PROVINCIAL ADMINISTRATION OF KWAZULU-NATAL
DEPARTMENT OF PUBLIC WORKS

KWAZULU-NATAL PROVINCE
PUBLIC WORKS
REPUBLIC OF SOUTH AFRICA

BILLS OF QUANTITIES

with GCC for Construction Works - Second Edition 2010

CONTRACTUAL SECTION

ONE VOLUME APPROACH
SECTION 2

DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3: ETHEKWINI REGION: DUMANE COMMERCIAL HS

PROJECT NAME	WIMS NO.	CONTRACT PERIOD
DUMANE COMMERCIAL HS	063634	7 CALENDAR MONTHS

ENGINEER/PRINCIPAL AGENT
LDM Quantity Surveyors DBN (Pty) Ltd
P.O. Box 19233
Dormerton
Durban
4015
031 - 207 1340 - Tel Number
031 - 209 9441 - Fax Number
lkhwela@ldm.co.za

EMPLOYER:
Head: Public Works
KZN Department of Public Works
Private Bag X 9041
PIETERMARITZBURG
3200
Tel Number: 033 - 897 1300
Fax Number: 033 - 897 1399

QUANTITY SURVEYORS
LDM Quantity Surveyors DBN (Pty) Ltd
P.O. Box 19233
Dormerton
Durban
4015
031 - 207 1340 - Tel Number
031 - 209 9441 - Fax Number
lkhwela@ldm.co.za

REGION:
Regional Manager
KZN Department of Public Works
X54336
Mayville
4091
Tel Number: 031 - 203 2183
Fax Number: 031 - 261 5044

Tender Number:	ZNTD05574W	Project Code:	063634
CIDB Grading:	4GB OR HIGHER	Document Date:	As Per Tender Advert
ECDP Number:	N/A	Contract Period:	7 Calendar Months

Contracting Party: _____
CIDB Registration number: _____
Central Suppliers Database Registration Number: _____

DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3: ETHEKWINI REGION: DUMANE COMMERCIAL HS

KWAZULU-NATAL PROVINCE
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THE CONTRACT

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THE CONTRACT

KWAZULU-NATAL PROVINCE
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DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3: ETHEKWINI REGION: DUMANE COMMERCIAL HS

C1 - AGREEMENT AND CONTRACT DATA

KWAZULU-NATAL PROVINCE
PUBLIC WORKS
REPUBLIC OF SOUTH AFRICA

DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3: ETHEKWINI REGION: DUMANE COMMERCIAL HS

FORM OF OFFER AND ACCEPTANCE

FORM OF OFFER AND ACCEPTANCE

Tender No - ZNTD05574W

KWAZULU-NATAL PROVINCE
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DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3: ETHEKWINI REGION: DUMANE COMMERCIAL HS

C.1.1 - FORM OF OFFER AND ACCEPTANCE

THE OFFER AND ACCEPTANCE FORM IS BOUND INTO **SECTION 1** (See end of Returnable Documents) OF THIS DOCUMENT AS PART OF THE RETURNABLE DOCUMENTS. ONCE A CONTRACT IS CONCLUDED WITH A SUCCESSFUL TENDERER, THIS PAGE WILL BE REPLACED WITH THE FILLED AND SIGNED OFFER AND SIGN ACCEPTANCE BY THE EMPLOYER AND IT WILL BECOME PART OF THE CONTRACT.

PLEASE SUBMIT THE OFFER AND ACCEPTANCE FORM WITH THE OTHER RETURNABLE DOCUMENTS.

KWAZULU-NATAL PROVINCE
PUBLIC WORKS
REPUBLIC OF SOUTH AFRICA

DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3: ETHEKWINI REGION: DUMANE COMMERCIAL HS

C1.2 - CONTRACT DATA

C 1.2 CONTRACT DATA:
with GCC for Construction Works - Second Edition 2010

CONTRACT DATA FOR:

DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3: ETHEKWINI REGION: DUMANE COMMERCIAL HS

Tender no: **ZNTD05574W**

The General Conditions of Contract are the clauses contained in the General Conditions of Contract (2010) (Second Edition) published by the South African Institution of Civil Engineering. Copies of these conditions of contract may be obtained through most regional offices of the South African Institution of Civil Engineering, telephone number 011 805 5947 or by visiting their website at www.saice.org.za.

CONTRACT SPECIFIC DATA
The following contract specific data are applicable to this contract:

CONTRACT VARIABLES

This schedule contains all variables specific to this document and is divided into pre-tender and post-tender categories. The pre-tender category must be completed in full and included in the tender documents. Both the pre-tender and post-tender categories form part of this **agreement.**

Spaces requiring information must be filled in, shown as 'not applicable' or deleted but not left blank. Where choices are offered, the non-applicable items are to be deleted. Where insufficient space is provided the information should be annexed hereto and cross referenced to the applicable clause of the schedule. Key cross reference clauses are italicised in *[ ]* brackets.
The Engineer/Principal Agent, in accordance with Clause 1.1.1.16, shall obtain the specific approval from the Employer before executing any of his functions according to the "Conditions under which Consultants are appointed", or in the event where an employee of the Employer represents the Employer, the relevant General Delegations applicable at the time of executing his/her duties as described in Clause 3.1.2.

Part 1: CONTRACT DATA PROVIDED BY THE EMPLOYER:

PRE-TENDER INFORMATION

CONTRACTING AND OTHER PARTIES

[1.1.1.15] **Employer:**

Head: Public Works (KZN Department of Public Works: Province of KwaZulu-Natal)

Postal address:
Private Bag X 9041
PIETERMARITZBURG
3200

Tel: ***033 - 897 1399*** Fax: ***033 - 897 1300***

[1.2.1.2] Physical address:
191 Prince Alfred Street
PIETERMARITZBURG
3200

[1.1.1.16] **Employers Agent 1**
LDM Quantity Surveyors DBN (Pty) Ltd

Agent's service:
PRINCIPAL AGENT

Postal address:
P.O. Box 19233
Dormerton
4015

Tel: ***031 - 207 1340*** Fax: ***031 - 209 9441***

Employers Agent 2
LDM Quantity Surveyors DBN (Pty) Ltd

Agent's service:
QUANTITY SURVEYORS

Postal address:
P.O. Box 19233
Dormerton
4015

Tel: ***031 - 207 1340*** Fax: ***031 - 209 9441***

Employers Agent 3
Map Africa Consulting Engineers

Agent's service:
STRUCTURAL / CIVIL ENGINEERS

Postal address:
Suite ESS106A, Strathmore Park, 305 Musgrave Rd,
Musgrave, Durban
4001

Tel: ***031 309 5831*** Fax: ***031 309 2929***

Employers Agent 4
Ibuya Consulting Engineers

Agent's service:
ELECTRICAL ENGINEERS

Postal address:
P.O. Box 1692
Wandsbeck
3631

Tel: ***031 266 7332*** Fax: ***031 266 7340***

Tender no:	ZNTD05574W	
	Employers Agent 5 ***Nathan Francis Architects*** ***Agent's*** service: ***ARCHITECTS*** Postal address: ***Suite 12, 40 Newport Avenue*** ***Glen Ashley, Durban*** ***4001*** Tel: insert ***0790379821*** Fax: ***N/A***	
	Employers Agent 6 ***[Agents Name]*** ***Agent's*** service: ***[Identify Agent's Service, eg. Engineer]*** Postal address: ***[P.O. Box number]*** ***[Name of town]*** ***[Code]*** Tel: insert ***[Tel Number including Area Code]*** Fax: ***[Fax Number including Area Code]***	
	Employers Agent 7 ***[Agents Name]*** ***Agent's*** service: ***[Identify Agent's Service, eg. Engineer]*** Postal address: ***[P.O. Box number]*** ***[Name of town]*** ***[Code]*** Tel: insert ***[Tel Number including Area Code]*** Fax: ***[Fax Number including Area Code]***	
	Employers Agent 8 ***[Agents Name]*** ***Agent's*** service: ***[Identify Agent's Service, eg. Engineer]*** Postal address: ***[P.O. Box number]*** ***[Name of town]*** ***[Code]*** Tel: insert ***[Tel Number including Area Code]*** Fax: ***[Fax Number including Area Code]***	
	PART 1: DATA PROVIDED BY THE EMPLOYER	
[1.1.1.13]	**Defects Liability Period** The defects liability period is: **A time measured from the date of the Certificate of Completion.** Defects Liability Period is 12 Months for the whole of the Works	
	Latent Defect Period	
[5.16.3]	The latent defect period is:	5 years after the Final Approval Certificate
	Documentation required before Commencement of the Works:	
[5.3.1]	The documentation required before commencement with the Works execution are;	
[4.3]	Health and Safety Plan	The Contractor shall deliver his Health and Safety Plan of the Works within 14 calendar days after notice from the Employer, prior to the Commencement Date.
[5.6]	Initial Programme	The Contractor shall deliver his programme of work within 14 calendar days after notice from the Employer, prior to the Commencement Date.
[6.2]	Guarantee	The Contractor shall deliver his chosen Guarantee (security) for this Works within 14 calendar days after notice from the Employer, prior to the Commencement Date.
[8.6]	Insurance	The Contractor shall deliver his insurance for the Works within 14 calendar days after notice from the Employer, prior to the Commencement Date.
	Cash flow by contractor	The Contractor shall deliver his Cash flow for the Works within 14 calendar days after notice from the Employer, prior to the Commencement Date.
	Priced Bill of Quantity	The Contractor shall deliver his Priced Bill of Quantity within 14 calendar days after notice from the Employer, prior to the Commencement Date.
	Programme	The Contractor is required to submit his Programme of Works in terms of Clause 5.6.1 and 5.3.1 and the Principal Agent is required to approve this within 7 days in terms of Clause 5.6.3
	Other requirements	
[5.3.2]	The time to submit the documentation required before commencement with Works execution is:	14 calendar days

	Non-Working days
[5.8.1]	Non-Working days: **Sundays** Special non- working days: **All Nationally Recognized Public Holidays and the year end break**
[5.8.1]	First Year end break - commences: ***18-Dec-23*** ends on: ***8-Jan-24*** Second Year end break - commences: ***N/A*** ends on: ***N/A*** Third Year end break - commences: ***N/A*** ends on: ***N/A*** Fourth Year end break - commences: ***N/A*** ends on: ***N/A***
	Engineer/Principal Agent to consult with Employer
[3.1.3]	The Engineer shall obtain the specific approval from the Employer before executing any of his functions according to the "Conditions under which Consultants are appointed", or in the event where an employee of the Employer represents the Employer, the relevant General Delegations applicable at the time of executing his/her duties.
	Security
[6.2.1]	The time to deliver the deed of guarantee is Prior to site hand over in terms of clause 5.3.1 and 5.3.2.
[6.2.1]	Please see CONTRACT DATA - below to select Guarantee Option
	Commencement Date
	Commencement date means the date of Site Hand over that should not occur prior to the tenderer receiving one fully signed copy of the Offer and Acceptance in terms of the Form of Offer and Acceptance.
	*The **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)* *The agreement ("this document") consists of;* *1. Agreement and Conditions of Contract.* *2. Form of Offer and Acceptance.* *3. Contract Data.* *4. Scope of Works.* *5. Site Information.* *6. Drawings & documents referred to in the 1 to 4 above.* *(See Form of Offer and Acceptance)*
[5.3.1]	The contractor shall commence executing the Works within 7 calendar days from the Commencement Date.
[5.4.1]	***Possession of the site*** will be given within 10 calendar days after the **contractor** has fulfilled the conditions (4.3, 5.6, 6.2, 8.6) and received the notification from the Employer of Site Hand Over where the contractor will receive one fully signed copy of the Form of Offer and Acceptance from the **employer.**
[5.6.1]	The Contractor shall deliver his programme of work within 14 calendar days after notice from the Employer, prior to the Commencement Date.
	CONTRACT DETAILS
[1.1.1.33]	***Works*** description: Refer to document C3 – Scope of Work.
[1.1.1.30]	***Site*** description: Refer to document C4 – Site Information.
	Specific options that are applicable to a **State** organ only Where so :
[6.10.6.2]	***1)*** Interest rate legislation: ***(a)*** in respect of interest owed by the **employer**, the interest rate as determined by the Minister of Justice and Constitutional Development from time to time, in terms of section 1(2) of the Prescribed Rate of Interest Act, 1975 (Act No. 55 of 1975), will apply; and ***(b)*** in respect of interest owed to the **employer**, the interest rate as determined by the Minister of Finance, from time to time, in terms of section 80(1)(b) of the Public Finance Management Act, 1999 (Act No. 1 of 1999), will apply
	2) Lateral support insurance to be effected by the contractor: — ***Yes*** / ***No X***
	3) Payment will be made for materials and goods — ***Yes X*** / ***No***
	4) Dispute resolution by litigation — ***Yes*** / ***No X***
	5) Extended **defects** liability period applicable to the following elements: — ***Electrical, Mechanical, Civil and Building Work***
[8.6.1.1.2]	The Value of material, supplied by the Employer, and not included in the Contract Price, is: ***R0.00***
[8.6.1.1.3]	The amount to cover Professional Fees, not included in the Contract Price, for repairing damage and loss to be included in the insurance: ***30% of the Contract Price***
[8.6.1.3]	The limit for indemnity for liable insurance is: ***R10 Million***
[6.5.1.2.3]	The percentage allowance to cover overhead charges for contractor and subcontractors, is: ***5.00%***
[1.1.1.14]	**Practical Completion Date**
	The Practical Completion date is: **7 calendar months after date of formal site handover.**
	For the **works** as a whole: The whole of the works shall be completed within: 7 *Months (which shall be deemed to include all Non – Working Days, Special Non – Working Days and the year-end Builders Annual Industry Holiday Periods)*
[5.5.1]	The date for **practical completion** shall be: ***7 calendar months after date of formal site handover***
[5.13.1]	The penalty per calendar day shall be : ***0.04% of the Contract Price, rounded to the nearest R10***

	***For the* works in sections:**
	***The date for* practical completion** from the **commencement date** and the **penalty** per **calendar day:**
	Portion 1:
[5.5.1]	***N/A***
[5.13.1]	***0.04% of the Contract Price, rounded to the nearest R10***
	Portion 2:
[5.5.1]	***N/A***
[5.13.1]	***0.04% of the Contract Price, rounded to the nearest R10***
	Portion 3:
[5.5.1]	***N/A***
[5.13.1]	***0.04% of the Contract Price, rounded to the nearest R10***
	Portion 4:
[5.5.1]	***N/A***
[5.13.1]	***0.04% of the Contract Price, rounded to the nearest R10***
	Portion 5:
[5.5.1]	***N/A***
[5.13.1]	***0.04% of the Contract Price, rounded to the nearest R10***
	Portion 6:
[5.5.1]	***N/A***
[5.13.1]	***0.04% of the Contract Price, rounded to the nearest R10***
[1.3.2]	***The* law** applicable to this **agreement** shall be that of the: **Republic of South Africa**
[6.10.1.5]	The percentage advance on materials not yet built into the Permanent Works is: ***80.00%***
[6.10.3]	Percentage retention on amounts due to contractor is: ***Refer to Page 8 of 8 of the Contract Data.***
	Maximum retention is: ***5.00%*** *of the Contract Price*
[6.8.1]	Notwithstanding anything to the contrary contained in the General conditions of Contract and Preliminaries, this contract could only, when the construction period exceeds 6 months and the contract exceeds R1,000,000.00, be subject to a Contract Price Adjustment Factor.
[6.8.2] *[6.8.3]*	Clause 6.8.2 the last part of the sentence saying *"calculated according to the formula and the conditions set out in the Contract Price Adjustment Schedule."* must be replaced by *"calculated according to the Contract Price Adjustment Provisions (CPAP) Indices Application Manual for use with P0151 indices (Revised 1 January 2013)" as published by Statistics South Africa. The Contract Price Adjustment Provision (CPAP) will be subject to the most recently released indices by Statistic South Africa. Tenderers are advised that with reference to Clause 3.4.6 of the Contract Price Adjustment Provisions (CPAP) Indices Applications Manual, the Head: Public Works will not accept the submission by Tenderers of lists of additional items."*
[6.8.2] *[6.8.3]*	Where this contract is a Lump Sum contract, the contract will only be subject to Contract Price Adjustment Provisions (CPAP)(Revised 1 January 2013) where the contract period equals or exceeds 6 calendar months. The applicable work group shall be WG 180 for domestic buildings or WG 181 for commercial and industrial buildings only.
[5.14.5]	***The following clause must be added to clause 5.14.5:*** *[5.14.5.6]* The employers agent shall submit the **final account** within 3 calendar months to the principal agent.
[10.5]	The determinations of disputes shall be by ARBITRATION ONLY.
[10.5.3]	The number of Arbitration Board Members to be appointed is: **One**
[10.9.1]	Replace the last part of the clause with the following: *"..on the application of either party, by the Chairman, or his nominee of the Association of Arbitrators."*
	***Where* CPAP** is applicable, the **contract sum** will be adjusted in accordance with the Contract Price Adjustment Provisions (**CPAP**) as set out in the **CPAP** Indices Application Manual as published by Statistics South Africa, dated 1 January 2013 and any amendments thereto: 1) Glass etc. measured in specialist section Metalwork, will be adjusted in terms of the index for that work group unless specifically stated otherwise in the bills of quantities. 2) In case of uninterruptible power supplies, elevators, escalators and hoists, generating sets, motor-alternator sets and intercommunication systems shall be adjusted in accordance with Work Group 170. 3) Further to clause 3.4.6 of the CPAP Indices Application Manual, the listing of additional items for exclusion by Tenderer's, will not be permitted. ***Alternative Indices:* Not Applicable**
	Details of changes made to the General Conditions of Contract for construction works (2010) Second Edition
	Clause
[1.1]	*[1.1.1.5]* **COMMENCEMENT DATE** – means the actual date of Site Hand over that should not occur prior to the Tenderer receiving one fully signed copy of the Offer and Acceptance in terms of the Form of Offer and Acceptance.
	[5.12.2.2] **ABNORMAL CLIMATIC CONDITIONS** - means conditions over and above what could reasonably be expected for the specific locality where the Works are being executed and include inter alia excessive rain, heat, cold, wind and any other climatic condition that would not normally be experienced during the season that the Works are executed in that area. The South African Weather Service's (http://www.weathersa.co.za) 10 year average climatic conditions statistics would be what could be reasonably expected for the specific locality where the Works are executed.
	[6.2.1] **CONSTRUCTION GUARANTEE** – means an on demand guarantee at call obtained by the **contractor** from an institution approved by the **employer** in terms of the **employer's** construction guarantee form as selected in the Offer and Acceptance Form and the **contract data.** **CONSTRUCTION PERIOD** – means the period commencing on the **commencement date** and ending on the date of **due completion date.** This period will be deemed to commence on actual site hand over date to the contractor and end on the date of practical completion and shall include all annual industrial holiday periods, Sundays and public holidays. **CORRUPT PRACTICE** – means the offer, giving, receiving, or soliciting of anything of value to influence the action of a public official in the procurement process or in contract execution. **FINAL ACCOUNT** - The document prepared by the principal agent, which reflects the contract value of the works at final approval or termination. **FRAUDULENT PRACTICE** – means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of any tenderer and includes collusive practise among tenderers (prior to or after the tender submission) designed to establish tender prices at artificial non-competitive levels and to deprive the tenderer of the benefits of free and open competition.

	INTEREST – the interest rates applicable on this contract, whether specifically indicated in the relevant clauses or not, will be in terms of the legislation of the Republic of South Africa, and in particular: (a) in respect of interest owed by the **employer,** the interest rate as determined by the Minister of Justice and Constitutional Development from time to time, in terms of section 1(2) of the Prescribed Rate of Interest Act, 1975 (Act No. 55 of 1975), will apply; and (b) in respect of interest owed to the employer, the interest rate as determined by the Minister of Finance, from time to time, in terms of section 80(1)(b) of the Public Finance Management Act, 1999 (Act No. 1 of 1999), will apply
	[1.1.1.16] **ENGINEER/PRINCIPAL AGENT –** means the person or entity appointed by the **Employer** and named in the **Contract Data** as the **Engineer /Principal Agent** to act as agent of the **Employer**. In the event of an Engineer/**Principal Agent** not being appointed, then all the duties and obligations of an Engineer/**Principal Agent** as detailed in the **Contract** shall be fulfilled by a representative of the **Employer** as named in the **Contract Data. (Hereafter referred to as Engineer)** *[1.1.1.21]* **GENERAL ITEMS -** or preliminaries means items stipulated in the Pricing Data relating to general obligations, site services, facilities and/or items that cover elements of the cost of the work which are not considered as proportional to the quantities of the Permanent Works.
	[4.4.1] Add the following to the clause 4.4.1: *"The Contract shall only use subcontractors who are duly registered with the CIDB and who has an ACTIVE status at the time of submitting the tender"*
	[6.2.1] Refer to Offer and Acceptance form for the various options that the contractor may choose from in providing a form of **Guarantee** under "GUARANTEE OPTIONS".
	[6.10.6.2] Replace *"at the prime overdraft rate, as charged by the Contractor's Bank,"* with *"..at the interest rate as determined by the Minister of Justice and Constitutional Development from time to time, in terms of section 1(2) of the Prescribed Rate of Interest Act, 1975 (Act No. 55 of 1975). "* Omit *",on all overdue payments from the date on which the same should have been paid..." and replace with " only after 30 calendar days from receiving written notice from the Contractor that the amount is overdue,.."*
	SPECIAL CONDITIONS OF CONTRACT
[5.12.3]	Omit clause 5.12.3 and add the following: *"5.12.3. If an extension of time is granted, the Contractor shall be paid such additional time-related General Items, including for special non-working days, if applicable as are appropriate regarding to any other compensation which may already have been granted in respect of the circumstances concerned. The reasons for extension of time that would invoke payment of time related General Items are inter alia;* *5.12.3.1 Failure to give possession of the site to the contractor.* *5.12.3.2 Making good physical loss and repairing damage to the works where the contractor is not at risk.* *5.12.3.3 Contract instructions not occasioned by default by the contractor.* *5.12.3.4 Failure to issue construction information timeously or the late issue of a contract instruction following a request from the contractor.* *5.12.3.5 Late acceptance by the principal agent of a design undertaken by a selected subcontractor where the contractor's obligations have been met.* *5.12.3.6 Suspension or cancellation termination invoked by a nominated or selected n/s subcontractor due to default by the employer or the principal agent.* *5.12.3.7 Insolvency of a nominated subcontractor.* *5.12.3.8 A direct contractor.* *5.12.3.9 Opening up and testing of work and materials and goods where such work is according to in accordance with the contract documents.* *5.12.3.10 The execution of additional work for which the quantity included in the bills of quantities is not sufficiently accurate.* *5.12.3.11 Late or failure to supply materials and goods for which the employer is responsible.* *5.12.3.12 Suspension of the works."*
[5.14.5.1]	Omit entire clause 5.14.5.1
[5.16.4]	Add the following new clause *"5.16.4. Upon the issue of a Final Approval Certificate, unless otherwise provided in the Contract:* *5.16.4.1. The performance Guarantee (if any) shall be returned within 14 days to the guarantor in terms of Clause 7."*
[6.2.2]	Replace the following *"..it shall be deemed that the Contractor has selected a security of ten percent retention of the value of the Works."* with *"..it shall be deemed that the Contractor has selected a security of a bank or insurance guarantee of 5% of the value of the Works and a payment reduction of 5% of the value certified in the payment certificate excluding value added tax."*
[6.2.3]	Add to clause 6.2.3 the following *"The Contractor shall provide proof of paid-up premium payments to accompany his payment certificate as proof that his performance guarantee has not expired yet. The Contractor will not receive payment without proof of the validity of their performance*
[9.3.2.2]	Omit *"without prejudice to the exercise of any lien the Contractor may have acquired over the Employer's property."*
	Duties and functions of the **Engineer** requiring the specific approval of the **Employer** BEFORE execution of any part of these duties are as follows; (a) Determinations of contractors claims for extension of time (revision of the contract completion date). All claims for extension of time shall be submitted by the **Engineer,** together with the **Engineer's** recommendations, to the **Employer** for determination. Omit "Engineer" in clause 42.2 (b) Drawings, instructions or communications of any kind requiring variations of the works and involving EXTRA's shall NOT be given effect by the **Contractor** UNTIL BOTH the "Official Variation Order" and the "Financial Request for Variation Order and Additional Funds" form, as issued by the Department of Public Works, have been approved and signed by the **Employer.** (c) Insurance policies to be approved by the **Employer** within 21 days of the date of the **Commencement** of the Works. (d) Any notice of disagreement raised by the **Contractor** or written Dispute Notice given by the **Contractor** to the **Engineer** shall be submitted by the **Engineer**, together with the **Engineer's** recommendations, to the **Employer** for determination. (e) The issue of the certificate of practical completion, certificate of completion and the final approval certificate shall be signed and submitted by the **Engineer**, to the **Employer** for final approval and signature. The certificates shall not be considered as officially issued until signed by the
	MANAGING PROJECT DURATION (a) The Contractor shall co-ordinate his programme with all other contractors whose work may precede or be executed simultaneously to his own. The Contractor will be called upon to plan and control the project using the Project Evaluation and Review Technique (PERT) or other approved Critical Path Method (CPM) network analysis of his events and activities and those of the dub-contractors in his employ and must co-ordinate his planning with any other contractor employed on the project. A fortnightly project control report will be expected from the Contractor in writing, evaluating any gains or delays against the critical path and he should allow for all costs involved in planning reviewing and updating the programme to the satisfaction of the Principal Agent against this item. (b) Activity-and total float shall belong to the Employer. (c) The Contractor shall deliver his programme of work within 14 calendar days after notice from the Employer, prior to the Commencement Date. It is a condition of this contact that, the contractor submit to the Engineer/principal agent a detailed CPM Programme which shall be to the approval of the Engineer/principal agent. In this regard tenderers are advised to consult with the Engineer/Principal Agent as to the format and requirements of the programme as no claim whatsoever will entertained should the programme fail to meet the requirements of the Engineer/Principal Agent. Failure to submit the programme within the stipulated time may result in the contractor being held in breach of contract. The approved programme will form the basis of time management of the project and extension of time will not be guaranteed unless the Contractor has strictly complied with this provision. The programme shall make allowance for rain and the number of rain days allowed within the critical path shall be on the provisions of the clause dealing with inclement weather and claiming for delays in performance in this bill. Allowance for the above must be made under this item as no claims for failing to comply with this precondition will later be entertained.

INCLEMENT WEATHER AND CLAIMS FOR DELAYS IN PERFORMANCE

(a) The Contract Sum includes a monthly allowance of 3 working days inclement weather during which rainfall exceeds 10mm per day for months as indicated in the Scope of Works. These days shall be reflected on the critical path of the Contractor's programme as specified in MANAGING PROJECT DURATION above.

(b) Claims for delays in performance due to inclement weather shall be calculated separately for each calendar month and for the project as a whole. Delays or gains to the critical path shall be reflected in all revisions of the programme. An extension of time will only be granted where the following conditions are met:

(i) The criteria to be used for WORK stoppages shall be for safety hazards or poor quality of work.

(ii) The Employer's site representative or the Employer's Principal Agent, if the site representative is not available shall be notified when the Contractor stops the work and intends to claim performance delays. The Employer representative shall inspect the situation together with the Contractor and give an immediate decision.

1. The stoppage claimed must cause a delay in the Completion Date of work. If the critical activities can proceed and a non-critical activity is delayed due to inclement weather no claims for delay shall be granted.
2. No claims for stoppages less than 2(two) hours per day shall be considered.
3. Claims granted for more than 2 (two) hours, but less than 10 (ten) hour (lunch included) day, shall be added together and expressed as full days.
4. All claims shall be submitted in writing to the Principal Agent within one working day of the actual stoppage.
5. The total delay in performance granted to the Contractor expressed in days shall be added to the contractual Completion Date of each section of the Works. The contractual penalty clause shall only come into effect after this newly arrived date.
6. Total delays (in hours) will be rounded up or down to the nearest integer for the calculation of Working Days. The total hours (including lunch) per Working Day shall be 10 unless otherwise indicated on the Contractor's programme.
7. Where the programmed delays for inclement weather exceed the actual delays incurred the Completion Date(s) will not be adjusted.
8. Where the project includes builder's holidays the programmed durations for inclement weather shall be adjusted pro-rate to the actual Working Days.
9. The total of all monthly delays due to inclement weather shall be calculated in accordance with the example given below:

Description		Months					Total
		Sept	Oct	Nov	Dec	Jan	
		Hours	Hours	Hours	Hours	Hours	Hours
Programmed	Rain days	0	30	30	15	15	90
Actual	Rain days	16	22	35	15	18	106
Difference		-16	8	-5	0	-3	-16
8 hrs/day*						Estimated Extension of time - in working days	2

See point 5.2 in the Scope of Works for the specific days the tenderer must allow for in this contract.

Tender no: **ZNTD05574W** **Part 2: CONTRACT DATA PROVIDED BY THE CONTRACTOR:**

POST-TENDER INFORMATION

Note: All information for this section requires consultation with the **Contractor**. The **Engineer/Principal Agent** shall not pre-select any of the alternatives available to the **Contractor.**

1 CONTRACT DETAILS

[1.1.1.9] **Contractor Name:** .....

[1.2.1.2] Postal address:

.....

.....

.....

Tel no ..... Fax no .....

Tax / VAT Registration No: ..... e-mail address .....

