 15 mm thick).

Spread mix B as a bedding screed to a minimum thickness of 10 mm and bed tiles directly on some.
Joints to be filled with mix B or as otherwise specified approximately 24 hours after floor laid and pinted with average 1 mm deep polished square recersed joints or as otherwise specified.

Prices for all floor and wall tiling are to include for setting and cutting such that equal margins will be used against vertical edges or ends and whole tiles along cappings or top edges, except that where less than 1/4 tiles would be used then allowance shall be made for additional cutting of adjoining tiles to increase. To minimum 3/8tiles.

Resilient floor coverings shall be laid in accordance with SABS 070 by ski lied workmen. Before laying the covering, the flooring specialist is to approve and accept the sub floor surfaces which shall be perfectly dry, smooth, level, clean and in a proper condition. The adhesive used shall be as supplied or recommended by the manufacturer. Top set cove skirtings shall be installed tight against the backing with the space completely filled, corner fittings shall line up and be flush with adjoining surfaces. When laying is completed, all areas shall be thoroughly cleaned and waxed in accordance with the manufacturer's recommendations.

ZD 4.5 Paving

Paving slabs shall be laid on a 50 m layer of fine sand spread on compacted ground surfaces and shall be laid in neat lines, level or to falls. All joints shall be straight and continuous not exceeding 9 mm and solidly pointed with a 1:5 cement mortar and ruled. The surface of the paved area shall be even and regular and the block shall not project more than 3 m above the edge of any adjacent block at the joint. A bitumastic joint shall be placed every 5 metres of length of paving for expansion purposes.

Precast kerbing shall be used at edges of paving where specified and laid true to line and levels or falls. Joints shall be pointed in 1:5 cement mortar and rates for laying shall include for bedding the kerbs at each joint in a bed of 1:3:6 concrete to facilitate accurate laying. The kerbs shall generally be firmly bedded in the compacted earth on which they are laid

ZD5 TOLERANCES
Sand for plaster shall generally have a fineness modulus between the limits of 1,1 and 2,1.

Plastering on vertical surfaces shall not generally be less than 9 mm nor more than 12 mm in thickness exclusive of keys, unless otherwise described. Plastering on concrete soffits shall not exceed 9 mm in thickness.

Permissible deviations in the final finished surfaces to the degree of accuracy required will be applied to linear dimensions, position, verticality, level, squareness and bow.

The degree of accuracy may be one of the following:
Degree of accuracy III for use where a high degree of accuracy is unnecessary e.g. mass storage warehouse walls and floors.
Degree of accuracy II for what is commonly called "goodwork".
Degree of accuracy I where the use of special, as opposed to normal, methods and/or materials is required.

Any deviation from flatness or plumpness or trueness of plane surfaces will be measured as the maximum deviation of the surface from a straight line joining two points on the surface in two separate measurements:

Over a distance of 2400 mm as in the table hereunder.

Abrupt changes in a continuous surface over a short distance maximum say 300 mm shall be 40% of that specified under 5.6.

ZD 5.1 Table of Permissible Deviations

Item	Finish	Permissible deviation for degree of accuracy		
		III (mm)	II (mm)	I (mm)
ZD 5.1.1	Sand/cement plaster			
	- Course rough texture	20	15	10
	- Fine rough texture	17	10	7
	- Wood float	13	8	5
	- Steel trowel			
	- matt paint finish	10	6	4
	- gloss paint finish	5	3	-
ZD 5.1.2	Gypsum or similar finishing plaster			
	- Steel trowel			
	- matt paint finish	-	4	2.5
	- gloss paint finish	-	2.5	1.5
ZD 5.1.3	Wall tiling			
	Deviation from pre-determined or average levels in adjoining rooms	5	3	2
ZD 5.1.4	Total plaster surface out of level or true plane of falls	15	8	3
ZD 5.1.5	Total screed surface out of level or true plane of falls	15	10	51
ZD 5.1.6	Sand/cement screed steel trowel			
	- for vinyl type finish	8	5	5
	- for carpet finish	15	8	3
ZD 5.1.7	Granolithic			
	- wood float	15	8	5
	- steel float	8	5	3
ZD 5.1.8	Out of square of corner, a reveal or element (such as a column) 300mm from corner	8	5	3
ZD 5.1.9	Out of alignment with maximum 20mm projecting prefixed items (such as windows and door frames) or exposed corners or edges *	4	2.5	1

* These deviations diversions could increase to double the stated dimensions at 150 mm projection proportional to the width of the projection.

NOTE: The governing factor out of square or true of a corner or angle measured 300 mm from the angle required.

ZD6 TESTING

As the Contractor is fully responsible for ensuring that the quality of all work produced, both in respect of materials used and of workmanship, he shall carry out sufficient control tests as the Engineer considers are necessary to ensure that all work is carried out within the Specifications.

ZD7 MEASUREMENT ANDPAYMENT

The unit of measurement for all plastering, granolithic, floor screeds, wall tiling, paving slabs, floor tiling, etc., shall be the square metre (m²) of the specified type and thickness laid.

Rates for plastering, floor screeds and granolithic shall include for supply, preparation of surfaces, mixing, placing, levelling, colouring, finishing, jointing, rounding of angles and edges, forming of drips on lintels, curing, etc. No extra will be paid if thicker applications than those thickness specified are required due to the unevenness of the concrete or brick surface under.

Rates for tiling shall include for supply, cleaning of the surfaces on which it is laid, mortar bedding, slushing, adhesives, pointing, cutting, fitting around pipes, waste, etc. and thorough cleaning down on completion.

Rates for paving slabs shall include for supply the 50 mm sand layer under, pointing of joints, forming of expansion joints and cleaning down on completion.

ZE1 SCOPE

This section of the Specification covers all aspects of carpentry and joinery including timber windows, doors and doorframes as well as all aspects of supply and labour.

ZE2 MATERIALS

ZE 2.1 Standards

All materials used in the Works shall comply in all respects with the following standard specifications, the latest issues of which shall be held to apply:

SABS05 : Preservative treatment of timber. SABS540 : Wood fibre building board.
SABS545 : Wooden flush doors. SABS563 : Softwood structural timber. SABS629 : Softwood flooring boards.
SABS737 : Timber to be used in manufacture of furniture. SABS803 : Asbestos-cement celluloses heets.
SABS 876 : Glued laminated timber structural members. SABS 1245 : Stress graded softwood engineering timber. SABS 082 : Timber building.
BS1186: Quality of timber and workmanship injoinery. BS2521 : Lead-based priming paints.
CP112 : The structural use of timber.

The structural use of timber shall be in accordance with the National Building Regulations, Part L, SABS 082 or BS Code of Practice 112.

ZE 2.2 General

All timber shall be of good quality, properly dried and free of gum and sap, large loose or dead knots, checks, splits, uneven sides and other defects. The timber shall be free of any signs or rot, worm and beetle and shall be well cut and free of warps and other deformations. The timber shall be supplied in full lengths and sizes and shall be kiln dried to a moisture content suitable for the area in which it is to be used as recommended by the National Building Research Institute.

The timber shall be seasoned to a moisture content of or below the maximum values specified for carpentry, and within the limits given in BS 1186 for joinery, which shall be maintained until the building is completed. Manufacturers shall ensure that the moisture contents of the various joinery items delivered to the site are appropriate to the conditions of use.

All timber used for structural purposes shall be merchantable grade and shall comply with the requirements of SASS 563 or SASS 629.

Unless otherwise specified all materials shall at least conform to the appropriate SASS or SS where such standards exist for timber, plywood, blockboards, nails, screws, bolts, adhesives, etc.

Timber for joinery shall be carefully selected and shall be of best quality, free from large or dead knots, shakes, waney edges or other defects.

Hardwoods and softwoods for joinery shall comply with SS 1186 and suitable species shall be used for the various purposes.

Timber skirtings shall be meranti, of standard size and profile, and shall be as indicated on the drawings and finishing schedules

ZE 2.3 Connector Plates for Trusses
The metal connector plates shall be fabricated out of 1,2 mm or 2,0 mm drawn quality galvanised steel.

The steel shall have a minimum yield strength of 228 MPa and a minimum ultimate tensile strength of 330 MPa. The corrosion resisting coating shall be 0.38 kg/m commercial class hot dipped galvanised before stamping.

The connector plates shall be capable of transmitting the forces between the members of a truss without exceeding the design stresses set out in the table below:

Design values per pair of connector plates in SA Pine, minimum density = 360 kg/m

Values at 0°angle between load and plate axis and between load and grain:

1,2mmplate 2,21MPa
2,0mmplate 1,34MPa
Values at 90°angle between load & plate axis & between load & grain: 1,2mmplate 1,17MPa
2,0mmplate 0,90 MPa

The connector plates shall have the following Design Plate Strength for pairs of plates in Newtons per lineal millimetre:

	1,2mm (N/mm)	2,0 mm (N/mm)
Tension parallel to plate axis	246	403
Tension perpendicular to plate axis	141	230
Shear parallel to plate axis	109	172
Shear perpendicular to plate axis	105	162

The connector plates shall be shown to be capable of transmitting these forces in structural SA Pine in tests conducted by the Timber Research Institute of theCSIR.

Hurricane clips and U-type hangers shall be as supplied by Timber Engineering Company.

ZE 2.4 Preservative Treatment

Where directed, all timber shall be treated with a Pentachlorophenol-zinc naphthenate solution, complying with the requirements of SABS 565 and no timber infested with bored or other pests shall be allowed on the Site. The preservative treatment shall be applied by the pressure process described in the SABS Code of Practice No. 05 and the minimum penetration for the various timbers required shall be as specified in Table 11 (Item 13) of the same Code of Practice. All joinery work to be treated shall be completely wrot, fabricated, fitted and then dismantled and sent for treatment before final assembly. The preservative treatment shall not impair the final finish. Any untreated surfaces exposed by subsequent cutting or planning shall be properly painted with the same preservative solution specified above.

Where timber is to be treated for fire resistance, the Engineer shall be provided with .details of the proposed material for approval.

ZE 2.5 Priming

Carpentry and joinery which is to be painted shall be coated with a thick mixture of white lead and linseed oil, or other approved primer.

No priming shall be applied to surfaces which are to be glued.

The jointing surfaces of all joints exposed to the weather and build-in portions of frames shall be thickly primed except where adhesives are specified.

Carpentry and joinery which is prepared for painting by the manufacturer shall be knotted and primed before it is dispatched to the site.

Primed surfaces shall be touched up where necessary during the progress of the work or where site adjustments have been made.

"Gypsum" or similar type boarding or surfaces to be skim plaster coated shall be fixed with galvanized clout nails, or where screw fixed shall have the heads of both ferrous and non- ferrous metal screws primed or treated as recommended by the manufacturer of the finishing plaster to prevent deleterious action or pattern staining to the finished product, or alternatively the base material shall be fixed with approved stainless steel fixings.

ZE 2.6 Ceiling Materials

Ceiling boards shall be 4 mm thick pressed asbestos-cement cellulose sheets manufactured in accordance with SASS 803, or 6 mm thick gypsum plasterboard manufactured in accordance with SASS266.

Joint cover strips shall be asbestos-cement cellulose, 5 mm thick x 50 mm wide or 20 mm half-round timber beads or H-profile steel jointing strips as directed.

Timber brandering shall be 38 x 50 mm or 38 x 38 mm as specified.

Where ceilings are described as suspended, they shall be formed of a grid framework formed of exposed galvanised mild steel or aluminium "Ts" suspended from rafters or purlins and be of the two directional type. The panel size, unless otherwise described shall be 600 mm x 1200 mm.

Size and thickness of main and support members shall be such that the finished ceiling shall have a maximum deflection of 1/360 of span.

Asbestos cement Acoustic ceilings shall be asbestos-cement cellulose sheets manufactured in accordance with SABS 803, with a perforation pattern of 5 mm diameter holes at 19 mm spacing at right angles in both directions.

Cornices shall be stock covered gypsum - plaster board, asbestos-cement, pressed hardboard or timber as indicated on the drawings and schedules.

ZE 2.7 Door stops

Rubber door stops, 40 mm diameter shall be screwed to plugs in floors and walls as directed wherever it is required to prevent damage to fittings, wall finishes, door handles, etc.

ZE 2.8 Tempered and Untempered Hardboards

Tempered and untempered hardboard shall comply with the requirements of SABS 540 and shall be a rigid fibre type board of approved manufacture, and of a thickness as indicated on the drawinqs.

Each individual sheet shall have the following information clearly marked on it or on a label attached to it the manufacturer's name, trade name or registered trade mark, the nominal thickness and type of board, and the mark of the South African Bureau of Standards.

ZE 2.9 Fibre Softboard

Fibre softboard shall comply with the requirements of SABS 540 and shall be a rigid fibre type building board of approved manufacture, and of the thickness specified in the schedules or as shown on the drawings.

Each individual board shall have the following information clearly marked on it or on a label attached to it: the manufacturer's name, trade name or registered trade mark, the nominal thickness and type of board, and the mark of the South African Bureau of Standards

ZE3 EQUIPMENT

The Contractor shall provide and maintain in good working order, adequate equipment for carrying out the required work in accordance with this specification in a safe and efficient manner.

ZE4 CONSTRUCTION

ZE 4.1 Carpentry (General)

Carpentry work shall be carried out in a proper manner and in conformance with the drawings.

The carpenter shall perform all cutting away and making good in attendance upon all other trades.

The carpenter shall be responsible for the closing-in of openings necessary for the protection of the work during progress. He shall also provide and maintain any temporary coverings required for the protection of any finished work that might be damaged if left unprotected during the progress of the work.

Unless otherwise specified, all joints shall be secured with a suitable type and a sufficient number of nails or other approved type of connectors.

Housings, mortice-and-tenon and other joints shall be carefully made in such a way that they do not impair the strength and stiffness of the beams or members.

"Unwrot" timber shall be as sawn and shall be to the dimensions specified.

All exposed woodwork shall be wrote to a smooth surface, free of machine or other tool marks, scratches, etc., unless otherwise specified. The wrote sizes shall be as specified but with a maximum allowance of 3 mm off full sizes.

ZE 4.2 Roofs

ZE4.2.1 General

All roof timbering shall generally be of sawn sections and only wrot in exposed projections. All timber fascias and bargeboards shall have all surfaces wrot.

All wall plates shall be properly creosote impregnated and bolted to concrete or fixed to brickwork with galvanised hoop iron ties.

Where splices are necessary in rafters, ties or ceiling joists, the timbers shall be lapped at least five times the width of the timber and securely spiked. Splices in timbers wider than 115 mmshallbeboltedwithatleastthree9mmboltsandwashersinadditiontospiking.Allmain

intersections shall be bolted with 9 mm diameter bolts. "Gang Nail" type prefabricated roof trusses or equal approved may be used.

Wall plates shall be halved at junctions and angles. Purlins, battens, etc., shall be splay scarved at junctions and in all cases the joints shall be placed over the point of support and well spiked.

All purlins and battens shall be properly cross-nailed to rafters as well as brandering to ceiling joists.

ZE4.2.2 Prefabricated Contractor Designed RoofTrusses

Design

All trusses shall be designed in accordance with the draft SASS Code of Practice for the design of timber structures by a firm approved by the owner's appointed agent. Trusses shall be designed for a live load of 0,50 kN/m and for the - dead loads described in the schedule. Trusses shall be designed to fall within the maximum centres stated in the schedule. Trusses have been measured at approximately those centres and should the designer or contractor consider that maximum benefit could be obtained by a decrease in the centres he will be free to design and supply such increase number of trusses but the number of trusses measured and paid for shall remain as measured. The number of trusses to be paid for shall be changed only if the structure to be roofed has been altered.

Shop Drawings

Two prints of the detailed shop drawings and one copy of the design calculations shall be submitted to the Contractor for approval a minimum of three weeks prior to the commencement of manufacture and/or construction of superstructure above door head height, whichever will be the sooner. One copy of the drawings marked up for correction will be returned to the designer fabricator for correction and a corrected sepia is to be submitted to the contractor prior to commencement of manufacture or construction above door head height.

Fabrication

The trusses shall be constructed with jigs especially designed to provide correct cambers and pitches.

All joints are to be close fitted butt joints and made by precision pressing of the metal connector plates into each side of the joint.

The timber roof trusses shall be fabricated in a properly equipped factory by an approved specialist firm of Truss Fabricators using metal plate connector.

Nailing to 'Hurricane" clips and "U" brackets shall be with 2,8 mm x 40 mm galvanised clout nails.

ZE 4.3 Ceilings

Main brandering 38 mm x 50 mm shall be fixed at 400 mm centres at right angles to tie beams with stout galvanised wire nails driven in on skew alternatively in opposite directions. Where trusses are spaced not more than 900 mm apart, the main brandering may be reduced to 38 mm x 38 mm.

Ceiling boards shall be fixed to brandering with clout headed nails 2 mm diameter x 32 mm long and spaced at 100 mm centres to edges and 150 mm centres to intermediate fixings. Joints in ceilings shall receive stock 50 mm wide asbestos-cement cover strips or 20 mm half round wood cover beads or H-profile steel jointing strips as directed. Cornices shall be securely and neatly fixed. Where directed, a trapdoor 600 mm x 600 mm and fitted with a pair of 75 mm steel butts shall be formed in the ceiling.

For suspended ceilings all ductwork, electrical conduit, etc., above the ceiling shall be completed before fixing the suspended ceiling.

Sheets shall not be screwed, nailed or wedged too tightly. Fixing of nails or screws along the extreme edges shall, be avoided and the fixing points shall be not less than 18 mm from the edge of the sheet.

The suspension system shall support the ceiling assembly as shown on the drawings with a maximum deflection of 1/360 of the span. Wall rnouldinqs shall be fastened to the walls at the perimeter of the ceilings.

Where brand name prefabricated type ceiling tiles are specified:

installation shall not be completed (final fixing of tiles) until residual moisture has dissipated and the building is weatherproofed.
tiles from at least four separate containers shall be selected at random during the laying or fixing process.
tiles shall be wedged or fixed in position as recommended by the manufacturers of the specified product.

ZE 4.4 Skirtings

Where indicated on the drawings, standard meranti skirtings shall be fitted with heads of nails punched in, stopped with a matching colour and sanded down.

ZE 4.5 Joinery

All joinery work shall be carried out in a workmanlike manner and in conformance with the drawings.

Joinery work shall consist of the manufacture, delivery to the site and the fixing in the building of all joinery and associated fixtures and fittings described in the specifications and shown on the drawings. It shall also include for the supply and fixing of metal straps, lugs, dowels, etc., the supply and application of priming and preservatives and all ironmongery.

All wrot timber shall be sawn, planed, drilled or otherwise machined or worked to the correct sizes and shapes as shown on the drawings or as specified.

The arrangement, jointing and fixing of all joinery shall be such that shrinkage in any part and in any direction shall not impair the strength and appearance of the finished work, and shall not cause damage to adjoining materials of structures.

All timber that is to be exposed in the finished surfaces of joinery works shall be wrot on the appropriate faces unless otherwise specified, and all machine marks shall be removed by sanding or planning.

The joiner shall perform all necessary morticing, tenoning, grooving, matching, tonguing, housing, rebating, and all other works necessary for correct jointing. He shall also provide all metal plates, screws, nails and other fixings that may be ordered by the Engineer, or that may be necessary for the proper execution of the joinery works specified.

The joiner shall also carry out all works necessary for the proper construction of all framings, linings, etc., and for their support and fixing in the buildings.

Joints shall be constructed exactly as shown on the detailed drawings. Where joints are not specifically indicated they shall be the recognized type of joint for that purpose. The joints shall be made so as to comply with the requirements of BS1186.

Loose joints shall be used where provision must be made for correct positioning, shrinkage, or other movements, and glued joints shall be made where there is no shrinkage or movement in the joints. All glued joints shall be cross tongued or otherwise reinforced. All nails, spikes, sprigs, etc., shall be punched and concealed. Screws shall be countersunk.

All joinery sizes shall be checked with detail drawings and from the building before work is commenced. Jointer's work shall be put in hand as soon as possible but shall not be wedged or glued up until just before being fixed in the building. Joinery on Site shall be carefully stored under cover and protected from rain, wind and sun and should preferably not be introduced into the building until the bricks and plaster have dried out and the windows have been glazed. Joinery built in shall be boarded up and carefully protected to the satisfaction of the Engineer.

The term "arris rounded" means that the corners shall be slightly rounded with sandpaper. Unless otherwise described all wrot timber shall be arris rounded. The term "angle rounded" means that the corners shall be rounded from 3 mm to 9 mm radius and mitred at angles. The term "fully rounded" means that the edge of the material shall be completely rounded to a semi-circular shape and mitred at angles.

All mortice and tenon joints shall be flush pinned. All linings shall be tongued at angles and framed to conceal the tongued angles. All screws for joinery shall be best quality brass screws unless otherwise stated.

All wrot surfaces shall be steel scraped and sandpapered before and, if necessary, after fixing. Flooring boards, skirtings, cornices and rails of all kinds, shall be in long lengths where possible, but where joints are unavoidable, they shall be concealed. All heading joints shall be splayed. Joinery shall be framed and put together in accordance with the best standard practice. Joiner's work shall be manufactured in the climatic area in which it is to be used and shall be purpose made to detail unless otherwise described as stock.

Where plastic laminates are used the reverse side of the boarding shall be coated with one coat pink primer or other approved sealing agent.

Any work with defects such as shrinkage, warping, opening of joints, etc., appearing before the expiration of the maintenance period for this Contract, shall be removed, refitted and redecorated or replaced by new joinery at the Contractor's expense and any other work disturbed in consequence thereof, shall also be made good at the Contractor'sexpense.

Where shop fabricated joinery is specified to be fixed-in or erected in position after the surrounding or enclosing works of the main building have been completed, it shall be the responsibility of the Contractor to ensure that the necessary fixings are incorporated in the building, alternatively, the Contractor shall construct such groundworks as are required to provide a suitable base and fixing for the joinery.