Physical address:

.....

.....

.....

[1.1.1.10] The accepted **contract price** inclusive of **tax** is R :

.....

[Amount in words]

Payment Of Preliminaries (Clause 6.7, 6.8, 6.10 and 6.11)

The preliminaries amounts shall be paid in terms of:

***Alternative A**	**Yes**
****Alternative B**	**N/A**

** Assessed by the Engineer/Principal Agent as an amount prorated to the value of the Work duly executed in the same ratio as the Preliminaries bears to the Contract Price excluding VAT, Preliminary amount, Contingencies and any CPAP.*

*** Calculated from the priced Bill of Quantity/Lump Sum document. The Contractor and the Engineer/Principal Agent shall agree on a division of the priced Preliminaries items into: initial establishment charge, monthly charge and final disestablishment charge.*

If the Contractor and the Engineer/Principal Agent can not agree, within 10 Working Days from the Commencement Date, on such a division then the Engineer/Principal Agent shall make a division of the Preliminaries to be incorporated in the valuations for each monthly payment certificate as follows;

10% of the General Items/Preliminaries amount shall not be varied

15% of the General Items/Preliminaries shall only be varied in proportion of the Contract Price to the Contract Sum

75% of the General Items/Preliminaries shall be varied in proportion to the revised Construction Period compared with the initial Construction Period.

Alternative A

Adjustment of Preliminaries (Clause 6.7, 6.8, 6.10 and 6.11)

For the adjustment of Preliminaries both the Contract Sum and the Contract Value (including tax) shall exclude the amount of Preliminaries, all Contingency Sum(s) and any provision for Cost Price Adjustment Provisions:-

- An amount which shall not be varied.

- An amount varied in proportion to the contract value as compared to the Contract Sum.

- An amount varied in proportion to the Construction Period as compared to the initial Construction Period (excluding revisions to the Construction Period to which the Contractor is not entitled) to adjustment of the Contract Value in terms of the agreement.

The Contractor shall provide a breakdown of charges (including tax) within 15 working days of the date of acceptance of tender and, where applicable, an apportionment of Preliminaries per section

If the Contractor and the Principal Agent cannot agree, within ten (10) Working Days from the Commencement Date, on such a division then the Principal Agent shall make a division of the Preliminaries to be incorporated in the valuations for each monthly payment certificate as follows;

10% of the amount shall not be varied

15% varied in proportion of the Contract Value to the Contract Sum

75% varied in proportion to the revised Construction period compared with the initial Construction Period

Sectional Completion : Subdivision of Preliminaries Costs

For the adjustment of preliminaries for sections of the work the value of fixed, value, and time related amounts of the preliminaries for each section is required. The contractor is to provide such information within fifteen (15) working days of taking possession of the site, failing which the categorised preliminaries amounts shall be prorated to the value of each section.

The above shall apply equally for projects where sectional completion was not contemplated at tender stage but subsequently occurred on an adhoc basis during construction of the works as agreed between the client and the employer. The original priced categorised amounts for fixed, value, and time related amounts shall be prorated to the value of each section.

When an extension of time has been granted in terms of the GCC and the preliminaries require to be adjusted accordingly, the pertinent sectional (subdivided) categorised preliminaries amounts shall be utilised, where applicable and not the overall preliminary amounts.

Where sectional completion is required in terms of the agreement, the Contractor shall provide the Principal Agent with the division of the above categorized amounts into sections. Should the Contractor fail to provide such information within the period stipulated the categorized amounts shall be prorated to the value of each section.

YES *yes / no*

or

Alternative B

The Contractor shall within 15 working days of the date of possession of the site provide the Principal Agent with a detailed breakdown of Preliminaries amounts for the works as a whole, or per section where applicable, including administrative and supervisory staff charges and for the use of construction equipment in terms of the programme.

NO *yes / no*

The contractor is informed that only alternative 'A' shall apply

2 DOCUMENTS

Contract documents marked and annexed hereto:

Priced **Bills of Quantities:** **Yes** [ ] **No** [ ]

Lump Sum document: : **Yes** [ ] **No** [ ]

Guarantee Options:

Not applicable

2.2 DESIGN BRIEF

Not applicable [ ] **YES or NO**

2.3 DRAWINGS

See list of Drawings/Annexures attached to this document. [ ] **YES or NO**

2.4 DESIGN PROCEDURES

Not applicable [ ] **YES or NO**

Contract drawings: **Yes** [ ] **No** [ ]
Other documents:

Waiver of the Contractors lien or right of continuing possession is required. **YES**

GUARANTEE OPTIONS

The Tenderer agrees to provide a bank or insurance guarantee in accordance with clause 6.2.3 of the Conditions of the GCC2010 Contract within the period stated in the Contract Data. This guarantee shall be for a sum equal to an amount stated in the Contract Data.

Guarantees submitted must be issued by either an insurance company duly registered in terms of the Insurance Act (Long Term Insurance Act No 52 of 1998 or Short Term Insurance Act No 53 of 1998) or by a bank duly registered in terms of the Banks Act No 94 of 1990, on the pro-forma referred to above. No alterations or amendments of the wording of the pro-forma will be accepted.

(a) the tenderer accepts that in respect of contracts up to R1 million, a payment reduction of 5% of the contact value will be applicable and will be reduced by the Employer in terms of the applicable conditions of contract.

(b) in respect of contracts above R1 million, the Tenderer offers to provide security as indicated below: select one option

(i) cash deposit of 10 % of the Contract Price	
(ii) bank or insurance Performance Guarantee of 10 % of the Contract Price	
(iii) cash deposit of 5% of the Contract Price and a payment reduction of 5% of the value certified in the payment certificate (excluding VAT)	
(iv) bank or insurance guarantee of 5% of the Contract Price and a payment reduction of 5% of the value certified in the payment certificate (excluding VAT)	

NOTE: Where the Tenderer has not selected one of the guarantee options above, the default option will be as if the Tenderer has selected a security of a bank or insurance guarantee of 5% of the value of the Works and a payment reduction of 5% of the value certified in the payment certificate excluding value added tax. - See GCC2010 clause 6.2.2 as amended in Contract Data.

3 SIGNATURES OF THE CONTRACTING PARTIES

Thus done and signed at.....on .....of.....20.....

Name of signatory — for and behalf of the **Employer** who by signature hereof

Capacity of signatory — as Witness.

Thus done and signed at.....on .....of.....20.....

Name of signatory — for and behalf of the **Contractor** who by signature hereof

Capacity of signatory — as Witness.

KWAZULU-NATAL PROVINCE
PUBLIC WORKS
REPUBLIC OF SOUTH AFRICA

DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3: ETHEKWINI REGION: DUMANE COMMERCIAL HS

C1.3 - FORM OF GUARANTEE

C1.3 PERFORMANCE GUARANTEE - GCC FOR CONSTRUCTION WORKS (2nd Edition - 2010)

Head: Public Works
KZN Department of Public Works:
Private Bag X 9041
PIETERMARITZBURG
3200

Sir,

ON DEMAND PERFORMANCE GUARANTEE

Tender Number ZNTD05574W	**Project Code 063634**

For use with the General Conditions of Contract for Construction Works, Second Edition, 2010.

GUARANTOR DETAILS AND DEFINITIONS

"Guarantor" means: _____

Physical Address: _____

"Employer" means: The Provincial Administration of KwaZulu-Natal in its Department of Public Works

"Contractor" means: _____

"Engineer" means: _____

"Works" means: **DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3: ETHEKWINI REGION: DUMANE COMMERCIAL HS**

"Site" means: _____

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

"Contract Sum" means: The accepted amount inclusive of tax of: _____

Amount in Words:

"Guaranteed Sum" means: The maximum aggregate amount of: 10% _____
Of Contract Sum

Amount in Words: _____

"Expiry Date" means: _____

CONTRACT DETAILS

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

PERFORMANCE GUARANTEE

1 The Guarantor's liability shall be limited to the amount of the Guaranteed Sum.

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

3 The Guarantor hereby acknowledges that:

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

3.2 its obligation under the Performance Guarantee is restricted to the payment of money.

4 Subject to the Guarantor's maximum liability referred to in 1, the Guarantor hereby undertakes to pay the Employer the sum certified upon receipt of the documents identified in 4.1 to 4.3:

4.1 A copy of a first written demand issued by the Employer to the Contractor stating that payment of a sum certified by the Engineer in an Interim or Final Payment Certificate has not been made in terms of the Contract and failing such payment within seven (7) calendar days, the Employer intends to call upon the Guarantor to make payment in terms of 4.2;

4.2 A first written demand issued by the Employer to the Guarantor at the Guarantor's physical address with a copy to the Contractor stating that a period of seven (7) days has elapsed since the first written demand in terms of 4.1 and the sum certified has still not been paid;

4.3 A copy of the aforesaid payment certificate which entitles the Employer to receive payment in terms of the Contract of the sum Certified in 4.

5 Subject to the Guarantor's maximum liability referred to in 1, the Guarantor undertakes to pay to the Employer the Guaranteed Sum or the full outstanding balance upon receipt of a first written demand from the employer to the Guarantor at the Guarantor's physical address calling up this Performance Guarantee, such demand stating that:

5.1 the Contract has been terminated due to the Contractor's default and that this Performance Guarantee is called up in terms of 5; or

5.2 a provisional or final sequestration or liquidation court order has been granted against the Contractor and that the Performance Guarantee is called up in terms of 5; and

5.3 the aforesaid written demand is accompanied by a copy of the notice of termination and/or the provisional/final sequestration and/or the provisional liquidation court order.

6 It is recorded that the aggregate amount of payments required to be made by the Guarantor in terms of 4 and 5 shall not exceed the Guarantor's maximum liability in terms of 1.

7 Where the Guarantor has made payments in terms of 5, the Employer shall upon the date of issue of the Final Payment Certificate submit an expense account to the Guarantor showing how all monies received in terms of this Payment Guarantee have been expended and shall refund to the Guarantor any resulting surplus. All monies refunded to the Guarantor in terms of this Performance Guarantee shall bear interest at the prime overdraft rate of the Employer's bank compounded monthly and calculated from the date payment was made by the Guarantor to the Employer until the date of refund.

8 Payment by the Guarantor in terms of 4 or 5 shall be made with seven (7) calendar days upon receipt of the first written demand to the Guarantor.

9 Payment by the Guarantor in terms of 5 will only be made against the return of the original Performance Guarantee by the Employer.

10 The Employer shall have the absolute right to arrange his affairs with the Contractor in any manner which the Employer may deem fit and the Guarantor shall not have the right to claim his release from this Performance Guarantee on account of any conduct alleged to be prejudicial to the Guarantor.

11 The Guarantor chooses the physical address as stated above for the service of all notices for all purposes in connection herewith.

12 This Performance Guarantee is neither negotiable nor transferable and shall expire in terms of 2, where after no claims will be considered by the Guarantor. The original of this Guarantee shall be returned to the Guarantor after it has expired.

13 This Performance Guarantee, with the required demand notices in terms of 4 or 5, shall be regarded as a liquid document for the purposes of obtaining a court order.

14 Where this Performance Guarantee is issued in the Republic of South Africa the Guarantor hereby consents in terms of Section 45 of the Magistrate's Court Act No 32 of 1944, as amended, to this jurisdiction of the Magistrate's Court of any district having jurisdiction in terms of Section 28 of the said Act, notwithstanding that the amount of the claim may exceed the jurisdiction of the Magistrate's Court.

Signed at _____

Date _____

Guarantor's signatory (1) _____

Capacity _____

Guarantor's signatory (2) _____

Capacity _____

Witness signatory (1) _____

Witness signatory (2) _____

KWAZULU-NATAL PROVINCE
PUBLIC WORKS
REPUBLIC OF SOUTH AFRICA

DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3: ETHEKWINI REGION: DUMANE COMMERCIAL HS

PART C2 - PRICING DATA

C2.1 PRICING INSTRUCTIONS
GCC FOR CONSTRUCTION WORKS (Second Edition 2010)

Project title:	**DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3: ETHEKWINI REGION: DUMANE COMMERCIAL HS**		
Tender no:	**ZNTD05574W**	**Project Code:**	**063634**

C2.1 Pricing Instructions

Where any item is not relevant to this specific contract, such item is marked N/A (signifying "not applicable")

The adjustment of the preliminaries each item priced is to be allocated to one or more of the three categories by insertion of "F", "V", "T" as the case may be against the price in the "rate" column immediately preceding the "amount" column, where "F" denotes a fixed amount (amount not varied), "V" denotes an amount variable in proportion to value and "T" denotes an amount variable in proportion to time.

1 MASSES AND MEASURING UNITS

These shall be in accordance with the Measuring Units and National Measuring Standards Act No. 76 of 1973 and amendments thereto.

The pages of each of these documents are numbered consecutively and before the Tenderer submits his tender he should check the number of pages, and if any are found missing or duplicated, or the figures or writing indistinct, or the documents contain any obvious error, he should apply to the Head : Public Works AT ONCE and have same rectified as no liability whatsoever will be admitted by the Administration in respect of errors in Tender due to the foregoing.

2 PRICES FOR VARIATIONS

Where prices or quotations for variations are submitted by the Contractor during the currency of the Contract, it is to be clearly understood that these are for the purpose of consideration by the Head : Public Works and that there is no assumption of acceptance. The Contractor will be notified of acceptance of prices or quotations either by insertion of the amount on the variation order or by written intimation.

3 SCALE

The scale to which the Drawings are made is only to be made use of when no figured dimensions are given either on the Drawings or in the tender documents and the figured dimensions are always to be followed though they may not coincide with the scale of the Drawings, but dimensions where possible are to be taken from the buildings.

4 PROVISIONAL ITEMS

All items described as "Provisional" shall be used as directed by the Employer and measured and valued or paid for.

No work for which "Provisional" items are allowed shall be commenced without written instructions from the Head : Public Works.

5	**TIMELY ORDERING OF MATERIALS** The Contractor is warned to place all orders for materials or special articles as early as possible, as he will be held solely responsible for any delay in the delivery of such goods. Nevertheless this tender is conditional upon no liability being attached to the Contractor if delivery of materials is rendered impossible by reason of any act of the Government.
6	**ELECTRICAL LIGHTING, POWER AND WATER** The Contractor shall provide any artificial lighting which may be necessary or required for the proper execution of the works, and provide electric power and water required by all Sub-Contractors, Nominated Sub-Contractors and Sub-Contractors appointed directly by the Employer. The Contractor shall give all notices and pay all fees in connection with temporary electrical and water connections and shall connect temporary Electrical and Water meters for and pay for all current and water consumed. Tenderers are advised that the permanent light fittings and water points of any kind installed in the Works are not to be used to provide temporary lighting and supplement water requirements for construction purposes.
7	**IMPORT PERMITS, DUTIES AND SURCHARGES.** All tenders by means of which imported products are being called for, must use the rate of exchange 14 days prior to the closing date indicated in the tender documents. If this day falls on a weekend or public holiday, the next working day must be used. Furthermore, Tenderers must submit documentary proof (in the form of a certified copy) from their bank or legally recognised financial institution, clearly indicating what the rate of exchange was 14 days prior to the closing date, as mentioned above. Together with this, the Tenderer must confirm that the tender price relating to an imported product, was based on the rate of exchange 14 days prior to the closing date as mentioned above.
8	**STANDARD SYSTEM OF MEASUREMENT WHERE BILLS OF QUANTITIES FORM PART OF THE TENDER DOCUMENTS** The work executed under this Contract has been measured in accordance with the; **Standard System of Measuring Builders Work (7th Edition)** including all amendments unless descriptions of items indicate a deviation and it shall be understood that the system of measurement which is herein adopted is the only system of measurement which will be recognised in connection with this contract. Any contradictions to this system of measurement contained in the "ASAQS Model Preambles for Trades 2017" shall be disregarded (unless same have been accommodated in the system of measurement) but applicable rates shall be included for all requirements stated and not measured separately in compliance with this system.
9	**PRICING OF ROCK EXCAVATIONS** It is a condition of this tender that should the tenderer elect to price the Rock Excavation included in this tender, the rates must be market related and should be identically priced for the same classification of excavations and not vary for similar billed items in the different sections.

10 BROAD BASED BLACK ECONOMIC EMPOWERMENT

1. It is the deliberate policy of the Provincial Administration of KwaZulu-Natal to foster and to encourage the economic empowerment of Black South Africans. This policy will be implemented without prescription and without prejudicing the principles and the integrity of the Provincial Administration of KwaZulu-Natal. Subject to these constraints and also subject to good business practice and commercial consideration, it is therefore considered appropriate that the Provincial Administration of KwaZulu-Natal should encourage business relationships with companies which actively pursue Affirmative Action and Black Economic Empowerment Programmes.
2. In responding to this tender you are therefore encouraged to devote attention to these two subjects of Affirmative Action and Economic Empowerment. In addition, in considering the appointment of sub-contractors, you are requested to extend the spirit of these policies.
3. The foregoing enunciations of this policy are not intended to be prescriptive nor to preclude any individual or operation from responding to this tender.

11 REGISTRATION ON THE CENTRAL SUPPLIERS DATABASE

1. In terms of the Public Finance Management Act (PFMA), 1999 (Act No 1 of 1999) Section 38 (1) (a) (iii) and 51 (1) (iii) and Section 76 (4) of PFMA National Treasury developed a single platform, The Central Supplier Database (CSD) for the registration of prospective suppliers including the verification functionality of key supplier information.
2. Prospective suppliers will be able to self - register on the CSD website: www.csd.gov.za
3. Once the supplier information has been verified with external data sources by National Treasury a unique supplier number and security code will be allocated and communicated to the supplier. Suppliers will be required to keep their data updated regularly and should confirm at least once a year that their data is still current and updated.
4. Suppliers can provide their CSD supplier number and unique security code to organs of state to view their verified CSD information.
5. Tenderers are required to fill in clearly, legibly, in bold print and black ink their CSD supplier number in the space hereunder:

Name of Supplier	
Central Supplier Database (CSD) Supplier Number:	

12 TAX CLEARANCE REQUIREMENTS

It is a condition of tender that the taxes of the successful tenderer must be in order, or that satisfactory arrangements have been made with South African Revenue Service (SARS) to meet the Tenderer's tax obligations. It is a condition of this Offer of Commission that your practice remains in good standing with SARS (South African Revenue Services) in terms of its tax clearance, during the project, which is required to process your payment certificates.

1. In order to meet this requirement tenderers are required to apply via e-filing at any SARS branch office nationally. The Tax Compliance Status (TCS) requirements are also applicable to foreign Tenderers / individuals who wish to submit Tenders.
2. SARS will then furnish the Tenderer with a Tax Compliance Status (TCS) PIN that will be valid for a period of 1 (one) year from the date of approval.
3. In tenders where Consortia / Joint Ventures / Sub-contractors are involved, each party must submit a separate Tax Compliance Status (TCS) PIN.
4. Application for Tax Compliance Status (TCS) PIN can be done via e-filing at any SARS branch office nationally or on the website www.sars.gov.za.

	5 Tax Clearance Certificates may be printed via eFiling. In order to use this provision, taxpayers will need to register with SARS as eFilers through the website www.sars.gov.za. 6 Tax Clearance Certificates may be printed via eFiling. In order to use this provision, taxpayers will need to register with SARS as eFilers through the website www.sars.gov.za.	
	Security PIN Number	
	Company / Entity Tax Reference Number	
13	**BILLS OF QUANTITIES/LUMP SUM DOCUMENT** The Bills of Quantities document forms part of and must be read and priced in conjunction with all the other documents forming part of the contract documents, the Standard Conditions of Tender, Conditions of Contract, Standard Preambles to all Trades, Specifications, Drawings and all other relevant documentation.	
14	**VALUE ADDED TAX** The tender price must include for Value Added Tax (VAT). All rates, provisional sums, etc. in the Bills of Quantities must however be net (exclusive of VAT) with VAT calculated and added to the Total Value thereof in the Final Summary.	
15	**FIXED PRICE CONTRACT** Should the Bills of Quantities/Lump Sum Document be a fixed price contract, the following clause must be inserted in the Pricing Instructions: Tenderers are to take note that the contract price adjustments are not applicable to this contract. Tenderers should therefore make provision in the Contract Sum, schedule of rates, etc. for possible price increases during the contract period, as no claims in this regard shall be entertained.	
16	**LOCAL LABOUR** Tenderers attention is specifically drawn to Clause E9 in the Preliminaries and General and adequate provision shall be made in tendered rates for payment of local unskilled labour at the minimum prescribed rates as directed by Labour Law and current Government Legislations, however tenderers also need to ensure that they pay the average going rate/market related rate of the area where the project is located and ultimately be in accordance with the prescribed and legislated labour rates, promulgated by Government. Tenderers attention is specifically drawn to the requirement that all unskilled labour utilized on the construction site by both the Main Contractor and Sub-contractors must be employed from the local community where the project is located.	

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C2.2 - Preliminaries for GCC for Construction works - 2nd Edition 2010

Item No		Quantity	Rate	Amount

SECTION NO. 1

BILL NO. 1

PRELIMINARY AND GENERAL(CPAP WORK GROUP NO. 190 UNLESS OTHERWISE STATED)

The Tenderer is referred to the relevant Clauses in the separate document Model Preambles for Trades (2017 Edition)

NOTES

i) The agreement is to be the General Conditions of Contract for Works of Civil Engineering Construction (2010) (Second Edition), published by the S. A. Institution Of Civil Engineering.

ii) The Preliminaries are to be the Construction and management requirements for works contracts - Part 1: General engineering and construction works (SANS 1921-1: 2004 Edition 1) prepared by Standards South Africa and shall be deemed to be incorporated herein.

iii) Tenderers are referred to the abovementioned documents for the full intent and meaning of each clause thereof (hereinafter referred to by heading and clause number only) for which such allowance must be made as may be considered necessary.

iv) Where standard clauses or alternatives are not entirely applicable to this contract such modifications, corrections or supplements as will apply are given under each relevant clause heading.

Carried to Collection R

v) Where any item is not relevant to this specific contract such item is marked N/A (signifying "not applicable").

vi) Adjustment of the preliminaries: each item priced, is to be allocated to one or more of the three categories, where "F" denotes a fixed amount (amount not to be varied), "V" denotes an amount variable in proportion to value and "T" denotes an amount in proportion to time.

vii) Time (T) related Preliminaries will only be adjusted for omissions or additions, issued by the Employer, or delays caused by the Employer, for which variation and extension of time has been granted.

SECTION A: GENERAL CONDITIONS OF CONTRACT

1 **A1** General(clause 1)

F:_____ V:_____ T:_____ Item

2 **A2** Basis of Contract (clause 2)

F:_____ V:_____ T:_____ Item

3 **A3** Engineer (clause 3)

F:_____ V:_____ T:_____ Item

4 **A4** Contrators general obligations (clause 4)

F:_____ V:_____ T:_____ Item

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5	**A5**	Time and related matters (clause 5) - As referred to in the Contract Data under Special Condition of Contract. The Contract Period shall be deemed to include all Non - Working Days, Special Non - Working Days and the year-end Builders Annual Industry Holiday Periods. F:_____ V:_____ T:_____	Item		
6	**A6**	Payment and related matters (clause 6) F:_____ V:_____ T:_____	Item		
7	**A7**	Quality and related matters (clause 7) F:_____ V:_____ T:_____	Item		
8	**A8**	Risks and related matters (clause 8) F:_____ V:_____ T:_____	Item		
9	**A9**	Terminations of Contract (clause 9) F:_____ V:_____ T:_____	Item		
10	**A10**	Claims and disputes (clause 10) F:_____ V:_____ T:_____	Item		
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SECTION B: SANS 1921-1:2004 (Edition 1): CONSTRUCTION AND MANAGEMENT REQUIREMENTS FOR WORKS CONTRACTS: PART 1

Refer to the SCOPE OF WORK for detail requirements:

11	**B1**	Scope (clause 1) F:_____ V:_____ T:_____	Item		
12	**B2**	Normative references (clause 2) F:_____ V:_____ T:_____	Item		
13	**B3**	Definitions (clause 3) F:_____ V:_____ T:_____	Item		
14	**B4**	Requirements for construction and management (clause 4) F:_____ V:_____ T:_____	Item		
15	**B4.1**	General (Clause 4.1) F:_____ V:_____ T:_____	Item		
16	**B4.2**	Responsibilities for design and construction (clause 4.2) F:_____ V:_____ T:_____	Item		
17	**B4.3**	Planning, programme and method statements (clause 4.3) F:_____ V:_____ T:_____	Item		
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18	**B4.4**	Quality assurance (clause 4.4) F:_____ V:_____ T:_____	Item		
19	**B4.5**	Setting out (clause 4.5) F:_____ V:_____ T:_____	Item		
20	**B4.6**	Management and disposal of water (clause 4.6) F:_____ V:_____ T:_____	Item		
21	**B4.7**	Blasting (Clause 4.7) F:_____ V:_____ T:_____	Item		
22	**B4.8**	Works adjacent to services and structures (clause 4.8) F:_____ V:_____ T:_____	Item		
23	**B4.9**	Management of the Works and site (clause 4.9) F:_____ V:_____ T:_____	Item		
24	**B4.10**	Earthworks (clause 4.10) F:_____ V:_____ T:_____	Item		
25	**B4.11**	Testing (clause 4.11) F:_____ V:_____ T:_____	Item		
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26	**B4.12** Materials, samples and fabrication drawings (clause 4.12) F:_____ V:_____ T:_____	Item			
27	**B4.13** Equipment (clause 4.13) F:_____ V:_____ T:_____	Item			
28	**B4.14** Site establishment (clause 4.14) F:_____ V:_____ T:_____	Item			
29	**B4.15** Survey control (clause 4.15) F:_____ V:_____ T:_____ As built survey information prepared by an Engineering Surveyor to be submitted upon request to the Engineer.	Item			
30	**B4.16** Temporary works (clause 4.16) F:_____ V:_____ T:_____	Item			
31	**B4.17** Existing services (clause 4.17) F:_____ V:_____ T:_____ The Contractor to note that the water and electricity supplies at the specific school may be restricted or possibly non-existent. Accordingly, the tenderer to ensure that temporary supplies(water tanks/ electrical generators) are available on site to meet the project demands and to achieve continuity of the works on site.The use of potable water for construction activities is prohibited.	Item			
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32	**B4.18** Health and safety (clause 4.18) F:_____ V:_____ T:_____ The Contractor shall provide all PPE requirements for all Employees and visitors to the site, during the execution of the works.	Item		
33	**B4.19** Environmental requirements (clause 4.19) F:_____ V:_____ T:_____	Item		
34	**B4.20** Alterations, additions, extensions and modifications to existing works (clause 4.20) F:_____ V:_____ T:_____	Item		
35	**B4.21** Inspection of adjoining structures, services, buildings and property (clause 4.21) F:_____ V:_____ T:_____	Item		
36	**B4.22** Attendance on nominated and selected Sub-contractors (clause 22) F:_____ V:_____ T:_____	Item		
	SECTION C: SCOPE OF WORK IN ACCORDANCE WITH SANS 10403 *(The reference to Clauses refer to Table B.1 of SANS 1921-1:2004)*			
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37	**C.1**	Certification by recognised bodies (clause 4.4) F:_____ V:_____ T:_____ The Contractor shall provide all original certification of compliance in respect of all specialist installations and compliance testing as deemed necessary or as stipulated by the Engineer. Payment will be withheld in the absence of the provision of original compliance certificates.	Item		
38	**C.2**	Agrément certificates (clause 4.5) F:_____ V:_____ T:_____	Item		
39	**C.3**	Other services and facilities (clause 4.8) F:_____ V:_____ T:_____	Item		
40	**C.4**	Recording of weather (clause 5.2) F:_____ V:_____ T:_____ A rain gauge shall be provided on site for the duration of the contract. A diary shall be maintained with all rainfall records and signed off by the School Principal and thereafter submitted to the Engineer at every site meeting.	Item		
41	**C.5**	Management meetings (clause 5.3) F:_____ V:_____ T:_____	Item		
42	**C.6**	Daily records (clause 5.6) F:_____ V:_____ T:_____	Item		
		Carried to Collection		R	

43	**C.7**	Bond and guarantees (clause 5.7) F:_____ V:_____ T:_____	Item		
44	**C.8**	Permits (clause 5.9) F:_____ V:_____ T:_____	Item		
45	**C.9**	Proof of compliance with the law (clause 5.10) F:_____ V:_____ T:_____	Item		
		SECTION D: SPECIFICATION DATA ASSOCIATED WITH SANS 1921-1:2004 (Table A.1)			
46	**D.1**	Requirements for drawings, information and calculations for which the Contractor is responsible (clause 4.1.7) F:_____ V:_____ T:_____	Item		
47	**D.2**	The responsibility strategy assigned to the Contractor for the works (clause 4.2.1) F:_____ V:_____ T:_____	Item		
48	**D.3**	The planning, programme and method statements (clause 4.3) F:_____ V:_____ T:_____ The Contractor must provide weekly programme updates to the Engineer including the identification of all the activities that are delayed and the proposed plan for corrective action.	Item		
		Carried to Collection		R	

49	**D.4**	Samples of materials, workmanship and finishes (clause 4.12.1) F:_____ V:_____ T:_____	Item		
50	**D.5**	Fabrication drawings that the Contractor is to provide and deliver to the Employer (clause 4.12.2) F:_____ V:_____ T:_____	Item		
51	**D.6**	Office for the Foreman (clause 4.14.3) F:_____ V:_____ T:_____	Item		
52	**D.7**	Telephone (clause 4.14.3) F:_____ V:_____ T:_____	Item		
53	**D.8**	Office for inspector of works (clause 4.14.3) F:_____ V:_____ T:_____	Item		
54	**D.9**	Telephone in office for inspector of works (clause 4.14.3) F:_____ V:_____ T:_____	Item		
55	**D.10**	Sheds (clause 4.14.3) F:_____ V:_____ T:_____	Item		
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56	**D.11**	Provision and erection of signboards (clause 4.14.6) F:_____ V:_____ T:_____	Item		
57	**D.12**	Termination, diversion or maintenance of existing services (clause 4.17.1) F:_____ V:_____ T:_____	Item		
58	**D.13**	Services which are known to exist (clause 4.17.3) F:_____ V:_____ T:_____	Item		
59	**D.14**	Detection apparatus (clause 4.17.4) F:_____ V:_____ T:_____	Item		
60	**D.15**	Additional health and safety requirements (clause 4.18) F:_____ V:_____ T:_____	Item		

SECTION E: SPECIFIC PRELIMINARIES

Section E contains Specific Preliminary items which apply to this contract except where "N/A" (Not Applicable) appears against the item.

Carried to Collection R

61	**E1**	**PROPRIETARY BRANDED PRODUCTS** The Tenderer shall take delivery of, handle, store, use apply and/or fix all proprietary branded products in strict accordance with the manufacturer's instruction after consultation with the manufacturer's authorised representative. F:_____ V:_____ T:_____	Item		
62	**E2**	**OVERTIME** Should overtime be required to be worked for any reason whatsoever, the costs of such overtime are to be borne by the Contractor unless the Engineer/Principal Agent has specifically authorised in writing, prior to the execution thereof, that costs for such overtime are to be borne by the Employer. F:_____ V:_____ T:_____	Item		
63	**E3**	**AS BUILT DRAWINGS** The position of construction breaks and the extent of individual concrete pours are to be recorded by the Contractor on the Structural Engineer's drawings and are to be submitted to the Engineer/Principal Agent and the Structural Engineer for their records. F:_____ V:_____ T:_____	Item		
		Carried to Collection		R	

64 **E4 SITE INSTRUCTIONS**

Site instructions issued on site are to be recorded in triplicate in a site instruction book which is to be maintained on site by the Contractor.

F:_____ V:_____ T:_____

Item

65 **E5 LABOUR RECORD**

At the end of each week for the full duration of the contract, the Contractor shall provide the Engineer/Principal Agent with a written record, in schedule form, reflecting the number and description of tradesmen and labourers employed by him and all Sub-contractors on the works each day. The Contractor shall provide the completed DPW local labour forms , records and schedules together with all supporting documentation (certified ID copies , Employee details, wage rates, proof of payment , period of employment, employment contracts, etc.). The client reserves the right to conduct random inspections on site to verify the local labour employed on the project.

F:_____ V:_____ T:_____

Item

66 **E6 PLANT RECORD**

At the end of each week the Contractor shall provide the Engineer/Principal Agent with a written record, in schedule form, reflecting the number, type and capacity of all plant, excluding hand tools, currently used on the works.

F:_____ V:_____ T:_____

Item

Carried to Collection R

67	**E7**	**NON CESSION OF MONIES** The Contractor shall not cede nor assign his rights or claims to any monies due or to become due under this contract. F:_____ V:_____ T:_____	Item		
68	**E8**	**SECTIONAL COMPLETION** When it is required that the contract be executed in sections or portions, the Tenderer shall allow for all costs in this regard as no claim for additional costs will be entertained. F:_____ V:_____ T:_____	Item		
		Carried to Collection		R	

69 **E9 LOCAL LABOUR**

It is a general requirement of this contract that persons normally resident in the locality of the works (local labour) be given preference for employment on the contract. Provided, however, that should adequate and appropriate labour not be available within the locality, other may be employed subject to satisfactory proof being provided that every reasonable endeavour has been made to employ local labour. The Contractor shall identify the local community leaders with the purpose of negotiating with them regarding the utilization of local labour in the construction process. In this regard, the Contractor shall furthermore give preference, wherever possible to the employment of single heads of households, women and youth and preference should be given to parents of those children that are enrolled in the school whom are not currently employed. The Contractor shall, in general, maximize the involvement of the local labour and it is required that 100% of unskilled labour should be from the local community. All standard local labour employment forms (EPWP local labour forms) together with the supporting documentation (certified ID copies, Employee details, wage rates, proof of payment, period of employment, employment contracts, etc.) must be submitted with the monthly payment certificates and issued to the Engineer.

F:_____ V:_____ T:_____

Item

Carried to Collection R

70 **E10 IMPORT PERMITS AND DUTIES**

The responsibility for obtaining the necessary import permits shall rest with the successful Tenderer. No foreign exchange will be arranged or provided by the Administration.
Tenderers are to allow in their tenders and pay the ordinary levy imposed on imported items in terms of item 196.10 of Part 8 of Schedule No. 1 of the Customs and Excise Act, 1964 with effect from 1 October 1989.

F:_____ V:_____ T:_____

Item

71 **E11 CONTRACT PRICE ADJUSTMENT PROVISIONS (CPAP)**

Notwithstanding anything to the contrary contained in this Contract shall only when the Construction Period exceeds 6 months and the Contract sum exceeds R1,000,000,00 be subject to the Contract Price Adjustment Provisions Indices Application Manual for use with P0151 indices (CPAP) (Revised 1 January 2013) as published by Statistics South Africa.
Tenderers are advised that with reference to Clause 3.4.6 of the Contract Price Adjustment Provisions (CPAP) Indices Applications Manual, the Head: Public Works will not accept the submission by Tenderers of lists of additional items unless otherwise instructed.
Where this contract is a Lump Sum contract, the contract will be subject to Contract Price Adjustment Provisions (CPAP) only where the contract period equals or exceeds 6 calendar months. The applicable work group shall be WG 180 for domestic buildings or WG 181 for commercial and industrial buildings.

F:_____ V:_____ T:_____

Item

Carried to Collection R

E12 EXPANDED PUBLIC WORKS PROGRAMME (EPWP) CONDITIONS AND SPECIFICATIONS

12.1 EMPLOYMENT TARGETS

E12.1 a. Employment Targets

72 The Contractor needs to provide a realistic estimate on the number of jobs that the project has the potential to create throughout the project duration, as the project will be implemented using Labour Intensive Construction methods on elements where it is economical and feasible. No. of jobs estimated to be created equals to a **minimum of 5 unskilled labour** for the duration of the project.

It is a general requirement of this contract that persons normally resident in the ward of the works (local labour) be given preference for employment on the contract. Provided, however, that **should adequate and appropriate labour not be available within the ward**, others may be employed subject to satisfactory proof being provided that every reasonable endeavour has been made to employ local labour **(Local Sub-contractor(s); Skilled; Semi-Skilled and Unskilled).** The Contractor shall in consultation with the local community leaders (**Project Steering Committee**) with the purpose of negotiating with them regarding the utilization of local resources in the construction process. In this regard, the Contractor shall furthermore give preference, wherever possible to the employment of single heads of households, women and youth as well as families declared as most indigent by War on Poverty/ Sukuma Sakhe programme profiling process. The Contractor should aim, in general, to maximise the involvement of the local community, however workers from other communities should not exceed 20% of all persons working on the project, where local Employees possess skills at a level of competency that meets Contractor's requirements.

F:_____ V:_____ T:_____ Item

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E12.1 b. Employment Requirements

73 Tenderers are advised that this contract will be subject to the Expanded Public Works Program (EPWP) aimed at alleviating and reducing unemployment.

Tenderers must allow for any costs for the following employment requirements of the EPWP;

1. 55% of unskilled labour to be women
2. 55% of the unskilled labour to be youth aged between 18 and 35 years
3. 2% of the unskilled labour to be people with disabilities

100% Unskilled labour utilised must reside within the boundaries of the Municipality ward where this contract is executed, with preference to the local community closest or at a walking distance to the contract site. Wherever possible, local skilled tradesmen are to be employed on this contract with the view to maximize utilization of local resources.

F:_____ V:_____ T:_____

Item

Carried to Collection R

74	**E12.1 c. Labour Rate and Payment Intervals** The Contractor should ensure that labour rate paid to unskilled local labour is commensurate to the daily task. When determining the rate, consideration should be given to that EPWP beneficiaries are mostly bread winners in their families, as the program intends alleviating poverty. There should also be consideration that the labour rate promotes creation of expanded number of jobs created and person days of work. Contractors should make endeavours to ensure that labourers, particularly unskilled are remunerated on a fortnight basis and prior notification be made should there be a shortfall on their wages. The labour rate for local unskilled shall also be determined in consideration of the location of the project, i.e. projects implemented in urbanized municipalities will not be the same as that for rural municipalities. F:_____ V:_____ T:_____	Item			
	12.2 LABOUR INTENSIVE CONSTRUCTION METHOD				
	E12.2 a Labour Intensive Construction Method				
75	Those parts of the contract to be constructed using Labour Intensive methods will be marked in the Bill of Quantity with letter LI (indicating Labour Intensive) against every item so designated. Such works will only be constructed using the method so indicated. Reference to be made to Guidelines for the implementation of Labour Intensive Infrastructure projects under EPWP. **"Scope of Work in Respect of Work Relating to the Expanded Public Works Programme (EPWP)"** **Labour Intensive Component** Due to the nature of the work involved, this type of project lends itself to be feasible as a labour Intensive project i.e. the construction activities will indeed require skilled/unskilled labour.				
	Carried to Collection			R	

The aim of the projects is to provide some form of economic benefit whilst generating and increasing the acquired skills shortage to improve sustainability in the local area. The following are potential focus areas where employment creation can be optimized per project:

(i) Trenching works not exceeding depth of 1.5m, including trenching for Foundation, Electrical, Water, Mechanical & Civil Services Works including backfilling where ground conditions permit
(ii) Building Works; All masonry works (which include concrete mixing on site; brickwork; block work ; plastering; screed works; jointing; etc.); Painting, Plumbing, Ironmongery; roof cladding; glazing; tiling; carpentry; flooring; waterproofing; etc.
(iii) Sewer works including construction of manholes, laying of Sewer pipes, bedding, backfilling and compaction.
(iv) Water Reticulation works including excavation, bedding, laying of pipes and compaction
(v) Site Clearance Works
(vi) Electrical Reticulation works
(vii) Stormwater drainage using in-situ concrete
(viii) Landscaping and Grassing of Sports Field
(ix) Cleaning and Fencing Works

The above identified activities are deemed suitable to be constructed using the LIC methods; to build, upgrade and maintain the social and economic levels of the underdeveloped area, promoting community participation, development of skills and creating more work opportunities.

The above identified activities **should** be marked in the Bill of Quantities with the letter (LI). Contractor to price the above items in the Bill of Quantities bearing in mind that they are regarded as the main sources of job creation, whether sub-contracted or undertaken by the Main Contractor.

The use of plant to provide such works, other than plant specifically provided for in the scope of work, is a variation to the contract. The items marked with the letter LI are not necessarily an exhaustive list of all the activities which must be done by hand.

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	Payment for items which are designated to be constructed labour-intensively (either in this schedule or in the Scope of Works) will not be made unless they are constructed using labour-intensive methods. Any unauthorised use of plant to carry out work which was to be done labour-intensively will not be condoned and any works so constructed will not be certified for payment.			
	F:_____ V:_____ T:_____	Item		
	E12.3 RECORD KEEPING			
76	12.3.1 Every Employer must keep in the project site office the following; minutes of site progress meetings; Contractors' monthly site progress reports; accurately recorded attendance register; proof of payment as means to verify authenticity of data in the EPWP beneficiary form submitted with payment certificates. Copies of submitted EPWP beneficiary data forms should also be kept in the site office.			
	F:_____ V:_____ T:_____	Item		
77	12.3.2 The Employer must keep this record for a period of at least three (3) years after the completion of the project in his/her office as the project site office would have been relocated. This should be safely kept for job creation data verifications and periodical audits on projects conducted by National and Provincial Department of Public Works after one (1) or two (2) quarters of submitting captured EPWP data to the National EPWP co-ordinating Department.			
	F:_____ V:_____ T:_____	Item		
	Carried to Collection		R	

	E12.4 EPWP MONTHLY REPORTING DOCUMENTS			
78	At the end of each month the Contractor must submit: • EPWP monthly data collection form • Worker monthly payment upload • Worker monthly acknowledgement of receipt of payment • Worker monthly Payment register • Worker monthly training form • Monthly attendance Register • Worker Monthly pay slips • Unskilled labour certified ID copies (once off) • Beneficiary ID-size photos • Proof of UIF • Proof of COIDA			
	F:_____ V:_____ T:_____	Item		
	E12.5 EPWP PROMOTION			
	12.5.1. EPWP signage board			
79	EPWP Program at the project level shall always be promoted through the provision of projects signage board that embraces EPWP logo at the bottom, correct measurement for this sign board will be provided by the project leader during the site handing over meeting.			
	F:_____ V:_____ T:_____	Item		
	12.5.2 Branding of labour apparel			
80	Contractor & Sub-contractors' labourers shall be provided with EPWP branded Personal Protective Equipment (PPE), reflector vest with EPWP acronym at the back as an ideal and cost effective means of promoting program on site. The Contractor is advised to price for both items 12.5.1 and 12.5.2			
	F:_____ V:_____ T:_____	Item		
	Carried to Collection		R	

E12.6 COMMUNITY LIAISON OFFICER (CLO)

UTILISATION OF A COMMUNITY LIAISON OFFICER

The Contractor shall allow for and pay any and all costs necessary for the engagement of the services of a Community Liaison Officer (CLO) for the full duration of this contract.

A CLO will be identified by the local structures (Project Steering Committee) of the ward areas and appointed, following fair and transparent interviewing process, to be conducted in the presence of local structures and the Contractor representative, in order to assist the Contractor in the procurement of any local labour, etc. required for this project. The Contractor is to liaise with the CLO and afford him any assistance needed in ensuring sound working relations with the local community.

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Key responsibilities of the CLO are envisaged to include and not necessarily be limited to:

1. Assisting local leadership in conducting skills and resources audit which facilitates sourcing labour from within the ward or targeted areas for employment, as required by Contractor.

2. Assisting in sourcing labour-only domestic Sub-contractors and the procurement of materials from local resources, as required by the Contractor.

3. Assisting the Contractor by identifying areas of potential conflict and or threats to the project or to stakeholders in the project and recommend appropriate action to the Contractor.

4. Assisting Contractor and stakeholders in the project in the resolution of any conflicts which may arise.

5. Establishing and ensuring that sufficient and open communication channels between the Contractor and the work force are maintained.

6. Establish and ensuring that efficient and open communication channels between the Contractor and the community are maintained.

7. Identifying and reporting to the Contractor regarding issues where communication between stakeholder is necessary, recommend courses of action and facilitate such communications.

8. Assisting the Contractor and the workforce in the establishment of grievance procedures and necessary recommendations to the Contractor regarding the grievances and solution thereto.

9. Attending to site meetings and project implementation meetings as required by the Contractor and preparing periodic reports as may be required by the Contractor, from time to time.

10. Attending to such other duties which are consistent with the functions of a CLO, as may be required by the Contractor, from time to time.

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81	Tenderers are to price twice the rate of unskilled local labour rate for the Community Liason Officer (CLO) against this item for any and all costs arising out of compliance with the foregoing and in the event of a Tenderer failing to price against this item or making inadequate financial provision against this item for compliance as aforesaid, then no claim for costs or additional cost incurred will be entertained by the Head: Public Works. F:_____ V:_____ T:_____	Item			
	E12.7 SKILLS DEVELOPMENT ON SITE				
82	The Contractor is conforming to the objectives of EPWP if his beneficiaries are capacitated with skills that will render them employable in the future. It is then the responsibility of the Contractor that mandatory life skills are provided to 100% of workforce on site and on the job training to labourers from whom the potential for further development has been identified. The latter is not mandatory to all as it covers technical skills. The Contractor should also make provision for the possibility that there might be local youth that will need to be placed on the project with an intention to be provided support towards improving their level of competency and productivity. The Contractor shall also provide all necessary on-the-job training to targeted labour to enable such labour to master and advance on techniques required to undertake the work in accordance with requirements of the contract in a manner that does not compromise workers health and safety. F:_____ V:_____ T:_____	Item			
	Carried to Collection			R	

E12.8 SUB-CONTRACTING FOR LOCAL EMERGING ENTERPRISES

The project can support the notion of one Main Contractor to be appointed whilst several Sub-contractors, possibly from the local Small, Medium and Micro Enterprises (SMME) group, are employed to undertake various smaller activities. However due to the nature of the project, there will be **no local** Sub-contracting.

83 **12.8.1 Sub-contractor Procedure**

The recommendation will be that the Contractor shall advertise and call for competitive tenders in respect of each portion of the works that are required to be subcontracted. The tenders received are then evaluated by both the Employer and the Contractor. The evaluation panel shall comprises equal representatives from the Employer and from the Contractor.

The Contractor shall without delay enter into contract with the successful tendering Subcontractor based on their accepted tender submission.

This will promote the cost effective participation and development of smaller registered Contractors in larger valued contracts without losing single point of accountability for projects. This will allow the emerging Contractors to tender for work in a fair, transparent and equitable manner rather than having to negotiate such contracts with the Main Contractor. Also guarantees the participation of Contractors registered in lower Contractor grading designation.

F:_____ V:_____ T:_____ N/A

Carried to Collection R

84	**12.8.2 Sub-contractor Mentoring** Once the Sub-contractors have been identified and engaged, the Contractor shall closely monitor their performance in the execution of their contracts. The Contractor will be responsible for drawing implementation plan that will assist in managing the development of Sub-contractors undertaking Labour Intensive work. The Contractor will be responsible for management of the Sub-contractors and to ensure that they comply with all EPWP requirements as set-out in this specification. The Contractor and Sub-contractors will be required to compile monthly progress reports to be submitted with payment certificates. The reports shall include planned targets with regards to the works and employment, employment of EPWP beneficiaries and project expenditure. Failure to produce monthly reports will render payment certificates incomplete The Contractor will be required to assist, train, mentor and monitor its Sub-contractors and report through monitoring tool on progress of each Sub-contractor. F:_____ V:_____ T:_____	N/A		
	Carried to Collection		R	

85	**12.8.3 Portfolio of Evidence** The Contractor is to develop and /or maintain a portfolio of evidence for each Sub-contractor. The Portfolio of Evidence is a collection of proof of the training, coaching, guidance and monitoring inputs provided to the Sub-contractor. It is the document which records the development progress of the Sub-Contractor and will need to be updated continually throughout the duration of the contract. The Portfolio of Evidence should include but not limited to the following documentation: • The development path designed for each Sub-Contractor, • The Training course completed by the Sub-Contractor, • The hours of guiding, coaching and mentoring received for each activity listed in the developmental plan, • A list of outcomes achieved at each level for each activity. F:_____ V:_____ T:_____	N/A		
	Performance and Penalties The Contractor performance will be monitored throughout the contract. Should the Contractor fail to fulfil his obligation he will be liable for penalties. Payment of the penalty shall not absolve the Contractor of any claim, or relieve the Contractor of any of his duties, obligations or responsibilities under the contract. • Utilisation of the Sub-Contractors The Contractor's achievement of the targets will be measured quarterly to determine the progress made to date.			
	Carried to Collection		R	

86 **12.8.4 Local Suppliers**

Local material suppliers within the vicinity of the site to be utilise as long as their materials meets the required specification. However, quality and suitability would have to be checked by the Employer, if the local suppliers are unable to meet the demand the nearest suitable suppliers are to be used.

Production of materials should be done on site, where economies of scale allow e.g. concrete paving blocks should be encouraged which will enable employment creation and also allow for enterprise development.

F:_____ V:_____ T:_____

N/A

87 **12.8.5 TENDERER'S TO NOTE CONDITIONS**

a) The contract to be entered into between the Contractor and the PPG's will be a LABOUR ONLY sub-contract.

b) The Contractor will be responsible for ensuring that all materials for use by the PPG's in the works are to be on site timeously. The Contractor shall liaise with the Mentor and PPG to determine the nature and extent of materials required and the lead time necessary.

c) The Contractor shall be responsible for the overall programming of the Works and he is to allow for monitoring the PPG's programme and progress.

d) In conjunction with the Mentor, he is to allow for the supervision and mentoring (where necessary) of the PPG to ensure quality and adherence to standard building practice.

e) The Contractor is to allow for extra storage facilities on site for the PPG's tools and equipment.

f) Basic tools shall be provided by the PPG's and where these are not available, the Contractor will supply him with the necessary tools and equipment and deduct the costs thereof from the interim claims made by the PPG.

Carried to Collection R

g) Work requiring specialized tools will be provided free of charge by the Contractor with the provision that these be returned upon completion of the Work.

CO-ORDINATION

The Contractor is to co-ordinate the work of all the PPG's, Sub-Contractors and Nominated Sub-Contractors appointed direct by the Employer in such a manner and at all times as will suit the building programme and he is to allow adequate access, for the PPG's, where required, to carry out their work in an efficient manner as no claims for extras in this connection will be entertained.

ATTENDANCE

The Contractor may allow for attendance upon the PPG's concerned to execute the work. The Contractor is to allow the PPG's the use of any scaffolding belonging to him while it remains so erected on the site.

Where scaffolding is necessary for the use by any PPG and the Contractor has not erected any for his own use or has removed same after his own use, the Contractor shall supply sufficient scaffolding to the PPG to be erected and dismantled by the PPG and returned to the Contractor.

This attendance upon PPG's to execute the work is to include for the scaffolding provisions as aforesaid and, in addition, is to include for co-operating to the fullest extent with all the parties, attending on off-loading materials, providing suitable storage for tools and materials used by the PPG's, use of general facilities such as latrines, etc., supply and cost of power, lighting, water and the like.

F:_____ V:_____ T:_____ N/A

Carried to Collection R

E12.9 EPWP CONTRACT FOR LABOUR

88 It is compulsory that shortly after the Contractor and or Sub-contractor has appointed local labour, the employment contract should be signed by both parties, prior to commencement with works on site. The employment contract forms part of the Ministerial Determination or from the regional EPWP officials.

F:_____ V:_____ T:_____ Item

E12.10 EPWP SCOPE OF WORKS FOR THIS PROJECT

89 **Contractors are to price any item on the Bill of Quantities highlighted below, bearing in mind that they are regarded as main sources of job creation, whether Sub-contracted or undertaken by the Main Contractor.**

Elements on the scope of work where the application of Labour Intensive Construction methods are indicated with letters (LI) are as follows:

i) Excavating trenches for foundations and any other civil works with the depth not more than 1.5 m
ii) All masonry works which include concrete mixing on site; brickwork; plastering; screed works; jointing; etc.
iii) Painting, Plumbing, Ironmongery; roof cladding; glazing; tilling; carpentry; flooring; waterproofing; etc.
iv) External works such as landscaping; cleaning; paving; fencing; tarmac; etc.

F:_____ V:_____ T:_____ Item

Carried to Collection R

90	**E13**	**HIV/AIDS AWARENESS** Tenderers are to price against the following items for compliance with the SPECIFICATION FOR HIV/AIDS AWARENESS bound into this document (The clauses referred to are those of the Specification for HIV/AIDS) **E13.1** Provide and maintain a condom dispenser in terms of Clause 5.1a F:_____ V:_____ T:_____	Item		
91	**E13.1**	Provide and maintain HIV/AIDS awareness posters terms of Clause 5.1b F:_____ V:_____ T:_____	Item		
92	**E13.2**	HIV /Aids Awareness Programme on Site for not less than 90% of workers inclusive of all direct and indirect costs; Engage a qualified service provider as described in the scope of works to conduct an HIV Awareness Programme in terms of Clause 5.2.1a F:_____ V:_____ T:_____	Item		
93	**E13.3**	Arrange for workers to attend the HIV Awareness Programme in terms of Clause 5.2.1b F:_____ V:_____ T:_____	Item		
		Carried to Collection		R	

94 **E13.4 REPORTING**

Prepare and attach to claims for payment a brief report in terms of Clause 5.3 (see also HIV/STI Compliance Report (included with this document).

F:_____ V:_____ T:_____

Item

Note: In the event that the Contractor fails to satisfy the requirements of this specification, the Employer (Head: Public Works) may apply any of the sanctions provided for in the contract. Sanctions may include the application of a financial penalty of .04% of the Contract Sum.

95 **E14 OCCUPATIONAL HEALTH AND SAFETY ACT NO. 85 OF 1993**

Tenderers are to allow for costs in providing a project specific ' Construction Phase Safety, Health and Environmental Plan' in accordance with "Section 2 - Specification Data associated with SANS 1921-1:2004" clause C4.18 in "Part C3 - Scope of Work".

F:_____ V:_____ T:_____

Item

96 **E15 NOTICE BOARD, SITE OFFICE, ETC.**

Bidders are to allow for the provision and removal of a project notice board and a site office in accordance with the Principal Agent's requirements.

F:_____ V:_____ T:_____

Item

Carried to Collection R

97	**E16**	**IMPORTED MATERIALS AND EQUIPMENT** Where imported items are listed in the tender documents, the tenderer shall provide all information called for, failing which the price of any such item, material or equipment shall be excluded from currency fluctuations. F:_____ V:_____ T:_____	Item		
98	**E17**	**CONTRACT DOCUMENTS** The drawings issued with these Bid documents do not comprise the complete set but serves as a guide only for Biding purposes and for indicating the scope of works to enable the Bidder to acquaint him with the nature and extent of the works and the manner in which they are to be executed. Should any part of the drawings not be clearly legible to the Bidder he shall, before submitting his Bid, obtain clarification in writing from the Principal Agent. F:_____ V:_____ T:_____	Item		
99	**E18**	**GENERAL PREAMBLES** The Document Preambles will be the "ASAQS Model Preambles for Trades - 2017" and is obtainable from the various Regional Office's of the Department of Public Works and shall be read in conjunction with the Bills of Quantities and be referred to for the full descriptions of work to be done and materials to be used. F:_____ V:_____ T:_____	Item		
		Carried to Collection		R	

100 **E19 TRADE NAMES**

Wherever a Trade Name for any product has been described in the Bills of Quantities the Bidder's attention is drawn to the fact that any other product of equal quality may be used subject to the written approval of the Principal Agent being obtained prior to the closing date for submission of Bids.

F:_____ V:_____ T:_____

Item

101 **E20 EXISTING PREMISES**

The Contractors attention is drawn to the fact that the existing building and surrounding buildings will remain in occupation during the performance of this contract and it is essential that the interruption to the daily activities of be kept to a minimum during the construction activities, to this end, the Contractor must allow for working in co-operation with the Engineer in organising the work in such a way as to cause the minimum disruption to the normal activities of this institution.

F:_____ V:_____ T:_____

Item

Carried to Collection R

102	**E21**	**INACCURATE AND DEFECTIVE WORK EXECUTED UNDER PREVIOUS CONTRACT** The Contractor shall, after taking possession of the site and before commencing the work, check all levels, liners, profiles and the like and satisfy himself as to the dimensional accuracy of all work executed under the previous contract which may affect his work. Should any inaccurate or defective work be found, the Contractor shall immediately notify the Principal Agent in writing requesting his instructions with regard thereto and afford every facility to those rectifying such inaccurate or defective work. F:_____ V:_____ T:_____	Item		
103	**E22**	**VIEWING THE SITE IN SECURITY AREAS** If the site is situated in a security area, the Bidder must arrange with the Authorities to obtain permission to enter the site for Bidding purposes. F:_____ V:_____ T:_____	Item		
104	**E23**	**COMMENCEMENT OF WORKS IN SECURITY AREAS** If the works falls within a security area, the Contractor must arrange with the Authorities and give the necessary notices before commencement of the works. Should the Contractor fail to make such arrangements, admission to the site may be refused and any additional costs will be for the Contractor's account. F:_____ V:_____ T:_____	Item		
		Carried to Collection		R	

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Bill No. 1
PRELIMINARIES
LDM QUANTITY SURVEYORS DBN (PTY) LTD.

105 **E24 ENTRANCE PERMITS TO SECURITY AREAS**

If the works fall within a security area, the Contractor shall obtain entrance permits for his personnel and workmen entering the area and shall comply with all regulations and instructions which may be issued from time to time regarding the protection of persons and property under control of the Authority.

F:_____ V:_____ T:_____

Item

106 **E25 SECURITY CHECK OF PERSONNEL**

The Principal Agent may require the Contractor to have his personnel and workmen, or a certain number of them, security classified.

In the event of the Principal Agent requesting the removal of a person or persons from the works for security reasons, the Contractor shall do so forthwith and shall thereafter ensure that such person or persons are denied access to the works and the site and/or to any document or information relating to the works.

F:_____ V:_____ T:_____

Item

Carried to Collection R

107 **E26 PROHIBITION ON TAKING PHOTOGRAPHS**

In terms of article 119 of the Defence Act, 44 of 1957, it is prohibited to sketch or to take photographs of any military site or installation or any building or civil works thereon or to be in possession of a camera or other apparatus used for taking photographs, except when authorised thereto by or on behalf of the Minister."

The same prohibition is also applicable to all Correctional Institutions in terms of article 44.1(e) of the Correctional Services Act 8 of 1959.