The Contractor shall secure the fixed-in joinery so that they are plumb and true to the shapes and dimensions as detailed.

ZE 4.6 Panelling

Where panelling is called for, it shall be executed with the type of material as called for in the Schedule of Quantities or on the drawings. Where wood is called for, this shall be selected and used according to colour. Panelling shall be done in such a - manner that nail heads or any other marks may be covered or filled in. Any joints shall be covered with pre-selected timber strips and where hardboard, asbestos-cement or any other material is used, the cover strips shall be as recommended by the manufacturer.

ZE 4.7 Timber Windows

Windows shall be of the types and sizes as indicated on the schedules. All opening sashes shall be hung with 75 mm butt hinges and fitted with furniture as indicated on the schedules.

ZE 4.8 Timber Doors, Door Frames and Fanlights

ZE4.8.1 General

Timber door frames shall be of the types and sizes as indicated on the schedules and shall be rebated for door and angle rounded on exposed salient edge. If the door has a hardwood finish, then the same type of hardwood shall be used for door frame, quadrants and architraves.

Door frames, linings, panel doors, flush doors, sliding doors, etc., shall be supplied and installed, fitted or hung by the joiner and be of the types and sizes as shown on the drawings.

Doors shall be hung in such a manner that they are able to open without binding at any point.

Approved types of joints shall be made at all intersections of timber framed doors and the joints shall be properly doweled and glued.

Doors and frames shall be prepared for oiling, staining, varnishing or painting as specified.

Interior and exterior timber doors and door furniture shall be as shown on the drawings or as indicated in the schedules.

ZE4.8.2 Flush Doors

All flush doors shall comply with the requirements of SABS 545 and this specification.

Flush doors shall be approved before being fixed in the building, shall not be less than 40 mm thick and shall be constructed to comply with the following requirements:

The frame shall be of solid wood not less than 38 mm wide at the sides and 76 mm wide at the top and bottom and each component shall be of one piece or of approved laminated construction.

The hollow core within the frame shall be filled with compressed corrugated cardboard, so manufactured that it shall retain its shape if removed from the frame.

Both sides of the frame shall be continuous, smooth and capable of taking the adhesive required for fixing the veneer or hard boardfacing.

Lock rails 750 mm long x 76 mm wide shall be doweled and glued to the middle of the side framing.

The door facing shall consist of either 3 mm thick veneer or hardboard, finished at the sides against the edge cover strips.

The edge cover strips shall be of a timber to match the door facing, and shall not be less than 7,5 mm thick for single doors and hanging stiles of double doors, and 19 mm thick for meeting stiles of double doors. The 19 mm thick strips shall be clearly marked.

The frame, core filling, edge strips and door facings shall be bonded together under hydraulic pressure into one single unit using an approved water resistant adhesive, and the exposed surfaces shall be sanded to a smooth and even surface after removal of the door from the press.

The doors shall be guaranteed against defects for the maintenance period after hanging, and the Contractor shall replace at his own expense, any door found to be defective due to hanging or the fitting of door furniture during the guarantee period.

Door stops shall be fitted as indicated in the schedules.

ZE4.8.3 Framed, Ledged and Braced Batten Doors

Framed, ledged and braced batten doors shall only be for external use unless otherwise specified, and shall not be less than 40 mm thick.

All framed, ledged and braced batten doors shall be approved before being fixed in the building and shall be constructed to comply with the following requirements:

Unless otherwise specified, framed, ledged and braced batten doors shall be constructed with components having the following minimum dimensions, stiles and top rail 40 mm x 114 mm, middle ledge 19 mm x 152 mm, bottom ledge 19 mm x 228 mm and braces 19 mm x 114mm.

The braces shall be splayed at the ends for fitting into notches in the ledges, stiles and top rail.

The stiles and top rail shall be grooved all round on the inner edges for, and filled in with 19 mm thick, tongued and grooved boarding in narrow widths with V-joints on both faces.

The boarding shall be rebated on the outer edges and fitted into grooves in the stiles and top rail, and fixed with countersunk screws from the back of the door at each intersection with the middle ledge, bottom ledge and the braces.

The inner edges of the stiles, top rail and abutting edges of the boarding shall be chamfered on the outer face to form a V-joint.

Where a door is specified with a flush panel on the inner face, the inner edges of the stiles, top rail and middle and bottom ledges shall be rebated for, and filled in flush with a 6 mm thick three-ply plywood panel let into these rebates and secured with panel pins.

Hardwood weather bars as detailed on the drawings shall be fitted to the external face of the doors.

Door stops and approved retaining devices shall be fitted as indicated in the schedules.

ZE4.8.4 Fanlights

Except where otherwise specified, fanlights shall be formed with 40 mm x 65 mm stiles and top rails, and 40 mm x 76 mm bottom rails properly joined together.

The inner edges of the frame shall be open rebated for the glass, fitted with 13 mm x 19 mm quadrant glazing beads mitred at the corners and fixed with panel pins.

ZE 4.9 Blackboards

Blackboards shall be formed with a meranti wood frame and chalkrail with the corners mitred, properly jointed, doweled and glued, all as detailed and dimensioned on the drawings.

mm thick untempered hardboard shall be fitted to the rear of the frame with countersunk screws. The hardboard shall not extend beyond the edges of the frame, and shall be painted with two coats of green school-board paint.

Blackboards shall be rigid and shall have a flat, smooth and plane surface and shall be fitted in an approved manner in positions as indicated in the schedules or as shown on the drawings.

ZE 4.10 Pinboards

Pin boards shall be formed with a meranti wood frame with a rebate on the inside to receive the pinning surface corners shall be mitred, properly jointed, doweled and glued, all as detailed and dimensioned on the drawings.

Pin boards shall be rigid and shall have a flat, smooth and plane surface and shall be fitted in an approved manner in positions as indicated in the schedules or as shown on the drawings.

ZE5 TOLERANCES
Wrot sizes of timber shall be as specified but with a maximum allowance of 3 mm off full sizes.

No allowance will be made on the thickness of doors, fanlights, flooring and sashes which shall be to the full size specified or on other items where finished sizes are specified.

All doors shall be hung with a maximum clearance of 1,5 mm at the top and sides and 3 mm at the bottom.

ZE6 TESTING
As the Contractor is fully responsible for ensuring that the quality of all work produced, both in respect of materials used and of workmanship, he shall carry out sufficient control tests as the Engineer considers are necessary to ensure that all work is carried out within the Specifications.

ZE7 MEASUREMENT ANDPAYMENT
Measurement and payment of roof timbering, flooring, joinery, timber doors, doorframes, windows, ceiling brandering, ceilings, cornices, insulation to ceilings, skirtings and door stops shall be according to the units and rates determined from the Schedule of Quantities and the rates quoted will be deemed to cover the item of work finished complete in every respect.

Pricing of all roof and floor timbers shall include for all preservative treatment, lapping, scarfing, splay cutting, halving, etc., as well as jointing and fixing materials.

Rates for all joinery items shall include for all aspects of fabrication, preservative treatment, mitres, stopped and fair ends, morticing, tenoning, housing, trenailing, flush pinning, wedging, keying, clamping, glueing, etc., as well as for fixing complete with all necessary nails, spikes, screws, plugs or "Rawlplugs" or hardened steel nails, etc., and for making good plaster, tiles, facings or other finish.

Rates for doors shall include for all fixing, hanging, oiling of hinges and accessories and easing required for proper operation.

The following schedules of prices include for the supply of all timber of the required grade and type including all cutting and waste, cutting to exist length and end angles necessary to manufacture the respective truss types, the supply of all connector plates, prefabrication of the trusses in a jig, checking the completed truss for quality, loading up, transporting to the site of the works and-

Unloading and storing under cover and protected from the weatheror,

Hoisting up and erecting the trusses at the required truss centre. Truly plumb and square on top of wall plates, all in accordance with site instructions for erection, bracing, and holding down and connection supplied by the truss fabricator.

Such site supervision as deemed necessary by the - fabricator of the trusses to ensure that all the erection details have been complied with to his satisfaction.

Rates for all roof sheeting, ceiling boarding, etc. shall include for all straight cutting and waste.

ZEA 1 SCOPE

This Specification covers all aspects of the design, fabrication and erection of monoplaner prefabricated metal connectored timber roof trusses.

ZEA 2 MATERIALS

ZEA2.1 Standards

All materials used in the Works shall comply in all respects with the following standard specifications, the latest issues of which shall be held to apply:

SABS05 : Preservative treatment of timber. SABS563 : Softwood structural timber.
SABS1245 : Stress graded softwood engineering 1timber.

The structural design of timber shall be in accordance with the National Building Regulations, Part Land SABS 0163.

ZEA2.2 General

All timber shall be of good quality, properly dried and free of gum and sap, large loose or dead knots, checks, splits, uneven sides and other defects. The timber shall be free of any signs or rot, worm and beetle and shall be well cut and free of warps and other deformations. The timber shall be supplied in full lengths and sizes and shall be kiln dried to a moisture content suitable for the area in which it is to be used as recommended by the National Building Research Institute.

All timber used for structural purposes shall be stress graded and shall comply with the requirements of SASS 563.

ZEA2.3 Connector Plates for Trusses
The metal connector plates shall be fabricated out of 1,2 mm or 2,0 mm drawn quality galvanised steel.

The steel shall have a minimum yield strength of 228 MPa and a minimum ultimate tensile strength of 330 MPa. The corrosion resisting coating shall be 0.65 kg/m commercial class hot dipped galvanised before stamping.

The connector plates shall be capable of transmitting the forces between the members of a truss without exceeding the design stresses set out in the table below:

Design values per pair of connector plates in SA Pine, minimum density = 360 kg/m

Values at 0°angle between load and plate axis and between load and grain:

1,2mmplate 2,21MPa
2,0mmplate 2,30MPa
Values at 90°angle between load and plate axis and between load and grain: 1,2mmplate 1,17MPa
2,0mmplate 0,90 MPa

The connector plates shall have the following Design Plate Strength for pairs of plates in Newtons per lineal millimetre:

	1,2mm (N/mm)	2,0 mm (N/mm)
Tension parallel to plate axis	246	403
Tension perpendicular to plate axis	141	230
Shear parallel to plate axis	109	172
Shear perpendicular to plate axis	105	162

The connector plates shall be shown to be capable of transmitting these forces in structural SA Pine in tests conducted by the Timber Research Institute of theCSIR.

Hurricane clips and U-type hangers shall be as supplied by Timber Engineering Company (Pty) Ltd. (TECO)

ZEA2.4 Preservative Treatment

Where directed, all timber shall be treated with a Pentachlorophenol-zinc naphthenate solution, complying with the requirements of SABS 565 and no timber infested with bored or other pests shall be allowed on the Site. The preservative treatment shall be applied by the pressure process described in the SABS Code of Practice No. 05 and the minimum penetration for the various timbers required shall be as specified in Table 11 (Item 13) of the same Code of Practice. All joinery work to be treated shall be completely wrot, fabricated, fitted and then dismantled and sent for treatment before final assembly. The preservative treatment shall not impair the final finish. Any untreated surfaces exposed by subsequent cutting or planning shall be properly painted with the same preservative solution specified above.

Where timber is to be treated for fire resistance, the Engineer shall be provided with .details of the proposed material for approval.

ZEA 3 DESIGN AND FABRICATION

ZEA3.1 Design

All trusses shall be designed by a registered professional engineer in accordance with SABS Code of Practice 0163 Part 1 by a firm approved by the Architect. Trusses shall be designed for a live load of 0,50 kN/m while dead loads, slope and pitch of trusses, spans and other special considerations are to be determined from the tender drawings.

ZEA3.2 Shop Drawings

Two prints of the detailed shop drawings and one copy of the design calculations shall be submitted to the Architect for approval a minimum of two weeks prior to the commencement of manufacture of trusses. One copy of the drawings marked up for correction will be returned to the designer/fabricator for correction and a corrected sepia is to be submitted to the Architect prior to commencement of manufacture of trusses.

ZEA3.3 Fabrication

The trusses shall be constructed with jigs especially designed to provide correct cambers and pitches.
All joints are to be close fitted butt joints and made by precision pressing of the metal connector plates into each side of the joint.
The timber roof trusses shall be fabricated in a properly equipped factory by an approved specialist firm of Truss Fabricators using metal plate connectors.
Nailing to "Hurricane" clips, cleats and "U" brackets shall be with 2,8 mm x 40 mm galvanised clout nails.

ZEA 4 ERECTION

The erection and bracing of pre-fabricated timber roof trusses shall be carried out in accordance with the manual titled "The Erection and Bracing of Timber Roof Trusses" as produced by the Truss Plate Association of Southern Africa and the National Timber Research Institute of the CSIR. The quality of the timber used for bracing must be at least Grade M4 or better. The provision of suitable holding down arrangements of trusses to walls is essential and is to be provided and built into walls by the main contractor. The designer of the trusses shall confirm in writing to the Architect that the trusses have been erected and braced to his satisfaction.

ZEA 5 PRICING

The price tendered by the fabricator of the prefabricated timber roof trusses shall include for:

All design and drawings costs

The supply of all timber of the required grade and type including all cutting and waste, cutting to exact length and end angles necessary to manufacture the respective truss types, the supply of all connector plates, prefabrication of the trusses in a jig, checking the completed trusses for quality, loading up, transporting to the site of the works and unloading.

Unloading and storing under cover and protecting from the weather.

Hoisting up and erecting the trusses at the required truss centres, truly plumb and square on top of the wall plates, all in accordance with the working drawings including all bracing, holding down and metal connections supplied by the truss fabricator.

Site supervision to ensure that all erection details have been complied with satisfactorily

ZG1 SCOPE

This section of the Specification covers all aspects of roof and wall cladding and rainwater items such as gutters and down pipes as well as the supply of materials and labour.

The Contractor must submit sheeting layout drawings and material take-off lists in duplicate to the Engineer for approval at least 3 weeks before commencement of ordering of material.

The Engineer will return one copy of the Contractor's drawings and material lists within 2 weeks of receipt. These will be corrected where necessary and stamped "Approved in Principle".

ZG2 MATERIALS

ZG 2.1Standards

All materials used in the Works shall comply in all respects with the following standard specifications, the latest issues of which shall be held to apply:

SABS542 : Concrete roofing tiles.
SABS685 : Asbestos-cement sheets (Corrugated and flat). SABS934 : Hot dip (galvanised) zinc coatings on steel and strip.

ZG 2.2 Galvanised Steel Items

ZG2.2.1 Roofing and Cladding

The I.B.R. roof sheeting and wall cladding shall have five box rib flutes 37 mm deep, spaced at 171,5 mm centres providing a nett laid cover width of 686 mm and shall be manufactured from plain or embossed galvanised steel sheet in 0,6 mm, 0,8 mm or 1,0 mm thickness with Z275, Z450 or Z600 spelter. Where possible, the sheets shall be a single length, from eaves to eaves for roofs and from floor to roof or as otherwise indicated for walls. However, if these lengths are greater than standard sheet lengths, the number of laps shall be kept to a minimum and shall conform to the manufacturer's recommendations for the roof slopes indicated.

The roofing and cladding shall be complete with all necessary matching flashings, ridging, hip and corner coverings, ridge and eaves closers, etc., with material thickness and spellers as above except that all flashings to be 0,8 mm thick.

ZG2.2.2 Gutters and Rainwater Downpipes

Sizes and shapes of the gutters and down pipes with galvanised mild steel brackets and clips shall be as shown on the drawings and shall be galvanised sheet steel 0,8 mm thick.

ZG2.2.3 HailGuards

Hail guards shall be 2 mm diameter crimped galvanised steel wire woven into a mesh with 12 mm x 12 mm openings.

ZG2.2.4 Bird Proofing

Bird proofing shall be of 2 mm diameter crimped galvanised steel wire woven into a mesh with 12 mm x 12 mm openings.

ZG2.2.5 Roof Ventilators

Roof ventilators shall be an approved type of galvanised sheet steel ventilator, complete with the necessary framework, flashings, etc. Where the buildings have ceilings, the ventilators shall be fitted with extension shafts from the roof to the ceiling with a suitable and aesthetically acceptable grill at the ceiling.

ZG2.2.6 Internal WallPanelling

Internal wall panelling shall be standard "Robertson Horizontal Q Panel" or equal approved manufactured from 1,2 mm thick galvanised sheet steel. The panelling shall consist of 54 mm deep x 320 mm wide interlocking units except for closure units where specials may have to be manufactured.

ZG 2.3 Asbestos-Cement Items

ZG2.3.1 Roofing and Cladding

Asbestos-cement sheeting for roofs and wall cladding shall be of the corrugated type or as otherwise required, of best quality and to the approval of the Engineer. Where possible, the sheets shall be a single length, from eaves to eaves for roofs and from floor to roof or as otherwise indicated for walls. However, if these lengths are greater than standard sheet lengths, the number of laps shall be kept to a minimum and shall conform to the manufacturer's recommendations for the roof slopes indicated.

The roofing and cladding shall be complete with all the necessary flashings, ridging, ridge finals, hip and corner coverings, ridge and eaves closers, fascias, barge boards, etc., and these shall be of the sizes and shapes necessary to suit the sheeting.

ZG2.3.2 Gutters and Rainwater Downpipes

Sizes and shapes of the gutters and down pipes with aluminium brackets and clips and other accessories shall be as shown on the drawings.

ZG2.3.3 Bird Proofing

Sizes, shapes, and types of bird proofing shall be as indicated on the drawings.

ZG2.3.4 Roof Ventilators

Roof ventilators shall be of a type approved by the Engineer and shall be complete with all the necessary accessories. Where the buildings have ceilings, the ventilators shall be fitted with extension shafts from the roof to the ceiling with a suitable and aesthetically acceptable grill at the ceiling.

ZG 2.4 Translucent Sheeting

It shall be manufactured from 2,4 kg/m2 (heavyweight) "Paxit" (Paxit Pipekor Everite) fibre glass to SABS 1150 - 1984, "Opalescent 65" coated both sides with surface tissue.

ZG 2.5 Aluminium Flashings

Where aluminium flashings are called for, these shall be 1 mm thick.

ZG 2.6 Concrete Roofing Tiles

Concrete roofing tiles shall comply with the requirements of SABS 542.

ZG3 EQUIPMENT

The Contractor shall provide and maintain in good working order, adequate equipment for carrying out the required work in accordance with this specification in a safe and efficient manner.

ZG4 INSTALLATION

ZG 4.1General

The erection of roof sheeting, concrete roof tiles, cladding, accessories and translucent sheeting shall be in accordance with the manufacturer's recommendations.

All laps in roof sheeting, wall cladding, translucent sheeting, and accessories shall be sealed with an approved sealant to the manufacturer's specification which shall be approved by the Engineer prior to use.

All swarf, grindings, and surplus fasteners shall be removed from the roof sheeting, cladding, translucent sheeting and accessories after completion.

All holes for fasteners in roof sheeting, wall cladding, translucent sheeting, accessories, purlins and sheeting rails shall be drilled. (Asbestos cement cladding only)

All roofing and wall cladding fixed to buildings shall be waterproof.

Joints in brickwork shall be raked out for flashings and pointed with cement mortar after fixing of flashings.

ZG 4.2 Roofing and Cladding

ZG4.2.1 Galvanised Steel

Roofing, cladding and accessories shall be fixed to steel purloins and sheeting raiis with hexagon headed No.14 carbon steel top speed fasteners each complete with a 20 mm x 7 mm galvanised bonded washer. Longer drive screws generally 90 mm are to be used with timber purloins.

The sides of the galvanised sheets shall be lapped over for a minimum of one flute or according to the manufacturer's recommendations and shall be sealed and stitched with 25 mm long hexagon headed No.14 carbon steel top speed fasteners, each complete with a 20 mm x 7 mm galvanised bonded washer.

End laps shall only occur at purlins and girts and each sheet shall extend beyond the purlin by 150 mm (min) and the girt by 75 mm (min) to give laps of 225 mm and 150 mm (min) respectively.

Roof sheeting shall be laid with the narrow flutes, uppermost whereas the broad flutes shall be fixed externally for the wall cladding.

All Internal wall panelling shall be welded or screwed to the steel columns of the building framework.

ZG4.2.2 Asbestos-Cement

The sheets shall be laid with the smooth side upward for roofing and outwards for cladding and shall be sawn to the correct mitre before fixing. The sheets shall be laid with a minimum end lap of 150 mm and a side lap of 45mm.

Where roof slopes are less than 20' or where specially directed end laps shall be increased and side laps shall be bedded in an approved bitumen mastic.

When laying sheets, consideration shall be given to correct direction of lapping away from the direction of prevailing winds.

Sheets shall be secured to steel members with hook bolts and to timber members with drive screws. The hook bolts and drive screws shall be 8 mm diameter mild steel sherardized and dipped in epoxy tar compound of an approved make and supplied with one nut each where applicable, one conical washer and one bitumastic felt or approved plastic washer, the latter to be placed in contact with the sheet in each case. The hook bolts shall be of the correct length and shall not project more than the length of three thread pitches beyond the nut in the tightened position.

Sheets shall be fixed through the crown of the second corrugation from the side lap and for intermediate rows, one hook bolt or drive screw per sheet per purloin. Eaves shall be fixed by two hook bolts or drivescrews per sheet.

ZG 4.3 Gutters and Rainwater Downpipes

ZG4.3.1 Galvanised Steel

Gutters shall be manufactured with beaded edges and shall be lapped for a minimum of 75 mm at each joint. All joints shall be pop-rivetted and sealed with silicone sealant.

Gutters shall be fixed on suitable galvanised mild steel brackets and shall fall to the outlets as shown on the drawings. The brackets shall be accurately bent to shape with the outer edge clipped over the beaded edge of the gutter and fixed to the roofing in an approved manner.