F:_____ V:_____ T:_____

Item

108 **E27 NATURE AND EXTENT OF WORK**

The broad scope of the work comprises repairs, renovation, alterations, external works, etc. necessitated by **Water & Sanitation Programme Only**.

F:_____ V:_____ T:_____

Item

109 **E28 PROTECTION OF EXISTING**

Every care shall be taken to protect all parts of the building and ground against disfigurement of any kind. The Contractor shall be responsible for any damage caused to vehicles, persons or property by his operations, and he will be required to supply and maintain such temporary measures as are required, to prevent such damage.

F:_____ V:_____ T:_____

Item

Carried to Collection R

110	**E29**	**ACCESS** The Contractor is to allow for all costs associated with sites having restricted access due to location, road conditions, etc. The Contractor to note the sites have extremely restricted access and in some instances, restricted access may affect the delivery of materials, etc. The Contractor to accordingly ensure the most suitable and effective access routes are investigated and implemented to achieve continuity of the works. F:_____ V:_____ T:_____	Item		
111	**E30**	**SAFETY TO THE SITE** All scaffolding, protection, machinery and tools on the site shall be erected, used and/or maintained in accordance of the requirements of the Occupational Health and Safety Act (85/1993) as amended and any regulations thereto. All relevant local authority bylaws shall also be complied with. The Contractor to provide suitable hoarding to demarcate the area of the construction works from the other adjacent operational areas. All open excavations and incomplete construction work to be cordoned off with danger tape. F:_____ V:_____ T:_____	Item		
		Carried to Collection		R	

112 **E31 ASBESTOS CEMENT**

All preparatory work, alterations, demolitions, etc. to existing asbestos cement roof sheeting, gutters, rainwater pipes, etc. are to be carried out strictly in accordance with statutory requirements (Occupational Health and Safety Act, 1993 - Asbestos Regulations, 2001) and all necessary precautions must be taken when working with and disposing of asbestos cement products and the disposing of waste resulting from cleaning operations, etc.

Allowance is to be made for costs associated with compliance with these Regulations.

F:_____ V:_____ T:_____

Item

113 **E32 EXISTING PREMISES OCCUPIED**

The Contractor shall carry out the whole of the works with as little mess and noise as possible and with a minimum of disturbance to adjoining building and occupants. He shall provide proper protection and provide, erect and remove when directed, any temporary tarpaulins, temporary fences that may be necessary during the progress of the works, all to the satisfaction of the Principal Agent. The Contractor may have to sequence noisy activities during school hours. In addition, no disruptions will be entertained during examinations.

F:_____ V:_____ T:_____

Item

SUMMARY OF CATEGORIES

Category : Fixed R_____

Category : Value R_____

Category : Time R_____

Carried to Collection R

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LDM QUANTITY SURVEYORS DBN (PTY) LTD.

Section No. 1

Bill No. 1

PRELIMINARIES

COLLECTION

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PRELIMINARIES

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Bill No. 1

PRELIMINARIES

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KWAZULU-NATAL PROVINCE
PUBLIC WORKS
REPUBLIC OF SOUTH AFRICA

DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3: ETHEKWINI REGION: DUMANE COMMERCIAL HS

PART C2.3 BILL OF QUANTITIES

Item No		Quantity	Rate	Amount

SECTION NO. 2

BILL NO. 1

ALTERATIONS AND DEMOLITIONS (PIT TOILETS)(CPAP WORK GROUP NO. 102 UNLESS OTHERWISE STATED)

The Tenderer is referred to the relevant Clauses in the separate document Model Preambles for Trades (2017 Edition)

SUPPLEMENTARY PREAMBLES

View site

Before submitting his tender the contractor shall visit the site and satisfy himself as to the nature and extent of the work to be done and the value of the materials contained in the buildings or portions of the buildings to be demolished. No claim for any variations of the contract sum in respect of the nature and extent of the work or of inferior or damaged materials will be entertained

Explosives

No explosives whatsoever may be used for demolition purposes unless otherwise stated

Taking Out and Removal of Asbestos

Taking out and removing asbestos roof, gutters, underlay, fibreglass, downpipes, ect. must be in strict accordance with health and occupational safety regulations and a specialist firm must be contracted to dispose of the material

Carried to Collection R

General

Descriptions of taking out shall be deemed to include carting away from site to a dump ground to be found by the contractor

The contractor shall carry out the whole of the works with as little mess and noise as possible and with a minimum of disturbance to adjoining premises and their tenants. He shall provide proper protection and provide, erect and remove when directed, any temporary tarpaulins that may be necessary during the progress of the works, all to the satisfaction of the principal agent

Water supply pipes and other piping that may be encountered and found necessary to disconnect or cut, shall be effectually stopped off or grubbed up and removed, and any new connections that may be necessary shall be made with proper fittings, to the satisfaction of the principal agent

Doors, fanlights, fittings, frames, linings, etc which are to be re-used shall be thoroughly overhauled before refixing including taking off, easing and rehanging, cramping up, re-wedging as required and making good cramps, dowels, etc, and easing, oiling, adjusting and repairing ironmongery as necessary, replacing any glass damaged in removal or subsequently and stopping up all nail and screw holes with tinted plastic wood to match timber, unless otherwise described. Re-painting or re-varnishing is given separately

Prices for taking out of doors, windows, etc shall include for removal of all beads, architraves, ironmongery, etc

With regard to building up of openings in existing walls, cement screeds and pavings, granolithic, tops of walls, etc, shall be levelled and prepared for raising of brickwork

Making good of finishes shall include making good of the brick and concrete surfaces onto which the new finishes are applied, where necessary

Carried to Collection R

	The contractor will be required to take all dimensions affecting the existing buildings on the site and he will be held solely responsible for the accuracy of all such dimensions where used in the manufacture of new items (doors, windows, fittings, etc)				
	The Contractor to acknowledge that sequencing of the work will be necessary to accommodate the operational aspects of the school. The Contractor to accordingly factor the above requirement in the construction programme and pricing				
	DEMOLITIONS ETC				
	Demolishing and removing				
1	Single storey building with pitched roof 4.00 x 2.25m on plan and 3m high at eaves comprising of concrete surface bed, block external and internal walls, corrugated roof covering on timber purlins including breaking up and removing foundations, backfilling on completion, levelling site and cart away of rubble off site (LI) - Girls Toilet	m2	9		
2	Single storey building with pitched roof 5.00 x 2.00m on plan and 3m high at eaves comprising of concrete surface bed, block external and internal walls, corrugated roof covering on timber purlins including breaking up and removing foundations, backfilling on completion, levelling site and cart away of rubble off site (LI) - Staff Toilet	m2	10		
3	Single storey building with pitched roof 7.50 x 2.00m on plan and 3m high at eaves comprising of concrete surface bed, block external and internal walls, corrugated roof covering on timber purlins including breaking up and removing foundations, backfilling on completion, levelling site and cart away of rubble off site (LI) - Boys Toilet	m2	15		
	Carried to Collection			R	

	TEMPORARY ABLUTION				
4	Rental of temporary chemical mobile toilets including transportation and establishment on site and de-establishment on completion for a period of 7 calendar months. Rental to include weekly cleaning and sanitisation of the temporary chemical mobile toilets and any other prescribed maintenance for the period of seven (7) calendar months	No	17		
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Section No. 2

Bill No. 1

ALTERATIONS (PROVISIONAL)

COLLECTION

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Item No			Quantity	Rate	Amount
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	BILL NO. 1				
	NEW BUILDINGS				
	The Tenderer is referred to the relevant Clauses in the separate document Model Preambles for Trades (2017 Edition)				
	EARTHWORKS (PROVISIONAL)(CPAP WORK GROUP NO. 104 UNLESS OTHERWISE STATED)				
	SITE CLEARANCE, ETC				
	Site clearance				
1	Digging up and removing rubbish, debris, vegetation, hedges, shrubs and trees not exceeding 200mm girth, bush, etc (LI)	m2	220		
2	Stripping average 150mm thick layer of top soil and stockpiling on site (LI)	m2	220		
	EXCAVATION, FILLING, ETC. OTHER THAN BULK				
	Excavation in earth not exceeding 2m deep				
3	Reduced levels under floors (LI)	m3	10		
4	Trenches, foundation beams, etc (LI)	m3	6		
5	Holes (latrine pit)	m3	66		
	Excavation in earth exceeding 2m but not exceeding 4m deep				
6	Holes (latrine pit)	m3	34		
	Carried to Collection			R	

	Back excavation of vertical sides of excavation in earth for working space including backfilling compacted to 98% Mod. AASHTO density			
7	Not exceeding 1,5m deep, etc. 300mm away from excavated face (LI)	m2	58	
8	Exceeding 1,5m and not exceeding 3m deep, etc. 300mm away from excavated face	m2	34	
	Extra over trench and hole excavations in earth for excavation in			
9	Intermediate material	m3	20	
10	Hard rock	m3	20	
	Extra over back excavation in earth for working space for excavation in intermediate material			
11	Not exceeding 1,5m deep, etc. 300mm away from excavated face	m2	58	
12	Exceeding 1,5m and not exceeding 3m deep, etc. 300mm away from excavated face	m2	34	
	Extra over back excavation in earth for working space for excavation in hard rock			
13	Not exceeding 1,5m deep, etc. 300mm away from excavated face	m2	58	
14	Exceeding 1,5m and not exceeding 3m deep, etc. 300mm away from excavated face	m2	34	
	Extra over all excavations for carting away			
15	Surplus material from excavations and/or stock piles on site, to a dumping site to be located by the contractor	m3	116	
	Risk of collapse of excavations			
16	Sides of trench and hole excavations not exceeding 1,5m deep (LI)	m2	58	
	Carried to Collection			R

17	Sides of trench and hole excavations exceeding 1,5m deep (LI)	m2	34		
	Keeping excavations free of water				
18	Keeping excavations free of all water other than subterranean water (LI)		Item		
	FILLING ETC				
	Earth filling supplied by the contractor under floors, etc				
19	150mm G5 Material in accordance with SABS 1200 DM compacted to 98% Mod. AASHTO density (LI)	m3	8		
	Compaction of surfaces				
20	Compaction of ground surface under floors, etc. including scarifying for a depth of 150mm, breaking down oversize material, adding suitable material where necessary and compacting to 98% Mod. AASHTO density (LI)	m2	90		
	Prescribed density tests on filling				
21	"Modified AASHTO Density" test	No	4		
22	"Field Density" test including "Optimum Moisture Content" (four readings per test)	No	4		
	SOIL POISONING				
	Soil Insecticide in accordance with SANS 5859				
23	Under floors, etc. including forming and poisoning shallow furrows against foundation walls, etc., filling in furrows and ramming	m2	110		
	Carried to Collection			R	

Section No. 3

Bill No. 1

EARTHWORKS (PROVISIONAL)

COLLECTION

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SECTION NO. 3

BILL NO. 2

NEW BUILDINGS

The Tenderer is referred to the relevant Clauses in the separate document Model Preambles for Trades (2017 Edition)

CONCRETE, FORMWORK AND REINFORCEMENT (PROVISIONAL)(CPAP WORK GROUP NO. 110 UNLESS OTHERWISE STATED)

SUPPLEMENTARY PREAMBLES

Cost of tests

The costs of making, storing and testing of concrete test cubes as required under Clause 7 "Tests" of SABS 1200 G shall include the cost of providing cube moulds necessary for the purpose, for testing costs and for submitting reports on the tests to the Principal Agent. The testing shall be undertaken by an independent firm or institution nominated by the contractor to the approval of the Principal Agent. (Test cubes are measured separately)

Carried to Collection R

	Formwork Descriptions of formwork shall be deemed to include use and waste only (except where described as "left in" or "permanent"), for fitting together in the required forms, wedging, plumbing and fixing to true angles and surfaces as necessary to ensure easy release during stripping and for reconditioning as necessary before re-use. The vertical strutting shall be carried down to such construction as is sufficiently strong to afford the required support without damage and shall remain in position until the newly constructed work is able to support itself. Formwork to soffits of solid slabs etc. shall be deemed to be to slabs not exceeding 250mm thick unless otherwise described. Formwork to sides of bases, pile caps, ground beams, etc. will only be measured where it is prescribed by the Engineer for design reasons. Formwork necessitated by irregularity or collapse of excavated faces will not be measured and the cost thereof shall be deemed to be included in the allowance for taking the risk of collapse of the sides of the excavations, provision for which is made in "Earthworks".				
	UNREINFORCED CONCRETE CAST AGAINST EXCAVATED SURFACES				
	15MPa Concrete				
1	Surface blinding under surface beds, slabs, etc (LI)	m3	2		
	REINFORCED CONCRETE				
	25MPa/19mm Concrete				
2	Foundation beams (LI)	m3	6		
3	Surface beds, etc., including thickening (LI)	m3	10		
4	Slabs including beams and inverted beams (LI)	m3	4		
	Carried to Collection			R	

5	Concrete nib, etc (LI)	m3	2	
6	Pit base (LI)	m3	12	
	CONCRETE SUNDRIES			
	Sleeves			
7	110mm Diameter pipe and socket cast in concrete formed of 130mm long black pipe uPVC welded to 100mm long uPVC pipe with single socket (LI)	No	10	
	Finishing top surfaces of concrete smooth with a wood float			
8	Surface beds, slabs, etc (LI)	m2	74	
	Test blocks			
9	Making and testing 150 x 150 x 150mm concrete strength test cubes	No	16	
	FORMWORK (CPAP WORK GROUP NO. 111 UNLESS OTHERWISE STATED)			
	ROUGH FORMWORK (DEGREE OF ACCURACY III)			
	Rough formwork to sides			
10	Foundation beams (Provisional), etc (LI)	m2	40	
	ROUGH FORMWORK (DEGREE OF ACCURACY II)			
	Rough formwork to sides			
11	Edges, risers, ends and reveals not exceeding 300mm high or wide (LI)	m	40	
	Rough formwork to soffits			
12	Slabs, propped up exceeding 1.5m and not exceeding 3.5m high (LI)	m2	20	
	Carried to Collection			R

	Rough formwork to sides and soffits				
13	Beams propped up exceeding 1.5m and not exceeding 3.5m high (LI)	m2	12		
	Boxing out rough formwork to form				
14	110 x 255mm High horizontal projections to sides along bottom edges (LI)	m	6		
	MOVEMENT JOINTS, ETC.				
	Slip joints between horizontal concrete and brick surfaces with two layers of 3 ply malthoid				
15	Not exceeding 300mm wide (LI)	m	30		
	Expansion joints with bitumen impregnated fibreboard between vertical concrete surfaces				
16	13mm Joints not exceeding 300mm high (LI)	m	48		
	REINFORCEMENT (PROVISIONAL) (CPAP WORK GROUP NO. 114)				
	High tensile steel reinforcement to structural concrete work				
17	Bars of varying diameters (LI)	t	2.622		
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Section No. 3

Bill No. 2

CONCRETE, FORMWORK AND REINFORCEMENT (PROVISIONAL)

COLLECTION

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Item No			Quantity	Rate	Amount
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	BILL NO. 3				
	NEW BUILDINGS				
	The Tenderer is referred to the relevant Clauses in the separate document Model Preambles for Trades (2017 Edition)				
	PRECAST CONCRETE (CPAP WORK GROUP 112)				
	Precast concrete cover slab 80mm thick formed of 25Mpa/19mm concrete with class 1 smooth finish on exposed surfaces splayed 25mm at edges with ref. 193 mesh reinforcement and 2no. 15mm diameter polycop pipe sleeves cast in to receive 2no. threaded 10mm diameter galvanised L-shaped lifting handles with 50 x 50 x 5mm holed plates, nuts and lock nuts, including holes to fit 110mm diameter vent pipe, etc. laid on brick walls				
1	Cover slab size 820 x 930mm (LI)	No	14		
2	Cover slab size 825 x 930mm (LI)	No	2		
	Carried to Summary of Section No. 3			R	

Item No		Quantity	Rate	Amount
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	BILL NO. 4			
	NEW BUILDINGS			
	The Tenderer is referred to the relevant Clauses in the separate document Model Preambles for Trades (2017 Edition)			
	MASONRY(CPAP WORK GROUP NO. 116 UNLESS OTHERWISE STATED)			
	SUPPLEMENTARY PREAMBLES			
	BRICKWORK			
	Sizes in descriptions			
	Where sizes in descriptions are given in brick units, "one brick" shall represent the length and "half brick" the width of a brick			
	Hollow walls etc			
	Descriptions of hollow walls shall be deemed to include leaving every fifth perpend of the bottom course of the external skin open as a weep hole			
	Walls in two skins described as "bagged and sealed" shall be deemed to include having the outer face of the inner skin bagged with 1:6 cement and sand mixture and sealed with two coats "Brixeal" bitumen emulsion waterproofing coating			
	Face bricks			
	Bricks shall be ordered timeously to obtain uniformity in size and colour			
	Carried to Collection		R	

	Pointing				
	Descriptions of recessed pointing to fair face brickwork and face brickwork shall be deemed to include square recessed, hollow recessed, weathered pointing, etc				
	BRICKWORK IN FOUNDATIONS				
	Brickwork of NFX (14 MPa nominal compressive strength) clay imperial bricks in cement mortar				
1	One brick wall (LI)	m2	110		
	OPENINGS THROUGH WALLS ETC				
	Breaking out for and forming plain openings through brick walls, including prestressed concrete lintels to suit opening, etc				
2	Opening 340 x 330mm high through one brick wall (LI)	No	12		
	Brickwork reinforcement				
3	150mm Wide reinforcement built in horizontally (LI)	m	200		
	BRICKWORK IN SUPERSTRUCTURE				
	Brickwork of NFP Bricks in Class II mortar				
4	Half brick wall (LI)	m2	28		
5	Half brick wall in beamfilling (LI)	m2	4		
6	One brick wall (LI)	m2	264		
	BRICKWORK SUNDRIES				
	Bagging of 1:3 cement and sand mixture				
7	On outer face of inner skin of brick walls including any additional labour required in raising wall in two separate skins and working around wire ties and / or brick reinforcing fabric (LI)	m2	264		
	Carried to Collection			R	

	Brickwork reinforcement			
8	75mm Wide reinforcement built in horizontally (LI)	m	74	
9	150mm Wide reinforcement built in horizontally (LI)	m	652	
	Prestressed fabricated lintels			
10	90 x 115mm Lintels in lengths not exceeding 3m (LI)	m	52	
	Turning pieces			
11	230mm Wide turning piece to lintels, etc (LI)	m	26	
	Galvanised wire ties etc			
12	30 x 1.6mm Roof tie 1.6m long with one end built into brickwork and other end fixed to timber (LI)	No	32	
	Air bricks etc			
13	229 x 152mm Terra-cotta vermin proof air brick (LI)	No	16	
	FACE BRICKWORK			
	"Corobrik Firelight Satin" or equal and approved face bricks in stretcher bond with ruled joints and perpends internally and externally			
14	Extra over brickwork for face brickwork (LI)	m2	264	
15	Extra over brickwork for brick-on-edge header course lintel (LI)	m	22	
	Brick-on-edge header course copings, sills, etc. of "Corobrik Firelight Satin" or equal and approved face bricks pointed with recessed joints on all exposed faces			
16	220mm Wide sill set sloping and slightly projecting (LI)	m	16	
	Carried to Collection			R

	"NUTEC" OR EQUAL AND APPROVED FIBRE-CEMENT WINDOW SILLS				
	Natural grey sills in single lengths bedded in class I mortar including metal fixing lugs etc				
17	150 x 15mm Thick sills set flat and slightly projecting (LI)	m	16		
	Carried to Collection			R	

Section No. 3
Bill No. 4
MASONRY (PROVISIONAL)
LDM QUANTITY SURVEYORS DBN (PTY) LTD.

Section No. 3

Bill No. 4

MASONRY (PROVISIONAL)

COLLECTION

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Item No			Quantity	Rate	Amount
	SECTION NO. 3				
	BILL NO. 5				
	NEW BUILDINGS				
	The Tenderer is referred to the relevant Clauses in the separate document Model Preambles for Trades (2017 Edition)				
	WATERPROOFING(CPAP WORK GROUP NO. 120 UNLESS OTHERWISE STATED)				
	DAMP-PROOFING OF WALLS AND FLOORS				
	One layer of 375 micron Consol Plastics Brikgrip DPC or equal and approved embossed damp proof course				
1	In walls under sills, over lintels, etc (LI)	m2	20		
	One layer 375 'Hyperstatic Orange' or equal and approved DPM with 3mm masonite protection				
2	Vertically between walls (LI)	m2	110		
	One layer of 250 micron "Consol Plastic Gunplas USB Green" or equal and approved waterproof sheeting Type C, sealed at laps with "Gunplas Pressure Sensitive Tape"				
3	Under surface beds, slabs, etc (LI)	m2	74		
	Two coats "ABE Brixeal" or equal and approved bitumen emulsion waterproof coating				
4	On brick walls (LI)	m2	264		
	Carried to Collection			R	

	WATERPROOFING TO ROOFS, BASEMENTS, ETC.			
	Five coats "Acrylastic" or equal and approved fibre reinforced heavy duty maintenance free acrylic waterproofing			
5	Collar around pipe not exceeding 100mm internal diameter (LI)	No	10	
	JOINT SEALANTS, ETC.			
	Two-part grey polysulphide sealing compound including backing cord, bond breaker, primer, etc			
6	13 x 13mm In expansion joints in vertical concrete / brick surfaces including raking out expansion joint filler as necessary (LI)	m	48	
	Carried to Collection			R

Section No. 3

Bill No. 5

WATERPROOFING (PROVISIONAL)

COLLECTION

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Total Brought Forward from Page No.	64	
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Item No			Quantity	Rate	Amount
	SECTION NO. 3				
	BILL NO. 6				
	NEW BUILDINGS				
	The Tenderer is referred to the relevant Clauses in the separate document Model Preambles for Trades (2017 Edition)				
	ROOF COVERINGS, ETC.(CPAP WORK GROUP NO. 125 UNLESS OTHERWISE STATED)				
	SUPPLEMENTARY PREAMBLES				
	Corrugated metal sheeting and accessories				
	Roof sheeting systems are to be manufactured in strict accordance with the supplier's specifications				
	Fixing of all roof sheeting is to be in accordance with the manufacturer's approved instruction book				
	The manufacturer shall comply with ISO9002 Quality Management System				
	PROFILED METAL SHEETING AND ACCESSORIES				
	0.58mm Colorbond or equal and approved IBR profile sheeting, colour one side fixed to timber purlins (elsewhere measured) and fixed strictly in accordance with the manufacturer's instructions				
1	Roof covering with pitch not exceeding 25 degrees (LI)	m2	90		
2	Standard galvanised ridge capping (550mm girth) screwed through sheeting to purlins (LI)	m	14		
	Carried to Collection			R	

3	Sondor IBR pattern polyclosures to underside of ridge capping (LI)	m	28		
4	Corrugated pattern metal closures under capping	m	28		
	ROOF AND WALL INSULATION				
	"Sisalation FR430" or equal and approved Heavy Industrial Grade Aluminum Foil based insulation				
5	Insulation laid taut over purlins and fixed concurrent with roof covering including galvanised steel straining wires (LI)	m2	90		
	Carried to Collection			R	

Section No. 3
Bill No. 6
ROOF COVERINGS (PROVISIONAL)
LDM QUANTITY SURVEYORS DBN (PTY) LTD.

Section No. 3

Bill No. 6

ROOF COVERINGS (PROVISIONAL)

COLLECTION

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Item No		Quantity	Rate	Amount

SECTION NO. 3

BILL NO. 7

NEW BUILDINGS

The Tenderer is referred to the relevant Clauses in the separate document Model Preambles for Trades (2017 Edition)

CARPENTRY AND JOINERY(CPAP WORK GROUP NO. 126 UNLESS OTHERWISE STATED)

PREFABRICATED TIMBER ROOF TRUSSES, ETC

NOTE:

Timber roof trusses are to comply with SABS Code of Practice 0243. (The design, manufacture and erection of timber trusses, including nail-plated and bolted trusses with lapped members).

The following is applicable in respect of roof trusses:

Trusses are at maximum 1200mm centres. Roof covering is IBR profiled metal sheeting colour one side on 50 x 76mm purlins. Ceilings are nailed gypsum plasterboard on brandering.

The dimensions in the descriptions of the trusses are nominal and actual measurements are to be obtained from site before design or fabrication commences

Carried to Collection R

	Design and supply plate nailed timber roof trusses				
1	Design, supply and install roof truss system complete in accordance with the Standard Building Regulations, including cross battens at hips, valleys, etc. fixed to trusses with and including ring shank nails, hurricane clips at exposed sections and at ridges, temporary and permanent bracing, etc. to suit roof area approximate size **45m2 (on flat floor area inclusive of overhangs) Type B**	No	2		
2	Allowance for the issue of TR1 and TR2 certificates after completion of entire roof installation, signed by a competent person		Item		
	Wrought softwood				
3	38 x 114mm Wall plates (LI)	m	28		
4	76 x 50mm Purlins (LI)	m	132		
5	76 x 76mm Splayed gutter purlins (LI)	m	28		
6	38 x 114mm Timber backing board fixed onto rafter for fascia and barge boards (LI)	m	56		
	EAVES, VERGES, ETC.				
	Pressed Nutec or equal and approved fibre cement boards				
7	12mm x 225mm Fascia boards including aluminium H-profile fascia joiners fixed with galvanised screws and washers (LI)	m	28		
8	10 x 80 x 200mm Barge boards including H-profile jointing strips (LI)	m	24		
	DOORS, ETC.				
	'Lotus RG' or equal and approved horizontal hardwood doors				
9	40mm Thick solid horizontal hardwood door size 813 x 1932mm high (LI)	No	6		
	Carried to Collection			R	

10	40mm Thick solid horizontal hardwood door size 813 x 2032mm high (LI)	No	6		

Carried to Collection R

Section No. 3
Bill No. 7
CARPENTRY AND JOINERY (PROVISIONAL)
LDM QUANTITY SURVEYORS DBN (PTY) LTD.

Section No. 3

Bill No. 7

CARPENTRY AND JOINERY (PROVISIONAL)

COLLECTION

	Page No		Amount
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Item No			Quantity	Rate	Amount
	SECTION NO. 3				
	BILL NO. 8				
	NEW BUILDINGS				
	The Tenderer is referred to the relevant Clauses in the separate document Model Preambles for Trades (2017 Edition)				
	IRONMONGERY(CPAP WORK GROUP NO. 132 UNLESS OTHERWISE STATED)				
	HINGES, BOLTS, ETC.				
1	Solid Art 294 WC or other approved anodised aluminium mortice indicator bolt (LI)	No	6		
	"Union" or equal and approved				
2	"37651" Helping hand indicator bolts (LI)	No	2		
	"Dorma" or equal and approved				
3	"DRR-SS-012" 102 x 75 x 3mm Stainless steel rising butt hinge (LI)	No	24		
4	"Dorma" DBC - SS - 017 Stainless steel adjustable roller bolt (LI)	No	2		
	LOCKS				
	"Union" or equal and approved				
5	" 2247-7855 Commercial Series" Four lever mortice lock (LI)	No	6		
	Carried to Collection			R	

	HANDLES				
	"Union" or equal and approved				
6	"CB862-05CH" Brass Gower lever handles (LI)	No	4		
	"Dorma" or equal and approved				
7	"Dorma" DPH301B 300 x 25mm Stainless steel pull handle with flange fixing (LI)	No	4		
	SUNDRIES				
	"Union" or equal and approved				
8	38mm Diameter rubber door stop, plugged and screwed to wall with 50mm long brass screw (LI)	No	6		
9	"CZ8731CH" Door stop fixed with counter-sunk bolt into anchor bolt (LI)	No	4		
	"Dorma" or equal and approved				
10	"Dorma" DDS - SS - 017 Stainless steel floor stop (LI)	No	2		
	LETTERS, NAMEPLATES, ETC.				
	Signage				
11	200 x 250mm Pressed aluminium with male, female or paraplegic symbol fixed to brickwork with 6 no. "Hilti" nail anchors (LI)	No	6		
	BATHROOM FITTINGS				
	Toilet roll holders				
12	40 x 3mm Thick steel plate with 2 x 8mm holes and rawl bolts and 2 x 30mm holes to support roller bent to suit 27 diameter x 2mm thick steel pipe with hole for padlock and a 40 x 3mm thick steel plate welded on other end (See architect drawing No.TRH) (LI)	No	6		
	Carried to Collection			R	

	"Kimberly Clark Professional" or equal and approved				
13	Kimberly Clark Professional SQ2 toilet tissue dispenser (LI)	No	2		
	"Dorma" or equal and approved				
14	"Dorma" Cistern back rail DGR - SS - 150, plugged (LI)	No	2		
15	"Dorma" Side grab rail DGR - SS - 152, plugged (LI)	No	2		
16	"Dorma" Flush-valve backrail DGR - SS - 151, plugged (LI)	No	2		
	Carried to Collection			R	

Section No. 3

Bill No. 8

IRONMONGERY (PROVISIONAL)

COLLECTION

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Item No			Quantity	Rate	Amount
	SECTION NO. 3				
	BILL NO. 9				
	NEW BUILDINGS				
	The Tenderer is referred to the relevant Clauses in the separate document Model Preambles for Trades (2017 Edition)				
	METALWORK(CPAP WORK GROUP NO. 136 UNLESS OTHERWISE STATED)				
	WELDED GALVANISED STEEL SCREENS, GATES, ETC.				
	Screens and gates				
1	Single gate size 877 x 2250mm high of 40 x 60 x 3mm rectangular tubing with 12mm diameter steel rods at 110mm centre and 40 x 6mm horizontal support flat bars fixed with hinges to steel frame of 45 x 45 x 3mm rectangular tubing fixed to walls with bolts and lugs including padlock plate (LI)	No	6		
	HOT DIPPED GALVANISED MILD STEEL DOOR FRAMES				
	1,2mm Rebated frames suitable for half brick walls				
2	Frame for door 813 x 2032mm high (LI)	No	6		
	1,2mm Rebated frames suitable for one brick walls				
3	Frame for door 813 x 2032mm high (LI)	No	6		
	GALVANISED STEEL WINDOWS, DOORS, ETC				
	SS industrial type windows				
4	Window type W1, 360 x 518mm high (Refer to window schedule on drawing - GR-2S-1T-TB) (LI)	No	10		
	Carried to Summary of Section No. 3			R	

Item No			Quantity	Rate	Amount
	SECTION NO. 3				
	BILL NO. 10				
	NEW BUILDINGS				
	The Tenderer is referred to the relevant Clauses in the separate document Model Preambles for Trades (2017 Edition)				
	PLASTERING(CPAP WORK GROUP NO. 142 UNLESS OTHERWISE STATED)				
	SCREEDS				
	Screeds steel trowelled, on concrete				
1	Average 50mm thick on floors to falls (LI)	m2	74		
	INTERNAL PLASTER				
	Cement plaster steel trowelled, on brickwork				
2	On walls (LI)	m2	324		
3	On narrow widths (LI)	m2	4		
4	On pit walls (LI)	m2	220		
	Carried to Summary of Section No. 3			R	

Item No			Quantity	Rate	Amount
	SECTION NO. 3				
	BILL NO. 11				
	NEW BUILDINGS				
	The Tenderer is referred to the relevant Clauses in the separate document Model Preambles for Trades (2017 Edition)				
	TILING (CPAP WORK GROUP NO. 144 UNLESS OTHERWISE STATED)				
	WALL TILING				
	300 x 300 x 10mm Thick "Salt and Pepper" Glazed Porcelain tiles flush pointed with 2mm approved waterproof grout on tile adhesive on prepared plaster.				
1	On walls (LI)	m2	146		
	FLOOR TILING				
	300 x 300 x 10mm Thick "Salt and Pepper" Glazed Porcelain tiles flush pointed with 2mm approved waterproof grout on tile adhesive on screed.				
2	On floors (LI)	m2	74		
	SUNDRIES				
	Aluminium edge trim corner protectors, expansion joint strips, etc				
3	12mm Aluminium edge trim	m	70		
	Carried to Summary of Section No. 3			R	

Item No			Quantity	Rate	Amount
	SECTION NO. 3				
	BILL NO. 12				
	NEW BUILDINGS				
	The Tenderer is referred to the relevant Clauses in the separate document Model Preambles for Trades (2017 Edition)				
	PLUMBING AND DRAINAGE (PROVISIONAL)(CPAP WORK GROUP NO. 148 UNLESS OTHERWISE STATED)				
	PLUMBING				
	NOTE: Prices for sanitary fittings fixed to walls or abutting walls, etc. shall include for sealing against walls with silicone sealing compound. This shall apply to wash hand basins, sinks and drainers, urinals, WC cisterns, wash troughs, shower trays and the like				
	RAINWATER DISPOSAL				
	'Seamless' aluminium				
1	155 x 100mm Square profile eaves gutters with baked enamel finished fixed with concealed brackets (LI)	m	28		
2	Extra over eaves gutter for stopped ends (LI)	No	8		
3	Extra over eaves gutter for drop box suitable 155 x 100mm box gutter (LI)	No	4		
4	100 x 75mm Fluted aluminium downpipes with baked enamel finish (LI)	m	10		
5	Extra over rainwater downpipes for bends (LI)	No	8		
6	Extra over rainwater downpipes for shoes (LI)	No	4		
	Carried to Collection			R	

	SANITARY FITTINGS				
	"Atlas Plastics (Pty) Ltd" or equal and approved				
7	Atlas "VIP 200" (code 222AP) pedestal with footpiece complete with seat and lid screwed in precast slab including inlet funnel (code 224AP) riveted to shaft (LI)	No	8		
8	Atlas 507 AP bowl urinal C/W 496 AP waterless urinal fitting, waste, etc complete (LI)	No	4		
9	Atlas Plastics "Christy" (Code 945AP) wash hand basin with splashback, colour Granite, overall size 580 x 410mm wide with 2 tap holes and 40mm waste outlet, plugged and screwed to wall with galvanised screws and brackets (LI)	No	6		
	Precast concrete wash trough				
10	Single precast concrete wash trough, 670mm x 500mm x 340mm deep with reinforced concrete pedestals (LI)	No	2		
	TRAPS ETC				
	"Cobra Watertech" or equal and approved				
11	32 x 40mm Butyl rubber P-trap jointed to waste outlet fitting and to 50mm uPVC pipe including clamps (LI)	No	10		
	TAPS, VALVES, ETC				
	"Cobra Watertech" or equal and approved				
12	15mm Chromium plated 'Star 136-15' stopcock (LI)	No	6		
13	15mm Chromium plated 'Star 106-15' basin bibtap (LI)	No	4		
14	15mm Standard brass 'Plain 100-15' bibtap with flow straightener (LI)	No	2		
15	15mm Chromium plated elbow action pillartap (code 503-21B) (LI)	No	2		
	Carried to Collection			R	

	SANITARY PLUMBING				
	Black uPVC UV stabilised pipes				
16	110mm Vent pipes (LI)	m	40		
	Extra over Black uPVC UV stabilised pipes for fittings				
17	Vent cowl formed of 110mm vent valve with top cut off and black shade cloth fixed over end of vent pipe (LI)	No	10		
	uPVC pipes				
18	50mm Pipes (LI)	m	24		
19	110mm Pipes (LI)	m	80		
	Extra over uPVC pipes for fittings				
20	50mm Bend (LI)	No	16		
21	110mm Bend (LI)	No	8		
22	50mm Access bend (LI)	No	8		
23	110mm Access bend (LI)	No	8		
24	50mm Junction (LI)	No	8		
25	110mm Junction (LI)	No	8		
26	110mm Reducing junction (LI)	No	8		
27	110mm Pan connector (LI)	No	8		
	WATER SUPPLIES				
	"Polycop" Heavy duty Class 2 polypropylene pipes with brass compression fittings				
28	15mm Pipes (LI)	m	40		
	Carried to Collection			R	

	Extra over "Polycop" Heavy duty Class 2 polypropylene pipes for brass compression fittings				
29	15mm Fittings (LI)	No	16		
	TESTING				
30	Allow for testing the whole of the sanitary plumbing and water supply		Item		
	Carried to Collection			R	

Section No. 3

Bill No. 12

PLUMBING AND DRAINAGE (PROVISIONAL)

COLLECTION

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Item No			Quantity	Rate	Amount
	SECTION NO. 3				
	BILL NO. 13				
	NEW BUILDINGS				
	The Tenderer is referred to the relevant Clauses in the separate document Model Preambles for Trades (2017 Edition)				
	GLAZING(CPAP WORK GROUP NO. 150 UNLESS OTHERWISE STATED)				
	GLAZING TO WOOD/STEEL WITH PUTTY				
	6mm Thick obscure safety glass				
1	Panes exceeding 0,1m2 and not exceeding 0.5m2 (LI)	m2	16		
	MIRRORS, ETC				
	6mm Silvered float glass copper backed mirrors with polished edges holed for and fixed with chromium plated dome capped mirror screws with rubber buffers to plugs in brickwork or concrete				
2	Mirror 300 x 400mm high (LI)	No	6		
	Carried to Summary of Section No. 3			R	

Item No			Quantity	Rate	Amount
	SECTION NO. 3				
	BILL NO. 14				
	NEW BUILDINGS				
	The Tenderer is referred to the relevant Clauses in the separate document Model Preambles for Trades (2017 Edition)				
	PAINTWORK(CPAP WORK GROUP NO. 152 UNLESS OTHERWISE STATED)				
	PAINTWORK, ETC. TO NEW WORK				
	"PLASCON" OR OTHER EQUAL AND APPROVED				
	ON INTERNAL FLOATED PLASTER SURFACES				
	Prepare and brush surface to remove all loose contaminants and apply one coat alkali resistant primer, one undercoat and two coats 'PLASCON Wall & All' or other approved emulsion paint for interior use				
1	Walls (LI)	m2	192		
	ON FIBRE-CEMENT BOARD SURFACES				
	Prepare and brush surface to remove all loose contaminants and apply one coat alkali resistant primer and two coats superior quality acrylic emulsion paint for exterior use				
2	Fascias and barge boards, including priming metal jointing strips (LI)	m2	24		
	Carried to Collection			R	

	ON WOOD SURFACES				
	Prepare surfaces and remove all loose material, apply one coat water based primer, one coat alkyd based universal undercoat and two coats superior quality universal enamel paint, on timber doors				
3	On doors (LI)	m2	44		
	Prepare surfaces and remove all loose material, apply two coats 'ABE Provonite' carbolineum or equal approved anti-corrosive coal tar paint				
4	Roof timbers at eaves and verges (LI)	m2	16		
	Carried to Collection			R	

Section No. 3

Bill No. 14

PAINTWORK (PROVISIONAL)

COLLECTION

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Section No. 3

LDM QUANTITY SURVEYORS DBN (PTY) LTD.

Item No			Quantity	Rate	Amount
	SECTION NO. 4				
	BILL NO.1				
	COVERED WALKWAYS (ALL TRADES) (PROVISIONAL)				
	The Tenderer is referred to the relevant Clauses in the separate document Model Preambles for Trades (2017 Edition)				
	EARTHWORKS (PROVISIONAL)(CPAP WORK GROUP NO. 104 UNLESS OTHERWISE STATED)				
	SITE CLEARANCE ETC				
	Site clearance				
1	Digging up and removing rubbish, debris, vegetation, hedges, shrubs and trees not exceeding 200mm girth, bush, etc (LI)	m2	110		
	EXCAVATION OTHER THAN BULK				
	Excavation in earth not exceeding 2m deep				
2	Reduce levels under floors (LI)	m3	11		
3	Trenches (LI)	m3	9		
	CARTING AWAY				
	Extra over all excavations for carting way				
4	Surplus material from excavations and/or stocked piles on site to a dumping site to be located by the contractor	m3	20		
	Carried to Collection			R	

	KEEPING EXCAVATIONS FREE OF WATER				
	Keeping excavations free of water				
5	Allow for keeping excavations free of water or mud by hand or machinery (LI)		Item		
	COMPACTION				
	Compaction of surfaces				
6	Compaction of ground surfaces under floors etc including scarifying for a depth of 150mm, breaking down oversize material, adding suitable material where necessary and compacting to 93% Mod. AASHTO density (LI)	m2	110		
	TESTS				
	Prescribed density tests on filling				
7	Modified AASHTO Density test (LI)	No	2		
8	"Field Density" test including "Optimum Moisture Content" (four readings per test)	No	2		
	SOIL POISONING				
	Soil insecticide in accordance to SANS 5859				
9	Under concrete walkways, etc (LI)	m2	110		
	CONCRETE, FORMWORK AND REINFORCEMENT (CPAP WORK GROUP NO. 110 UNLESS OTHERWISE STATED)				
	REINFORCED CONCRETE CAST ON/IN FORMWORK				
	20Mpa/19mm Concrete				
10	Foundation beams (LI)	m3	9		
	Carried to Collection			R	

11	Surface beds cast in panels (LI)	m3	11		
	CONCRETE SUNDRIES				
	Finishing top surfaces of concrete with a broomed non-slip finish				
12	Surface beds, slabs, etc (LI)	m2	110		
	Test blocks				
13	Prepare a set of six concrete cubes each cube size 150 x 150 x 150mm for strength cubes and deliver to an approved laboratory for testing and pay all charges in connection therewith	Sets	4		
	ROUGH FORMWORK (DEGREE OF ACCURACY II) (CPAP WORK GROUP NO. 111)				
	Rough formwork to sides				
14	Edges, risers, ends and reveals n.e 300mm high (LI)	m	100		
	MOVEMENT JOINTS, ETC				
	Expansion joints with 10mm softboard between vertical concrete surfaces				
15	10mm Joints not exceeding 300mm high (LI)	m	55		
	REINFORCEMENT (PROVISIONAL) (CPAP WORK GROUP NO. 114)				
	Fabric reinforcement				
16	Type 193 fabric reinforcement in concrete surface bed, slabs, etc (LI)	m2	110		
	Carried to Collection			R	

	WATERPROOFING (CPAP WORK GROUP NO. 120 UNLESS OTHERWISE STATED)				
	Joint Sealants, etc				
	"ABE Flexothane" or equal and approved two-part grey polysulphide sealing compound including backing cord, bond breaking, primer, etc				
17	In 10mm joints not exceeding 300mm high (LI)	m	55		
	ROOF COVERINGS, ETC.(CPAP WORK GROUP NO. 125 UNLESS OTHERWISE STATED)				
	PROFILED METAL SHEETING AND ACCESSORIES				
	0,58mm Colorbond or equal and approved roof sheeting IBR profile colour one side fixed in accordance with the manufacturer's instructions				
18	Roof covering with pitch not exceeding 25 degrees (LI)	m2	130		
	CARPENTRY AND JOINERY(CPAP WORK GROUP NO. 126 UNLESS OTHERWISE STATED)				
	ROOFS, ETC				
	Wrought softwood				
19	228 x 170mm Timber beam (LI)	m	100		
20	114 x 38mm Rafter beam (LI)	m	108		
21	76 x 50mm Purlins (LI)	m	150		
	Carried to Collection			R	

	SUNDRIES				
	"Mi-Tek eCo" or equal and approved purlin clips fixed to timber purlins and rafters on both sides of purlins				
22	"EPURCLIP" Purlin clips	No	168		
	"Mi-Tek eCo" or equal and approved hurricane clips fixed to timber beams and rafters on both sides of rafter				
23	"EHURR" Hurricane clips	No	166		
	STRUCTURAL STEELWORK(CPAP WORK GROUP NO. 134 UNLESS OTHERWISE STATED)				
	GALVANISED STEEL POSTS, ETC				
	Hot dip galvanised full penetration welded posts with angle section cleats and flat section fixing plates bolted to concrete				
24	102mm Diameter x 3mm thick circular hollow section posts including all plates, fixings, etc (LI)	t	0.96		
	Galvanised bolts, etc.				
25	M12 Grade 8.8 bolts (LI)	No	134		
	PAINTWORK(CPAP WORK GROUP NO. 152 UNLESS OTHERWISE STATED)				
	PAINTWORK, ETC. TO NEW WORK				
	Prepare surfaces and remove all loose material, apply two coats 'ABE Provonite' or equal and approved carbolineum or equal approved anti-corrosive coal tar paint				
26	On roof timbers at eaves and verges (LI)	m2	130		
	Carried to Collection			R	

Section No. 4

Bill No. 1

COVERED WALKWAYS (PROVISIONAL)

COLLECTION

	Page No	Amount
Total Brought Forward from Page No.	91	
	92	
	93	
	94	
	95	

Carried to Summary of Section No. 4 R

Item No			Quantity	Rate	Amount
	SECTION NO. 4				
	BILL NO.2				
	CONCRETE APRONS (ALL TRADES) (PROVISIONAL)				
	The Tenderer is referred to the relevant Clauses in the separate document Model Preambles for Trades (2017 Edition)				
	EARTHWORKS (PROVISIONAL)(CPAP WORK GROUP NO. 104 UNLESS OTHERWISE STATED)				
	SITE CLEARANCE ETC				
	Site clearance				
1	Digging up and removing rubbish, debris, vegetation, hedges, shrubs and trees not exceeding 200mm girth, bush, etc (LI)	m2	117		
	EXCAVATION OTHER THAN BULK				
	Excavation in earth not exceeding 2m deep				
2	Reduced levels under floors (LI)	m3	15		
	CARTING AWAY				
	Extra over all excavations for loading, carting and dumping surplus excavated material				
3	Off site to be located by the contractor	m3	15		
	Carried to Collection			R	

	COMPACTION				
	Compaction of surfaces				
4	Compaction of ground surfaces under floors etc including scarifying for a depth of 150mm, breaking down oversize material, adding suitable material where necessary and compacting to 95% Mod. AASHTO density (LI)	m2	117		
	TESTS				
	Prescribed density tests on filling				
5	Modified AASHTO Density test	No	3		
6	"Field Density" test including "Optimum Moisture Content" (four readings per test)	No	3		
	SOIL POISONING				
	Soil insecticide in accordance to SANS 5859				
7	Under floors, etc. including forming and poisoning shallow furrows against foundation walls, etc., filling in furrows and ramming	m2	117		
	CONCRETE, FORMWORK AND REINFORCEMENT (CPAP WORK GROUP NO. 110 UNLESS OTHERWISE STATED)				
	REINFORCED CONCRETE CAST ON/IN FORMWORK				
	20MPa/19mm Concrete				
8	Surface beds, slabs, etc to falls and currents (LI)	m3	15		
	CONCRETE SUNDRIES				
	Finishing top surfaces of concrete with a wood float finish				
9	Concrete channel to falls (LI)	m2	117		
	Carried to Collection			R	

	Test blocks				
10	Prepare a set of six concrete cubes each cube size 150 x 150 x 150mm for strength cubes and deliver to an approved laboratory for testing and pay all charges in connection therewith	Sets	3		
	ROUGH FORMWORK (DEGREE OF ACCURACY II) (CPAP WORK GROUP NO. 111)				
	Rough formwork to sides				
11	V drains, paving and ramps not exceeding 300mm high (LI)	m	117		
	MOVEMENT JOINTS, ETC.				
	Expansion joints with 10mm softboard between vertical concrete and brick surfaces				
12	10mm Joints not exceeding 300mm high (LI)	m	124		
	REINFORCEMENT (PROVISIONAL) (CPAP WORK GROUP NO. 114)				
	Fabric reinforcement				
13	Type 193 fabric reinforcement in concrete surface beds, slabs, etc (LI)	m2	117		
	WATERPROOFING (CPAP WORK GROUP NO. 120 UNLESS OTHERWISE STATED)				
	JOINT SEALANTS, ETC				
	"ABE Flexothane" or equal and approved two-part grey polysulphide sealing compound including backing cord, bond breaker, primer, etc				
14	In 10mm joints not exceeding 300mm high (LI)	m	124		
	Carried to Collection			R	

Section No. 4

Bill No. 2

CONCRETE APRONS (PROVISIONAL)

COLLECTION

	Page No		Amount
Total Brought Forward from Page No.	97		
	98		
	99		
Carried to Summary of Section No. 4		R	

Item No			Quantity	Rate	Amount
	SECTION NO. 4				
	BILL NO.3				
	PRECAST CONCRETE CHANNELS (ALL TRADES) (PROVISIONAL)				
	The Tenderer is referred to the relevant Clauses in the separate document Model Preambles for Trades (2017 Edition)				
	EARTHWORKS (PROVISIONAL)(CPAP WORK GROUP NO. 104 UNLESS OTHERWISE STATED)				
	EXCAVATION OTHER THAN BULK				
	Excavation in earth not exceeding 2m deep				
1	Reduced levels under floors (LI)	m3	24		
	CARTING AWAY				
	Extra over all excavations for loading, carting and dumping surplus excavated material				
2	Off site to be located by the contractor	m3	20		
	EARTH FILLING, ETC				
	Note: All filing whether obtained from the excavations, from stockpiles or by the contractor from an outside source must be selected and approved by the Structural / Civil Engineers				
	Filling with material from the excavations compacted to a density of at least 93% Mod. AASHTO density				
3	Backfilling to trenches, holes, etc (LI)	m3	4		
	Carried to Collection			R	

	COMPACTION				
	Compaction of surfaces				
4	Compaction of ground surfaces under floors etc including scarifying for a depth of 150mm, breaking down oversize material, adding suitable material where necessary and compacting to 95% Mod. AASHTO density (LI)	m2	71		
	TESTS				
	Prescribed density tests on filling				
5	Modified AASHTO Density test	No	3		
6	"Field Density" test including "Optimum Moisture Content" (four readings per test)	No	3		
	SOIL POISONING				
	Soil insecticide in accordance with SANS 5859				
7	Under floors, etc. including forming and poisoning shallow furrows against foundation walls, etc., filling in furrows and ramming	m2	71		
	CONCRETE, FORMWORK AND REINFORCEMENT (CPAP WORK GROUP NO. 110 UNLESS OTHERWISE STATED)				
	UN-REINFORCED CONCRETE CAST ON EXCAVATED SURFACES				
	20Mpa/19mm Concrete				
8	Bases (LI)	m3	8		
	Test blocks				
9	Making and testing 150 x 150 x 150mm concrete strength test cubes	No	3		
	Carried to Collection			R	

PRECAST CONCRETE (CPAP WORK GROUP 112)

"LG Green" SWC3 or equal and approved precast concrete storm water channel

10	460mm x 170mm Precast concrete storm water channel (LI)	No	117		
11	Extra over precast concrete storm water channel for angles, intersections, etc (LI)	No	20		

Carried to Collection R

Section No. 4

Bill No. 3

PRECAST CONCRETE V-DRAINS (PROVISIONAL)

COLLECTION

	Page No	Amount
Total Brought Forward from Page No.	101	
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	103	

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Item No			Quantity	Rate	Amount
	SECTION NO. 4				
	BILL NO. 4				
	WATER TANK SUPPORTS (ALL TRADES) (PROVISIONAL)				
	The Tenderer is referred to the relevant Clauses in the separate document Model Preambles for Trades (2017 Edition)				
	EARTHWORKS (PROVISIONAL)(CPAP WORK GROUP NO. 104 UNLESS OTHERWISE STATED)				
	EXCAVATION OTHER THAN BULK				
	Excavation in earth not exceeding 2m deep				
1	Bases (LI)	m3	32		
	Extra over trench and hole excavation in earth for excavation in				
2	Hard rock	m3	4		
	CARTING AWAY				
	Extra over all excavations for loading, carting and dumping surplus excavated material (no allowance made for increase in bulk)				
3	Off site to be located by the contractor	m3	16		
	EARTH FILLING, ETC				
	Note: All filing whether obtained from the excavations, from stockpiles or by the contractor from an outside source must be selected and approved by the Structural / Civil Engineers				
	Carried to Collection			R	

	Filling with material from the excavations compacted to a density of at least 93% Mod. AASHTO density				
4	Backfilling to trenches, holes, etc (LI)	m3	16		
	KEEPING EXCAVATIONS FREE OF WATER				
	Keeping excavations free of water				
5	Allow for keeping excavations free of water or mud by hand or machinery		Item		
	COMPACTION				
	Compaction of surfaces				
6	Compaction of ground surfaces under floors etc including scarifying for a depth of 150mm, breaking down oversize material, adding suitable material where necessary and compacting to 93% Mod. AASHTO density (LI)	m2	28		
	TESTS				
	Prescribed density tests on filling				
7	Modified AASHTO Density test	No	4		
8	"Field Density" test including "Optimum Moisture Content" (four readings per test)	No	4		
	SOIL POISONING				
	Soil insecticide in accordance to SANS 5859				
9	Under floors, etc., including forming and poisoning shallow furrows against foundation walls, etc., filling in furrows and ramming	m2	52		
	Carried to Collection			R	

	CONCRETE, FORMWORK AND REINFORCEMENT (PROVISIONAL)(CPAP WORK GROUP NO. 110 UNLESS OTHERWISE STATED)				
	UNREINFORCED CONCRETE CAST AGAINST EXCAVATED SURFACES				
	10MPa Concrete				
10	Surface blinding under footings, bases, etc (LI)	m3	4		
	REINFORCED CONCRETE CAST AGAINST/ON FORMWORK				
	25MPa/19mm Concrete				
11	Surface beds (LI)	m3	4		
12	Bases (LI)	m3	8		
	CONCRETE SUNDRIES				
	Finishing top surfaces of concrete with a wood float				
13	Surface beds, slabs, etc (LI)	m2	24		
	Test blocks				
14	Prepare a set of six concrete cubes each cube size 150 x 150 x 150mm for strength cubes and deliver to an approved laboratory for testing and pay all charges in connection therewith	Sets	4.00		
	ROUGH FORMWORK (DEGREE OF ACCURACY III) (CPAP WORK GROUP NO. 111)				
	Rough formwork to sides				
15	Edges, risers, ends and reveals not exceeding 300mm high or wide (LI)	m	40		
	Carried to Collection			R	

	Boxing in smooth formwork to form				
16	50mm Horizontal chamfer at corner (LI)	m	40		
	REINFORCEMENT (PROVISIONAL) (CPAP WORK GROUP NO. 114)				
	Mild steel reinforcement to structural concrete work				
17	10mm Diameter bars (LI)	t	0.320		
	MASONRY(CPAP WORK GROUP NO. 116 UNLESS OTHERWISE STATED)				
	BRICKWORK IN FOUNDATIONS				
	Brickwork of NFX (14 MPa nominal compressive strength) clay imperial bricks in cement mortar				
18	One brick wall (LI)	m2	32		
	BRICKWORK IN SUPERSTRUCTURE				
	Brickwork of NFP Bricks in Class II mortar				
19	One brick wall (LI)	m2	16		
	BRICKWORK SUNDRIES				
	Bagging of 1:3 cement and sand mixture				
20	On outer face of inner skin of brick walls including any additional labour required in raising wall in two separate skins and working around wire ties and / or brick reinforcing fabric (LI)	m2	16		
	Brickwork reinforcement				
21	150mm Wide reinforcement built in horizontally (LI)	m	184		
	Carried to Collection			R	

	FACE BRICKWORK				
	"Corobrik Firelight Satin" or equal and approved face bricks in stretcher bond with ruled joints and perpends internally and externally				
22	Extra over brickwork for face brickwork (LI)	m2	16		
	PLUMBING AND DRAINAGE (PROVISIONAL)(CPAP WORK GROUP NO. 148 UNLESS OTHERWISE STATED)				
	WATER SUPPLIES AND FIRE SERVICES				
	TAPS, VALVES, ETC				
	"Cobra Watertech" or equal and approved				
23	15mm Rough brass hose bib tap as 'Cobra Watertech' Ref. No. 108-15 or equal and approved including hose union, wall plate elbow, etc. with couplings for copper (LI)	No	4		
	TANKS, ETC				
	Polyethylene drinking water tanks				
24	5000 Litre low profile circular tank size 2250mm diameter x 1800mm high, with access lid and inlet hole,embedded in pedestal to a minimum of 400mm above ground level and tied down with 2 No. off 4mm galvanised double strap stay wires tied to galvanised mild steel M12 eye bolt of which is to be drilled and fixed to the 4 corners of concrete supporting base (LI)	No	4		
	Carried to Collection			R	

Section No. 4

Bill No. 4

WATER TANKS (PROVISIONAL)

COLLECTION

	Page No	Amount
Total Brought Forward from Page No.	105	
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Item No			Quantity	Rate	Amount
	SECTION NO. 4				
	BILL NO.5				
	SOAK-AWAY (ALL TRADES) (PROVISIONAL)				
	The Tenderer is referred to the relevant Clauses in the separate document Model Preambles for Trades (2017 Edition)				
	EARTHWORKS (PROVISIONAL)(CPAP WORK GROUP NO. 104 UNLESS OTHERWISE STATED)				
	SITE CLEARANCE, ETC				
	Site clearance				
1	Digging up and removing rubbish, debris, vegetation, hedges, shrubs and trees not exceeding 200mm girth, bush, etc (LI)	m2	44		
2	Stripping average 150mm thick layer of top soil and stockpiling on site (LI)	m2	44		
	EXCAVATION, FILLING, ETC				
	Excavation in earth not exceeding 2m deep				
3	Holes	m3	60		
	Extra over bulk excavations in earth for excavation in				
4	Soft rock	m3	8		
5	Hard rock	m3	8		
	Carried to Collection			R	

	Extra over all excavations for carting away				
6	Surplus material from excavations and/or stock piles on site to a dumping site to be located by the contractor	m3	60		
	Risk of collapse of excavations				
7	Sides of bulk excavations not exceeding 1,5m deep (LI)	m2	68		
	EARTH FILLING, ETC				
	Earth filling supplied by the contractor (not compacted)				
8	Backfilling to trenches, holes, etc	m3	31		
	Keeping excavations free of water				
9	Allow for keeping excavations free of water other than subterranean water		Item		
	PLUMBING AND DRAINAGE (PROVISIONAL)(CPAP WORK GROUP NO. 148 UNLESS OTHERWISE STATED)				
	DRAINAGE				
	Class 34 HD uPVC sewer and drain pipes				
10	50mm Perforated pipes laid in herring-bone pattern and including trenches not exceeding 1m deep (LI)	m	90		
11	110mm Pipes laid in and including trenches not exceeding 1m deep (LI)	m	140		
	Extra over Class 34 HD uPVC sewer and drain pipes for fittings				
12	110mm Bend (LI)	No	12		
13	110mm Access bend (LI)	No	4		
14	50mm Reducing junction (LI)	No	48		
	Carried to Collection			R	

15	110mm Junction (LI)	No	8		
	INFILTRATOR CHAMBER SYSTEM				
	"KAYTECH" or equal and approved infiltrator chamber system				
16	1220 x 1000 x 410mm High, high capacity chamber	No	4		
17	710 x 1000 x 410mm High, high capacity end cap	No	4		
	Testing				
18	Allow for testing the whole of the Soil Drainage to the satisfaction of the Principal Agent and Local Authorities All defective work is to be taken out and replaced at the contractor's expense and the whole re-tested until found satisfactory		Item		
	GRASSING, ETC(CPAP WORK GROUP NO. 104 UNLESS OTHERWISE STATED)				
	Topsoil supplied by the contractor, including spreading and levelling				
19	In plant beds, grassed areas and holes for trees, shrubs, etc (LI)	m3	4		
	Grassing, ground covers, etc				
20	"Kikuyu" rolls 50mm thick (LI)	m2	28		
	Carried to Collection			R	

Section No. 4
Bill No. 5
SOAKAWAY (PROVISIONAL)
LDM QUANTITY SURVEYORS DBN (PTY) LTD.