The seams of the down pipes shall be folded and all slip joints shall be pop rivetted.

The downpipes shall be fixed 25 mm clear of the finished wall face or structure by suitable galvanised mild steel brackets which shall be fixed to the walls.

ZG4.3.2 Asbestos-Cement

Gutters and downpipes shall be erected to the manufacturer's instructions and recommendations.

ZG 4.4 Hail Guards

Where called for, hail guards shall be fitted over the full length of the gutters and shall be supported on suitable stools at approximately 500 mm centres.

ZG 4.5 Bird Proofing

Bird proofing shall be fixed at the eaves of buildings and where otherwise required in an approved manner as shown on the drawings.

ZG 4.6 Roof Ventilators

Roof ventilators shall be mounted on the roofs of buildings where shown on the drawings in an approved manner.

ZG 4.7 Internal Wall Panelling

All units of internal wall panelling shall be welded or screwed to the steel columns of the building framework.

ZG 4.8 Translucent Sheeting

Translucent roofing and cladding sheets shall be fixed in position in accordance with the manufacturer's recommendations.

ZG5 TOLERANCES

The structural properties of the galvanised steel roof cladding must be such that the load given below can be supported by the roof cladding over the given spans within the defined limited deflection:

Maximum super imposed distributedload: 1,5 kPa" Maximum deflection: 1/200th of span Maximum required spans:
Single span 1,85m

Double span 2,15m

Cantilever 0,45m

The structural properties of the galvanised steel wall cladding must be such that the load given below can be supported by the wall cladding over the given spans within the defined limited deflection:

Maximum super imposed distributed load: 0,75 kPa Maximum deflection: 1/120th of span Maximum required spans:
Single span 2,85m

Double span 3,15m

Cantilever 1,15m

ZG6 TESTING

As the Contractor is fully responsible for ensuring that the quality of all work produced, both in respect of materials used and of workmanship, he shall carry out sufficient control tests as the Engineer considers are necessary to ensure that all work is carried out within the specifications.

ZG7 MEASUREMENT ANDPAYMENT

Measurement and payment for all items under this section shall be according to the units and rates determined from the Schedule of Quantities and the rates quoted will be deemed to cover the items of work finished complete in every respect.

ZH1 SCOPE

This section of the Specification covers the installation of the potable water system, soil waste and vent systems and plumbing fixtures as well as the supply of all materials and labour.

ZH2 MATERIALS

ZH 2.1 Standards

All materials used in the Works shall comply in all respects with the following standard specifications, the latest issues of which shall be held to apply:

SABS62 : Steel pipes and pipe fittings up to 150 mm nominal bore suitable for screwing to ISO R7 pipethreads

SABS151 : Fixed electric storage water heaters SABS226 : Water taps
SABS242 : Stainless steel sinks with draining boards for domestic use SABS460 : Copper and copper alloy tubing
SABS497 : Glazed ceramic sanitary-ware SABS509 : Malleable cast iron pipe fittings
SABS558 : Cast iron surface boxes and manhole and inspection cover sand frames

SABS559 : Vitrified clay sewer pipes and fittings SABS677 : Concrete non-pressure pipes
SABS746 : Cast iron pipes and pipe fittings for use above ground in drainage installations

SABS776 : Copper alloy gate valves

SABS906 : Stainless steel wash hand basins and wash troughs SABS907 : Stainless steel sinks for institutional use
SABS921 : Pitch impregnated fibre sewer pipes and couplings SABS924 : Stainless steel stall urinals
SABS966 : Components of unplasticized PVC pressure pipe systems.

SABS967 : Un plasticized PVC pipes and pipe fittings for use above ground in drainage installations

SABS974 : Rubber joint rings(non-cellular) SABS058 : Sewer and drain jointing
SABS074 : Identification of pipeline contents

SABS 0140 : Identification colour marking Part
BS1115: Cast iron gratings for gullies and stormwater drains

BS1211: Centrifugally cast (spun) iron pressure pipes for water, gas,and sewage

ZH 2.2 General

All materials, fixtures and equipment shall be of the best quality and of approved manufacture, new, undamaged in any way and shall bear the manufacturer's name and grading.

ZH 2.3 Electric Hot Water Geysers

Electric hot water geysers shall be of an approved type and manufacture, and of the type and capacity specified on the drawings and shall comply with the requirements of SABS 151 and be marked accordingly.

Geysers shall be a high pressure type (300 kPa), with a dry element, complete with an approved type of automatic pressure control and vacuum safety valve.

ZH 2.4 Wash hand Basins for Offices and Houses

Unless otherwise specified, wash-hand basins shall be one of the following types:

Cast iron wash-hand basins shall be of an approved manufacture of minimum overall dimensions 550 mm x 400 mm, with a mass of not less than 20 kg constructed from clean cast iron to an approved shape and finished on the inner face, rim, edges, etc., with white porcelain enamel, which shall be free from all blemishes and be of even thickness over the whole surface, and the outside shall be painted

Vitreous china wash-hand basins shall be of minimum overall dimensions 550 mm x 400 mm, with a mass of not less than 14,5 kg, constructed from vitreous china finished with a vitreous lead less glaze thoroughly fused and united to the body, all complying with the requirements of SABS497.

ZH 2.5 Wash-hand Basins and Wash Troughs for Workshops and Ablutions

Unless otherwise specified, stainless steel wash-hand basins shall be of approved manufacture of type 3041,2 mm thick stainless steel with splash backs of approved height and shall otherwise comply with SABS 906 and SABS 242.

Basins shall be of minimum overall dimensions 520 mm x 400 mm, and shall be fixed in position on approved 25 mm diameter stainless steel pipe stands fixed to walls and floors in an approved manner.

Stainless steel wash troughs shall be of approved manufacture of type 304 1,2 mm thick stainless steel and shall otherwise comply with SABS 906 and to be of one piece pressed construction.

ZH 2.6 Fittings to Wash-hand Basins

Wash-hand basins shall be fitted with a 32 mm diameter, threaded, brass waste union, a chromium-plated brass flange and grating, a black vulcanite plug on a chromium-plated chain "Flexi" Butyl rubber trap or approved equal, and one pair of 15 mm diameter "Easy Clean" heavy pattern chromium-plated screw down pillar taps marked with red and green identification spots are separately measured. Where only cold water is supplied, the basin shall be fitted with one pillar tap with a green identification spot (separately measured) and the second tap hole in the basin shall be plugged with a cemented-in fireclay or china plug.

ZH 2.7 Baths

Unless otherwise specified, baths shall be first grade, of cast iron with rectangular top, porcelain enamelled inside and painted outside. Baths shall be fitted with 38 mm diameter waste connection, overflow, plug, and chain. Two 15 mm "Easy Clean" heavy pattern chromium-plated bib taps marked with red and green identification spots and a "Flexi" Butyl rubber or equal approved trap are separately measured.

ZH 2.8 Stainless Steel Sinks and Drainers

Stainless steel sinks and drainers shall be manufactured from Type 304 stainless steel, and shall comply with the requirements of SABS 242 for domestic uses, or with SABS 907 for other uses.

All units shall be treated on the underside with a vermin-proof sound deadening material that shall be sprayed on at the factory. All units shall be clearly embossed or stamped, either on the unit itself, or on an attached plate, showing the name, trade name or registered trade mark of the manufacturer and the grade of material used. Each sink for institutional use shall be complete with a 150 mm splash back, a slot overflow, a 40 mm diameter threaded brass waste union, a chromium-plated brass flange and grating, a black vulcanite plug on a chromium-plated chain, and a "Flexi" Butyl rubber trap or approved equal. Where specified, the drainers shall be complete with a tiling key along the back edge and along one or both ends.

ZH 2.9 Shower Fittings

Unless otherwise specified, each shower cubicle shall be fitted complete with the following fittings which shall be of approved manufacture and pattern:

One pair of built-in type 15 mm diameter heavy pattern chromium-plated shower valves fitted with red and green identification spots. (measured separately)

One "Castle Brass No. AP2-6" vandal proof chromium-plated cast brass shower rose, or approved equal or a 50 mm diameter chromium plated shower rose for screwing to 13 mm pipe as called for on the drawings. (measured separately)

One cast brass heavy pattern shower trap with hinged chromium-plated grating. (measured separately)

One "Vaal No. 6031" soap holder, or approved equal, 150 mm x 150 mm semi-recessed, tongue lipped, white earthenware, built into one wall. (measured separately)

(One full-length heavy-duty plastic shower curtain, complete with chromium-plated rail and fittings, and with heavy-duty plastic curtain rings. The colour of the curtain shall be approved by the Engineer.

ZH 2.10Sanitary Fittings

Low level W.C. suites shall consist of "Vaal Protea" or approved equal, white vitreous china closets with "S" or "P" traps and seat lugs, matching flat bottom flushing cisterns with left-hand or right-hand outlets, with or without vents, complete with brackets, ball valves, flush pipes connected to flushing rims of pans with rubber cone joints; solid, heavy duty double flap, plastic toilet seats with hinges and buffers; and with brass gate valves for isolation or maintenance (valves separately measured).

Toilet paper holders shall be "Vaal No. 6030" or approved equal, 150 mm x 150 mm semi- recessed, white earthenware, complete with wood or plastic spring loaded rollers, fitted next to all W.C. pans or an approved stout chromium plated toilet paper holder plugged to the wall as called for in the Schedule of Quantities.

ZH 2.11Stainless Steel Urinals

Stainless steel urinals shall be "Citimetal" Model CS102 or approved equal, manufactured from Grade 304 stainless steel, and comply in all respects with the material requirements and constructional details laid down in SASS924.

The urinal shall be of one piece construction approximately 1,2 m high, with a tilling key at the top, complete with an automatic built-in flush system, having a curved back, end panels, channel, and tread plate, and with the channel outlet fitted with a chromium-plated brass grating and frame with a threaded tail for jointing to the outlet pipe.

All urinals shall be clearly embossed or stamped, either on the unit itself, or on an attached plate, showing the manufacturer's name, trade name or registered trademark and the grade of material used.

ZH 2.12Mild Steel Pipes and Fittings

Galvanized mild steel piping for water supply and waste drainage shall be solid drawn seamless mild steel pipes, galvanized inside and out, complying with the requirements of SABS 62 medium class

All threads shall be tapered. Parallel threads will not be acceptable.

Flexible joints for galvanized mild steel pipes shall be "Viking-Johnson Junior Couplings" or approved equal.

Fittings for water piping shall be best quality malleable iron pipe fittings of approved manufacture, complying with the requirements of SASS 509.

Fittings for waste piping shall be best quality cast brass of approved manufacture. The fittings shall be of full bore, smooth and clean inside and outside and with sharply cut threads. Cleaning eye fittings shall be fitted with brass spanner headed caps, threaded and screwed into position. Unless otherwise specified cleaning eyes shall be used at all changes in direction of waste pipes.

ZH 2.13Cast Iron Pipes and Fittings

Cast iron pipes and fittings for waste pipes underground and vent pipes above ground shall be heavy duty and comply with the requirements of SS 1211, be of approved manufacture, be approved before being installed and shall be badged with the manufacturer's name and trade name.

Cast iron pipes and fittings shall be coated internally and externally with an approved bituminous preservative.

Cast iron pipes and fittings shall be dark grey in colour when fracture tested and be such that they may be easily drilled, tapped and filed.

"Timesaver" couplings or approved equal shall be used for plain ended pipes and fittings.

ZH 2.14Vitrified Clay Pipes and Fittings

Vitrified clay, spigot and socket pipes and fittings for soil pipes underground shall comply with the requirements of SASS 559. Plain ended pipes with specified or other approved jointing systems may be used.

The pipes and fittings shall be of the diameter specified.

Each length of pipe and each fitting shall be legibly marked with the manufacturer's name, trade mark or trade name, and the SASS mark,

Rubber sealing rings complying with SASS 974 shall be used at joints of socketed vitrified clay pipes and fittings, except for oily sewers where the sealing rings shall be neoprene complying with SASS 974 Class S.

ZH 2.15Concrete Pipes

Unless otherwise specified, concrete pipes shall comply with the requirements of SASS 677 for Class "C", Type "SC" spigot and socket pipes. These concrete pipes shall be used below slabs, loading platforms, etc., to convey rainwater discharged from downpipes.

ZH 2.16PVC Pipes and Fittings

Rigid PVC pressure pipes and fittings for cold water supply and soil and vent pipes and fittings shall comply with the requirements of SASS 966 and SASS 967 respectively.

ZH 2.17Copper Tubes

Copper tubes shall be of the best quality, of approved manufacture and shall comply with SASS 460 when fixed in buildings. Copper tubing shall only be used at connections to fixtures and the length of tubing used shall be kept to a minimum.

ZH 2.18Pitch Fibre Pipes and Fittings

Pitch impregnated fibre sewer pipes and fittings shall comply with the requirements of SASS 921.

ZH 2.19Water Taps and Valves

All water taps and gate valves shall be of the best quality and manufacture, complying with the requirements of SABS 226 and SABS 776 respectively.

Taps for internal use shall be heavy pattern chromium plated smooth faced easy-clean type, with hot and cold badges where applicable. Taps for external use shall be heavy pattern polished brass hose type.

Gate valves shall be "Prestex" cast brass full way gate valves or approved equal.

15 mm diameter brass "L. K. connector type angle valve", or approved equal, shall be used below wash-hand basins, etc., where called for on drawings.

ZH 2.20Traps

Brass traps shall be solid cast brass traps with even and clean bores, fitted where specified with a screwed inspection opening cast into the body with a spanner headed cap screwed in. Butyl rubber traps shall be "Flexi" or equal approved and fitted where specified.

Traps for waste drainage outside buildings shall be 1 00 mm diameter vitrified clay or pitch fibre gulley traps or 100 mm diameter vitrified clay or pitch fiber universal traps with hopper heads with one, two or three vertical or side inlets, encased in Class 15/19 concrete. Each trap shall be fitted with a cast iron hinged grating and frame, with brass locking fittings, set on cement mortar.

ZH 2.21Cast Iron Surface Boxes

All surface boxes for valves, inspection eyes, etc., shall be of the sizes and weights specified or shown on the drawings, complying with the requirements of SABS 558 and coated with an approved preservative solution before leaving the manufacturer's works.

ZH3 EQUIPMENT

The Contractor shall provide and maintain in good working order, adequate equipment for carrying out the required work in accordance with this Specification in a safe and efficient manner.

ZH4 INSTALLATION

ZH 4.1 General

All drainage work, sanitary work and plumbing work shall be executed in accordance with the regulations and by-laws of the Local Authorities and to the satisfaction of the Engineer. Only licensed drain layers are to be employed in a skilled capacity for pipe laying.

Plumbing shall be installed in conformance with building and structure conditions. Wherever possible, all pipes shall be positioned before the walls, etc. are built, in order that the pipes may be built into the walls, floors, etc. However, where this is not feasible, the walls shall be chased using carborundum or diamond tipped cutting tools to cut the sides, followed by a sharp chisel to finish the chase. Pipes fixed in chases shall be firmly fastened in position with saddles fixed at minimum 1000 mm centres and a maximum of 150 mm from wall entry or exit points. Depths of pipes below brick or concrete surfaces to receive plaster shall be a minimum of 3 mm to any portion of the pipe or fillings failing which the chases shall be covered by a layer of expanded metal latching minimum 0,8 kg/m 100 mm wider than the chase prior to plastering. Exposed piping shall be parallel with, or at right angles to walls or structures. Provision shall be made for expansion and contraction without undue stress in the piping systems.

Plumbing shall be carried out in strict accordance with the drawings. No deviations from the drawings may be made without written approval from the Engineer

Water and sewer pipelines shall be a minimum of 300 mm apart, horizontally and vertically.

All WC pans and wash basin pedestals shall be fixed with stout brass cup headed screws to lead plugs embedded in the floor and flush with granolithic or floor tiles. All cisterns, wash basins, and urinals shall be fixed flush to, tiled, plastered, bagged or smooth brick walls with bolts cast in.

Hot and cold water connections as well as all necessary traps and waste pipes, are to be made to wash basins, sinks, showers, cisterns, etc.

Electric geysers shall be mounted as shown on the drawings and all hot water piping shall be laid inside buildings. Approved pressure control valves shall be fitted to the cold water supply to the geysers.

All holes or chases in walls, ceilings, etc. , as well as making good to all finishes, shall be included For under the respective plumbing and drainage items.

ZH 4.2 Mild Steel Piping

Teflon tape, or approved equal, shall be applied to make threads of screwed joints in the direction of the threads and wound from the barrel of the pipe to the open end.

The interior of all threaded pipes shall be reamed to remove burrs and all scale shall be removed from the inside of the pipes.

Welding shall not be permitted on galvanized mild steel piping.

Unions or flanges shall be provided at connections to each piece of equipment and elsewhere as required for system maintenance. When connecting dissimilar metals, insulating couplings shall be used.

If a reduction in the size of a pipe takes place at an angle, the bend or elbow shall be of the size of the inlet or larger pipe.

ZH 4.3 Cast Iron Piping

Pipes shall be accurately laid and jointed in accordance with SABS 058.

Spigot and socket joints shall be caulked with hemp rope to half the depth of the socket and completely filled with molten lead in one pour. Other approved caulking compounds may be used if approved by the Engineer.

ZH 4.4 PVC Pressure Piping

PVC pressure pipe systems shall be laid and jointed in strict accordance with the manufacturer's instructions and recommendations.

ZH 4.5 Fixing of Pipes

Mild steel pipes less than 50 mm in diameter shall be fixed to walls with galvanized malleable iron "School Board" pattern brackets. Pipes over 50 mm in diameter shall be fixed with galvanized hinged holder bats, fastened with brass pins or bolts. The brackets or holderbats shall be built into the wall with cement mortar. Pipes fixed to timbers shall be secured with strong galvanized iron pipe clips screwed to the woodwork. Pipes laid in clay or in earth with a high acidic level shall be wrapped in "Denso" or other approved wrapping tape.

Cast iron pipes shall be fixed to walls or structures with cast iron hinged holderbats fastened with brass pins, or bolts, fixed into walls with cement mortar, or secured with bolts to wood framing.

Pipe supports shall be spaced at the following minimum distances:

	Horizontal Pipes	Vertical Pipes
For cast iron	1,830m	1,830m
For mild steel		
Up to 20 mm diameter	1,200m	1,830m
From 25 mm diameter up to 40 mm diameter	1,830m	2,450m
From 50 mm diameter up to 100 mm diameter	2,450m	3,050m

Pipes shall be inclined, so that no air can lodge therein and shall generally fall towards the main pipe to ensure complete emptying.

ZH 4.6 Insulation of Pipes

Insulation of pipes shall be executed where specified with sectional pipe lagging, comprising a compressed resin bonded glass or mineral wool casing covered with hessian or canvas. The running joints shall be secured with clipped-on, galvanized hoop iron bands. Insulation of bends, tees, etc., on pipelines to be lagged, shall be executed with a bandage strip of resin bonded glass or mineral wool wrapped securely around the fitting and covered with an asbestos compound cement.

Where required, exposed hot water pipes shall be insulated to prevent injury.

ZH 4.7 Gate Valves

Gate valves shall be fitted to service pipes at points of entry to each separate building, or at each separate connection to a building.

Gate valves shall be fitted on branch lines longer than - 3 meters, servicing one or more fixtures.

Gate valves shall be fitted to isolate individual fixtures.

Unless otherwise specified, gate valves shall be the same diameter as the pipe.

ZH 4.8 Trenching

The sides of trenches for drainage pipes shall be excavated as nearly vertical as possible. Trenches shall not be excavated wider than required to allow adequate working space for laying and jointing the pipes. The bottoms of the trenches shall be evenly graded and firm to the proper inclinations. Should the proper depth of trench excavations be exceeded by carelessness or in error, the Contractor shall, at his own expense, cause such excessive depth to be filled up to the proper level and compacted. Uneven bottoming in rock cutting shall be filled with weak concrete.

All planking, strutting and shoring which may be necessary for maintaining sides of excavation, shall be carried out. Any parts of trenches that fall in through insufficient support will be required to be cut out, if necessary, to a square section filled with compacted backfilling and the extra excavation and backfilling thereby required shall be filled in at the Contractor's expense.

Trenches shall be kept clear of water during the progress of the work by pumping or other adequate means, where necessary. All drainage sumps shall be sunk clear of the work outside the excavations. The entire expense of replacing or repairing to the satisfaction of the Engineer, any work destroyed or damaged, by rain or flood, shall be borne by the Contractor.

Water pipes laid in ground shall have a clear cover of not less than 500 mm and shall be excavated and backfilled in the same manner as for drainage pipes.

ZH 4.9 Drain Laying

Drains shall be accurately laid to the lines and gradients shown on the drawings or as directed, with pipes of the diameter as shown. Barrels of vitrified clay pipes shall be rest on solid ground or alternatively, the pipes may be bedded in concrete which is to be haunched up on both sides of pipes once the joints have been made, tested and approved. In all cases the barrels of vitrified clay pipes shall rest on the ground or be bedded in concrete for at least two- thirds the length of the barrels. All vertical bends, gullies, and traps are to be bedded on and encased in concrete. The laying of PVC and pitch-fiber drains shall be in strict accordance with the manufacturer'sinstructions.

Vitrified clay pipes shall be jointed with a gasket and 2:1 cement mortar as laid down in SABS
Cast iron pipes shall be jointed by caulking with sufficient turns of white hempen yarn to leave unfilled 45 mm depth of socket in the case of 100 mm diameter pipes, and 50 mm depth of socket in the case of 150 mm diameter pipes. These spaces are then to be filled with molten lead and well caulked. PVC and pitch fibre pipes shall be jointed strictly in accordance with the manufacturer's instructions.

Drains shall be provided with all necessary easy bends, junctions, taper pipes, etc., as required. Pipes shall be built into walls of manholes, etc, in 2: 1 cement mortar. Open ends of drains shall be plugged to prevent the entry of soil or mud during wet weather. The drains shall be suitably protected against damage until they have been tested, approved, and covered in. Should they be damaged in anyway, the Contractor shall make good the damage at his own expense.

Where vitrified clay pipes are to be within or connected to a structure, box or manhole, the pipe to be built in shall be a quarter standard length, or shorter if a closure piece is required. To this pipe a half standard length shall be connected followed by standard full length pipes.

Where marked "I.E." on the drawing and at every junction and bend and after all ramps and rodding eyes, inspection (access) eyes shall be provided with stoppers sealed in bitumen.

ZH 4.10Back-filling

After drains have been laid and the initial air test successfully carried out, all hand holes shall first be carefully and solidly filled up under and around sockets. The space around and at sides of pipes and above same shall then be filled carefully with clean, soft, loose, soil, well- watered, until a depth of 300 mm has been reached, after which the filling shall be carefully rammed with a wooden hammer.

The filling of the remaining depths of the trenches shall be carried out in 230 mm layers solidly rammed with iron hammers, weighing not less than 5 kg each until the level of the ground is reached. If required, the Contractor is to have the trench soaked with water whilst the filling is being effected. Top soil, or surfacing material, shall be replaced at the top layer of the filling. No pot clay will be permitted to be used for filling. All surplus material shall be carted away (1 km free haul) or spread on site as directed by the Engineer.

ZH 4.11Ventilation Pipes

Where shown on the drawings or as required, cast iron or PVC ventilation pipes shall be fixed to walls with hinged holder bats built into walls and carried up not less than one meter above roofs. Ventilation pipes shall be connected below to the drains and roofs shall be cut as required and properly flashed at these intersections.

ZH 4.12Construction of Manholes

Manholes shall be constructed in brickwork using NFX type solid clay bricks as detailed on the drawings and fitted with cast iron covers and frames complying with SASS 558 and coated with an approved preservative solution before leaving the manufacturer's works.

ZH5 TOLERANCES

Manufacturing tolerances shall be as laid down in the various standard specifications listed in Clause ZH 2.1.

ZH6 TESTING

ZH 6.1 Underground Drains

Upon completion of each drainage connection, it will be inspected by the Engineer and checked for grade, alignment, cleanliness, and appearance of the inner surface. If found to be satisfactory, an air test shall then be applied. The air test will consist of two tests, one before and one after the trenches have been filled in with fine material to a depth of 300 mm over pipe.

Air tests shall be made with an approved air-testing machine and the portion of the drainage connection to be tested shall be closed with expanding plugs or bladders. An air pressure of not less than 40 millimetres head of water shall be applied and the float will be required to stand for one minute. Should any portion of the work fail to pass the test specified, the fault or faults shall be made good by the Contractor at his own expense and the work shall again be tested. No patching up of pipes, joints or connections will be allowed and all defective pipes must be carefully cut out and made good in a proper manner to the entire satisfaction of the Engineer.

After final backfilling, the drain shall be tested by• passing a smooth rubber ball of diameter 12 mm less than the diameter of the pipe, through the pipe to ensure that no obstruction exists. All appliances, labour and materials necessary for testing, shall be provided by the Contractor at his own expense.

ZH 6.2 Plumbing

Domestic hot and cold water systems shall be flushed out, tested at 700 kPa for one hour and left at supply main pressure for the balance of the construction period.

All outlets of soil, waste and vent pipes shall be plugged and the systems filled with water and individual sections tested with not less than 3 meter water head for one hour with no drop in the water level being permitted.

Plumbing fixtures shall be filled with water and checked for leaks or retarded flow.

All gate valves, taps and similar equipment shall be adjusted to provide for the proper operation of the various systems.

Any leaks and faults found above shall be repaired or replaced and re-tested where applicable.

ZH 6.3 Costs of Tests

The costs of tests described above shall be borne by the Contractor who shall be deemed to have included these costs in the scheduled rates for plumbing and drain laying.

ZH7 MEASUREMENT ANDPAYMENT

Measurement and payment of plumbing and drain laying items shall be according to the units and rates determined from the Schedule of Quantities and the rates quoted will be deemed to cover the item of work finished complete in every respect.

ZI1 SCOPE

This section of the Specification covers the supply and fixing of glazing.

ZI2 MATERIALS

ZI2.1 Standards

All materials used in the Works shall comply in all respects with the following standard specifications, the latest issues of which shall be held to apply:

SABS680 : Glazing putty for wood and steels ashes.

BS Code of : Glazing and fixing of glass for buildings. Practice152

ZI2.2 Glass

All glass shall be of such quality that surface deterioration will not develop after glazing. All glass shall be free of bubbles, waviness, scratches, stains and other imperfections.
Unless otherwise specified, sheet glass for glazing shall be fiat drawn clear glass of ordinary glazing quality and of the thickness specified in the following table for the various sizes of glasspanes:

Surface Area of Glass Pane	Thickness of Glass
Not exceeding 0,5m²	3mm
Exceeding 0,5m² and not exceeding 1,5m²	4mm

Polished plate glass for glazing shall be transparent polished plate glass of "GG" quality and, unless otherwise specified, shall be 6 mm thick.

Obscure glass for glazing shall be 3 and 4 mm thick "Pacific" or other approved pattern.

Wired transparent glass for glazing shall be 6 mm thick polished "Georgian" or other approved wired glass.

Wired obscure glass for glazing shall be 6 mm thick rough cast "Georgian" or other approved wired glass.

Glass louvre blades shall be 6 mm thick drawn sheet with the exposed edges rounded and smoothed.

ZI2.3 Mirrors

Mirrors shall be or the outside dimensions as shown on the drawings and 6 mm thick high Quality polished plate glass with multiple coated copper backing giving a bright silver reflective surface. The edges shall be rounded and polished.

Alternatively mirrors shall be of 1,2 mm bright polished stainless steel of Grade 18/8 with rounded and smoothed edges.

ZI2.4 Putty

The putty shall be delivered to site in sealed containers badged with the SASS mark and the following information clearly legible on the container:

The manufacturer's name or brand name of the product orboth.
The words "Wood-sash glazing putty Type I" or "Steel-sash glazing putty TypeII".
The batch number and the date of manufacture.

Type I putty as specified shall only be used for glazing in wood sashes and Type II for steel sashes.

Where putty is used for glazing in unpainted hardwoods, it shall be tinted to match the colour of the wood.

Putty shall not be too hard or soft or caked when used and shall dry evenly without crazing .; orcracking.

Defective putty shall be cut out and replaced by the Contractor at his own expense, including replacing broken glass and paintwork

ZI3 EQUIPMENT

The Contractor shall provide and maintain in good working order, adequate equipment for carrying out the required work in accordance with this specification in a safe and efficient manner.

ZI4 GLAZING ANDFIXING

Industrial type windows shall be glazed from the inside and all other windows from the outside.

Glass shall be cut in panes to suit all glazed openings required, with sufficient clearance all round to prevent cracking by expansion, contraction or vibration. All panes of figured or textured glass shall be uniform in appearance with the pattern parallel to the edges and wire woven glass shall be so cut that the wires are parallel to the edges.

Glass rebates other than in unpainted wood, shall be primed before glazing.

Glass panes exceeding 0,5 m in area, fixed in wood frames without glazing beads, shall be secured in position with glazing sprigs and putty.

Glass panes exceeding 0,5 m in area, fixed in steel frames without glazing beads, shall be secured in position with glazing pegs or clips inserted in holes in the steel frames and putty.

In all cases the glass shall be well bedded and back puttied.

All putty shall be carefully trimmed, cleaned off and be neatly finished off to within 3 mm of the sight lines. The putty shall be straight with smooth surfaces and sharp mitres.

No soft or oily putty shall be covered with paint until it is rectified. All putty shall have formed a surface crust and have a smooth finish before any paint is applied. A paint primer shall be applied as soon as the putty has sufficiently dried out to reduce shrinkage cracks forming.

Glass panes fixed with glazing beads in unpainted hardwood doors or sashes shall be bedded on strips of wash leather, neoprene, felt, velvet or rubber, turned over on both faces of the glass in the rebates, to form a soft packing between the glass and the woodwork.

The edges of all plate glass shall be "blacked" and 6 mm thick float or plate glass shall be glazed in PVC glazing channels.

The whole of the glazing shall be cleaned before the premises are handed over for occupation. Should any glass be cracked or broken prior to handing over the building, the same shall be replaced by the Contractor at his own expense.

Mirrors shall be fixed to walls with four C.P. mirror screws and rubber washers behind, screwed to plugs in the wall.

ZI5 TESTING

As the Contractor is fully responsible for ensuring that the quality of all work produced, both in respect of materials used and of workmanship, he shall carry out sufficient control tests as the Engineer considers are necessary to ensure that all work is carried out within the Specifications.

ZI6 MEASUREMENT ANDPAYMENT

The unit of measurement for all glazing work shall be the square metre (m^2) of the specified glass installed and the rate shall include for all supply, cutting, fitting, putty application, priming and cleaning.

ZJ1 SCOPE

This section of the Specification covers all aspects of surface preparation and painting of interior and exterior surfaces such as timber, metal, plaster, concrete and structural steel work as well as the supply of all materials and labour.

ZJ2 MATERIALS

ZJ 2.1 Standards

All materials used in the Works shall comply in all respects with the following standard specifications, the latest issues of which shall be held to apply:
Surface Preparation

SIS055900 : Pictorial Surface Preparation Standards for Painting SteelSurfaces. Primers
SABS312 : Red lead based primers for structural steel -Type II, Grade II SABS678 : Primers for wood for interior and exteriors
SABS679 : Zinc chromate primers for steel SABS723 : Wash primer (metal etch primer)
SABS912 : Calcium plumbate primer Undercoat
SABS681 : Undercoats forpaints Finishes
SABS515 : Decorative paint for interior use

SABS630 : Decorative high gloss enamel paints for interior and exterior use -Grade I

SABS631 : Decorative oil gloss paint for interior and exterior use SABS633 : Emulsion paints for interior decorative purposes SABS634 : Emulsion paints for exterior use
SABS682 : Finishing paint, aluminium type SABS683 : Roof paints -Type B
SABS684 : Structural steel paint -Type B SABS801 : Epoxy-tarpaint
SABS887 : Varnish for interior use

ZJ 2.2 General

Samples and/or laboratory reports of the materials shall be submitted to the Engineer if and when required.

The Contractor shall provide the following information and details of the paints and decorative materials he proposes to use:

The name of the manufacturer and trade name.
Brand, type or grade of paint.
Manufacturer's data sheets, colour references, instructions for use including surface preparation, sealers, primers, undercoats and finishing coats, all of which shall be considered as being part of these specifications if approved by the Engineer.
Safeguards to protect the applied paint from damage until the work is accepted by the Engineer.
Period of guarantee and details of maintenance, if any, to uphold the guarantee.
Shelf or pot life of materials if applicable.

Where proprietary brands are used, the manufacturer's priming and all subsequent coats of paint suitable for that particular brand shall be employed in accordance with the manufacturer's instructions.

No other materials of a similar character and quality, or another manufacturer may be used instead of those approved, unless permission to do so has been obtained in writing from the Engineer.

All materials shall be brought on to the site in containers sealed by the manufacturer. No paint shall be mixed with another paint of a different quality, type, brand, or colour, or be thinned or adulterated in any way but shall be used as supplied by the manufacturer. Where mixing or thinning is required, it shall be carried out in accordance with the manufacturer's recommendations.

All varnishes and wood sealers shall be approved brands and shall be applied strictly in accordance with the manufacturer's recommendations.

Limewash is to be of 10 parts of fresh unslaked lime; one-and-a-half parts of coarse salt and one part of tallow or boiled linseed oil, all measured by weight. The lime is to be slaked and the salt and tallow or oil are to be well mixed with it whilst it is slaking. After slaking is complete, further water may be added to bring the lime wash to the necessary brushing consistency.

Cement based paint shall be self coloured and waterproof and shall be approved by the Engineer

ZJ3 EQUIPMENT

The Contractor shall provide and maintain in good working order, adequate equipment for carrying out the required work in accordance with this specification in a safe and efficient manner.

ZJ4 APPLICATION

ZJ 4.1 General

Factory finished products shall not be painted unless otherwise specified.

No paint shall be applied over any surface containing traces of dust, grit, grease, oil, etc., loose rust or mill-scale or corrosion products of – anykind.

All surfaces to which paint is applied shall be free from moisture, Unless otherwise specified, paint shall be applied over dry paint surfaces.

Where surfaces are to be welded, no paint shall be applied within 75 mm of the weld position unless otherwise specified.

Steel embedded in concrete shall not be oiled or painted except to 50 mm below the final level of the concrete.

The paint manufacturer's instructions shall be strictly adhered to.

Each priming coat and each undercoat of painting shall be inspected and approved by the Engineer before any subsequent undercoat or finishing coat is applied.

Each coat of paint shall be a distinctive colour. All colour schemes will be provided by the Engineer and samples of the final colours required shall be submitted to the Engineer for approval and the work shall then be finished to the colour or colours as approved and may include different colours and adjoining surfaces, and the Contractor must allow in his prices For painting of walls, etc., in different colours. Where different colours of paint finishes meet at external or internal angles, projecting rails, V-grooves, frames, steel windows, etc., no item for "cutting in" will be measured.

All metal fittings and fastenings shall be removed before the preparatory processes are commenced. On completion the metal fittings and fastenings shall be cleaned and rectified in position.

ZJ 4.2 Inspection

All surfaces to be treated shall be carefully inspected by the Contractor, who shall satisfy himself that the surfaces are in a perfect state to receive the paint or corrosion protection specified. No claim will be entertained arising from defective work as a result of a paint failure due to not strictly insisting on receiving from other trades, surfaces in a proper condition, fit to receive the type of paint specified.

ZJ 4.3 Preparatory Work

Where necessary, surfaces shall be thoroughly washed to remove all traces of soluble salts, grease, and corrosive air-borne contaminants prior to painting, dried and painted immediately thereafter.

Welds and adjacent parent metal shall be deslagged, inspected and approved and all spatters shall be removed prior to painting.

The weld area shall be abrasive blasted and/or ground and all contaminants such as flux shall be removed prior to painting.

Steel surfaces which are to rest on concrete or other floors shall receive the full paint system prior to erection.

Damaged paint areas of steel surfaces shall be cleaned, rust spots removed and spot priming carried out such that the patch painting extends 20 mm beyond the damaged areas.

Where the shop coat to steel surfaces is allowed to age for a few months before painting, light sanding or rubbing with steel wool or scrubbing with clean water using a bristle brush, shall be carried out.

All metal surfaces being painted shall be cleaned of all rust, scale and dirt by scraping or by means of steel wire brushes; also all oil and grease shall be removed and a perfectly clean surface obtained. If necessary, the surface shall be degreased immediately before applying the priming coat, with a suitable alkaline detergent solution and then thoroughly rinsed and allowed to dry; any salt deposits on the metal surfaces as may occur in industrial and marine atmospheres shall be similarly removed before priming.

New galvanised metal surfaces of all non-ferrous metals, which are to be painted, shall be cleaned down as above and given one coat of primer.

After cleaning off rust on metal work, those portions so affected shall be treated with an approved rust inhibitor.

Before painter's work internally is commenced all floors shall be swept clean and dirt and rubbish removed, and the rooms left practically free from dust, dust-free conditions being maintained during the progress of the work.

All plastered wall, ceiling and similar surfaces shall be perfectly dry and in a fit state to receive the finishing, before the work is put in hand.

All surfaces shall be properly prepared before painting, staining, etc. Each coat of paint excepting the last shall be rubbed down with a fine glass paper before the next coat is applied.

All surfaces not being painted such as face brickwork, window sills, floors, and stained woodwork, shall be covered up and protected against paint spots before any painting is commenced.

All plastered wall, ceiling and such like surfaces being painted shall be filled where necessary with suitable stopping or patching plaster, and the whole rubbed down ready to receive the finishing.

Boarded ceilings and cornices being painted shall be filled where necessary with suitable stopping.

Woodwork being painted shall be well sandpapered down, knots treated with knotting, and all surfaces primed, stopped with hard stopping and rubbed down to an even surface ready to receive the paint.

Woodwork being varnished, sealed or stained shall have all plaster stains, pencil marks and other surface discolouration and blemishes carefully removed, and stopped with tinted stopping and well rubbed down.

Nail holes, etc., shall be cleaned out and stopped with an approved filler or stopping after the priming coat of paint.

Backs of timber door frames and similar frames and surfaces of other new or re-fixed joinery in contact with brickwork, etc., and built in as the work proceeds, shall be primed before building in whether the articles are to be painted or not, to prevent moisture seeping into the wood from the mortar bedding.

Tongued, grooved and rebated edges of boards in batten doors and other such like inaccessible parts of joinery shall, before the joinery is assembled, be primed, or where the joinery is to receive a finish other than paint, be given one coat of such other finishing material.

Priming to external structural timbers shall be applied before the timbers are fixed in position, and shall include all wrot surfaces such as backs of fascia and barge boards.

ZJ 4.4 Workmanship and Finishes

Paint may be applied by spray, brush or roller depending on the materials used, the surface to be painted, and the manufacturer's instructions. In cases where spraying is permitted, all

surrounding surfaces shall be properly masked and an approved water trap and air regulating valve shall be furnished and installed on all equipment used in spray painting.

Every coat of paint, irrespective of method of application, shall be adequately and permanently keyed or bonded to the base material or previously applied coat, and shall be evenly distributed, continuous, free from sags, runs, brush marks, pin holes, or other imperfections, and shall dry to a smooth film.

The Contractor shall protect all parts of the structure or fittings against disfigurement by spatters, splashes, and smirches of paint or of paint materials. The Contractor shall be responsible for any damage, paint or dirt caused by his operations to vehicles, persons or property, and he will be required to provide protective measures to prevent such damage and make good where required at his own expense.

Any paint stains which may result in an unsightly appearance shall be removed or obliterated by the Contractor at his expense.

If passing traffic creates sufficient dust to harm or spoil the appearance of painted surfaces, the Contractor shall sprinkle the adjacent roads and shoulders with water at his expense, for a sufficient distance on each side of the location where painting is being done, to keep dust away from freshly painted surfaces. The Contractor shall also furnish and post at his own expense "DRIVE SLOWLY" signs and take other necessary precautions to prevent dust and dirt from adhering onto freshly painted surfaces.

Tinting of undercoats shall be done to distinguish the number of coats applied, or when a light colour has to be applied to a dark surface.

Where white or off-white colours are being used, an additional finishing coat shall be required. The final coat or finishing coat of paint shall be applied after all other work in the building is completed, unless otherwise specified.

The painter shall keep some of the final paint in reserve, in the event of having to make good any patching which may be required as a result of damage or unforeseen circumstances.

Upon completion, the Contractor shall clean all glass, remove all paint spots from walls, floors and fittings and leave the premises clean and fit for occupation.

All inflammable materials, comprising of solvents, thinners, wiping cloths, etc., shall be placed in tightly closed containers and properly disposed of.

ZJ 4.5 Painting of Plaster, Concrete or Brick Surfaces

ZJ4.5.1 Surface Preparation

Surfaces for painting shall be prepared by means of sandpapering, scraping or wire brushing to remove loose material, dust, laitance, scum or other deleterious materials or high spots. Defects shall be cut out where necessary, and made good with an approved non-shrink filler. Cracks shall be cut out, suitably keyed, and given a coat of approved bonding agent of paint before the filler is applied. All patches shall be rubbed down to an even surface. Surfaces shall be washed and allowed to dry.

All exposed metal, nails, screws, etc., shall be prepared by removing all rust, then painted with zinc chromate primer, followed by a universal undercoat.
All surfaces shall be thoroughly dry before painting.

ZJ4.5.2 Paint Application

For emulsion painted surfaces (PVA or acrylic), the paint shall be applied in two finishing coats on one full filler coat at the correct consistency and shall not be watered down atall.

Eggshell-finish (alkyd oil based), gloss oil paint or enamel gloss paint shall be applied as follows: One full coat of alkali resistant sealer followed by one coat of universal undercoat. Two finishing coats of semi-gloss eggshell, or gloss oil paint or enamel gloss paint shall then be applied. The finishing coat for shower walls shall be one coat of epoxy paint except where otherwise called for.

ZJ 4.6 Painting of Woodwork

ZJ4.6.1 Surface Preparation

The moisture content of the timber shall not be more than 20% at the time of applying the first coat.

All cracks, shakes or scars shall be filled flush before painting.

The surfaces shall be cleaned, sandpapered and rubbed down to a smooth, even face before painting. Each successive coat of paint shall be rubbed down to a smooth surface before the next coat is applied.

ZJ4.6.2 Primer Application

One coat of wood primer shall be applied.

After the open grain timber and plyboard have been prepared and primed, the grain shall be stopped and filled with synthetic filler and rubbed down with water paper

All new woodwork shall be properly primed on all surfaces and edges, before being fixed in position. All woodwork not previously painted, shall be given a prime coat, well brushed in.

ZJ4.6.3 Paint Application

One coat of universal undercoat shall be applied. Two finishing coats of gloss oil paint or enamel gloss paint or semi-gloss eggshell (alkyd oil based) paint shall then be applied.

ZJ4.6.4 Varnish Application

After surface preparation has been carried out, interior woodwork (e.g. doors, etc.) shall be treated with three coats of approved mat varnish, sanding between coats.

ZJ4.6.5 Wood sealing

After surface preparation has been carried out, woodwork shall be treated with three coats of approved wood sealer, sanding between coats.

ZJ4.6.6 Creosoting

All externally exposed roof timbers shall be treated with two coats of approved creosote wood preservative, before roof cladding is fixed into position. The same treatment is to be applied to roof timbers before being built into walls.