Section No. 4

Bill No. 5

SOAKAWAY (PROVISIONAL)

COLLECTION

	Page No	Amount
Total Brought Forward from Page No.	111	
	112	
	113	

Carried to Summary of Section No. 4 R

Item No		Quantity	Rate	Amount
	SECTION NO. 4			
	BILL NO. 6			
	BUDGETARY ALLOWANCES (PROVISIONAL)			
	The Tenderer is referred to the relevant Clauses in the separate document Model Preambles for Trades (2017 Edition)			
	DESLUDGING OF EXISTING PITS AND SEPTIC TANKS			
	Desludging of existing pits and septic tanks			
1	Provide the amount of R35,000.00 (Thirty Five Thousand Rand) for the De-sludging of Existing Pits and Septic Tanks Including Provision of Proof of Safe De-sludging and Disposal Certificate from a Registered Sewerage Disposal Firm	Item		35 000.00
2	Profit	Item		
3	Attendance	Item		
	Carried to Summary of Section No. 4		R	

Section No. 4
Bill No. 6
BUDGETARY ALLOWANCES (PROVISIONAL)
LDM QUANTITY SURVEYORS DBN (PTY) LTD.

SECTION SUMMARY - EXTERNAL WORKS (PROVISIONAL)

Bill No		Page No	Amount
1	COVERED WALKWAYS (PROVISIONAL)	96	
2	CONCRETE APRONS (PROVISIONAL)	100	
3	PRECAST CONCRETE V-DRAINS (PROVISIONAL)	104	
4	WATER TANKS (PROVISIONAL)	110	
5	SOAKAWAY (PROVISIONAL)	114	
6	BUDGETARY ALLOWANCES (PROVISIONAL)	115	

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Section No. 4

LDM QUANTITY SURVEYORS DBN (PTY) LTD.

Item No		Quantity	Rate	Amount

SECTION NO.5

BILL NO.1

BOREHOLE INSTALLATION (PROVISIONAL)

SUPPLEMENTARY PREAMBLES

PREAMBLE

A desk top study and a geophysical investigation has been carried out at each school site earmarked for the installation of a borehole and a site drawing will be issued to the Contractor at site handover indicating the most feasible position for the proposed new borehole.

This 'Performance Specification' details the minimum deliverables expected from the Contractor which will lead to the successful installation of the boreholes.

1. DRILLING OF BOREHOLE(S)

Generally rotary air percussion drilling with the application of foam will be required. Some boreholes may require mud flush/rotary or symetrix drilling where drilling targets are specified within unconsolidated geological formations. The assumed drilling method will be specified. For the purpose of this project it is assumed that all drilling will take place within consolidated rock and that normal percussion will be required. Depth of drilling and installation of steel casing within the upper weathered formation will vary and it is assumed that the drilling average will be about 120m; for the purpose of this project it is assumed that weathering occur to an average depth of 25m. Steel casing will be required along this upper zone and all steel casing supplied must conform to SABS 719 and SABS62, (177mm x 4mm).

All drilling work needs to be carried out as per SANS 10299-2: Part 2: The Design, Construction and Drilling of Boreholes under the full time on site supervision of a Geohydrologist.

Carried to Collection R

The following will be required for the project:

i. Prepare all Health and Safety documentation to carry out the work as per the current Occupational Health and Safety Standards;
ii. Need to be registered with the Borehole Water Association of South Africa (BWA) and Groundwater Association of KwaZulu-Natal (GAKZN);

iii. Establishment and de-establishment of a single "Air Percussion" drilling rig per school. All costs to include transportation, accommodation, subsistence, etc;
iv. Provide costs for setting up at each school;
v. Provide cost for drilling 216mm diameter holes down to approximately 25m per borehole (depths will vary), thereafter, 165mm diameter holes down to 120m;
vi. Costs in 1(v) should include for the installation of casing down to 25m;
vii. Provide costs for symetrix percussion drilling 203mm diameter down to 80m, include a cost for casing shoe and ringbit (In sandy areas only);
viii. Provide a cost for developing the borehole(s) and carrying out a blow yield test;
ix. Provide a cost for a sanitary seal and capping of the borehole(s);
x. Penetration rates need to be recorded for each metre drilled;
xi. The borehole "chip" samples need to be bagged per metre and kept. A "chip tray" should be priced for per borehole;
xii. A detailed drillers log needs to be provided on completion of the borehole(s); and
xiii. All surplus rock material needs to be removed off site.

2. PUMP TESTING OF BOREHOLE(S)

All work needs to be carried out as per SANS 10299. The following will be required for the project:

Carried to Collection R

i. Prepare all Health and Safety documentation to carry out the work as per the current Occupational Health and Safety Standards;
ii. Need to be registered with the Borehole Water Association of South Africa (BWA) and Groundwater Association of KwaZulu-Natal (GAKZN);
iii. Establishment and de-establishment of a single pump testing team per school. All costs to include, transportation, accommodation, subsistence, etc;
iv. Provide costs for setting up at each school;
v. Assume pump testing will be between 0.25ℓ/s and 5.0ℓ/s;
vi. Provide costs for pump installation and removal down to approximately 100m;
vii. Provide costs for 4No. x 1hr step drawdown test per borehole to determine a pumping rate for the constant discharge test;
viii. Provide costs for a 12hr and 24 hr constant discharge test per borehole;
ix. Provide costs for monitoring recovery of step test and constant discharge test;
x. Provide costs for groundwater sampling of borehole(s). A 2ℓ water sample will need to be submitted to a SANAS Accredited laboratory for testing i.e. 1.5ℓ bottle for chemistry and 0.5ℓ amber glass bottle for microbiological analysis. The sampling bottles need to be sterile. Cost for laboratory analysis to be included. SANS 241-2015 testing.
xi. Prepare a pump testing data log/report and submit to the appointed hydrogeologist to analyse. (Note this is only the fieldwork component, no interpretation of data).

3. PUMP INSTALLATION FOR BOREHOLE(S)

All work needs to be carried out as per SANS 10299. The following will be required for the project:

i. Prepare all Health and Safety documentation to carry out the work as per the current Occupational Health and Safety Standards;

Carried to Collection R

ii. Need to be registered with the Borehole Water Association of South Africa (BWA) and Groundwater Association of KwaZulu-Natal (GAKZN);
iii. Supply and install a submersible pump pumping up to 2.0ℓ/s;
iv. Supply and install a 0.55kw up to 1.5kw 220volt motor. The motor selected will be depending on the requirement per school;
v. All electrical and plumbing associated with the submersible pump to SANS (SABS) specifications and as indicated in SANS 10299;
vi. All specifications in 3(v) should include joint kit, base plate and fittings, class 10 HDPE pipe, submersible cable, piping, control box, safety rope, electrical connections, etc;
vii. Supply and install a manhole ring, cover and lockable galvanised lid;
viii. Supply and install a 3m high galvanised tank stand and a 5000 litre tank with a concrete plinth base;
ix. Supply and install all above ground piping to the tank stand and from tank stand to a single discharge point approximately 50m away, including trenching and backfilling;
x. Supply and install a tap to connect to the tank stand to as indicated in 3(ix);
xi. Provide all labour to install the above; and
xii. Provide compliance certificates for all work.

BOREHOLE INSTALLATION (PROVISIONAL)

Borehole Installation

Tenderers are to note that the sum included the amount column for this section of the Bill of Quantities, should be the total of all priced items in the Borehole Installation, Bill of Quantities as attached hereafter.

1	Borehole Installation (transferred from page 9 of 9 on the Borehole BOQ)	Item		
	Carried to Collection		R	

DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME

WIMS NO.: 063634

DUMANE S COMMERCIAL HIGH SCHOOL-DRILLING OF NEW BOREHOLE, TEST PUMPING, EQUIPPING OF BOREHOLE AND INSTALLATION OF ELEVATED TANK

SCHOOL NAME :	**DUMANE S COMMERCIAL HIGH SCHOOL**
CLUSTER NO. :	**N/A**
WIMS NO. :	**063634**
BOREHOLE SUBCONTRACTOR NAME :	
BOREHOLE SUBCONTRACTOR GAKZN / BWA AFFILIATION NUMBER :	
CONTACT PERSON :	
CONTACT NUMBER :	
EMAIL :	
TOTAL AMOUNT BIDDED (VAT excl.) :	

1 APPENDIX 1: SCHEDULE OF RATES - DRILLING

1-0 Drilling of borehole for DUMANE S COMMERCIAL HIGH SCHOOL					
Item No.	**Description**	**Unit**	**Qty**	**Rate**	**Amount R / c**
1-0	**Establishment of Own Facilities on Site** – All listed items to be available on each site – according the 'Occupational Health and Safety specification for Contractual work) – Document will be signed by successful bidder. - GPS, - Accommodation (Tents, caravans etc.) - Dedicated wash area (shower, basin etc.) - Dedicated area for food preparation, - Demarcated area for fuel, oil etc. - Medical kit, - Demarcation barrier (Not danger tape) - Protection clothing (Hard hat, safety shoe, etc.) - Overalls with contractors name and/or logo Contractors will be monitored by Consultants. This will include instructions to improve etc. reporting to the client and actions taken.				
1-1	Establishment of Own Facilities on Site	Sum	1		
1-2	Mobilisation and set-up of plant to/at first borehole	Sum	1		
1-3	Set-up of plant per boreholes (after first) up to 10km	No	0		Rate Only
1-4	Inter hole moves				
1-4-1	For distances exceeding 10 km	Km	0		Rate Only
1-5	De-establishment from site	Sum	1		
2-0	**DRILLING (Unconsolidated sediments and igneous, metamorphic and fractured carbonate rocks**				
2-1	Rotary air percussion with foam – 0 to 150 m				
2-1-1	165 mm diameter	m	30		
2-1-2	203 mm diameter	m	0		Rate Only
2-1-3	254 or 216 mm diameter	m	0		Rate Only
2-1-4	305 mm diameter	m	0		Rate Only
2-2	Rotary air percussion with foam – 151 to 300 m (rate to be over and above items 2-1-1 to 2-1-4				
2-2-1	165 mm diameter	m	0		Rate Only
2-2-2	203 or 216 mm diameter	m	0		Rate Only
2-2-3	254 mm diameter	m	0		Rate Only
2-2-4	305 mm diameter	m	0		Rate Only
				Sub-total carried over	

1-0 Drilling of borehole for DUMANE S COMMERCIAL HIGH SCHOOL					
Item No.	**Description**	**Unit**	**Qty**	**Rate**	**Amount R / c**
			Sub-total brought forward		
2-3	Mud Flush – 0 to 80 m				
2-3-1	165 mm diameter	m	0		Rate Only
2-3-2	203 mm diameter	m	0		Rate Only
2-3-3	254 or 216 mm diameter	m	0		Rate Only
2-3-4	305 mm diameter	m	0		Rate Only
3-0	**DRILLING (Highly abrasive rocks e.g. quartzite)**				
3-1	Rotary air percussion with foam – 0 to 150 m				
3-1-1	165 mm diameter	m	150		
3-1-2	203 or 216 mm diameter	m	18		
3-1-3	254 mm diameter	m	0		Rate Only
3-1-4	305 mm diameter	m	0		Rate Only
3-2	Rotary air percussion with foam – 151 to 300 m (rate to be over and above items 3-1-1 to 3-1-4)				
3-2-1	165 mm diameter	m	0		Rate Only
3-2-2	203 or 216 mm diameter	m	0		Rate Only
3-2-3	254 mm diameter	m	0		Rate Only
3-2-4	305 mm diameter	m	0		Rate Only
4-0	**DRILLING (Leached / cavernous carbonate rocks)**				
4-1	Rotary air percussion with foam 1m to Max 150m				
4-1-1	165 mm diameter	m	0		Rate Only
4-1-2	203 or 216 mm diameter	m	0		Rate Only
4-1-3	254 mm diameter	m	0		Rate Only
4-1-4	305 mm diameter	m	0		Rate Only
5-0	**CASING (supplied, delivered and installed)**				
5-1	Steel (bevel-edged plain)				
5-1-1	165 mm ID (minimum wall thickness 4 mm)	m	18		
5-1-2	215 mm ID (minimum wall thickness 4.5 mm)	m			Rate Only
5-1-3	254 mm ID (minimum wall thickness 4.5 mm)	m			Rate Only
5-2	Steel (slotted, width 3-4 mm)	m			Rate Only
6-0	**CASING SHOES – For drill & drive – on instruction from client/consultant only**				
6-1	To fit 165 mm ID steel casing	m	0		Rate Only
6-2	To fit 215 mm ID steel casing	m	0		Rate Only
6-3	To fit 254 mm ID steel casing	m	0		Rate Only
7-0	**REAMING OF BOREHOLES (Reaming bids must be available)**				
7-1	152 mm / 165 mm to 203 mm or 219 mm diameter	m	0		Rate Only
7-2	203 mm or 219 mm to 254 mm diameter	m	0		Rate Only
7-3	152 mm or 165 mm to 254 mm diameter	m	0		Rate Only
8-0	**RECOVERY OF STEEL CASING**	m	0		Rate Only
			Sub-total carried over		

1-0 Drilling of borehole for DUMANE S COMMERCIAL HIGH SCHOOL					
Item No.	**Description**	**Unit**	**Qty**	**Rate**	**Amount R / c**
			Sub-total brought forward		
9-0	**FORMATION STABILISER (supplied, delivered and installed) – See specifications.**	Per/kg	0		Rate Only
10-0	**CONCRETE COLLAR (complete per borehole)**	No	1		
11-0	**SANITARY SEAL (complete per borehole) per m – maximum five metres**	No	1		
12-0	**BOREHOLE DISINFECTION (complete per borehole)**	No	1		
13-0	**BOREHOLE PROTECTION ((including casing lid –)**				
14-0	Borehole ϕ 165 casing lid (obtainable from DWS refer to Drawing No. 10) (Borehole Protection)	No	1		
15-0	**BOREHOLE MARKING (complete per borehole) (refer to Drawing No. 9)**	No	1		
16-0	**DATA RECORDING AND REPORTING (complete per borehole)**	No	1		
	It is required that all payment certificates be accompanied by proof that the required data recording and reporting was submitted for entry onto the NGA The invoices of the contractors will not be certified for payment if it does not comply with the above requirements.				
17-0	**Development of Borehole (also for blow yield)**	Hr	1		
18-0	**STANDING TIME RATE (rate only)**	Hr	1		
19-0	**BOREHOLE REHABILITATION**				
19-1	With rotary air percussion drilling rig with foam	Hr	0		Rate Only
20-0	**Casual (Day) labour sourced locally (**	Day	0		Rate Only
	TOTAL CARRIED FORWARD TO SECTIONAL SUMMARY (VAT excluded)				

2 APPENDIX 2: SCHEDULE OF RATES - TEST PUMPING

2-0 Test pumping of boreholes for DUMANE S COMMERCIAL HIGH SCHOOL					
Item No.	**Description**	**Unit**	**Qty**	**Rate**	**Amount R / c**
1-0	**ESTABLISHMENT, PLANT SET-UP, INTER-HOLE MOVES AND DE-ESTABLISHMENT.**				
1-1	**Establishment of Own Facilities on Site** – All listed items to be available on each site – according the 'Occupational Health and Safety specification for Contractual work) – Document will be signed by successful tenderer. - GPS, - Accommodation (Tents, caravans etc.) - Dedicated wash area (shower, basin etc.) - Dedicated area for food preparation, - Demarcated area for fuel, oil etc. - Medical kit, - Demarcation barrier (Not danger tape) - Protection clothing (Hard hat, safety shoe, etc.) - Overalls with contractors name and/or logo - Contractors will be monitored by Consultants. This will include instructions to improve etc. reporting to the client and actions taken.	Sum	1		
1-2	Mobilisation and set-up of plant to/at first borehole	Sum	1		
1-3	Set-up of plant per boreholes (after first)	No	0		Rate Only
1-4	Inter-hole moves				
1-4-1	For distances up to 10 km	No	0		Rate Only
1-4-2	For distances exceeding 10 km	Km	0		Rate Only
1-5	De-establishment from site	Sum	1		
2-0	**TEST PUMPING**				
2-1	Installation of Test Pump **(depth up to 80m)**				
2-1-1	For yield up to 10 ℓ/s	No	1		
2-1-2	For yield greater than 10 ℓ/s to max 25l/s	No	0		Rate Only
2-2	Installation of Test Pump **(per metre over 60m up to 120m)**				
2-2-1	For yield up to 10 ℓ/s	m	0		Rate Only
2-2-2	For yield greater than 10 ℓ/s to max 25l/s	m	0		Rate Only
2-3	Laying out of Discharge Hose				
2-3-1	Minimum of 100m	No	1		
2-3-3	100m to 300m (extra-over 100m)	m	0		Rate Only
2-4	Slug Test	No	0		Rate Only
2-5	Calibration Test up to 25l/s	Hr	1		
				Sub-total carried over	

2-0 Test pumping of boreholes for DUMANE S COMMERCIAL HIGH SCHOOL					
Item No.	**Description**	**Unit**	**Qty**	**Rate**	**Amount R / c**
		Sub-total brought forward			
2-6	**Stepped Discharge Test (Maximum 120m**				
2-6-1	For yield up to 10 ℓ/s not deeper than 60m	Hr	4		
2-6-2	For yield >10 ℓ/s <25l/s up to 60m	Hr	0		Rate Only
2-6-3	For yields >20l/s but < 40l/s –max depth=60m	Hr	0		Rate Only
2-6-4	For yield up to 10 ℓ/s deeper than 60m <120m	Hr	0		Rate Only
2-6-5	For yields >10 ℓ/s <25l/s deeper than 60m <120m	Hr	0		Rate Only
2-7	**Constant Discharge Test (Maximum 120m**				
2-7-1	For yield up to 10 ℓ/s not deeper than 60m	Hr	24		
2-7-2	For yield >10 ℓ/s <25l/s up to 60m	Hr	0		Rate Only
2-7-3	For yield up to 10 ℓ/s deeper than 60m <120m	Hr	0		Rate Only
2-7-4	For yields >10 ℓ/s <25l/s deeper than 60m <120m	Hr	0		Rate Only
2-8	Recovery measurement after paragraph 2-5, 2-6, 2-7	Hr	24		
2-9	Borehole Disinfection (complete per borehole)	No	1		
2-10	Obtain & fit Borehole ϕ 165 casing lid) (Borehole Protection)	No	1		
2-11	Borehole Marking	No	1		
2-12	Site Finishing (complete per borehole)	No	1		
3-0	**DATA RECORDING AND REPORTING (Complete per borehole) Including measurements – Before & after installation of test equipment – depth & water level and Casing detection** ***IT IS REQUIRED THAT ALL PAYMENT CERTIFICATES BE ACCOMPANIED BY PROOF THAT THE REQUIRED DATA RECORDING AND REPORTING WAS SUBMITTED FOR ENTRY ONTO THE REGIONAL GRIP DATABASE AND NGA***	Per/bh	1		
	The invoices of the contractors will not be certified for payment if it does not comply with the above requirements.				
4-0	**WATER LEVEL MONITORING PER OBSERVATION BOREHOLE**	Hr	0		Rate Only
5-0	**CHEMICAL ANALYSIS OF WATER SAMPLE (macro-elements only) – TO BE COLLECTED DURING TEST.**	Sum	1		
6-0	**STANDING TIME RATE**	Hr	0		Rate Only
7-0	**CASUAL (DAY) LABOUR SOURCED LOCALLY** **Per person**	Day	1		
8-0	**WATER TESTING AND REPORTING** – water sample to be tested by an approved water testing laboratory and report to be provided on the quality of water including recommendation on the suitable water treatment solution	Item	1		
9-0	**Hydrogeological investigation report provided by a qualified and registered Hydro-Geotechnical Engineer upon completion of the borehole installation, detailing the following:** **1) Geophysical survey results** **2) Drilling results** **3) Pump testing results** **4) Water quality results** **Recommendation for usage and treatment of ground water**	Item	1		
	TOTAL CARRIED FORWARD TO SECTIONAL SUMMARY (VAT excluded)				

3 APPENDIX 3: SCHEDULE OF RATES - PUMP SUPPLY AND INSTALLATION

3-0 Pump Supply and Installation for DUMANE S COMMERCIAL HIGH SCHOOL

Item	Description	Unit	Qty	Rate	Amount
1-0	**Pump supply and installation**				
1-1	Trenching - rising main (soft)	m	120		
1-2	Trenching - Electrical cable to DB (soft)	m	150		
1-3	Excavation in all materials for cabling and water pipes including backfilling, compaction, reinstatement and disposal off site of all surplus materials.	m^3	25		
1-4	Commissioning	Sum	1		
	PUMP SUPPLY				
1-5	1.5 KW FRANKLIN MOTOR AND PUMP (or equivalent, to be approved by the Engineer)	No	1		
1-6	STANDARD CONTROL BOX (similar to fig. 1.1) to be lockable and weather proof and be installed on a concrete base)	No	1		
	FITTINGS AND PROTECTION				
1-7	Protective pump housing (concrete ring with lockable galvanized steel lid as per DWG NO.447/Sk102)	No.	1		
1-8	Piping HDPE 40 mm PE 100 Class 16 - Borehole riser	m	200		
1-9	Piping HDPE 40 mm PE 100 Class 16 - Rising Main	m	120		
1-10	$16mm^2$ 2 core 600/1000V rated PVC/SWA/ECC cable (down the borehole). Include for 2 No. termination	m	265		
1-11	$16mm^2$ 3 core 600/1000V PVC waterproof submersible. Include 2No. termination.	m	56		
1-12	$16mm^2$ 2 core 600/1000V rated PVC/SWA/ECC cable (borehole to DB in 50mm PVC sleeve including radius bends and conduits). Include for 2No. termination	m	97		
1-13	Safety Rope (minimum 12mm diameter SAB approved nylon safety rope)	m	100		
1-14	Pump Fittings and Compression fittings (all HDPE pipe fittings to be PN 16 SABS approved)	sum	1		
1-15	In-Line Klorman Feeder + 16 x Feeder Cartridges & Lamotte Chlorine Test Papers 0 – 10 ppm (or equally approved, to be approved by the Engineer)	Sum	1		
1-16	Supply and installation of 15A curve D Circuit Breaker 5kA fault level to existing main board including working on and updating the main board and legend card	Sum	1		
1-17	Supply and install combination of 10 amp circuit breaker and 20 amp double pole contactor in the existing distribution board	No.	1		
1-18	Supply and install surface mounted 20 amp isolator switch with indicator light	No.	1		
1-19	Electrical Compliance certificate	sum	1		
1-20	Supply and install 25 mm mild steel galvanised conduit	m	46		
1-21	Supply and install 200 mm x 200 mm York Box	No.	1		
				Sub-total carried over	

3-0 Pump Supply and Installation for DUMANE S COMMERCIAL HIGH SCHOOL					
Item No.	**Description**	**Unit**	**Qty**	**Rate**	**Amount R / c**
			Sub-total brought forward		
2-0	**Tank stand**				
2-1	Elevated Tank stand and fittings and 5000lt GRP Water Tank designed in accordance with British Standard BS4994-1987 and BS EN 13121-3:2016 (or equally approved) (as per specification – Drawing No. 447/Sk100)	no	1		
2-2	HDPE Piping 40 mm PE100 PN 16 SABS approved	m	75		
3-0	**Reticulation**				
3-1	Trenching - feeding main (soft)	m	105		
3-2	HDPE Piping 40 mm PE100 PN 10 SABS approved - feeding main	m	105		
3-3	Installation of Tap Stand in accordance with Drawing No.447/Sk101	Sum	1		
				TOTAL CARRIED FORWARD TO SECTIONAL SUMMARY (VAT excluded)	

WIMS NO. 063634
SUMMARY OF BIDDED PRICES

DUMANE S COMMERCIAL HIGH SCHOOL	AMOUNT BIDDED
1. Drilling: Dumane S Commercial High School	
2. Pump Testing: Dumane S Commercial High School	
3. Pump Supply and Installation: Dumane S Commercial High School	
TOTAL AMOUNT BIDDED (VAT excl.) carried forward to form of Bid Section	

Section No. 5

Bill No. 1

BOREHOLE INSTALLATION (PROVISIONAL)

COLLECTION

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Item No		Quantity	Rate	Amount

SECTION NO. 6

BILL NO.1

TYPE B - NEW BUILDING (2NO.)

ELECTRICAL INSTALLATION (PROVISIONAL)(CPAP WORK GROUP NO. 160 UNLESS OTHERWISE STATED)

SUPPLEMENTARY PREAMBLES

ELECTRICAL

1. The work is to be carried out in accordance with SANS 10142 and the Occupational Health and Safety Act of 1993 as amended. The installation is to be tested and compliance certificate submitted on completion of works.
2. Workmanship must comply with good engineering practice.
3. All materials necessary to satisfactorily complete the installation as per the bill of quantities.
4. The scope of work is for the complete electrical installation as shown on the layout drawings / site instruction.
5. The installation is to be covered by a 12 month unconditional guarantee, commencing from date of completion and acceptance of the works.
6. Ablution Block Being Demolished - the contractor to make safe and disconnect the feeder cable from the incomer distribution board and also from the distribution board before the demolition of the ablution block.
7. Refurbished Ablution Block - the contractor to verify that the electrical installation is compliant and advise the electrical engineer.
8. New Ablution Block - refer to electrical drawings layout.
9. Light fittings as per the bill of quantities / site instruction.

Carried to Collection R

	10. All surface conduit to be mild steel galvanised. 11. 2.5mm² uPVC copper insulated wiring in conduit to be used			
	LIGHTNING PROTECTION			
	1. This work is to be carried out by a specialist 2. The test result to be below 10 ohms. 3. 25mm² uPVC conduit dropper to be installed. 4. 50mm² Aluminium earth conductors to be used. 5. 10mm² Aluminium ridge conductor to be used for non-metal roofs. 6. Earth spike to be 1.8m. 7. Stainless steel lugs, bolts and nuts.			
	ELECTRICAL INSTALLATION (PROVISIONAL)			
	GUARANTEE			
1	Guarantee the efficient and safe working of the whole installation for 12 months after hand over of the completed building to the Department	Item		
	EARTHING SYSTEM			
2	Earthing of wash hand basin and all cold and hot water piping, by means of standard copper tape earth strapping at regular intervals of 6m and connecting same to the electrical earth system at the distribution board (2 No wash hand basins)	Item		
	TESTING			
3	After the installation has been completed the Electrical Contractor shall issue a certificate of compliance	Item		
4	Before issuing a certificate of compliance, an accredited person shall inspect and test each new installation or extension of an existing installation for compliance with the relevant standard	Item		
	P& G's			
5	Preliminary and General	Item		
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	DISTRIBUTION BOARDS				
	Distribution boards complete with sheet metal trays, frames, sub frames, bus bars, provision for four future circuit breakers, labeling and legend cards				
6	Distribution board DB 1 as per single line drawing 16016_400, supplied complete with detailed shop drawing and specification including circuit breakers, Earth & Neutral busbars	No	2		
7	20A CBI / HYMAG SX1-G3 single pole 230 V circuit breaker 5 kA fault level installed in existing main board	No	2		
8	40A CBI / HYMAG SX1-G3 single pole 230 V circuit breaker 5 kA fault level installed in existing main board	No	2		
9	Allow to work on existing distribution board and update legend card		Item		
	DISTRIBUTION CABLES				
	600/1000V rated cables laid in ground or in sleeves. To be protected when installed vertically up wall from ground				
10	10mm² 2 Core Airdec cable	m	152		
11	Termination for 10 mm² 2 core cable above	No	4		
12	4mm² 2 Core uPVC SWA Surfix cable	m	90		
13	Termination for 4mm² 2 core cable above	No	4		
	Carried to Collection			R	

	EARTHWORKS (PROVISIONAL)(CPAP WORK GROUP NO. 104 UNLESS OTHERWISE STATED)				
	EXCAVATION				
14	Excavate for and build cable inspection chamber with half brick sides fitted with 600 x 600 x 600 medium duty cover and frame complete with drain holes. Size internally 600 x 600 x 600mm deep (LI)	No	2		
15	Excavate not exceeding 600mm deep in soft intermediate rock material for cabling and cable pipe trench including bedding, backfilling, compaction and disposal of surplus material	m3	38		
16	Excavate not exceeding 600mm deep in hard rock for and cabling and cable pipe trench including bedding, backfilling,compaction and disposal of surplus material	m3	8		
	SLEEVES				
17	50mm uPVC sleeves	m	24		
18	50mm uPVC long radius bend	No	4		
	LIGHTING AND SMALL POWER				
	Thin walled hot dipped galvanised conduits				
19	20mm Diameter surface mounted on brickwork	m	30		
20	20mm Diameter fixed on timber rafters	m	70		
	Thin walled uPVC conduits				
21	20mm Diameter chased in brickwork	m	70		
22	20mm Diameter fixed on timber rafters	m	72		
	Carried to Collection			R	

	CONDUIT BOXES AND FITTINGS				
23	100 x 100 x 100/50mm Deep hot dipped galvanised box for 20mm diameter conduit in brick or concrete walls including conduit ends and cover	No	6		
24	65mm Round hot dipped galvanised box for 20mm diameter steel conduit in brick or concrete walls or ceiling void including conduit ends and cover	No	32		
	CONDUCTORS				
	uPVC insulated stranded copper conductors drawn into wire ways				
25	2.5mm²	m	396		
	LIGHT SWITCHES, SWITCHED SOCKET OUTLETS ETC.				
	Switches etc. complete with cover plates fixed in flush boxes				
26	20A Light switch with cover plate	No	6		
27	20A IP65 Double pole Weatherproof Isolator	No	2		
	LUMINARIES AND EQUIPMENT				
	Luminaries or equipment complete with lamps, connections etc. mounted in position				
28	Type A - Magnet/Lihlelight or equal and approved RML round bulkhead with die cast aluminium base & 1xPL26 Watt lamp complete with electronic control gear	No	32		
29	Type B - 2 x 35W T5 Vapour proof fluorescent light fitting complete with electronic control gear	No	2		
30	Photocells inclusive of enclosure	No	2		
	Carried to Collection			R	

	LIGHTNING PROTECTION				
	ABLUTION BLOCK				
31	Undertake soil resistivity test, witnessed by the Engineer inclusive of submitting a typed test report/certificate		Item		
32	10mm² Aluminium conductor	m	90		
33	50mm² uPVC insulated aluminium earth wire	m	44		
34	Bonding of earth tails to sheet trusses/roof sheeting/tiles	No	8		
35	Supply and install 25mm galvanised conduit	m	32		
36	Supply and install stainless steel lugs	No	8		
37	Supply and install stainless steel bolts and nuts	No	8		
38	Supply and install stop cork box	No	8		
39	1,8m Earth spike	No	20		
	TESTING AND CERTIFICATE OF COMPLIANCE				
40	Allow for testing of the complete installation to be witnessed by the Electrical Engineer, including the issue of SABS Certificate of Compliance of Earthing Systems, Annexures of recorded test results and "As Built" drawings as specified		Item		
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Section No. 6

Bill No. 1

TYPE B - NEW BUILDING (PROVISIONAL)

COLLECTION

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FINAL SUMMARY

Section No		Page No		Amount
1	PRELIMINARIES	43		
2	REPAIRS AND RENOVATIONS TO EXISTING BUILDINGS (PROVISIONAL)	48		
3	NEW BUILDINGS (PROVISIONAL)	90		
4	EXTERNAL WORKS (PROVISIONAL)	116		
5	BOREHOLE INSTALLATION (PROVISIONAL)	121		
6	ELECTRICAL INSTALLATION (PROVISIONAL)	128		
	SUB-TOTAL		R	
	VAT @ 15%		R	
	Carried to Form of Offer and Acceptance (T2.21)		R	

LDM QUANTITY SURVEYORS DBN (PTY) LTD.