ZJ 4.7 Painting of Metal Surfaces

ZJ4.7.1 Surface Preparation

The preparation of metal surfaces shall comply with the Swedish Standard SIS 05 59 00, Pictorial Surface Preparation Standards for Painting Steel Surfaces and shall receive the greatest care to ensure rust free conditions prior to the application of paint and corrosion protection systems.

All surfaces shall be prepared by removing loose paint, rust, plaster, scale, dust, dirt, greases, etc., and by repairing or patching the defective surfaces before painting or repainting.

Damaged shop primed surfaces shall be thoroughly cleaned of rust and patched with a prime coat.

ZJ4.7.2 Paint Application

Iron and Steelwork

All iron and steel work shall be properly primed with a red lead based primer where steel work is likely to be exposed to the elements for longer than 30 days or coastal conditions. Zinc chromate primer may be used elsewhere where over painting will be completed within 30 days after priming. Metal etch wash primers may be used under dry conditions where over painting will completed within 24 hours after priming. After priming, one coat of universal undercoat shall be applied. If necessary, the undercoat shall be tinted to a shade just lighter than the desired finish, using approved liquid stainers. The two finishing coats shall be gloss or matt of alkyd resin based synthetic enamel or oil based enamel paint.

Galvanised Iron and Steel

All traces of protective coating shall be removed with galvanised iron cleaner. One coat of calcium based etch primer shall be applied. One coat of tinted universal undercoat and two finishing coats of alkyd resin based synthetic enamel gloss paint shall be applied.

Non-ferrous Metals

Surfaces of aluminium, copper, etc., shall be prepared and cleaned, and one coat of self- etch zinc chromate wash primer shall be applied. One coat of universal tinted undercoat and two finishing coat of enamel gloss paint shall then be applied.

ZJ 4.8 Painting of Asbestos-Cement Items

ZJ4.8.1 Surface Preparation

Surfaces to be painted shall be exposed to the air while drying out after having been thoroughly scrubbed and shall be thoroughly dry before painting.

Treatment of the surface with hydrochloric acid or zinc sulphate shall not be permitted.

ZJ4.8.2 Primer Application

One coat of alkali resistant primer shall be applied.

ZJ4.8.3 Paint Application

Two finishing coats of PVA or acrylic paint shall be applied or two coats high gloss enamel on one undercoat.

ZJ 4.9 Painting of Hardboard

ZJ4.9.1 Surface Preparation

All surfaces shall be clean and dry before painting.

ZJ4.9.2 Primer Application

One coat of hardboard primer shall be applied.

ZJ4.9.3 Paint Application

One coat of universal undercoat shall be applied followed by one or two coats of enamel gloss paint.

Two coats of green school-board paint shall be applied to blackboards.

ZJ5 TOLERANCES

The total dry film thickness shall in no place be less than 0,10 mm when applied by either brush, roller or spray-gun.

ZJ6 TESTING

As the Contractor is fully responsible for the quality of all work produced, both in respect of materials used and workmanship, he shall carry out sufficient control tests as the Engineer considers are necessary to ensure that all work is carried out within the specifications.

ZJ7 MEASUREMENT ANDPAYMENT

Painting of structural steelwork will be measured per metric ton (t) of steelwork painted. No deduction will be made for surfaces required to be left unpainted. The rates entered by the Contractor in the Schedule of Quantities for cleaning and painting of structural steelwork will be deemed to be fully compensation for all material and labour in the preparation of surfaces, priming (excluding shop preparation and priming), painting, repair of damaged areas and final repainting after erection, complete.

ZK1 SCOPE

This section of the Specification covers the supply and application of damp-proof courses, waterproofing of basements, vaults, stanchion bases, parapet walls and roofs. It also covers joint fillers and sealers.

ZK2 MATERIALS

ZK 2.1 Standards

All materials used in the Works shall comply in all respects with the following standard specifications, the latest issues of which shall be held to apply:

SABS92 : Bituminous roofing felt

SABS248 : Bituminous damp proof courses SABS297 : Mastic asphalt for roofing
SABS298 : Mastic asphalt for dampproof courses and tanking SABS317 : Industrial bitumens
SABS952 : Polythene sheet

ZK 2.2 Joint Filler

Joint filler shall be "Expandite Flexcell" expansion joint filler or approved equal impregnated fibre board.

The positions and dimensions of the joint filler shall be as detailed on the drawings.

ZK 2.3 Joint Sealer

Joint sealer shall be "Thiofiex 600" or an approved equal poly sulphide sealer.

The positions and dimensions of the joint sealer shall be as detailed on the drawings.

ZK 2.4 Polythene Sheeting

Polythene sheeting shall be to the thickness as indicated on the drawings and of manufacturer's approved by the Engineer.

ZK3 EQUIPMENT

The Contractor shall provide and maintain in good working order, adequate equipment for carrying out the required work in accordance with this specification in a safe and efficient manner.

ZK4 CONSTRUCTION

ZK 4.1 Concrete Surfaces

ZK4.1.1 Preparatory Work

All surfaces which are to be damp-proofed or waterproofed shall be dry and cleaned of all loose, flaky material, dust, shutter release oil or other substances which may affect the bonding of damp-proofing materials to the surface.

Laying operations shall not be undertaken on surfaces which are not thoroughly dry or during rainy, damp, frosty or other inclement weather, or where such weather can reasonably be expected within the following 24 hours.

ZK4.1.2 Laps in Materials

To ensure that each successive application bonds soundly with previous work, damp-proof material shall be laid with not less than 75 mm laps in vertical work and 150 mm laps in horizontal work.

Laps shall be provided at all internal angles or corners.

Laps are the distances by which abutting edges in successive layers of damp-proofing materials are staggered.

ZK4.1.3 Mastic Asphalt

Mastic asphalt shall be applied hot and in the following thicknesses:

Not less than 30 mm thick, applied in three layers on horizontal surfaces for tanking, basements, vaults and stanchions bases below ground level.
Not less than 20 mm thick, applied in two layers on horizontal surfaces on tops of walls and concrete beds above ground evel.
Not less than 20 mm thick on vertical surfaces for basements, vaults and stanchion bases below ground evel.
Not less than 13 mm thick on vertical surfaces. of walls above groundlevel.
Surfaces that are to be treated with mastic asphalt shall have the individual layers applied in their entirety before additional layers areapplied.

Warm, clean and properly made joints shall be made between horizontal and vertical asphalt, with two-coat angle fillets at all internal angles or corners.

ZK4.1.4 Protection from Water Pressure

Damp proofing shall be protected from water pressure by maintaining the external water table at 0,3m below the level of the base concrete during the progress of the work.

The application of materials to wet surfaces shall be avoided.

Dewatering shall be maintained until the damp-proofing work is complete and temporary sumps have been filled and sealed.

ZK4.1.5 Tanking to Basements

A horizontal damp-proof course shall be laid over the whole area of the basement floor on a concrete bed prepared as indicated on the drawings, in three layers laid with 150 mm laps and carried through walls to connect with the vertical damp-proof course.

The faces of basement walls shall be covered with a vertical damp-proof course applied in three layers with 75 mm laps.

Vertical damp-proofing shall be carried up to a minimum height of 150 mm above ground level, or over the tops of vaults, under paving where these occur, and connected to the horizontal damp-proof course in walls to form a complete tank to the basement.

ZK4.1.6 Tanking to Stanchion Bases

Three layers of horizontal damp proofing shall be laid on the prepared surface forming the base to pits for stanchion bases.

Two layers of vertical damp proofing shall be fixed to the inner faces of the pit.

The provisions specified in ZK 4.1.5 above, Tanking to Basements, shall also apply to tanking to stanchion bases.

Damp proofing shall be continuous at joints, crosswalls, etc.

ZK4.1.7 Asphalt Roof Waterproofing

The concrete roof shall be primed with a suitable bonding primer before the asphalt waterproofing is laid.

20 mm of asphalt waterproofing shall then be laid in two layers in bays.

The edges of the second layer shall not coincide with the edges of the first layer.

The edge of unfinished or existing work shall be cleaned and warmed before fresh material is laid against it.

Asphalt fillets and skirtings shall be provided at vertical surfaces and joints in brickwork shall be raked out and enlarged for the turn-in of the asphalt where required and pointed with cement mortar.

Where applicable, the asphalt shall be turned down over the edges of the roof. Care shall be exercised to maintain the specified asphalt thickness throughout.
The completed asphalt shall be painted with two coats of bitumen-based aluminium paint. A minimum slope of 1 % shall be maintained on all roofs.
ZK4.1.8 Bitumen Rubber Latex Roof Waterproofing

The surface of the concrete roof slab shall be thoroughly cleaned to remove all dirt, dust, scale orgrease.

The concrete roof slab shall be primed with an approved diluted rubber bitumen primer at the rate of 0,3 litre/m, or at the manufacturer's recommended rate.

After the primer is dry, the first coat of bitumen rubber latex emulsion shall be applied with not less than 10 percent rubber, at the rate of 1,5 litre/m, or at the manufacturer's recommended rate. While the emulsion is still tacky, a layer of fibreglass ("L" staple 0,5 mm thick) shall be bedded onto this emulsion and all air pockets shall be removed.

When the first coat is almost dry, a second coat of the emulsion shall be applied at the rate of 1,2 litre/m, or at the manufacturer's recommended rate. While this emulsion is still tacky, a second layer of fibre glass ("L" staple 0,5 mm thick) shall be bedded onto the emulsion making sure that all air pockets are excluded.

When the second coat is almost dry, a third coat of the emulsion shall be applied at the rate of 1,2 litre/m, or at the manufacturer's recommended rate.

While this final coat is still tacky, it shall be blinded with a single sized fine aggregate (washed stone chips) passing a 5 mm sieve but retained on a 3 mm sieve, at the rate of 0,003 m/m (5 kg/m) or at the manufacturer's recommended rate.

When this final coat has dried, the roof shall be lightly brushed to remove any loose chips and then one coat of bitumen based aluminium paint shall be applied at a rate of 0,4 litre/m.

All timber battens, fillets, corrosion resistant sheet metal for welted aprons, drips or flashing shall be provided and fixed with corrosion resistant nails, bolts, etc.

ZK4.1.9 Polyethylene Sheeting under Concrete Surface Beds

Where shown on the drawings, the finished soil surface shall be covered with an approved polyethylene sheeting 0,25 mm thick, or as otherwise specified.

The sheeting shall be laid flat and smooth and shall be free from folds or rips.

Joints in the sheeting shall be heat-welded together or joined together with an approved adhesive to form watertight seams.

Care shall be taken when placing concrete or bricks not to displace or damage the sheeting in any way.

If the sheeting is damaged, the damaged area shall be patched and joined so as to be watertight.

ZK4.1.10 Polyethylene Sheeting under Concrete Roof Tiles

For concrete tiled roofs of pitch less than 30< to the horizontal, an approved polyethylene sheeting 0,25 mm thick or as otherwise specified, shall be installed over common rafters and under battens to receive tiles all in accordance with the recommendations of the manufacturer.

ZK4.1.11 Protection from Traffic

Where regular maintenance crews or other foot traffic on roofs must be provided for, the waterproofing shall be protected by means of 20 mm thick tiles or slates set in mastic, with joints solidly filled with a 1:3 cement: sand mortar or mastic.

Expansion joints shall be provided in walk ways to form bays not exceeding 8 m.

ZK 4.2 Damp Proofing to Walls

Black embossed polythene material to SABS 952, Type B with a minimum thickness of 375 micron must be used for all damp-proofing. It shall be laid without longitudinal joints on the full thickness of all foundation walls as well as under upper floor external walls. At ends, angles and intermediate junctions, the material is to be lapped 300 mm. Damp-proofing is also to be placed one course below external windowsills and bent up with an easy bend and tucked under window frames. For cavity wall construction, damp-proofing shall in addition be used at side reveals and lintels of all external doors and widows.

Where the ground level is above the internal floor level, or where necessitated by differences in ground levels, two layers of vertical damp-proofing shall be fixed to the outer faces of external wells. The vertical damp-proofing shall be connected to the horizontal damp proofing with 75 mm laps.

ZK 4.3 Expansion Joints

Where a concrete roof has expansion joints, a raised kerb shall be provided with an approved metal hood covering or a metal roll flashing of corrosion resistant material, with suitable welted

joints, drips and saddle pieces all neatly soldered where required. Suitable fixing clips, nails, bonding material, membrane, etc. shall be used at the expansion joints.

Where expansion joints have to be constructed elsewhere in concrete and brickwork, these shall be formed with joint filler. Raking out, cleaning, priming, and sealing of these joints shall be done in strict accordance with the manufacturer's instructions.

ZK5 TESTING

As the Contractor is fully responsible for the quality of all work produced, both in respect of materials used and of workmanship, he shall carry out sufficient control tests as the Engineer considers are necessary to ensure that all work is carried out within the Specifications.

ZK6 MEASUREMENT ANDPAYMENT

Measurement and payment for all items under this section shall be according to the units and rates determined from the Schedule of Quantities and the rates will be deemed to cover the items of work finished complete in every respect.

ZL1 SCOPE

This section of the Specification covers the supply and building in of materials described under iron monger, founder, and smith and Includes:

Pressed steel doorframes
Steel doors and frames
Standard industrial and residential and special steel windows including fasteners and fittings
Locks and hardware
Miscellaneous fittings.

ZL2 MATERIALS

ZL 2.1 Standards

All materials used in the Works shall comply in all respects with the following standard specifications, the latest issues of which shall be held to apply:

SABS4 : Door locks

SABS727 : Steel windows and steel doors

SABS064 : Preparation of steel surfaces for painting CKS79 : Pressed steel doorframes

ZL 2.2 General

All ironmongery shall be of the best quality and as detailed on the drawinqs or described in the Schedule of Quantities and shall be fixed complete with matching screws of similar metal.

All steel and iron work shall be delivered clean and free from rust, pitting or other defects. Shop primers shall be applied before delivery and shall consist of two coats of primers or other approved anti-rust paint on all surfaces and care shall be taken that defects are eliminated before priming.

Where galvanised steel doors, door frames and windows are called for, these shall be of a quality suitable for hot-dip galvanising. They shall be free from defects that preclude compliance of a zinc coating and from scale, paint or other coatings that are not removable by alkali cleaning or acid pickling. The thickness of zinc coatings shall be 45 microns minimum or the equivalent mass per unit area of 315 grams/m.

After approval of a product, the Contractor shall restrict himself to the use of that product for the duration of the Contract unless otherwise approved by the Engineer.

ZL 2.3 Pressed Steel Door Frames

Pressed steel door frames shall comply with CKS 79 and shall be manufactured from 1,6 mm thick mild steel sheet, pressed to the required shapes, properly mitred, welded, reinforced at angles, with all welding neatly cleaned off on all faces.

Frames for swing doors shall have the jamb curved in the centre to suit the rounded edge of the door. The head of the frame shall be plain.

Frames shall be of the widths required to suit the thickness of the walls into which they are built.

Frames shall be fitted with suitable tie bars and braces at the bottom, and lugs shall be provided for building in three (3) to each jamb or frames without fanlights and four (4) to each jamb of frames with fanlights.

Where fanlights are shown over doors on the drawings, the frames shall be fitted with pressed metal transoms, properly fitted and welded to the frames. The transoms shall be rebated as necessary for the door and fanlight.

Rebates in frames and transoms for doors and fanlights shall be of the width required to suit the thickness of the doors and fanlights.

Frames for all doors, except swing doors, shall be fitted with rebates in both jambs and head and a pair of 100 mm steel butt hinges welded to frame.

Transoms to bottom hung fanlights shall each be fitted with a pair of 75 mm steel butt hinges welded to frame.

Heads of frames or transoms over swing doors shall be prepared to receive the tops of spring hinges and shall be drilled and tapped for the fixing screws.

Heads of frames or transoms over double doors shall be drilled where required to form keeps for bolts and shall be fitted with one (1) rubber buffer for each leaf of the door.

Frames shall be drilled and tapped where required for screws, fixing fanlight openers, spring- catch keepers, etc.

Where fixed fanlights occur, the frames shall be drilled and tapped in the rebates for the screws securing the fanlights.

Frames for single doors shall be fitted in one (1) joint with approved chromium plated, or other specified, adjustable striking plate keeper, boxed in at the back of the frame with a welded on sheet metal box. The frames shall be fitted with a minimum of two (2) rubber buffers.

Door frames as specified, shall be ordered prepared for the specific type of hinge, lock keep, etc., to be used, and frames shall be cut out or recessed at these points, with back plates welded on, drilled and tapped to fix the specified fitting.

All frames shall be supplied complete with adjustable striking plates and rubber buffers in rebates.

ZL 2.4 Electrical Switch room Ventilators

Ventilators shall be standard factory steel units, standard type ALU (900 x 745 mm) or BLU (1590 x 745 mm) as indicated on the drawings.

The frames shall comply in all respects with the requirements for pressed steel door frames. The frames shall be built into walls, with two suitable lugs on either side.
The frames shall be fitted with mild steel blades of approved manufacture and pattern welded to the pressed steel frame.

An approved non-corrosive insect-proof screen shall be fitted in an approved manner to the frame of each ventilator.

ZL 2.5 Electrical Switch room Doors

Electrical switch room doors shall be framed, ledged and braced batten hardwood doors.

Each electrical switch room door shall be fitted with a five pin cylinder rim night latch of approved manufacture.

Where electrical switch room doors consist of two (2) leaves, one (1) leaf shall be fitted with an approved five pin cylinder night latch and the other leaf shall be fitted with barrel bolts top and bottom, and a striker plate shall be fitted to its reveal.

Each electrical switch room door shall be fitted with 100 mm "Boustred B657" chromium plated brass flush handle, or approved equal, on the outside of the door.

ZL 2.6 Vertically Opening Steel Sliding Doors

Vertically opening steel sliding industrial doors shall be "Henderson Slide-over" doors or approved, equal.

The component parts of the doors shall be dimensioned according to the manufacturer's recommendations for the weights and sizes of the doors shown on the drawings and shall be as detailed below.

Door sections shall be cold-rolled 0,63 mm thick galvanised steel sheet, ribbed and grooved for maximum strength.

Intermediate stiles shall be ribbed for reinforcing and formed from 1,6 mm thick galvanised steel.

End stiles shall be of channel section, formed from 1,6 mm thick galvanised steel. Double end stiles shall be used for wide and/or heavy doors.

Hinges and roller holders shall be of galvanised steel. Hinges shall be located between every door section on the intermediate stiles. Adjustable roller holders shall be assembled with hinges on the end stiles.

Vertical and horizontal side tracks shall be cold-rolled from galvanised steel, welded to galvanised steel reinforcing angles and jamb-mounting angles.

Head plates shall be paint-finished steel plates welded to the horizontal tracks. The head plate assembly shall incorporate a grease-packed bearing for the location of the cross shaft.

Cross shafts shall be 25 mm diameter bright steel bars.

Bracing shall be required for certain wide and/or heavy doors and shall consist of a deep- rolled galvanised steel brace, spanning the door sections and bolted internally to the stiles.

Roller wheels shall be of hardened steel, mounted on grease-packed ball bearings, and their diameter shall match the size of tracks used. The spindles shall be fully floating in their holders and the lengths of the spindles shall depend on whether single or double end stiles are specified.

Counterbalance torsion springs shall be helically wound from high tensile steel wire and be purpose made for each individually weighed door. The springs shall be mounted on cast iron end and winding plugs.

Cable drums shall be helically grooved die-cast aluminium drums, keyed to the cross shaft and locked with set screws. The drums shall be selected to match the vertical lift and travel of the door.

Cables shall be preformed galvanised wire of a diameter which will give a minimum safety factor of eight (8) to one (1) for all door weights.

Doors shall be supplied complete with lifting handles, step-plates, pull-down chains, or chain hoists, bumper springs, and spring door-holders to secure the top section against the head jamb.

Each, door shall be fitted with two padbolts, one on either side securing into the vertical side tracks, and one padlock per padbolt.

All bolts, nuts and screws shall be of galvanised steel.

The weather strip fitted to the bottom of the doors shall be vinyl or other approved material which is unaffected by oil or grease. The weather strip shall be a one piece moulding held in place by a retaining strip.

Where indicated on the drawings, vision panels shall be watertight, 600 mm x 180 mm nominal size, 5 mm thick glass fitted in neoprene seals.

ZL 2.7 Horizontally Opening Steel Sliding Doors

Horizontal sliding steel doors shall be constructed similar to "Robertson Q-Doors".

The doors shall be constructed from "Robertson galvanised steel pressed Q-panel sections" or approved equal, bolted together and bolted to 70 x 70 x 6 mm structural steel angles at the top and bottom of each door.

"Helm" sliding door gear or approved equal, shall be fitted to the top and bottom of the doors. The sizes and series types shall be as indicated on the drawings, and the bottom guide rail shall be flush with the floor.

ZL 2.8 Steel Window Frames

All steel window frames shall comply with SABS 727 and shall be of the type and sizes shown on the drawings.

Standard and purpose-made residential type steel window frames shall be constructed from rolled mild steel residential sections, 25 mm wide by 3 mm, welded at angles and properly jointed at intersections.

Standard and purpose-made industrial type steel window frames shall be constructed from rolled mild steel industrial sections 35 mm wide by 3 mm thick, with opening sections constructed from standard residential sections 25 mm wide by 3 mm thick, welded at angles and properly jointed at intersections.

Window frames shall be formed perfectly flat, truly square, properly jointed at all angles and the opening portion must fit properly on all faces and open and close freely.

Glazing bars shall be continuous with jointed intersections, the ends being neatly scribed and fitted to the frames and with the shouldered ends passed through the frame and securely welded in position.

Frames shall be fitted with standard fixing lugs, unless otherwise shown on the drawings.

Opening sections shall open as indicated on the drawings and shall be fitted with steel butts with brass pins. Pivoting sections shall be fitted with bronze ring centres. All inaccessible windows shall be fitted with projecting butts to facilitate cleaning of the windows from the inside.

Side hung or top hung opening sections shall be fitted with brass handles and friction stays. Bottom hung sections shall be fitted with friction pivots and spring catches.

Weather bar drips shall be attached to the fixed frames, for the complete width of the window at the head of outward opening sections, or at cills of inward opening sections and attached to the opening frame.

Composite windows may either be delivered completely assembled with mullions and transoms or as separate units for assembly on site, but "one piece" construction shall be preferred.

Where windows are to be fitted with burglar bars, these burglar bars shall be of standard pattern bars, welded at all intersections, flattened and drilled at the ends and screwed to the window frames. Only opening sections are to be fitted with burglar bars.

Permanent louvered window ventilators shall be standard factory units with mild steel blades of approved manufacture and pattern welded to residential type window frames and with a fine gauge expanded metal screen welded to the frame to prevent the entry of insects.

ZL 2.9 Combination Units Comprising Steel Framed Doors, Windows, Sidelights and Fanlights

Combination units shall comply with SASS 727 and shall be of approved manufacture and design. They shall be constructed from rolled mild steel sections, properly mitred and welded at angles with the welding cleaned off smooth on all faces.

Door frames shall be constructed from universal sections 30 mm wide by 4 mm thick.
Frames for windows, sidelights and fanlights shall be constructed from standard residential section 25 mm wide by 3 mm thick.

All opening sections shall fit perfectly on all faces and shall open and close freely without binding at any point.

Side hung sections shall open to at least ninety (90) degrees and top hung sections to at least eighty (80) degrees Bottom hung sections shall open to at least thirty (30) degrees and shall be fitted with concealed opening stays.

Side hung sections in windows not readily accessible for cleaning, shall be hung on cleaning hinges.

Suitable weather bars shall be provided where necessary to render the doors and windows perfectly watertight.

All handles, stays, catches and other fittings shall be best quality die-cast brass unless otherwise specified. The fittings shall be approved before being fixed in position and shall be secured with set screws.

The frames shall be provided with fixing lugs on each jamb, one near the top, one near the bottom and not more than 750 mm apart in between. Where the frames are to be fixed in timber frames or to plugs in concrete columns, etc., the steel frames shall be drilled and countersunk for fixing screws at similar spacing.

Windows exceeding 1,0 metre wide, but not exceeding 2,0 metres wide, shall be provided with a fixing lug or a countersunk hole in the centre of the top and bottom of the frame. Windows exceeding 2,0 metres but not exceeding 3,0 metres in width shall be provided with two (2) lugs or countersunk holes at the top and bottom of the frame. For every additional 1,0 metre in width of the window, either an additional fixing lug or a countersunk hole shall be provided in the top and bottom of the frame.

Standard and purpose-made windows shall be of "one piece" construction wherever possible.

Where two (2) or more windows are to be coupled together, the coupling shall be effected with standard coupling mullions and transoms as necessary.

Coupling mullions shall project not less than 50 mm at tops and bottoms or as shown on the drawings for building into lintels and sills.

Before leaving the works of, the manufacturer, the units shall be cleaned by acid pickling, rinsing, and drying in accordance with the requirements of SABS 064. They shall then be

primed with a red oxide primer using the double-dip process, with the article being suspended from the diagonally opposite corner for the second dip.

The overall sizes of the units shall be as shown on the drawings.

ZL 2.10 Door Locks

All door locks shall comply with the requirements of SABS 4 and shall be of approved manufacture and pattern.

All locks shall be supplied with two (2) keys.

Each key shall be distinctly numbered with consecutive numbers and each key shall be stamped with the same number as that of the lock which it controls.

No two (2) locks in anyone building shall have the same key.

Unless otherwise specified, all internal doors shall be fitted with two (2) lever mortise locks which shall' not be master-keyed.

Unless otherwise specified, external doors to changing and mess facilities shall be fitted with two (2) lever mortise locks which shall not be master-keyed.

Unless otherwise specified, external doors to workshops and buildings shall be fitted with four (4) lever heavy-duty mortise locks that shall be master-keyed.

External doors to electrical switch rooms shall be fitted with a five-pin cylinder rim night latch.

All night latches on electrical switch room doors, or where specified, shall be supplied with "all to pass keys" stamped with a number. All keys and night latches shall be stamped No.1.

Each building shall have different lock numbers and master keys from the other buildings except for those buildings that house only electrical equipment. These shall be fitted with night latches having the same "all to pass keys" as the electrical switch room doors and all keys and night latches shall be stampedNo.1.

A schedule of the suiting and master keying of the locks shall be prepared and supplied to the Engineer.

Door handles shall be cast zinc or anodised aluminium of approved manufacture and pattern "as called for in the Schedule of Quantities.

ZL 2.11 Padlocks

Padlocks shall be solid cast brass cylinder padlocks of approved manufacture and pattern. No two (2) padlocks on one (1) building shall have the same key.

ZL 2.12 Barrel Bolts

Barrel bolts shall be of solid chromium plated brass of approved manufacture and pattern.
The sizes and positions of the barrel bolts shall be as shown on the drawings or as indicated in the schedules.

ZL 2.13 Pad Bolts

Pad bolts shall be of galvanised mild steel of approved manufacture and pattern.
The sizes and positions of the pad bolts shall be as shown on the drawings or as indicated in the schedules.

ZL 2.14 Hasps and Staples

Hasps and staples shall be of galvanised mild steel or brass of approved manufacture and safety pattern.

The sizes and positions of the hasps and staples shall be as shown on the drawings or as indicated in the schedules.

ZL 2.15 Indicating Bolts

Indicating bolts shall be of chromium plated brass of approved manufacture and pattern. The engaged/vacant mechanisms shall only display coloured indicators.

ZL 2.16 Door Hinges

Door hinges in wooden frames shall be "Boustred No. 398" (PWD 34) or approved equal.
The hinges shall be solid drawn brass butt hinges, 100 x 75 x 3 mm, fitted with double steel washers between the leaves on a 6 mm diameter steel pin. Each leaf of the hinge shall have four 6 mm diameter countersunk holes.

Where fitted to wood, the hinges shall be attached using suitable brass countersunk wood screws.

Where fitted to steel, the hinges shall be attached using suitable brass countersunk bolts.

ZL 2.17 Overhead Door Closers

Door closers shall be of approved manufacture and pattern. The finish of the door closers shall be a gold bronze. Light duty door closers shall be fitted to internal doors. Heavy-duty door closers shall be fitted to external doors. The position and type of door closer, whether single control, dual control or delayed action. shall be as shown on the drawings or as indicated in the Schedules.

ZL 2.18 Hat and Coat Hooks

Hat and coat hooks shall be "Boustred No. B 810" or approved equal.

The hooks shall be solid cast chromium plated brass, fitted with a rubber buffer.

ZL 2.19 Towel Rails

Towel rails shall be of approved manufacture and pattern, 20 mm diameter x 610 mm long, of chromium plated brass complete with suitable chromium plated brass brackets.

ZL 2.20 Miscellaneous Fittings

All fittings such as retaining devices, etc. shall be of solid cast brass, plated as required, and of the pattern indicated on the drawings or in the schedules. Where no specific pattern is indicated, the fitting shall be not less in quality than that described as PWD pattern. All fittings shall be secured by screws or set screws of the same material and finish as thefitting.

No fitting requiring fixing to plastered walls or masonry shall be fixed directly to the wall surface, but to hardwood blocks of suitable size, plugged and screwed to the plaster or masonry. Such hardwood blocks shall be fixed to plastered walls or masonry with patent plastic or fibre plugs fitted into drilled holes.

Panic bolts shall be polished brass of approved manufacture.

Doorstops shall be provided at every door and shall be 40 mm diameter rubber stops fixed with brass screws, in patent plastic or fibre plugs fitted into holes drilled in the floor orwall.

All nails, spikes, screws, etc., required for the proper completion of the Contract shall be supplied by the Contractor, and shall be the best of their respective kinds.

ZL3 EQUIPMENT

Contractor shall provide and maintain in good working order, adequate equipment for carrying out the required work in accordance with this specification in a safe and efficient manner.

ZL4 INSTALLATION

All working parts of items installed shall be eased, oiled, adjusted and left in perfect working order on completion.

All exterior doors shall be fitted with door stops and retaining devices where required. Doorframes shall be protected during transit and erection from twitching and damage.
All built-in door and window frames shall be set straight, plumb, and level, and shall operate to the satisfaction of the Engineer after fixing is complete.

Fittings shall be either removed, or wrapped and protected from damage until all rough trades have been completed.

Each vertically opening sliding door shall be installed in an approved manner complete with all necessary structural steelwork, hangers, supports, etc. to suspend the door tracks from the roof structure.

All horizontally opening sliding doors shall be installed complete with padlocks, handles, barrel bolts, pad bolts, and stops, etc.

All locks shall be properly installed and after completion striker plates shall be adjusted and the locks serviced.

Barrel bolts, pad bolts, hasps and staples, indicating bolts and door closers shall be firmly fixed in position in an approved manner where shown on the drawings or as indicated in the schedules.

Coat hooks shall be fitted behind doors or as otherwise required, using suitable brass wood screws in positions as indicated in the finishing schedule.

Towel rails shall be fitted adjacent to wash-hand basins and sinks in an approved manner and in positions as shown on the drawings or as indicated in the schedules.

ZL5 TOLERANCES

Manufacturing tolerances shall be as laid down in the various standard specifications listed in Clause ZL 2.1.

ZL6 TESTING

As the Contractor is fully responsible for the quality of all work produced, both in respect of materials used and of workmanship, he shall carry out sufficient control tests as the Engineer considers are necessary to ensure that all work is carried out within the Specifications

ZL7 MEASUREMENT ANDPAYMENT

Unless otherwise stated in the Schedule of Quantities, the unit of measurement for all items of this section shall be the number of specified items installed. The rates shall include for supply and installation as well as shop priming, galvanizing and servicing where specified.

ZLA 1 SCOPE

This section of the specification covers the manufacture, supply and installation of aluminium framed windows, doors and shop fronts.

All material and workmanship shall unless otherwise described conform with the information contained in the publication "Association of Architectural Aluminium Manufacturers of South Africa - Selection Guides dated April 1986".

ZLA 2 MATERIALS

ZLA2.1 Standards

All materials used in the Works shall comply in all respects with the following standard specifications, the latest issues of which shall be held to apply:

SABS1202 : Modular dimensional specification for aluminium windows and sliding doors (domestic range)

SABS999 : Anodic coatings on aluminium SABS989/992 : Aluminium and aluminium alloys

ZLA2.2 Aluminium

Aluminium alloy shall be Huletts architectural AA 6063 (50S) or other approved for extrusions and AA 1100 (2S) or other approved, for sheet LM 5 (A 1 Mg5) for castings and AA 5005 for forgings. It is imperative that all material for the contract shall be of the same type from the same manufacturer.

ZLA2.3 Finish

Unless otherwise specified to be natural mill finish Where anodised finish is specified than the exposed surfaces shall be chemically etched and sulphuric acid anodised to give an anodic film thickness as follows:

10 microns for interior applications 20 microns for exterior applications
25 microns for exterior applications in heavy industrial areas or coastal areas

The above thickness may not anywhere be less than 2 microns less than the specified thickness.

Where colour anodising is specified then the finish shall be obtained by the "ANOLOK" process carried out by a licensed anodiser (Hulett's Aluminium). Unless otherwise specified the colour is to be "545 DarkBronze".

The anodiser is to submit, via the supplier or manufacturer two samples of the chosen colour, namely a light and a dark, which shall be approved by the Architect prior to the work commencing. All colour anodised aluminium subsequently supplied for the works shall remain within the range of the accepted colour samples.

ZLA 3 SUB-FRAMES

Where sub-frames are specified, prices for units are to allow for the manufacture and delivery to site of an approved sub-frame. And suitably temporarily cross-braced to prevent distortion. The sub-frames are to be free from warp or twist and true in plane to a tolerance of ± 3 mm and rectangular to suit the tolerances as specified for the finished units.

The sub-frames shall be fitted with building in lugs as specified under main frames.

Where sub-frames are to be exposed then they shall be anodised to match the main units.

ZLA 4 MAIN FRAMES

ZLA4.1 ColourMatching

The manufacturer shall select from the material supplied for the project so as to ensure minimum colour variation in anyone or any adjacent units.

ZLA4.2 Framing, Joints, etc.

All external corners of units shall be mitred and internal junctions shall be scribed and fitted. Welded joints shall only be permitted in sub-frames except where an approved flash-butt welding process is used.

Where welded joints are employed the welding is to be completed prior to any surface treatment being executed and is to be done in such a manner as not to alter the material characteristics or the face to form the final exposed surfaces. Finished surfaces are to be true and identical to adjacent "unaffected" surfaces.

Where non-welded joints are used the method of fixing is to be invisible from the finished faces and all joints are to be suitably reinforced to ensure that no movement takes place in the joint prior to final fixing in position.

The gap between any two mitred or butted joints shall not exceed 0,05 mm. Sample of jointing methods are to be submitted for approval.

ZLA4.3 Design

Glazed window frames shall be capable of withstanding an outward pressure of 1 200 Pa and an inward pressure of 950 Pa. The glazing system to be used shall be by glazing bead or approved neoprene gasket.

The design shall be such that a double seal is created between opening and fixed sections and shall provide for adequate drainage of water penetrating the outer seal or arising from condensation. Provision shall also be made for the accommodation of a damp course at cills and reveals.

Hinges, furniture, latches, stays, etc. shall be of solid construction, anodised to match the window frame material and shall be screw fixed or bolted with stainless steel screws or bolts and shall not be pop-riveted.

Two copies of all working drawings are to be submitted for approval at least two weeks prior to commencement of manufacture.

Bearings and bushes shall be used and these shall be nylon or of an approved non-ferrous metal. Hinge pins shall be of an approved non-ferrous metal. Latch handles stays and the like shall be free from play and shall preferably be capable of adjustment subsequent to fixing. Samples of all fittings are to be submitted for approval.

ZLA4.4 Fixing ofFrames

ZLA4.4.1 Frames or Sub-frames to be Builtin

Fixing lugs shall be such as to allow for building a minimum of 300 mm into brickwork or fixing to concrete in an approved manner. Fixing lugs shall be of a material resistant to corrosion by contact with water, mortar, etc. and shall be separated from the aluminium frame in an approved manner if not electrolitically compatible with aluminium.

ZLA4.4.2 Fixing of Frames to Sub-frames Grounds or Pre-fixed Fixing Lugs and Fixing of Lugs to Frames

Frames shall be countersunk screwed to fixing members or lugs with pre-finished screws or bolts coloured to match main frames at maximum 450 mm centres along the full length of the frame and at no greater distance than 150 mm from the corners. The screws or bolts' shall be manufactured from materials electrolitically compatible with aluminium. Screws or bolts on which the exposed finish has been damaged shall be replaced.

ZLA4.5 Protection

Where frames are to be built in then all manufactured frames are to be protected prior to delivery by means of an approved heavy-duty low adhesive type of tape. This tape shall not be removed until the building is ready for final cleaning prior to completion inspection. The tape shall be removed by the manufacturer who shall be fully responsible for all damage caused in the process of removal.

Where frames are fixed to sub-frames previously built in then the frames shall be fixed into position after the completion of all wet trades and other adjoining work. Tape protection will not be required but the frames are to be protected after installation in order to prevent any damage.

No scratched or damaged surface will be accepted and "touching up" with matching paint will only be permitted where permission is obtained in writing from the Architect.

ZLA 5 TOLERANCES

Units shall be constructed to an overall horizontal or vertical tolerance of 3 mm out of true and a maximum of 5 mm out of square measured on the diagonal. Edges and lines running within 50 mm of each other shall be parallel to a tolerance of ± 1 mm over 600 mm.

Composite windows shall be linked so as to provide a double weather seal created by the coupling member and the coupled units and joints shall be sealed with an approved non- hardening mastic sealant complying with SABS.

ZLA 6 MEASUREMENT AND PAYMENT

The unit of measurement of the units shall be by number. Rates shall include for glazing as specified. Rates shall include for all fittings, anodising, protection, etc.

Rates shall include for the removal of factory applied protection by the manufacturer.

Rates are to include for the complete servicing and adjustment of windows prior to hand-over. Rates are to allow for the submission and approval of shop drawings.

ZN1 SCOPE

This section of the Specification covers the supply and fixing of kitchen cupboard units and sink/cupboard units.

ZN2 MATERIALS

All units shall be of the sizes, types and manufacture as indicated on the drawings and/or Schedule of Quantities or as detailed.

The units shall be manufactured from either mild steel or timber as indicated and finished with a high gloss enamel paint.

Worktops to cupboard units shall be Grade 18/8 stainless steel or panelyte as indicated on the drawings and/or Schedule of Quantities.

Tops of sink/cupboard units shall be Grade 18/8 stainless steel.

ZN3 EQUIPMENT

The Contractor shall provide adequate equipment to manufacture and/or install the units to the satisfaction of the Engineer.

ZN4 INSTALLATION

The units shall be fixed to both floors and walls in an approved manner in the positions as indicated on the drawings

ZN5 MEASUREMENT ANDPAYMENT

The unit of measurement shall be the number of type and size of units installed and the rates shall include for all aspects of supply and installation complete.

ZS1 SCOPE

This section of the Specification covers the supply and application of termite proofing using a soil poisoner.

ZS2 MATERIALS

The poison shall comply with the requirements of CKS 376 "Insecticidal emulsifiable concentrate containing aldrin (soil insecticide for the protection of buildings)".

Only soil poisoner brought on to the site as a "ready for use" solution in sealed drums prepared by the manufacturer shall be used.

The Contractor shall not be permitted to prepare his own solutions. The poison shall be stored in a safe place behind lock and key.

ZS3 EQUIPMENT

The Contractor shall provide and maintain in good working order, adequate equipment for carrying out the required work in a safe and efficient manner.

ZS4 APPLICATION

Termite proofing shall be carried out strictly in accordance with the manufacturer's recommendations.

The poison shall be handled and applied with the utmost care and workmen shall wear suitable protective clothing.

All grass and other cellulose material shall be removed from the area which is to receive termite proofing.

After the poison has been applied, the surface of the poisoned layer of material shall not be disturbed or damaged. If the poisoned layer is damaged in any way, the damaged area shall be restored and re-treated by the Contractor at his own expense.

ZS5 SUPERVISION

Termite proofing shall be carried out under the supervision of the Engineer.

ZS6 MEASUREMENT ANDPAYMENT

The unit of measurement for termite proofing shall, unless otherwise stated in the Schedule of Quantities, be the square metre (m^2) of the treated area and the rate shall include for all aspects of supply and labour complete in every respect.

ZX1 SCOPE

This section of the Specification covers the supply and installation of door signs and number plates to doors or door frames.

ZX2 MATERIALS

Door signs and number plates shall be of an approved type and manufacture and shall either be:

Pressed or engraved rigid plastic, or
Hard matt polyvinyl chloride film transfers on rigid bases.

Character and symbols shall be a different colour from the background of the door signs and number plates.

Standard symbols shall be used.

Door signs and number plates on external doors shall be of a permanent type, weather- resistant and colour fast.

Materials, sizes and colours of signs, number plates, character and symbols shall be submitted to the Engineer for approval.

ZX3 INSTALLATION

Signs and number plates shall be attached to doors or door frames in an approved manner and in approved positions.

All doors shall be numbered. Numbers and number sequence shall be as instructed by the Engineer.

Door signs shall be installed on doors to toilets, ablutions, kitchens, mess rooms, locker rooms, or where instructed by the Engineer.

ZX4 MEASUREMENT ANDPAYMENT

The unit of measurement for Door Signs and Number Plates shall unless otherwise stated in the Schedule of Quantities, be the number and the rate shall include for all aspects of supply and labour complete in every respect.

SECTION LA: MINOR FABRICATED STEEL AND OTHER METALWORK

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NLA: MINOR FABRICATED STEEL AND OTHER METALWORK

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LA2.3 COLD ROLLED STEEL

All cold rolled sections shall be cold rolled from mild steel strip, to the shapes and dimensions specified and shall be used in accordance with British Standard PD 4064 - "The use of Cold Formed Steel Sections in Building" - (Addendum 1 to BS449).

LA2.4 STAINLESSSTEEL

Fabricated items of stainless steel shall generally be made from material complying with the American Iron and Steel Institute Standard types 304 or 316. If the grade is not stipulated it shall be assumed to be type304.

Stainless steel for castings shall comply with the standards CF-8 and CF-8M of the Alloy Casting Institute, the cast counterparts of AISI types 403 and 316 respectively.

LA2.5 ALUMINIUM

Fabricated aluminium items

shall be made from material complying with the requirements of BS 1476 and 1477 unless otherwiserequired.

LA2.6 BOLTS ANDNUTS

All bolts and nuts shall be of such length as to project 6 to 12 mm beyond the nut when tightened up. The bearing

surfaces of the nuts shall, in every case, be at right angles to the axis of the holes through the nuts. Where heads of nuts are seated on bevelled surfaces of beams or channel flanges, bevelled washers shall be inserted. The heads and bodies of the bolts shall be forged from one piece of metal.

LA 2

Black bolts shall be cleanly finished and the threads shall comply with the tolerances given for "Black Bolts" in Table 3 of BS 4190: 1976. The dimensions of black bolts shall comply with those given in Table 10 of BS 4190.

High strength friction grip bolts shall comply with BS 4395: Part 1 and shall be used in accordance with BS 4604: Part 1.

All bolts having counter-sunk heads shall have strong feathers forged on the neck and head to prevent turning, and the bolt holes shall be cut to receive same.

All nuts for ordinary black bolts shall be furnished with circular washers of sufficient thickness, the outside diameter to be at least twice the nominal diameter of the bolt, unless otherwise indicated on the drawing.