KWAZULU-NATAL PROVINCE
PUBLIC WORKS
REPUBLIC OF SOUTH AFRICA

DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3: ETHEKWINI REGION: DUMANE COMMERCIAL HS

PART C3. SCOPE OF WORKS

C3.1 SCOPE OF WORKS
GCC FOR CONSTRUCTION WORKS (Edition 2 of 2010)

Scope of Works complied in accordance with SANS 10403 where reference is made to this part of SANS 1921-1:2004

Project title:	**DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3: ETHEKWINI REGION: DUMANE COMMERCIAL HS**		
Tender no:	**ZNTD05574W**	**Project Code:**	**063634**

SECTION 1

1 EXTENT OF THE WORKS

1.1 EMPLOYERS OBJECTIVES

The upgrade of the school's existing sanitation infrastructure including associated external works.

1.2 OVERVIEW OF THE WORKS

The upgrade of the school's existing sanitation infrastructure including demolitions of existing toilets, construction of new ablution facilities, including external works, new walkways, jojo tanks, borehole installation etc.

1.3 EXTENT OF THE WORKS

Refer to Bills of Quantities and attached drawings for detailed scope of work.

1.4 LOCATION OF THE WORKS

KZN Ethekwini Region: 29°27'28"S 30°54'10"E

1.5 TEMPORARY WORKS

All temporary work to comply with the Occupational Health and safety Act (Act 85 of 1993)

2 ENGINEERING

2.1 EMPLOYER'S DESIGN

The Employer design and related documentation and specification is as per the Appointed Consultants.

2.2 DESIGN BRIEF

As per the drawings and specifications provided by the appointed Engineers and Architects.

2.3 DRAWINGS

See list of Drawings/Annexures attached to this document.

2.4 DESIGN PROCEDURES

As per the design, documentation and specification issued by the Appointed Consultants and/or the Employer.

3 PROCUREMENT

3.1 PREFERENTIAL PROCUREMENT PROCEDURES

This tender will be subject to the implementation of the Preferential Procurement Regulations, 2022, pertaining to the Preferential Procurement Policy Framework Act, Act Number 5 of 2000 and the relevant Supply Chain Management Legislation and the KwaZulu-Natal Supply Chain Management Policy Framework published by the KwaZulu-Natal Provincial Treasury. Tenderers are referred to www.kzntreasury.gov.za for access to the relevant documents.
Tenderers are advised to familiarize themselves with the contents of the KwaZulu-Natal Supply Chain Management Policy Framework regarding Preference Point Systems, evaluation of tenders appeals and other matters.

3.2 RESOURCE STANDARD PERTAINING TO TARGETED PROCUREMENT

NOTE : This project will be adjudicated as not exceeding R 50,000 000,00

3.3 SCOPE OF MANDATORY SUBCONTRACT WORK

Not Applicable

3.4 PREFERRED SUBCONTRACTORS/SUPPLIERS

As per the conditions stated in form T2.6, in Section 1 of this document

3.5 SUBCONTRACTING PROCEDURES

Not Applicable

4 CONSTRUCTION

4.1 APPLICABLE SANS 2001 STANDARDS FOR CONSTRUCTION WORKS

The Contractor is referred to the "ASAQS Model Preambles to Trades - 2017", any "Supplementary Preambles", the Electrical Specifications and Mechanical Specification for full descriptions of materials and methods referred to in these Bills of Quantities/Lump Sum documents, insofar as they apply. The Contractor is advised to study the "Standard Preambles to all Trades", any "Supplementary Preambles", the Electrical Specifications and Mechanical Specification, before pricing Bills of Quantities/Lump Sum documents.

Where the description in the Bills of Quantities/Lump Sum documents differ from those in the Standard Electrical Specifications, the descriptions in the Bills of Quantities/Lump Sum documents are to apply. No claim whatsoever will be allowed in respect of errors in pricing due to brevity of description of items in the Bills of Quantities/Lump Sum documents which are fully described when read in conjunction with the relevant Preambles and/or Specifications. Suppliers of materials and the like, whose quality systems apply with one or more of the SABS/SANS ISO 9000 Series should be used whenever possible in the absence of a particular SABS/SANS Specification Standard Mark.

Wherever the words "shall be deemed to be included in the description", "shall be stated" or other words having the same effect, appear in the Standard System, it shall be deemed that all descriptions in these Bills of Quantities/Lump Sum documents incorporated such inclusions and statements whether specifically stated or not.

The Contractor is hereby informed that where SABS/SANS Specifications are referred to in these Bills of Quantities/Lump Sums documents and Specifications thereto, then ONLY the Specification of Work Clauses will apply. The method of measurement and payment clauses will NOT apply to this Contract.

The Contractor is hereby informed that risk of collapse and keeping excavations free from water (excluding subterranean water) generally are deemed to be included in the descriptions unless accommodated in the system of measurement. Please refer to the Geotechnical Investigation report when included at the end of these tender documents.

Whenever reference is made to "Sub-Contractor", "Nominated Sub-Contractor" or the like in the specifications included or referred to in these Bills of Quantities/Lump Sums documents, it shall be deemed to mean "Contractor" as defined.

4.2 APPLICABLE NATIONAL AND INTERNATIONAL STANDARDS

See above 4.1

4.3 PARTICULAR / GENERIC SPECIFICATIONS

The Contractor is referred to the following documents whether attached to this document or not:

SPECIFICATION	PAGES
Specification for HIV/AIDS Awareness (CIDB)	HIV1 TO HIV3
Project Specific Health and Safety Specification	26
ASAQS Model Preambles for Trades 2017 - (Not Attached)	1
General Electrical Specification	E/1 to E/21
Lightning Protection Installation	LP/1 to LP/6

4.4 CERTIFICATION BY RECOGNIZED BODIES

Only contractors registered with the Electrical Contracting Board of South Africa in accordance with the Regulations of the Occupational Health and Safety Act will be accepted and permitted to do work under this contract. Only contractors registered with the Department of Labour in the safe handling of asbestos products are allowed to remove and dispose of any asbestos type material and issue the associated certificates.

4.5 AGRÉMENT CERTIFICATES

Not Applicable

4.6 PLANT AND MATERIAL PROVIDED BY THE EMPLOYER

Not Applicable

4.7 SERVICES AND FACILITIES PROVIDED BY THE EMPLOYER

Not Applicable

4.8 OTHER SERVICES AND FACILITIES

The Contractor shall provide any artificial lighting which may be necessary or required for the proper execution of the works, and provide electric power and water required by all Sub-Contractors, Nominated Sub-Contractors and Sub-Contractors appointed directly by the Administration.
The Contractor shall give all notices and pay all fees in connection with temporary electrical and water connections and shall connect temporary Electrical and Water meters for and pay for all current and water consumed.
The Contractor is advised that the permanent light fittings and water points of any kind installed in the Works are not to be used to provide temporary lighting and supplement water requirements for construction purposes.

5 MANAGEMENT

5.1 APPLICABLE SANS 1921 STANDARDS

Tenderers are referred to
SECTION 2 : SPECIFICATION DATA ASSOCIATED WITH SANS 1921-1:2004 IN THIS DOCUMENT

5.2 RECORDING OF WEATHER

The Contractor shall keep record of abnormal climatic conditions to facilitate the adjudication of claims for extension of the contract period.

The Contractor shall allow in his programme for the following number of days for rain days (rain > 10mm per day) as per the table below:

CURRENT YEAR			YEAR + 1	YEAR + 2
January	w/days		3	3
February	w/days		3	3
March	w/days		3	3
April	w/days		3	3
May	w/days		3	3
June	w/days		3	3
July	w/days		3	
August	w/days		3	
September	w/days		3	
October	w/days		3	
November	w/days		3	
December	w/days	3	3	

5.3 MANAGEMENT MEETINGS

In order to facilitate the smooth functioning of the Works and to ensure the closest co-operation between all the parties concerned, the Employer will call for regular meetings to be held on the site (one technical meeting and one site meeting per month), at which a senior member of the Contracting firm and the General Foreman of the Works will always be required to be present.
In addition to the above, other persons will be required to attend these meetings as and when their presence is necessary, e.g., Consultants in all disciplines, representatives of the various Sub-Contractors, etc.
Proper minutes of these meetings will be kept by the Employer\Principal Agent and copies will be circulated to all persons attending the meetings and to others who need to be kept informed.

5.4 FORMS FOR CONTRACT ADMINISTRATION

The Employer shall provide all necessary forms.

5.5 ELECTRONIC PAYMENTS

The Contractor shall provide all required information to the Employer to facilitate electronic payments upon request.

5.6 DAILY RECORDS

The Contractor shall keep daily records of people and equipment employed as well as a site diary in respect of work performed on the site.
At the end of each week the Contractor shall provide the Principal Agent with a written record, in schedule form, reflecting the number and description of tradesmen and labourers employed by him and all Sub-Contractors on the works each day.
At the end of each week the Contractor shall provide the Principal Agent with a written record, in schedule form, reflecting the number, type and capacity of all plant, excluding hand tools, currently used on the works.

5.7 BONDS AND GUARANTEES

The Contractor shall within 10 calendar days after receiving notice from the Engineer and prior to 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.

5.8	**PAYMENT CERTIFICATES** Requirements will be in accordance with the Employers prescriptions.
5.9	**PERMITS** The Contractor is advised that, in the case of an existing building or institution, all security measures in force will remain in operation and he must acquaint himself and his Employees with them as he and his Employees will at all times be subject to these measures. The Contractor will on no account extend his operations beyond the confines of the building site as indicated by the Employer and must ensure that all his Employees are made aware of these limits. Any Employee disregarding this instruction and found outside the limit of the building site without authority, shall be redeployed immediately and shall not again be employed on this Contract. The Contractor will be responsible for ensuring that this instruction is strictly enforced and must provide and remove upon completion or when directed, such other necessary temporary barriers, fences, etc., as may be required and is to allow opposite this item for any charges he may wish to make in this connection. The Employer will accept no responsibility whatsoever for damage to or the loss of plant, materials, etc., from the site.
5.10	**PROOF OF COMPLIANCE WITH THE LAW** The following certificates must be provided before first delivery is taken: - HIV/STI Report (Bound into this document) - Electrical Compliance Certificate - Plumbing Compliance Certificate - Lightning Certificate - Soil Protection Certificate - Concrete test and cube certificates - Waterproofing Guarantee certificates - TR1 and TR2 prefabricated roof truss certificates - Soil compaction certificates - Electrical and Mechanical test certificates - Plumbing and drainage pressure test certificates - Fire Compliance Certificate - Entomology Certificate - SANS 10400-A:2010 compliance certificates - Latest National Building Regulation
5.11	**INSURANCE PROVIDED BY THE EMPLOYER** Not Applicable
	SECTION 2 **SPECIFICATION DATA ASSOCIATED WITH SANS 1921-2004**
Clause Numbers	
4.1.7	**The requirements for drawings, information and calculations for which the Contractor is responsible are**
	Prefabricated roof trusses design must be submitted for approval 30 days prior to erections.
4.2.1	**The responsibility strategy assigned to the Contractor for the works is:**
	Strategy A
4.2.2	**The structural engineer is:**
	Map Africa Consulting Engineers
4.2.3	**Drawings & other info are to be submitted in accordance with the contractors programme**
	N/A
4.3	**The planning, programme and method statement are to comply with the following:**
	The project would be done classroom block for classroom block and the Contractor must allow for the fact that they would not have all the buildings at the same time to work on. The sequence of the blocks would be determined once the Contractor is on site and in agreement with the Principal of the school.

4.12.1	**Samples of materials**
	The work is to be executed with materials of the best specified and in the most substantial and workmanlike manner under the inspection of the Employer and to his satisfaction. The Contractor shall furnish, without delay, such samples as called for or may be called for by the Employer, who may reject all materials or workmanship not corresponding with the approved sample. The samples of materials, workmanship and finishes that the Contractor is to provide and deliver to the employer are: - Tile sample. - Paint Colour. - Brick sample. - Light Fitting sample. - Screed panel 2m x 2m impact test. - Tested trial mix to be approved by the Engineer. - Others as per the Consultants requirements.
4.12.2	**Fabrication drawings that the contractor is to provide to the employer are:**
	Truss Fabrication Drawings
4.12.3	**Office accommodation, equipment, accommodation for site meetings and other facilities for use by the employer and his agents are:**
	OFFICE FOR FOREMAN
	Provide, erect, maintain and remove at completion a suitable temporary office for the Contractor or his Foreman, perfectly secured, lighted and ventilated and having a desk with drawers.
	TELEPHONE
	The Contractor shall provide a telephone on the site for the use of the Contractor and all Sub-Contractors for the duration of the Contract, and must make the necessary application for connection, give all notices and pay all fees, rentals and charges for the service and also for all calls.
	OFFICE FOR INSPECTOR OF WORKS
	Provide, erect, maintain and remove at completion a well constructed temporary office for the Inspector of Works not less than 4 x 3 m on plan and 3 m high to eaves to the approval of the Employer. The office shall be constructed of wood framing covered externally with corrugated iron or corrugated asbestos and with a lean-to roof covered with the same material as the external wall covering. The office shall be lined internally with soft board or other approved material and a ceiling shall be provided of the same material as the internal lining. A suspended wood floor shall be provided and is to finish not less than 300 mm above the ground level. A lockable door and a window, which provides adequate light and ventilation, shall be fitted. An office constructed of 115 mm thick brick-work and provided with a screeded concrete floor and roofed and ceiled as above described may be accepted as an alterative but prior permission of the Employer will be necessary before construction of such an office is commenced and his requirements shall be stated and fulfilled by the Contractor. The office shall be fitted in an approved manner with a sloping topped desk of height and length suitable for the laying out and studying of drawings, a desk or table with not less than two lock-up drawers, shelves, seating and wash-stand, and the Contractor shall provide all necessary attendance.
	TELEPHONE IN OFFICE FOR INSPECTOR OF WORKS
	The Contractor shall arrange for the installation of a lockable telephone in the Office for the Inspector of Works for the duration of the Contract. The Contractor will be required to make the necessary application for connection and give all notices on behalf of the Employer. The Employer will, however, be responsible for the direct payment of all fees, rentals and other charges by Telkom for the service for the Inspector of Works and for all calls made from this telephone. - N/A

	SHED
	Provide, erect, maintain and remove at completion, ample temporary sheds for the proper storage of materials and for the use of the workmen, and remove when no longer required.
4.14.6	**The requirement for provision and erection of signboards are:**
	Supply, erect, maintain and remove at completion a painted notice board, size overall 2800 x 2345 mm high sign written to detail as Drawing No. T9506 which drawing is available from offices of the Department of Public Works. Only the official notice board is to be displayed on the site and no Sub-Contractor's boards will be permitted. The Contractor, at his own cost, may provide a board on which all sub-contract firms' names may be sign written. The notice board is to be to the approval of the Employer and is to be maintained in first class condition and placed where directed at the entrance to the site and remain there for the duration of the Contract.
4.17.1	**Requirement for the termination, diversion or maintenance of existing services**
	Should the Contractor come in contact with any underground cables or pipes during excavations, immediate notification must be made to the Employer and all work in the vicinity of such cables, pipes, etc., shall cease until authority to proceed has been obtained from the Employer. Should the Contractor damage underground cables or pipes resulting in a disruption of services to an existing institution such damage shall be repaired immediately.
4.17.3	**Services which are known to exist on the site:**
	Investigate and provide detail drawings.
4.17.4	**Requirement for detection apparatus**
	None
4.18	**ADDITIONAL HEALTH AND SAFETY REQUIREMENTS ARE:**
	By the submission of a tender, any Tenderer will, if awarded the contract to which this tender document relates, be deemed to be the mandatory as envisaged by Section 37 (2) of the Act. As a mandatory the successful Tenderer will be deemed to be the "principal contractor" and an employer in his/her/their own right with duties as prescribed in the Act and accordingly will be deemed to have agreed to be solely responsible for ensuring that in connection with the service to which this tender document relates, all work will be performed and machinery and plant used in accordance with the Act. Should the Contractor, for whatever reason be unable to perform as required by the Act, the Contractor undertakes to inform the Employer accordingly. Tenderers are advised that it is a Condition of this Tender that a 'Construction Phase Safety, Health and Environmental Plan' specifically relates to the project for which tenders are being submitted and must be prepared by the Tenderer and submitted with the other tender documents at the time of tender. Failure to do so will invalidate the tender. Tenderers are therefore advised to study the 'Construction Safety, Health and Environmental Specification' which is issued as part of this tender document, the ASAQS Model Preambles to Trades - 2017, any project Specification included in this tender document and any and all drawings which are referred to and issued as part of this tender document before preparing their own project specific 'Construction Phase Safety, Health and Environmental Plan' . Tenderers are also advised that such a plan which is submitted with a tender but is incomplete or considered inadequate by the Employer or his Representative will invalidate the tender. The Contractor will be deemed to have satisfied himself with his obligations in terms of the Act and to have allowed for all costs arising from compliance with the Act as no claim for extra costs arising from compliance with, and obligations in terms of the Act will be entertained.
4.22	**WORK BY NOMINATED AND SELECTED SUBCONTRACTORS COMPRISE:**
	N/A

C3.2 - SPECIFICATION FOR HIV/AIDS AWARENESS

1 Scope

This generic specification contains requirements applicable to the reduction of the risk of transfer of the HIV virus between and among construction workers and the local community through the following four strategies:

a) raising awareness about HIV/AIDS;
b) providing construction workers with access to condoms;
c) HIV counselling, testing and referral services; and
d) Sexually Transmitted Infection diagnosis and treatment.

2 Normative references:

The following standard contains provisions that, through reference in this text, constitute provisions of this standard:

SANS 4074 ISO 4074, *Condom Rubbers*

3 Definitions and Abbreviations

3.1 Definitions

Construction Worker: all persons in the employ of the contractor or in the employ of any of the subcontractors contracted by the contractor.

Local Community: the communities local to the site which are most likely to have contact with the construction worker and, in particular, sex workers in those communities.

Service provider: the natural or juristic person recognised by the South African Department of Health as specialist in conducting Aids Awareness Programmes.

3.2 Abbreviations

STI: Sexually transmitted infection

HIV: Human Immunodeficiency Virus

AIDS: Acquired Immune Deficiency Syndrome

4 Objectives

The objectives are to:

a) reduce the risk of transfer of the HIV virus between and among construction workers and the local community;
b) raise awareness amongst construction workers and the local community of the risk of infection with the HIV virus;
c) promote early diagnosis; and
d) assist affected individuals to access care and counselling.

5 Requirements

5.1 General requirement

The contractor shall, in order to satisfy the objectives stated in 4:

a) make condoms complying with the requirements of SABS ISO 4074 available to all construction workers at readily accessible points on the site, suitably protected from the elements, for the duration of the contract;

b) either place and maintain HIV/AIDS awareness posters of size of not less than A1 in areas which are highly trafficked by construction workers, or provide construction workers with a pamphlet, in languages largely understood by construction workers, which

c) encourage voluntary HIV/STI testing;

d) provide information concerning counselling, support and care of those that are infected services; and

e) comply with the requirements of 5.2.

***The* provisions *of* 5.1 c) *and d) do not apply to* this contract.**

5.2 HIV awareness programme

5.2.1 The contractor shall:

a) engage a qualified service provider as described in the scope of works to conduct an HIV Awareness Programme which is structured to achieve the outcomes stated in 5.2.3 for contract workers as soon as a construction workers camp is established and populated or, where no such camp is established, within two weeks of the commencement of a significant portion of the works and at subsequent intervals, if any, provided for in the scope of works; and

b) arrange for, provide a suitable venue, and instruct all construction workers to attend the HIV Awareness Programme and notify the Employer's Representative of the date, time and venue whenever a session with construction workers is conducted.

Note: The National Department of Public Works maintains a list of qualified service providers.

5.2.2 The contractor shall do nothing to dissuade construction workers from attending such an HIV Awareness Programme and shall take all reasonable steps to ensure that a minimum of 90% of construction workers engaged in the works attend such a programme, when it is conducted.

5.2.3 The outcomes of the HIV Awareness Programme shall as a minimum, result in contract workers exposed to such a programme being able to:

a) communicate the existence of problems of HIV and be able to outline the consequences of transmission of HIV to or from the local community;

b) recall and communicate the mode of HIV transmission and preventative measures including the proper use of the condom.

The HIV/ Aids awareness programme described in 5.2 is to be repeated at four month intervals throughout the duration of the contract. (Four times in total, including the initial one at the start of the contract)

5.3 Reporting

5.3.1 The contractor shall prepare and attach to his claims for payment a brief report which outlines how the actions taken by the contractor in the period for which payment is claimed satisfy the requirements and a schedule which lists the names, identity numbers, trade / occupation and name of employer of all construction workers exposed to the programme (see **HIV/STI Compliance Report**).

5.3.2 The employer's representative shall certify the report and schedule described in 5.3.1 whenever a claim for payment is issued to the employer.

Note: In the event that the contractor fails to satisfy the requirements of this specification, the employer (Head: Public Works) may apply any of the sanctions provided for in the contract. Sanctions may include the application of a financial penalty of .04% of the Contract Sum.

The *HIV /Aids* awareness programme *described* in 5.2 shall in addition *be conducted* for the benefit *of* the local community on two occasions in the community centre nearest to the building site. The contractor shall be *responsible* for inviting identifiable community-based *institutions and organisations, churches, and schools to participate in the* programme.

C3.3 - HIV/STI COMPLIANCE REPORT

Pro-forma reporting format in terms of the SPECIFICATION FOR HIV/AIDS AWARENESS

Project Code:	063634		
Payment Claim number:		Period covered by payment claim:	

1. Distribution of condoms (briefly describe where and how condoms are distributed).

2. Posters / pamphlets (briefly describe where posters were placed / how pamphlets were distributed).

3. Voluntary testing (briefly describe the actions taken / information provided to promote testing).

4. Counselling, support and care (summarise information provided).

5. HIV awareness programme (briefly describe action).

6. Schedule of construction workers exposed to the HIV awareness programme.			
Name	Identity number	Trade / occupation	Name of employer

I hereby declare the above to be a true reflection of actions taken to ensure compliance with the specification.

For Contractor:

Name: _____

Signature: _____

Date: _____

Employer's representative:

Name: _____

Signature: _____

Date: _____

KWAZULU-NATAL PROVINCE
PUBLIC WORKS
REPUBLIC OF SOUTH AFRICA

DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3: ETHEKWINI REGION: DUMANE COMMERCIAL HS

PART C4. SITE INFORMATION

C4.1 SITE INFORMATION
GCC FOR CONSTRUCTION WORKS (2 Edition of 2010)

Project title:	**DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3: ETHEKWINI REGION: DUMANE COMMERCIAL HS**		
Tender No.	**ZNTD05574W**	**Project Code:**	**063634**

C4.1 Site Information

C4.1 GENERAL

(a) The nature of ground is assumed to be loose, sandy material, possibly interspersed with soft and hard rock.

(b) The site is an existing, operational school. Extreme care must be taken to ensure that construction areas are kept secure and not accessible to students/staff. The Contractor must take note that storage material on site must be done in a well organized manner and the Contractor must create a workable space which will not disrupt the operation of the school or endanger the learners on the premises. The working area must be clearly demarcated and entrance to the work area must be controlled.

(c) The Tenderer is to note that various blocks that are currently in use, are required to be worked on. Planning and co-ordination therefore will be required by the Contractor to ensure that school activities are not interrupted, and under no circumstances will the Contractor be allowed to utlize any occupied buildings for any purpose other than the renovation of that building.

C4.2 GEOTECHNICAL INVESTIGATION REPORT

(a) Not Applicable

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DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3: ETHEKWINI REGION: DUMANE COMMERCIAL HS

PART C5 - DRAWINGS / ANNEXURES

C5.1 - LIST OF DRAWINGS/ANNEXURES

DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3: ETHEKWINI REGION: DUMANE COMMERCIAL HS

Tender No.:	ZNTD05574W	Project Code:	063634

(Where drawings/annexures are issued, document compilers must insert the following paragraph and list the applicable drawings/annexures below.)

The following drawings/annexures shall be issued during the Tender period to form part of the tender documentation. Where applicable, drawings/annexures could be re-issued to the Contractor at commencement of the construction phase.

DRAWING NO	DESCRIPTION
ARCHITECTURAL	**VIP**
2B-2G-IP-TB	2 Seater Girls, 2 Seater Boys, Teacher / Paraplegic Ablution - Type B (VIP)
TRH	Toilet Roll Holder
STRUCTURAL	**VIP**
447/301-REVP4	2 Seater Girls, 2 Seater Boys, Teacher / Paraplegic Ablution - Type B (VIP)
447/312-REVP1	Tank Stand
ELECTRICAL	**VIP**
009-REV0	2 Seater Girls, 2 Seater Boys, Teacher / Paraplegic Ablution - Type B (VIP)
400-REV0	Typical DB for Toilet Blocks - Single Line Diagram
E62-DUMACHS-REV1	SDP Layout
N/A	Provisional Site Plan

ANNEXURES	
Annexure 1	ASAQS Model Preambles for Trades 2017 - (Not Attached)
Annexure 2	General Electrical Specifications
Annexure 3	Lightning Protection Specifications
Annexure 4	Map of Tender Submission Location
Annexure 5	Joint Venture Agreement
Annexure 6	Project Specific Health and Safety Specification
Annexure 7	Health and Safety Bill of Quantities
Annexure 8	Builders Lien Agreement
Annexure 9	EPWP Specification
Annexure 10	Structural Engineers Project Specification Booklet
Annexure 11	Borehole Installation Specification

KWAZULU-NATAL PROVINCE
PUBLIC WORKS
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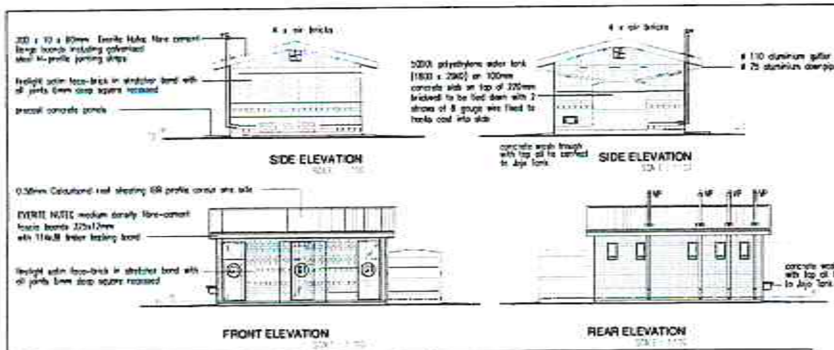
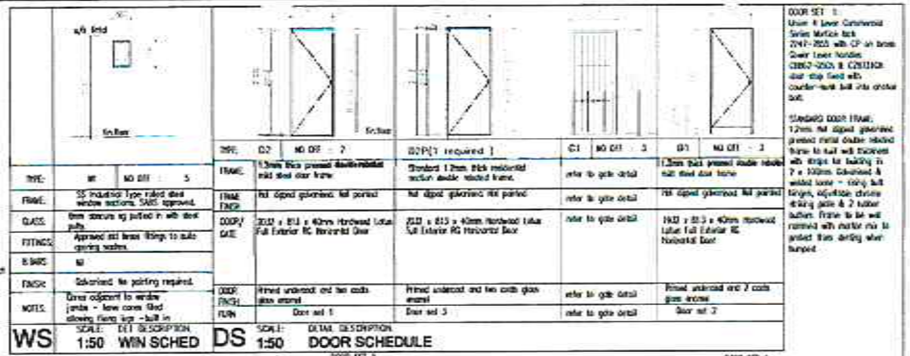
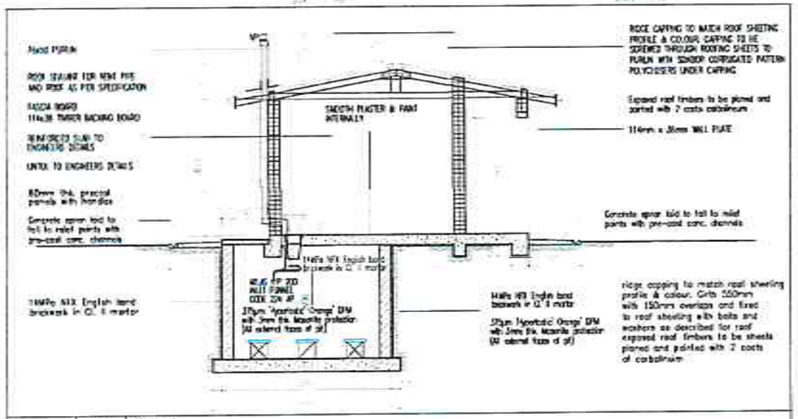
STANDARD DRAWINGS



SIDE ELEVATION — SIDE ELEVATION — FRONT ELEVATION — REAR ELEVATION



WS | SCALE: 1:50 | DET DESCRIPTION: WIN SCHED — DS | SCALE: 1:50 | DETAIL DESCRIPTION: DOOR SCHEDULE



SEC | SCALE: 1:50 | DESCRIPTION: SECTION A-A

refer to dwg 441/201 rev P1 for Engineering drawings

GENERAL SPECIFICATION NOTES:

This specified drawing to be read in conjunction with the #SD Standard Preambles.

Roof:
0.58mm Colourbond roof sheeting IBR profile colour one side, fixed with teck king roofing screws, mastic sealant at side laps. SONDOR IBR pattern polycloset under ridge capping.
Determine the direction of prevailing winds before laying sheets. sheets must project at 50mm beyond purlins at eaves. holes in sheets to be drilled not punched.
sheets are to be fixed to 76x50 purlins spaced @ maxed 900cc on 114x38 trusses spaced @ max 1250cc
prefabricated nailed roof trusses to be to engineers approval
roof is to be tied down to walls with 30mm x 1.6mm thick and 1.6m long galvanised hoop iron straps built in at least 10 courses
SISALATION 420 heavy industrial grade aluminium foil based underlay laid taunt over purlin and fixed with galvanised steel straining wires

HURRICANE CLIPS to be provided and secured to purlins and trusses at every intersection externally and internally
galvanised wire to be used.
exterior exposed roof timber to be painted with 2 coats ABE PROMOKIE before fixing of roof sheets, fascias and barge boards.

FASCIAS:
EVERITE NUTEC medium density fibre-cement fascia boards 12mm thick x 225mm with aluminium H-profile fascia joiners
Drill for and fix with hot-dip galvanised drive screws and washers.
Roof pitch to be 11 degrees
114x38 Under backing board inbetween rafters to fix gutter bracket

BARGEBOARD:
EVERITE NUTEC fibre cement socketless bargeboards 200mm x 80mm.

Aluminium H-profile barge board joiners
Drill for and fix with hot-dipped galvanised screws and washers.
76 x 50mm trimmer batten fixed underside of purlin ends for barge board fixing.

WINDOWS:
Hot dipped galvanised " SS Industrial type " metal windows.
No painting required.
6mm obscure glazing with steel putty. No painting necessary.
Refer to window schedule.

DOORS:
Galvanised Steel Single Rebated door frames (1.2mm thick) for 115mm brick walls – not painted with 1 pair of DORMA DRR-SS-012, 102X75X2MM stainless steel rising butt hinge
2032 x 813 x 40mm Hardwood Lotus
Full Exterior RG Horizontal Door

All doors to be primed, undercoat and 2 coats – gloss enamel.
1 rubber door stop plugged and screwed to wall in position where padlock plate would strike wall

FOUNDATIONS / FLOORS:
refer to Engineers specification

WALLS:
All walls are to comply with "Part K" of the National Building Regulations.

COROBRIK Firelight Satin Face Brick walls in stretcher bond with ruled joints and perpends externally.
COROBRIK COMMONS to be used where to recieve plaster.
COROBRIK ENGINEERING Bricks below ground level in foundation walls.

Brickforce to all courses from window head to underside wallplate.
Galvanised crimp wire wall ties (7 per square metre – laid staggered.)
External face of inner skin to be painted with bitumen paint.
External cills to be of sloping brick-on-edge roller course, cills to be 30 degrees.
Internal cills to be EVERITE NUTEC fibre-cement complete with fixing lugs and self-tapping screws.
375 micron embossed damp-proof membrane stepped below all window cills.
Where plaster is required internally (13 – 16mm thick), plaster is to have 1:5 cement:sand mix.
Cement plaster to be painted with 'WALL N' ALL' emulsion paint. Colour to be approved by the Department.
Beam filling to underside of roofing sheets.

VERANDAH WALKWAY:
Veranda floor to be graded to fall 50mm and cast in panels at 1850 centres. Control Joints at every 7,4m centres. Finish to be wood float non-slip. Control joints sealed with 10mm Polysulphide sealant with backing strip and softboard.

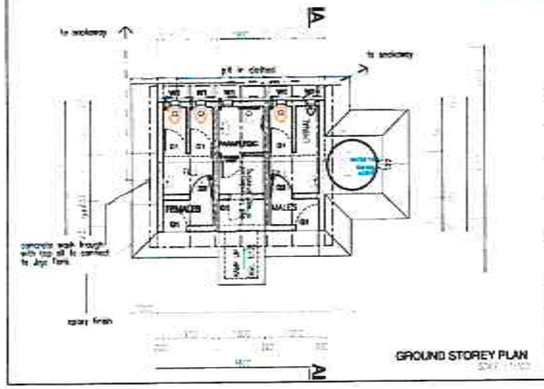
CONCRETE APRONS / CHANNELS:
Concrete aprons laid to a fall of 1:200 and in panels with control joints at every 3m centres on fill compacted to MOD AASHTO 95%.
Control joints sealed with 10mm Polysulphide sealant with backing strip and softboard.

BACKFILL:
Filling to be approved clean earth, well watered and rammed in layers not exceeding 150mm in depth and thoroughly consolidated to a density of 95% MOD AASHTO.
AIR-BRICKS
229 x 152mm Terra-cotta vermin proofed air-bricks built into brick beam filling at approx. 1200mm centres.

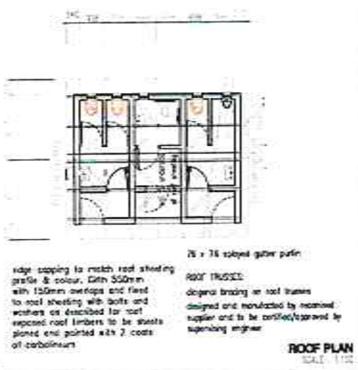
SANITARY FITTINGS
ATLAS VIP 200 (Code 332AP) pedestal with footplate and lid. Colour granite.
ATLAS LONG DROP (Code 631AP) pedestal with footplate & lid COLOUR granite.
ATLAS VIP 200 INLET FUNNEL CODE 274 AP
TOILET ROLL HOLDER PER PAN AS PER DETAIL – 30m-3
CONCRETE EXTERNAL WASH TROUGH
6mm Silvered float glass copper backed mirrors with polished edges holed for and fixed with chromium plated dome capped mirror screws with rubber buffers to plugs in brickwork or concrete

FLOORS:
Refer to engineers specification
micron GUNPLAS USB BLACK waterproofing on 25mm river sand bed on fill compacted to MOD AASHTO 95%.
Soil to be poisoned in accordance with SABS 1165.
(Certificate must be provided)

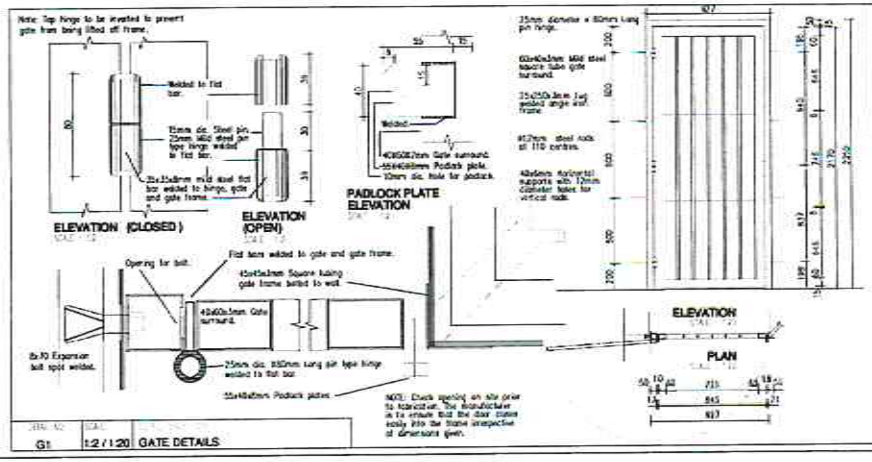
GN | detail description: GENERAL SPECIFICATION / CONSTRUCTION NOTES



GROUND STOREY PLAN



ROOF PLAN



Note: Top hinge to be inverted to prevent gate from being lifted off frame.

G1 | SCALE: 1:2 / 1:20 | GATE DETAILS

FOR TENDER

N. FRANCIS

LDM

architecture + restoration + urban design
think architecture
francis architect & interiors

PROVINCE OF KWAZULU-NATAL
DEPARTMENT OF PUBLIC WORKS

PROJECT: DEPARTMENT OF EDUCATION SANITATION PROGRAMME VIP TOILETS

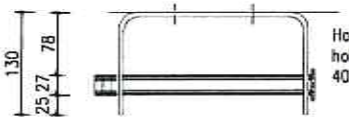
DRAWING DESCRIPTION: 3 SEATER GIRLS, 3 SEATER BOYS - 1 PAN & 1 URINAL

Drawn	Checked	Principal agent
n. gavu	n. francis	
Date: 31-08-18	Scale: AS SHOWN	
Drawing no: 18-3G-1P-T8	6	T	A1	1/1

Work no: 063634

Rev: B

Bend a 3mm thick steel plate as shown, with 2 x 30 holes to support roller. Fix to wall with 2 x 8mm dia. rawl bolts



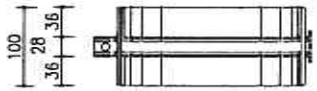
Hole for padlock on one side of toilet roll holder and on the other side weld a 40mm x 3mm thick steel plate.

PLAN

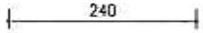
27 dia. x 2mm thick steel pipe toilet roll holder.

Note:-
Provide one toilet roll holder for girls toilet and one toilet roll holder for boys toilet- as shown on plan.

Steel to be finished with one coat zinc-chromate primer, one universal undercoat and two coats gloss enamel paint in approved colour.



All edges and sharp corners of bent plate are rounded to a radius of 1mm.



ELEVATION

Supply one padlock per holder.
N.B. All padlocks must be opened by one key
Supply one key for every 5 padlocks.

DETAIL No:	SCALE:	DETAIL DESCRIPTION
TRH	1:5	**DETAIL TOILET ROLL HOLDER**

STATUS OF ISSUE
FOR TENDER

SIGNATURE BY CLIENT DEPARTMENT

Revisions

Rev. No.	Date	REVISIONS	INIT.

Checked by Consultant
Name N. FRANCIS
Signature
06-09-18 Date
PROJECT MANAGER

PRINCIPAL AGENT

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THE CORNER
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GLEN ASHLEY

PROVINCE OF KWAZULU-NATAL
DEPARTMENT OF PUBLIC WORKS

HEAD OF PUBLIC WORKS
A. GOVENDER

PROJECT
DEPARTMENT OF EDUCATION
SANITATION PROGRAMME
WATERBORNE TOILETS

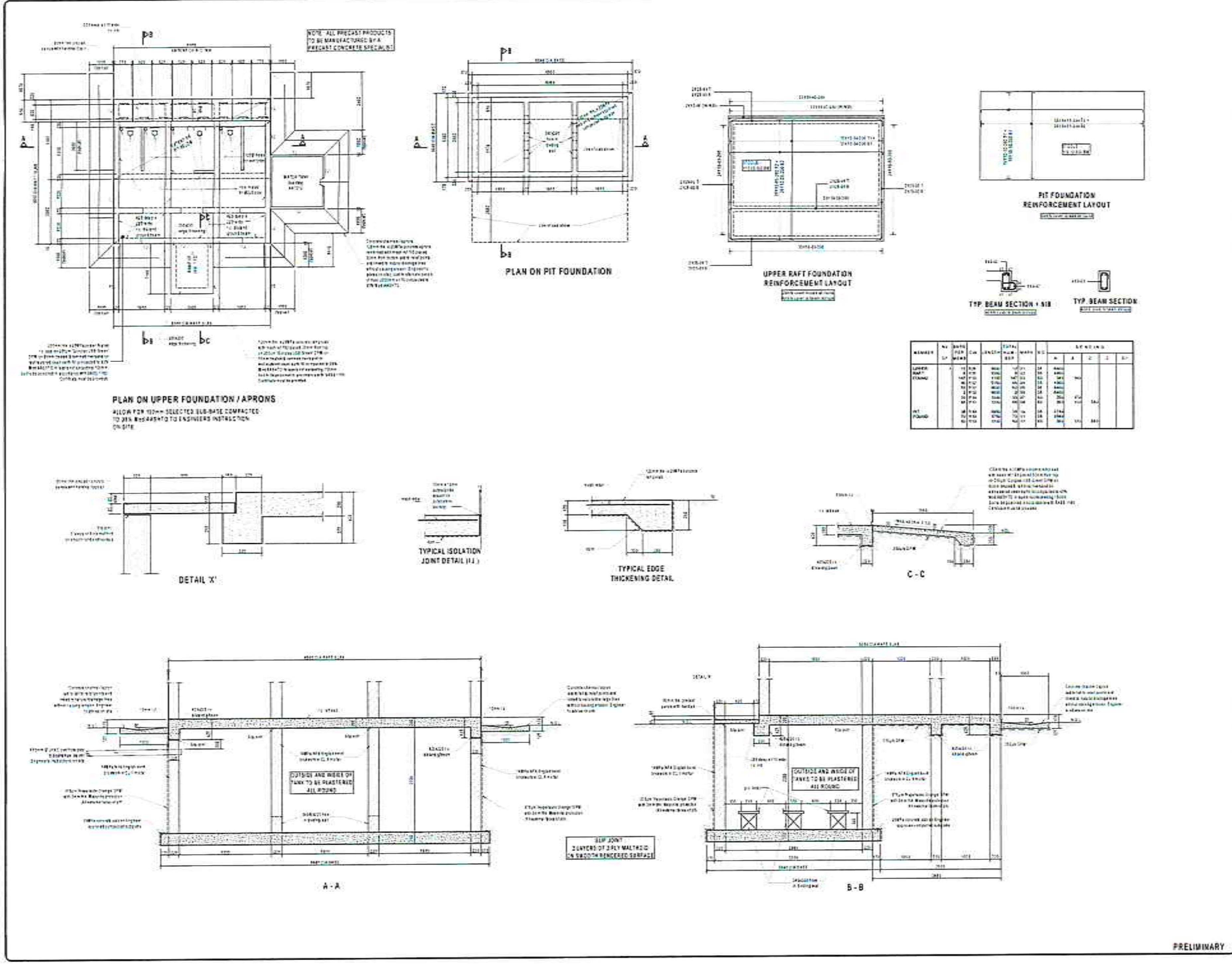
DRAWING DESCRIPTION	type
TOILET ROLL HOLDERS	TRH

DRAWN	CHECKED	PRINCIPAL AGENT	
n. gavu	n. francis	ARCHITECT	Y
DATE	SCALES	PROJECT MAN.	
06-09-18	AS SHOWN	XA CONSULTANT	

DRAWING No.	REVISION	STATUS S-C-AB-T	SHEET SIZE	SHEET
TRH	0	T	A3	1/1

Wims No	Emis No.
063634	

Stamped by Plans Approval Committee



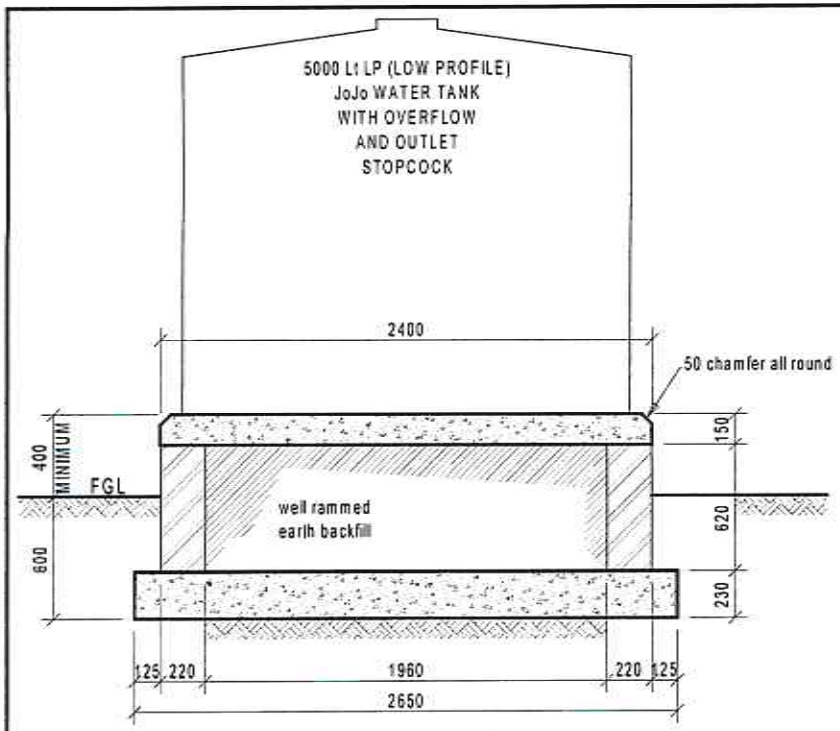
NOTES

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ARCHITECTS LAYOUT

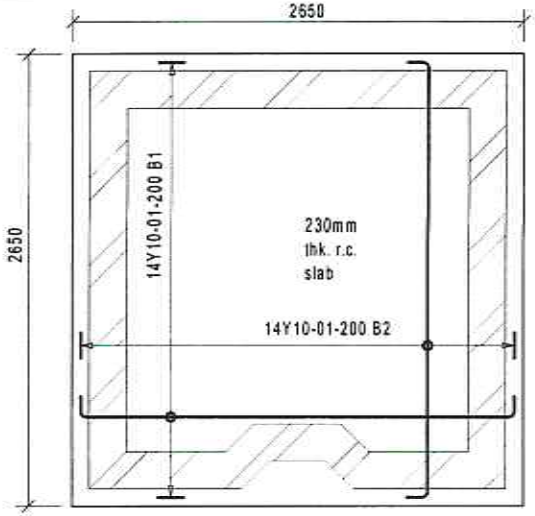
WIMS NO 063534
DEPARTMENT OF EDUCATION
SANITATION PROGRAMME

TYPE 'B' (PIT ABLUTION)
TYPICAL TEACHERS / LEARNERS ABLUTION
(2No MALE + 3No FEMALE + 1No PARAPLEGIC)
STRUCTURAL LAYOUTS & DETAILS

447 / 301

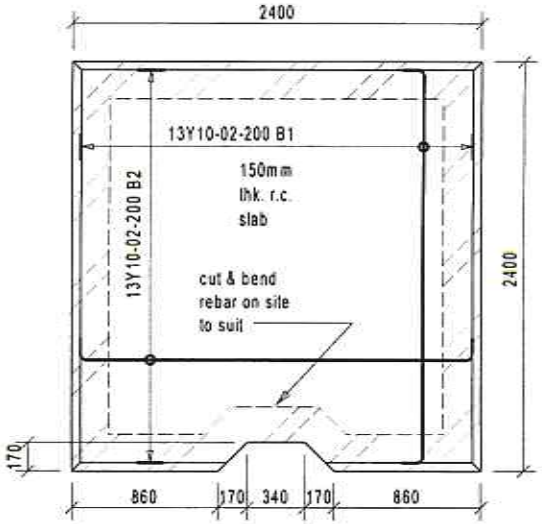


TYPICAL SECTION



PLAN ON FOOTING

50mm cover to reinforcement all round



PLAN ON TANK SUPPORT SLAB

25mm cover to reinforcement all round

JoJo Tank – 'strapping' down specifications

All JoJo tanks are to be strapped down (at each of the 4 stubs on top of the tank) to the supporting concrete base with 2 no. off 4mm diameter fully galvanized stay wires (allow for 'turnbuckles' to tighten each of the 'double strap' stay wires). Each of the 'double strap' stay wires are to be tied to a M12 eye bolt of which is to be drilled and fixed to the 4 corners of the concrete supporting base. The specification for the eye bolt is as follows : galvanised mild steel - M12 eye bolt with 25mm eye inside diameter and with 80mm long shank.

NOTES:
1. SEE ARCHITECTS LAYOUT FOR LOCATION OF TANK.
2. ALL FOUNDATION EXCAVATIONS TO BE COMPACTED TO A MINIMUM OF 93% MOD AASHTO PRIOR TO CONCRETE BEING CAST.
3. MINIMUM 25MPa CONCRETE STRENGTH AT 28 DAYS
4. MINIMUM 14MPa NFX BRICKWORK IN CLASS II MORTAR

PRELIMINARY

REV.	DESCRIPTIONS	BY	DATE
P1	PRELIMINARY	Y.R	04/07/2016

professional person: M.NAIR PrTechEng
registration: 200670211

MEMBER	No OF	BARS PER MEMB	DIA.	LENGTH	TOTAL NUM-BER	MARK	S C	BENDING A
	1	28	Y10	2750	28	01	35	2550
		26	Y10	2500	26	02	35	2300

LDM
Solutions For The Built Environment
WWW.LDM.CO.ZA

MAP AFRICA
CONSULTING ENGINEERS

PROJECT
WIMS NO. 063634
DEPARTMENT OF EDUCATION
SANITATION PROGRAMME

DATE
01/07/2016

REVISION
P1

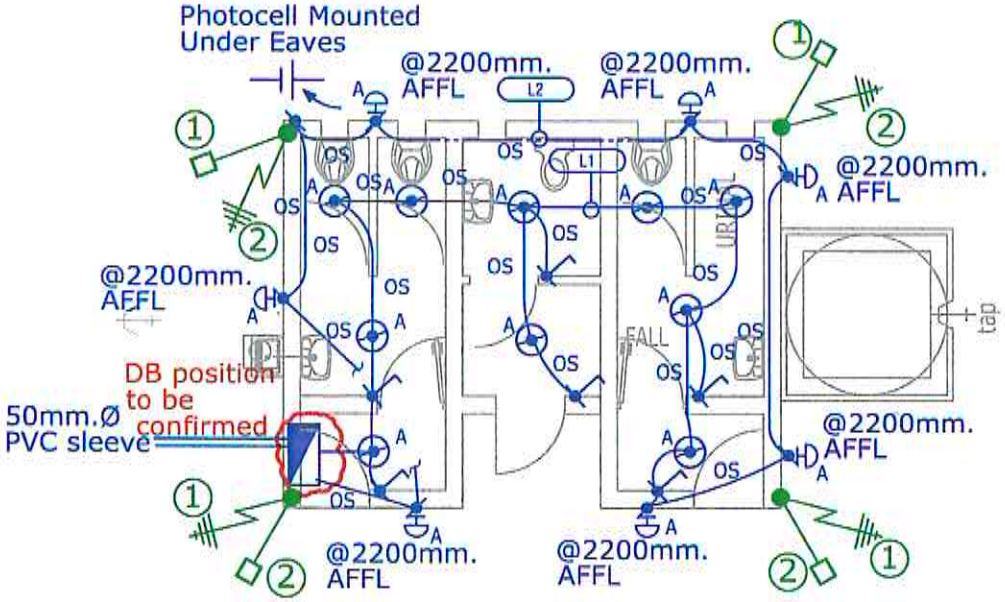
DETAILS
TYPICAL WATER TANK SUPPORT
CONCRETE & REINFORCEMENT
LAYOUT & DETAILS

DRG. No.
447 / 312

LIGHTNING PROTECTION NOTES

1) 25mm.Ø PVC CONDUIT DROPPER BUILT INTO BRICKWORK
2) EARTH SPIKE

Note: Only applicable to schools that have an existing and functional power supply



FOR TENDER

REV	DATE	BY	DESCRIPTION	SIGN
0	04/07/23	CG	Issue for Tender	

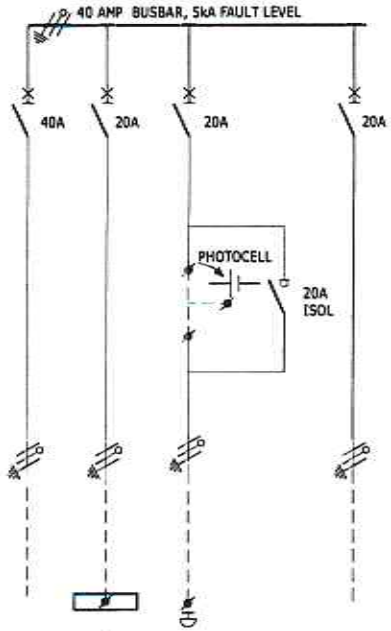
FILE NAME:

LDM
Solutions For The Built Environment

DATE	SCALE
04/07/23	1:100
DESIGNED	DRAWN
G.Chetty	C.G

TITLE:
WIMS No. 063634: Department of Education Sanitation Programme
Type B-VIP - 2 Seater Girls, 2 Seater Boys, Teacher/Paraplegic Ablution Block Lighting Layout

PROJECT No.	CHKD.
16016	
DRAWING No.:	
009	
SHEET No.:	REV.
	0



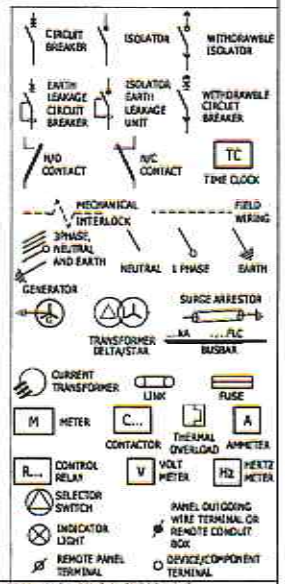
CIRCUIT No./PHASE		1	2	
DESIGNATION	INCOMER	ABLUTION LIGHTING	OUTDOOR LIGHTS	SPARE
WIRING	10mm² 2CORE Cu PVC SWA PVC ECC CABLE	3x2,5mm² PVC INSULATED TWIN AND EARTH CABLE	3x2,5mm² PVC INSULATED TWIN AND EARTH CABLE	
LOAD (AMPS)		XX	XX	
No. OF POINTS		XX	XX	

GENERAL NOTES:

A) DROPPERS/TAILS TO BE RATED FOR I^2t LET THROUGH
B) HARNESSED WIRING TO BE DERATED.
C) TUFFNOL BRACES NOT TO BE USED ABOVE 10kA.
D) COPPER BUSBARS TO BE CONTINUOUS RATED.
E) ENCLOSURE TO BE IP65.
F) PHASING R.W.B. TOP TO BOTTOM, LEFT TO RIGHT, BACK TO FRONT.
G) INTERNAL TEMPERATURE TO BE LIMITED TO 5° ABOVE ABOVE AMBIENT - MAX. 40°C.
H) CABLE ENTRIES AND GENERAL ARRANGEMENT TO SUIT INSTALLATION CONSTRAINTS.

ADDITIONAL NOTES:

1. ALL CIRCUIT BREAKERS, ISOLATORS AND EARTH LEAKAGE TO BE TYPE 2 CURVE AND EQUIPMENT TO BE CBI.
2. EARTH LEAKAGE TO BE 60A ISOLATOR WITH INTEGRAL 30mA.
3. SURFACE MOUNTED DB WITH ARCHITRAVE.
4. DB COLOUR TO BE WHITE