LA2.7 WELDINGELECTRODES

Electrodes for welding purposes must satisfy the conditions as stipulated in SABS 455. Electrodes damaged either due to chipping of the flux or contamination with moisture must not be used. All welds are to be properly cleaned after welding.

Electrodes for use in welding stainless steel shall be of the same basic analysis as the parent metal in order to obtain optimum corrosion resistance.

LA2.8 GENERAL

All materials shall be straight and free from wind and twist. Cold straightening that will not damage the material will be permitted.

LA3. EQUIPMENT

The Contractor shall be responsible for providing, to the satisfaction of the Engineer, all such equipment as may be required for the proper execution of the work described in this specification.

LA4. CONSTRUCTION

LA4.1 WORKINGDRAWINGS

The Engineer will prepare all design and general arrangement drawings and these shall form the basis for all of the necessary shop drawings and erection drawings which must be made by the Contractor for the fabrication and erection of all steel and other work.

LA4.2 FABRICATION

Unless otherwise stated, all materials and workmanship shall comply with BS 153: Part 1 and BS 449: Part 2 but where the two specifications are in conflict, BS 153 shall take precedence.

Temporary attachments may only be welded on with the approval of the Engineer and shall eventually be removed to leave a smooth surface, primed and made good to the satisfaction of the Engineer.

All bolt holes must be accurate to size and location, the centres of holes shall not be placed closer to the edge of the plate than 1% diameter, with and extra allowance of 6 mm for sheared edges. Bolt hole diameters shall generally exceed the diameter of the bolt for

it was made by 2 mm. Where possible, the adjoining parts forming a connection shall be drilled or reamed together. After assembly of the parts, the holes shall be true throughout the thickness of all parts and perpendicular to the axis of the member.

Bolted joints and connections shall be made strictly in accordance with the drawings as regards the diameter, size, and type of bolt to be used. All mild steel surfaces in contract with one another shall receive one coat of red lead paint to SABS type II Grade I before bolting together.

All flame cutting of sections in long lengths as well as welding of built up sections shall be carefully done in a manner and sequence in accordance with acknowledged good practice to avoid distortion.

LA4.3 WELDING

Welding procedure shall be such that distortion is reduced to a minimum and local distortion is rendered negligible in the final structure. Welding to be according to the American Welding Society "Code of Welding in Building Construction "AWS B1.0-69. Butt welds in flange plates and/or web plates shall wherever possible be completed before the flanges and webs are welded together.

Unless indicated on the drawings that a particular weld surface is to be ground, such weld surface is to be convex and of uniform contour and must blend reasonably well into the parent metal. Any spatter must be removed.

Pre-heating shall be carried out for repair work, where welding has been interrupted, where the temperature of the metal is below 10" or where instructed by the Engineer.

Special care shall be taken when welding stainless steels to take into account the higher coefficient of thermal expansion and lower thermal conductivity of chromium nickel steels. Tack welding will generally be necessary beforehand.

LA4.4 OPEN GRIDFLOORING

Open grid flooring shall generally be of the type with square or rectangular openings and all flooring panels shall be completely framed by a fiat peripheral bar of the same depth as the span bars and welded to all span and transverse bars. Where fusion welded grid flooring is specified these shall be of the Irving Grating type as manufactured by Andrew Mentis, or other approved similar. Open grid stair treads for stairs shall be of the type manufactured by Andrew Mentis or Angus McLeod, or similar approved to the dimensions specified, and shall be provided with approved side plates and non-skid nosing strips.

Stair treads shall be bolted to stair stringers. Normal flooring for walkways shall be fixed to structural steel angle stringers using patent clips, to the satisfaction of the Engineer.

Open grid flooring shall generally be cleaned and double dipped in an approved bituminous paint. If required, gratings shall be galvanised to SASS 763.

LA4.5 HAND-RAILINGS

All handrails and standards shall be "Monoweld" tubular or equal approved by the Engineer. Standards shall be straight and mounted plumb, and all straight sections of hand railing shall be mounted in straight lines without kinks or irregularities. Prefabricated radius bends shall be supplied where necessary. All connections between handrails and between handrails and standards shall be welded all round and filled or ground to a smooth finish. Handrail standards and railings shall be cleaned and galvanised to SASS 763 or shop primed as required.

LA4.6 HANDLING AND SITESTORAGE

All items shall be carefully handled and protected against mechanical damage and corrosion during transit and storage on site. The Contractor will be held responsible for all damage arising from neglect of the above precautions, and shall make good at his own expense.

Items delivered to Site shall be stacked off the ground, by means of timber bearers, and stacked in such a manner that it is self-draining or, alternatively, protected by means of tarpaulins.

LA4.7 ERECTION OFSTEELWORK

The correction of mistakes on Site by burning may only be undertaken with the special approval of the Engineer, and to his satisfaction.

LA4.8 GROUTING
LA5. TOLERANCES
LA6. TESTING
LA7. MEASUREMENT ANDPAYMENTS

PART C3.3.1

Particular Project Specifications

In the event of any discrepancy between the Project Specifications and a part or parts of the COLTO Standardized Specifications, SANS 1200 Standardized Specifications, the Schedule of Quantities or the Drawings, the Project Specifications shall take precedence. Where discrepancies arise with regard to the units of the payment items only, the units stated in the Schedule of Quantities shall prevail.

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PS 2 SITE FACILITIES AVAILABLE
PS 3 SITE FACILITIES REQUIRED
PS 4 FEATURES REQUIRING SPECIAL ATTENTION
PS 5 INFORMATION SUPPLIED BY EMPLOYER
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PS 21 LOCAL LABOUR AND LOCAL SUBCONTRACTORS

PS 1: CONSTRUCTION PROGRAMME

It is a prerequisite of this contract that minimal disruption of the public is ensured during construction. Construction methods must be of such a nature that no property or life is endangered. The Municipality accepts no responsibility for any work done outside the site boundaries without the Engineer's approval. The Contractor himself is responsible for liaison and arrangements with the Engineer in connection with the finalization and approval of the construction programme.

The Contractor is responsible for liaison with residents and house owners via the Project Steering Committee in respect of the programming of construction through private erven and the crossing of driveways to erven. No additional payment will be made in this regard and it shall be deemed to be covered by the relevant items.

Sufficient digital photographs of all existing structures and obstructions in the pipe line routes must be taken by the Contractor, compiled electronically, indexed and handed over to the Engineer before construction commences.

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The Contractor shall submit a programme of work to the Engineer/Municipality not later than 14 (fourteen) days after the Contractor has been notified of the acceptance of his tender. This programme must take into account, and allow for phased completion of the work. The Engineer may instruct the Contractor to stop construction work at any stage and time, as may be dictated by financial constraints highlighted by the Clients Cost Control Programme.

If necessary, the Engineer may instruct the Contractor to adjust his programme to suit other activities.

The programme shall not be in the form of a bar chart only, but shall clearly show the anticipated quantities, the production rates and value of work to be performed each month.

A network-based programme according to the precedence method shall also be provided showing the various activities and critical path in such detail as may be required by the Engineer. The programme shall be updated monthly in accordance with the progress made by the Contractor.

Failure to comply with these requirements will entitle the Engineer to use a programme based on his own assumptions for the purpose of evaluating claims for extension of time or additional payments.

If the programme submitted by the Contractor in terms of Clause 15 of the General Conditions of Contract, has to be revised because the Contractor is falling behind in his programme, he shall submit a revised programme of how he intends to regain lost time to ensure completion of the Works within the period defined in Clause 45 of the General Conditions of Contract or within a granted extension of time. A proposal to increase the tempo of work must incorporate positive steps to increase production either by more labour and plant on the site, or by using the available labour and plant in a more efficient manner.

Failure on the part of the Contractor to submit or to work according to the programme or revised programmes shall be sufficient reason for the Engineer to take steps as set out in Clause 58 of the General Conditions of Contract.

The approval by the Engineer of a programme shall have no contractual significance other than the Engineer will be satisfied if the work is carried out according to the programme. The said approval shall not limit the right of the Engineer to instruct the Contractor to vary the programme if necessary. The Contractor shall allow for the effect of normal rainfall and special non-working days in his programme.

(CRITICAL PATH MUST BE INDICATED ON PROGRAMME)

PS 2:SITE FACILITIES AVAILABLE

PS 2.1: Camp site

The Contractor shall negotiate with property owners and make his own arrangements to obtain sites for the erection of offices, laboratories, yards, etc. Written approval must be obtained from the owners on whose property the camp is to be situated. The choice of all sites for the establishment of camps is subject to the approval of the Engineer. Campsites within the road reserve will not be permitted.

PS 2.2: Water, electricity and sewage

The Contractor shall make his own arrangements concerning the supply of electrical power, water, telephone and all other services, both for use at the site establishment area as well as for the use in the construction of the Works. No direct payment shall be made for the provision of any service and the cost thereof shall be deemed to be included in the rates tendered for the various items of work for which these services are required.

PS 2.3: Rain gauge

The contractor must set up his own rainfall gauge. This item is included in the Schedule of Quantities under other fixed-charge obligations.

PS 3:SITE FACILITIES REQUIRED

PS 3.1: Facilities for the Engineer

No separate office is required for the Engineer's representative but the Contractor must provide a table, a chair and a plan cupboard in one of his offices for the exclusive use of the Engineer's representative. The Engineer's representative shall be allowed free use of the Contractor's facilities. The Engineer's representative shall be allowed free use of survey equipment and survey assistants to carry out control work as and when required.

PS 3.2: Equipment for Engineering staff

The Contractor shall allow for providing the following protective clothing for the engineering staff:

2 high visibility vests
2 hard hats (white)
2 Sets of safety boots

The contractor shall supply the Engineer with a Business cell phone and be responsible for the monthly running cost, and other cost relating to the use of the cell phone.

Office facilities shall be provided by the Contractor as described by Colto Specification.

PS 3.3: Water, electricity and sewage

The Contractor shall, at his own expense, be responsible for obtaining and distributing the water and electricity required for construction and domestic use. The distribution of water and electricity shall be carried out in accordance with the applicable laws and regulations.

No separate payment will be made for obtaining and distributing water and electricity, the cost of which will be deemed to be included in the tendered rates.

PS 3.4: Site instruction book

A triplicate book shall be provided by the Contractor to be used for site instructions. It shall at all times be

kept on the site.

PS 4: FEATURES REQUIRING SPECIAL ATTENTION

PS 4.1: Access to properties

The Contractor shall organize the work in such a manner as to cause the least possible inconvenience to the public and to the property owners adjacent to or affected by the work included in this contract.

If, as a result of restricted road reserve widths and the nature of the works, the construction of bypasses is not feasible, construction shall be carried out under traffic conditions in order to provide access to the erven and properties.

The Contractor may, with the approval of the Engineer, make arrangements with the occupiers of the affected erven and properties to close off a portion of a street, road, footpath or entrance temporarily, provided the Contractor duly notifies the occupiers of the intended closure and its probable duration and shall, as punctually as possible, re-open the route at the prescribed time. Where possible, the road shall be made safe and re-opened to traffic overnight. Any such closure shall be made by arrangement between the Contractor and the occupiers and shall not absolve the Contractor from his obligations under the contract to provide access at all times. Barricades, traffic signs and drums shall be provided by the Contractor to suit the specific conditions. The Contractor shall also comply with all the requirements of the Local Authority with regard to safety, signage and notices to the public.

PS 4.2: Existing residential areas

Access to the adjacent residential areas shall be maintained at all times, as shall access to individual houses.

Electricity and water supply interruptions to existing residential areas shall be kept to a minimum. Whenever it is necessary to interrupt these supplies, the Engineer's approval shall first be obtained. The affected residents shall then be notified in writing at least 3 days, but not more than 5 days in advance. Supplies shall be normalized by 16:00 on the same day.

Cognisance shall be taken by the Contractor of the possibility of residents from the adjacent residential areas having access, whether authorized or not, to the works. It is strongly emphasized that under no circumstances shall any claims be considered for delays or disruptions as a result of the presence of residents from the adjacent occupied areas.

PS 4.3: Facilities to other Contractors

In addition to the requirements of clause 21 of the general conditions of contract, the Contractor must make allowance for the presence of other Contractors engaged on other contracts on the site, which may involve, inter alia, the adoption of his programme to fit in with work to be done by the other Contractors, as well as assuring other Contractors access to their sites along prescribed routes which may fall within the site of this contract.

PS 4.4: Contractor's vehicles

All equipment and vehicles used by the Contractor shall be roadworthy at all times and all drivers and operators shall be in possession of valid drivers' licences.

PS 4.5: Site maintenance

During the progress of the work and upon its completion, the site of the works shall be kept and left in a clean and orderly condition. The Contractor shall at all times store materials and equipment for which he is responsible in an orderly manner, and shall keep the site free from debris and obstruction. Workers shall lunch or have tea breaks only in a designated area with approved refuse and toilet facilities.

No open fires shall be permitted on the site.

Vehicles and workers must adhere to property demarcated access routes and not take or make short cuts.

PS 4.6: Testing and quality control

The Contractor shall engage the services of an approved independent testing laboratory for the testing of materials and the quality testing of layer works, to ensure that his work conforms to the specifications.

No separate payment will be made for such testing by an approved independent laboratory, the costs of which will be deemed to be included in the Contractor's tenderered rates for the various items of work requiring testing in accordance with the specifications.

Certificates shall be submitted to the Engineer for all materials and equipment included in the works, where applicable.

PS 4.7: Subcontractors

The Contractor is responsible for work carried out on his behalf by subcontractors. The Engineer will not liaise directly with such subcontractors, and all problems relating to payments, programming, workmanship, etc, shall be the concern of the Contractor and the subcontractor, and the Engineer will not be involved.

PS 4.8: Existing Services

Before the Contractor commences operations, he must discuss with and have the approval of the Employer, authority or owner concerned regarding the method he proposes to use for relocating or safe-guarding any services and existing works he may encounter during construction.

The positions of existing services shown on the Drawings are given in good faith and no guarantee can be given that:

(a) These services actually are in the approximate positions indicated.
(b) That these are the only services in the vicinity, and
(c) That the nature and description of these services are correct.

The Contractor shall be responsible to locate and safeguard any existing service or works he may encounter during construction and shall obtain clearance from the Employer, authority and the Engineer before commencing work in the proximity of existing services or works.

The Contractor shall be responsible for any damage to such existing services and works in the execution of this contract and shall reimburse the Employer, authority or the owner concerned for any repairs required and for damages.

The Contractor shall be responsible for immediately notifying the Engineer and the authorities concerned regarding any damage caused to public services and existing works.

Any alteration to public services shall be carried out by the Authority concerned unless the Contractor is instructed otherwise.

The Contractor shall provide the necessary assistance during any operations necessary in connection with the removal, alteration or safe-guarding of any public service.

4. PS 4.9 Safety

The Contractor shall apply suitable proven methods for construction so that his activities will not constitute a hazard to the public or any adjacent property. All excavations shall be suitably safeguarded and barricaded especially during night time, weekends or holidays and any other day of inactivity by the

Contractor.

PS 5: INFORMATION SUPPLIED BY EMPLOYER

Certain information contained in these contract documents, or provided separately, is being offered in good faith. However, in the circumstances pertaining to the type of information supplied, no guarantee can be given that all the information is necessarily correct or representative. More specifically this applies to all material surveys and reports and similar information, the accuracy of which is necessarily subject to the limitation of testing, sampling, the natural variation of material or formations being investigated and the measure of confidence with which conclusions can be drawn from any investigations carried out. It also applies to the positions of existing services as indicated on the drawings.

The Employer accepts no liability for the correctness or otherwise of the information supplied or for any resulting damages, whether direct or consequential, should it prove during the course of the contract that the information supplied is either incorrect or not representative. Any reliance placed by the tenderer on this information shall be at his own risk.

PS 6: EXTENSION OF TIME ARISING FROM ABNORMAL RAINFALL

If abnormal rainfall or wet conditions occur during the course of the Contract, the Employer may grant an extension of time in accordance with Clause 45 of the General Conditions of Contract, calculated in accordance with the formula given below for each calendar month or part thereof:

$$V = (Nw - Nn) + (Rw - Rn)/X$$

If V is negative and its absolute value exceeds Nn, then V shall be taken as equal to minus Nn.

The symbols shall have the following meanings:

V = Extension of time in calendar days for the calendar month under consideration. When the value of V for any month exceeds the number of days in the particular month, V will be the number of days in the month.

Nw = Actual number of days in the calendar month on which a rainfall of Y mm or more were recorded.

Nn = Average number of days, derived from existing rainfall records, on which a rainfall of Y mm or more were recorded for the calendar month.

Rw = Actual rainfall in mm recorded on the Site in an approved rain gauge for the calendar month under consideration.

Rn = Average rainfall in mm for the calendar month, derived from existing rainfall records.

The total extension of time is the algebraic sum of all the monthly totals for the period under consideration, but if the total is negative, the time for completion will not be reduced on account of subnormal rainfall. Extensions of time for part of a month will be calculated by using pro rata values for Nn and Rn.

The factor (Nw - Nn) is considered a fair allowance for variations from the average number of days during which the rainfall exceeds Y mm.

The factor (Rw - Rn)/X is considered a fair allowance for variations from the average number of days during which the rainfall did not exceed Y mm but wet conditions prevented or disrupted work.

The average rainfall record for the past 10 years at the nearest rainfall station shall be for the purposes of this Contract are taken as normal rainfall. Rn and Nn for this period shall be used and the values of X and Y are 20 and 10 respectively.

PS 7: CERTIFICATES OF PAYMENT

It was agreed that the master copy of the payment certificates would be drawn up and processed by the Contractor. All costs to this effect, as well as reproduction costs shall be to the account of the Contractor. It was agreed that the first month's certificate will be evaluated and if in order, the same format will be used throughout the contract.

PS 8: CONSTRUCTION IN LIMITED AREAS

In certain cases working space may be limited. The method of construction in these restricted areas will depend largely on the Contractor's plant. However, the Contractor must note that measurement and payment will be according to the specified cross-sections and dimensions irrespective of the method used to achieve these cross-sections and dimensions, and that the rates and prices tendered shall be deemed to include full compensation for any difficulty encountered while working in limited areas and narrow widths, and that no extra payment will be made, nor will any claim for payment due to these difficulties be considered.

PS 9: NON-WORKING DAYS

The Contractor shall not work on Sundays or on the following statutory Public Holidays: New Years Day, Human Rights Day, Good Friday, Family Day, Freedom Day, Workers Day, Youth Day, National Women's Day, Heritage Day, Day of Reconciliation, Christmas Day and Day of Goodwill. Whenever any of the above statutory Public Holidays fall on a Sunday, the following Monday shall be a Public Holiday.

PS 10: SPOIL MATERIAL

No indiscriminate spoiling of material will be allowed. All surplus or unsuitable material shall be spoiled in designated areas as directed by the Engineer. Spoiling shall comply with the applicable statutory and municipal regulations.

PS 11: DRAWINGS

All "as built" information, as listed below, must be submitted to the Engineer's Representative before a certificate of completion will be issued. No separate payment will be made for the"as built" drawings

List of "as built" information required

(a) Exact coordinates or chainage on the road centre line of each duct road crossing for electrical and irrigation services.

(b) Exact coordinates and invert levels of all stormwater manholes, culverts and kerb inlets.

(c) Exact coordinates and invert levels of all construction work

A Registered Land Surveyor shall be required to provide the above information.

Only figured dimensions shall be used and drawings shall not be scaled unless so instructed by the Engineer.

The Engineer will supply any figured dimensions which may have been omitted from the drawings.

PS 12: LENGTH OF TRENCHES

Where no limitations are imposed by construction stages and unless otherwise permitted in writing by the Engineer, not more than 200 m of trench in any one place shall be opened in advance of pipe laying operations.

No trench may be left open over the builders' holidays.

PS 13: SAMPLES

The Contractor shall at his own cost, supply all samples that may be required. Material or work not conforming to the approved samples shall be rejected. The Engineer reserves to himself the right to submit samples to any tests to ensure that the material represented by the sample conforms to the requirements of the specifications. The cost of all tests failed shall be for the Contractor's account.

PS 14: MANUFACTURER'S INSTRUCTIONS

The recommendations of the manufacturers of patented materials must be strictly adhered to regarding the use, mixing, application, fastening, etc. thereof except when otherwise instructed in writing by the Engineer.

PS 15: MATERIALS AND PLANT

The contractor, when using materials that are required to comply with any standard specification, shall, if so ordered, furnish the engineer with certificates of compliance.

Where so specified, materials shall bear the official mark of the appropriate authority. Samples ordered or specified shall be delivered to the engineer's office on the site free of charge.

Where proprietary products have been specified, similar products may be used subject to the prior written approval of the engineer.

Unless otherwise specified, all proprietary materials shall be used and placed in strict accordance with the relevant manufacturer's current published instructions.

Unless anything to the contrary is specified, all manufactured articles or materials supplied by the contractor for the permanent works shall be unused.

Existing structures on the site shall remain the property of the employer and except as and to the extent required elsewhere in the contract, shall not be interfered with by the contractor in any way.

Materials to be included in the works shall not be damaged in any way and, should they be damaged on delivery or by the contractor during handling, transportation, storage, installation or testing they shall be replaced by the contractor at his own expense.

All places where materials are being manufactured or obtained for use in the works, and all the processes in their entirety connected therewith shall be open to inspection by the engineer (or other persons authorised by the engineer) at all reasonable times, and the engineer shall be at liberty to suspend any portion of work which is not being executed in conformity with these specifications.

The contractor shall satisfy himself that any quarry selected for use provides the necessary mined material in accordance with the specification.

PS 16: NOTICES, SIGNS, BARRICADES AND ADVERTISEMENTS

The Contractor shall erect the necessary signs, notices and barricades for the duration of the contract in order to safeguard both the works and the public.

Notices, signs and barricades as well as advertisements may be used only upon approval by the Engineer, and the Contractor shall be responsible for their supply, erection, maintenance and ultimate removal and shall make provision for this in his tendered rates.

The Engineer shall have the right to have any sign, notice or advertisement moved to another position or

to have it removed from the site of the works, should it in any way prove to be unsatisfactory, inconvenient or dangerous to the general public.

Such notices, signs and barricades shall be provided and erected at the Contractor's own expense.

The standard name board of the South African Association of Consulting Engineers is specified. The cost of which shall be included in the rates tendered for items 1300 (Colto) of the Schedule of Quantities.

PS 17: SETTING OUT OF WORK

Reference and level beacons will be shown to the Contractor by the Engineer at the commencement of the Contract and the Contractor will be responsible for transferring the data to the Site of Works.

The Contractor shall check the condition and accuracy of all reference and level beacons and satisfy himself that they have not been disturbed and are true with regard to position and level. A beacon that has been disturbed shall not be used until its true position and level have been re-established and the new values have been certified by the Engineer. The Contractor shall thereafter be held entirely responsible for the protection of all reference and level beacons.

The Contractor shall employ a capable surveyor to set out the Works to the required lines and levels. The Engineer shall be informed immediately should any discrepancy be discovered between the levels or dimensions obtained by the Contractor and those shown on the drawings.

Where a beacon is likely to be disturbed during construction operations, the Contractor shall establish suitable reference beacons at locations where they will not be disturbed during construction. No beacons shall be covered over, disturbed or destroyed before accurate reference beacons have been established and details of the positions and levels of such beacons have been submitted to the Engineer. The Contractor's reference beacons shall be of at least the same accuracy and sturdiness of construction as the existing beacons.

The Contractor shall submit the method of setting out he proposes to employ to the Engineer. Accurate control of line and level shall be provided by the Contractor at all stages of construction.

Work set out by the Contractor may be checked by the Engineer and any errors found shall be rectified by the Contractor at his own expense. The Contractor shall supply any instrument, equipment, material and labour required by the Engineer for this survey work. Any assistance, including checking given to the Contractor by the Engineer or any setting out done by the Engineer for Contractor shall not be held as relieving the Contractor of his responsibility for the accurate construction of the Works.

The Contractor's survey instruments and survey equipment shall be suitable for the accurate setting out of the Works and shall be subject to the approval of the Engineer. They shall furthermore be checked and correctly adjusted by the authorized agents before the commencement of the contract and subsequently when required by the Engineer and when otherwise necessary.
When required the Contractor shall, at his own expense, provide two labourers to assist the Engineer. The Engineer shall have the sole right of approving of such a labourer.

Survey work shall not be measured and paid for directly and compensation for the work involved in setting out shall be deemed to be covered by the rates tendered and paid for the various items of work included under the contract.

PS 18: WORKMANSHIP AND QUALITY CONTROL

The onus to produce work which conforms in quality and accuracy of detail to the requirements of the Specifications and Drawings rests with the Contractor, and the Contractor shall, at his own expense, institute a quality-control system and provide experienced Engineers, foremen, surveyors, materials technicians, other technicians and technical staff, together with all transport, instruments and equipment, to ensure adequate supervision and positive control of the works at all times.

The costs of all supervision and process control, including testing thus carried out by the Contractor shall be deemed to be included in the rates tendered for the related items of work.

The Contractor's attention is drawn to the provisions of the various standardized specifications regarding the minimum frequency of testing that will be required for process control. The Contractor shall, at his own discretion, increase this frequency where necessary to ensure adequate control.

On completion of every part of the work and submission thereof to the Engineer for examination, the Contractor shall furnish the Engineer with the results of all relevant tests, measurements and levels to indicate compliance with the specifications.

PS 19: TRANSPORT OF MATERIAL

All costs of transporting material, including overhaul, shall be included in the applicable tendered rates. All references in the specifications to transport, overhaul and haul distances shall be deleted irrespective of whether or not the deletion is included in these project specifications.

PS 20: LIAISON WITH LOCAL AUTHORITIES

The Contractor will have to liaise with local authorities regarding the following matters:

(a) Dealing with traffic.
(b) Locating of existing underground services.
(c) Protection of existing services during construction.

All the relevant authorities were notified of above operations. It is then the Contractor's onus to immediately contact all these authorities and to accommodate their involvement in his programme of work. The Contractor should also warn the authorities at least 48 hours before the actual work commences. Compensation for delays, losses or accidents will not be considered should the Contractor at any time have failed to keep the local authorities informed.

The Engineer or Employer must immediately be notified, should the Contractor experience any problem regarding work which involve a local authority.

PS 21 LOCAL LABOUR AND LOCAL SUBCONTRACTORS

PS 21.1 Introduction

It is envisaged that the works will be constructed by one Contractor employing local labour to construct the work applying the principles of the Expanded Public Works Programme (EPWP).

PS 21.2 Workload

The Contractor is required to execute certain components of this contract with labour-based construction methods as described in relevant sections.

PS 21.3 Assisting ABE’s

The Contractor is required to assist ABE's in accordance with the Contractors proposal included in his/her tender.

PS 21.4 Local Labour

It is the intention that this Contract should make maximum use of the local labour force that is presently under-employed. To this end the Contractor is expected to limit non-local employees to key personnel only and to employ and train local labour on this Contract.
The Contractor shall complete the form: AnnexureF and state how many non-local key personnel he intends to employ in the various categories. The numbers stated on the above-mentioned form will be

strictly controlled during the Contract period and any increase in numbers is subject to the approval of the Employer.

A Project Steering Committee (PSC) has been formed and consists of representatives of the affected community, Lepelle Nkumpi Local Municipality and the Engineer. The PSC is up to date with the details of the project and appointment of all local labour must be through the PSC.

The Contractor will be required to arrange his own documentation regarding a contract for locally employed labour and must include provisions for the Occupational Health and Safety Act (1993) and the Compensation for Occupational Injuries and Diseases Act. The minimum daily wage to be paid in accordance with the Wage Bill for the geographical area shall be as stated in the Government Gazette in terms of Wage Determination for the Civil Engineering Industry.

PS 21.5 Contractors Obligations

The Contractor is to supply the Engineer with copies of the agreements between himself/herself and his/her subcontractors within twenty-one (21) days of the contract being awarded.

Should the Contractor be unable to or unwilling to:

i) Subcontract the required Works as detailed in his/her tender document;
ii) Submit the necessary documentation to prove that he/she is subcontracting the work as specified in paragraph PS 10.6.
iii) Implement his/her proposed training scheme or any other scheme agreed to by the relevant parties;

The Municipality reserves the right to:

a) Nullify the said contract and re-issue it to tender;
b) Nominate available local subcontractors for the required Works;
c) Deduct payment from the monthly certificates, the value of which will be calculated as follows:

X = Y - Z
X = Amount of deduction from the monthly certificate
Y = Value of the work that should have been undertaken by the subcontractor during the month
Z = Value of the work actually undertaken by the Subcontractor during the month;
(d) = Nominate agents to undertake the proposed training at the expense of the Contractor.

PS 21.6 Work considered to be Labour Based

It is a condition of this contract that the following components of work must be executed using labour based construction methods.

1) Excavation of soft/ intermediate / hard material in pipe trenches not deeper than 1,2 m if the uninterrupted trench length of soft material is greater than 50 m, and the total depth of the trench consists of soft material.
2) Excavation of soft/ intermediate/ hard material in all pipe trenches for erf connections with no limitations.
3) Preparation of pipe bedding.
4) Laying and jointing of all pipes with a nominal diameter smaller than 230mm:
5) Backfilling of all trenches with compaction excluded.
6) Placing of concrete for anchor blocks and toilet foundations.
7) Brickwork in toilet structures.
8) Basic plumbing installation in toilets.
9) All earthworks required for foundations of toilet structures.
10) Precast concrete roof slabs for toilets, excluding erection.
11) Location of existing services.

Note:

The abovementioned work must either be done by local labourers employed by the Contractor or by local subcontractors. In the Schedule of Quantities, as an alternative to machine excavation, the cost of a compulsory labour based construction activity is covered by using the standard Colto payment item (where applicable). Site conditions and material present will dictate the application of labour-based trench excavation or machine excavation. A prerequisite for payment of these labour-based excavation items is that the Contractor keeps daily written records with names of labourers, tasks completed, man-hours spent and payments made.

Items excluded from labour based items:

1) Excavation in Boulders and rock material - Mechanical excavators and blasting allowed.
2) Compaction of bedding and backfilling - Rollers and plate compactors allowed.
3) Transport of materials LDV, dumpers and other transport equipment allowed.
4) Mixing of concrete - Mechanical mixers allowed.
5) Vibration of concrete - Vibrators compulsory.
6) Precast concrete manholes.

PS 22 TRAINING SCHEMES

Certain members of the Contractors staff will be selected from the locally recruited employees, to be subjected to training in tasks related to the execution of the contract.

The PSC will select the trainees and decide upon the specific training for each of them. The Contractor must guide PSC in this regard and make all the necessary arrangements with the training institution and the trainees, to ensure that the process runs smoothly. All other costs, including transport of trainees, will be borne by the Contractor and is deemed to be included in the P &G.

PS 23 PRESCRIPTIONS IN RESPECT OF EXISTING SERVICES

The scope of works for this contract could be affected by existing services. Where necessary the contractor must familiarize himself with the position and extent of existing services and to carry out the works in such a manner as not to cause damage to existing services.

PS 23.1 Water and Storm Water Services

All manhole covers in the road must be clearly referenced and absolutely no surfacing shall be allowed on any manhole cover.

Any cost of repairs, replacement and/or installation of services and equipment resulting from the contractor's negligence or unauthorized action shall be to the contractor's account.

PS 23.2 Electrical Services

The following procedures will apply:

1. The Contractor will in all instances submit construction drawings to the Electricity Supply Authority (ESA) for comments and for ESA to indicate known electrical services. These drawings will in all instances be available on site during the construction period or in the possession of the supervisor of the construction workers.

2. The cable's precise position on the terrain, with reference to the approximate position as indicated on the drawing, must be confirmed on terrain by means of cable tracing equipment to be supplied or arranged by the Contractor for this purpose. In the case of primary cables (11 kV and 33kV) as indicated on the drawings, it is essential that cable tracing be conducted by ESA.

The Contractor will provide sufficient white lime to mark the cable on the ground. The contact persons and telephone numbers for cable tracing personnel shall be obtained from ESA by the Contractor.

3. The Contractor must thereafter, very carefully, open up the cable by hand on at least two places, of which the in between distances will not exceed 50 meters.

4. At any position, between any two points of the exposed cable as described in 1.3 above, that cable shall be identified as a known service if it lays within 0,5 meters of a straight line drawn between these two points
5. If the cable lays further than 0,5 meters away from a straight line drawn between the two exposed points, it shall be identified as an unknown service.

6. With reference to the approximate position of cables on the drawing, the Contractor will be responsible for confirming the location of such cables on terrain by means of the equipment referred to in 1.2 above, and by careful digging by hand. If the exact position of the cables cannot be determined without doubt, ESA can be approached for help.

7. When existing electrical cables fall within the excavation area of the new service, the Contractor will be responsible for protecting and supporting such cable. During backfilling of the trench, the Contractor will ensure that the cable is not damaged and repositioned at the original position and depth with the necessary bedding and marker tape.

8. Before any exposed cables are backfilled, such cables shall be inspected for possible damage by the terrain agent, in the presence of the Engineer or his/her representative. A complete record of all positions where cables were exposed must be indicated on the drawing.

9. The Contractor is responsible for keeping a complete record of incidents where electrical cables (known or unknown) were damaged that includes the following:
   - Date when damaged and the reason
   - Date when repaired
   - The extent of repairs, for instance cable size, number of joints necessary, the length of cable replaced etc
   - The exact cable position and depth indicated on the plan

10. The Engineer's representative must check these records. The above-mentioned record will be an annexure to the minutes of the monthly site meetings. All repairs of damaged cables (known or unknown) will be conducted by ESA. The account for repairs done on known services (cables) will be delivered to the Contractor via the Engineer. On the basis of accounts delivered monthly by ESA, the repair cost of a known
service (electrical cable) that was damaged, will be recovered from the Contractor's certificate.

11. 33 kV Cables
In no instances will any Contractor be allowed to expose cover 33kV cables or excavate closer to 500mm (by hand) and 2000 mm (mechanical excavation) from the centre of a 33 kV cable. ESA will do the required excavation for the Contractor's account.

12. Overhead Services
Excavation and backfill shall be such that no foundation of overhead structures (power lines, streetlights, high mast lights, stays etc.,) will be disturbed. If disturbed, the Contractor will inform ESA in writing and will reinstate the foundation to its original state.

13. Maintenance Period
During the maintenance period the Contractor's responsibility shall include:
All electrical cables that were exposed or handled by him
Excavations in the vicinity of poles and stays, at the time of the construction activities

This makes provision for instances where damaged cables were covered up without informing

ESA that may cause many problems later on. The Contractor is responsible to repair all disturbed pole and stay foundations and to reinstate it to its original condition (electrical and structural), as they are disturbed.

LEPELLE-NKUMPI LOCAL MUNICIPALITY

CONTRACT NO. LNM020/2020/21

REFURBISHMENT AND UPGRADING OF LEBOWAKGOMO STADIUM

PART C3.4

Amendments to the Standard and Particular Specifications

PCL: COMMUNITY LIAISON AND COMMUNITY RELATIONS

PCL 1 GENERAL

The construction site is situated in a built-up area and the Contractor shall ensure the least possible disruption of movement of the public during construction. The Contractor shall be responsible for liaison with the Community Liaison Officer (CLO) in respect of construction activities next to private properties and entrances to properties. No separate payment will be made in this regard.

PCL 2 PROJECT STEERING COMMITTEE (PSC)

A Project Steering Committee (PSC) will be established for the project. The functions and powers of the PSC will be as approved by the Lepelle Nkumpi Local municipality.

In view of the Contract being executed in various Municipal Wards and to limit representation on the PSC, the PSC will consist of the local Ward Councillors and a total of three community representatives appointed by the Ward Councillors affected by the Works.

The Contractor will liaise with the CLO and Ward Councillors for the permanent appointment of local labour workforce for the duration of the Contract, irrelevant of the work being executed in various wards.

PCL 3 COMMUNITY LIAISON OFFICER (CLO)

A Community Liaison Officer (CLO) will be appointed by the Contractor only on instruction of the Employer. In the event of an appointment of a CLO, the contractor shall, however, accept the appointment as part of his management personnel.

PCL 3.1 DUTIES OF THE CLO

The CLO's duties will be the following:

a. The CLO will liaise with the PSC for the permanent appointment of local labour workforce for the duration of the Contract, irrelevant of the work being executed in various wards.

b. To be available on site daily between the hours of 07:15 and 10:30 and at other times as the need arises. His normal work day will extend from 07:15 in the morning until 16:45 in the afternoon inclusive of a thirty minute lunch interval.

c. To determine, in consultation with the Contractor, the needs of the local labour for relevant technical training. He will be responsible for the identification of suitable trainees and will attend one of each of the training sessions.

d. To communicate with the Contractor and the Engineer to determine the labour requirements with regard to numbers and skill, to identify possible labour disputes and to assist in their resolution.

e. To attend all meetings in which the community and/or labour is present or is required to be represented. In particular he will attend the first part of the monthly Site Meeting to report on local community labour involvement.

f. To report to and liaise with the Project Steering Committee.

g. To inform local labour of their conditions of employment and to inform local labourers as early as possible when their period of employment will be terminated.

h. To ensure that all labourers who are involved in activities where tasks have been set are fully informed regarding the principle of task work.

i. To attend disciplinary proceedings to ensure that hearings are fair and reasonable.

j. To receive and attend to any complaints lodge by PSC and members of the community.

k. To keep a daily written record of his interviews and community liaison.

l. All such other duties as agreed upon between all parties concerned.

m. To prevent any interference with any matter that is in conflict with the relevant contract as approved by the Local Municipality, that could have a direct influence on the technical specification or the conditions of contract as set out in the relevant contract documents.

n. To ensure that no member of the PSC or any member of the community put any pressure on the consultant and/or the contractor involved to make any financial or other contribution to individuals or the community as a whole without the knowledge of the Lepelle Nkumpi Local municipality.

PCL 3.2 PAYMENT FOR THE CLO

Remuneration of the CLO will be R4 500 per month unless otherwise ordered by the Engineer. A special item is incorporated in the Schedule of Quantities relating to payment of the CLO on a monthly basis.

The Contractor shall give to the CLO, at the earliest opportunity, written notice of the termination of the project, provided always that such notice shall not be less than one month.

PTR: TRAINING

PTR 1 GENERAL

Training needs will be determined during the construction period. The Community Liaison Officer (CLO) in consultation with the Project Steering Committee (PSC) and the Engineer will identify possible training needs. The training needs will be put before Lepelle Nkumpi Local Municipality and the Engineer for approval.

LEPELLE-NKUMPI LOCAL MUNICIPALITY

CONTRACT NO. LNM020/2020/21

REFURBISHMENT ANDD UPGRADING OF LEBOWAKGOMO STADIUM

PART C4

LOCALITY PLAN

1. C4.1: LOCALITY PLAN

C4.2: DRAWINGS

Annex C

Local Content Declaration - Summary Schedule

(C1)	Tender No.				Note: VAT to be excluded from all calculations
(C2)	Tender description:				
(C3)	Designated product(s)				
(C4)	Tender Authority:				
(C5)	Tendering Entity name:				
(C6)	Tender Exchange Rate:	Pula		EU		GBP	
(C7)	Specified local content %				

	Calculation of local content								Tender summary			
	Tender item no's	List of items	Tender price - each (excl VAT)	Exempted imported value	Tender value net of exempted imported content	Imported value	Local value	Local content % (per item)	Tender Qty	Total tender value	Total exempted imported content	Total Imported content
	(C8)	*(C9)*	*(C10)*	*(C11)*	*(C12)*	*(C13)*	*(C14)*	*(C15)*	*(C16)*	*(C17)*	*(C18)*	*(C19)*

(C20) Total tender value	R 0		
(C21) Total Exempt imported content		R 0	
(C22) Total Tender value net of exempt imported content		R 0	
(C23) Total Imported content			R 0
(C24) Total local content			R 0
(C25) Average local content % of tender			

Signature of tenderer from Annex B

Date:

Annex D

Imported Content Declaration - Supporting Schedule to Annex C

(D1)	Tender No.						
(D2)	Tender description:						
(D3)	Designated Products:						
(D4)	Tender Authority:						
(D5)	Tendering Entity name:						
(D6)	Tender Exchange Rate:	Pula		EU	R 9.00	GBP	R 12.00

Note: VAT to be excluded from all calculations

A. Exempted imported content

				Calculation of imported content						Summary	
Tender item no's	Description of imported content	Local supplier	Overseas Supplier	Forign currency value as per Commercial Invoice	Tender Exchange Rate	Local value of imports	Freight costs to port of entry	All locally incurred landing costs & duties	Total landed cost excl VAT	Tender Qty	Exempted imported value
(D7)	(D8)	(D9)	(D10)	(D11)	(D12)	(D13)	(D14)	(D15)	(D16)	(D17)	(D18)

(D19) **Total exempt imported value** R 0

This total must correspond with Annex C - C 21

B. Imported directly by the Tenderer

				Calculation of imported content						Summary	
Tender item no's	Description of imported content	Unit of measure	Overseas Supplier	Forign currency value as per Commercial Invoice	Tender Rate of Exchange	Local value of imports	Freight costs to port of entry	All locally incurred landing costs & duties	Total landed cost excl VAT	Tender Qty	Total imported value
(D20)	(D21)	(D22)	(D23)	(D24)	(D25)	(D26)	(D27)	(D28)	(D29)	(D30)	(D31)
	`										

(D32) **Total imported value by tenderer** R 0

C. Imported by a 3rd party and supplied to the Tenderer

				Calculation of imported content						Summary	
Description of imported content	Unit of measure	Local supplier	Overseas Supplier	Forign currency value as per Commercial Invoice	Tender Rate of Exchange	Local value of imports	Freight costs to port of entry	All locally incurred landing costs & duties	Total landed cost excl VAT	Quantity imported	Total imported value
(D33)	(D34)	(D35)	(D36)	(D37)	(D38)	(D39)	(D40)	(D41)	(D42)	(D43)	(D44)
`											

(D45) **Total imported value by 3rd party** R 0

D. Other foreign currency payments

			Calculation of foreign currency payments		Summary of payments
Type of payment	Local supplier making the payment	Overseas beneficiary	Foreign currency value paid	Tender Rate of Exchange	Local value of payments
(D46)	(D47)	(D48)	(D49)	(D50)	(D51)

(D52) **Total of foreign currency payments declared by tenderer and/or 3rd party**

Signature of tenderer from Annex B

(D53) **Total of imported content & foreign currency payments - *(D32), (D45) & (D52)* above** R 0

This total must correspond with Annex C - C 23

Date:

SATS 1286.2011

Annex E

Local Content Declaration - Supporting Schedule to Annex C

(E1)	**Tender No.**	
(E2)	**Tender description:**	
(E3)	**Designated products:**	
(E4)	**Tender Authority:**	
(E5)	**Tendering Entity name:**	

Note: VAT to be excluded from all calculations

Local Products (Goods, Services and Works)	Description of items purchased	Local suppliers	Value
	(E6)	*(E7)*	*(E8)*
	***(E9)* Total local products (Goods, Services and Works)**		R 0

(E10)	**Manpower costs**	(Tenderer's manpower cost)	R 0
(E11)	**Factory overheads**	(Rental, depreciation & amortisation, utility costs, consumables etc.)	R 0
(E12)	**Administration overheads and mark-up**	(Marketing, insurance, financing, interest etc.)	R 0

***(E13)* Total local content** R 0

This total must correspond with Annex C - C24

Signature of tenderer from Annex B

Date: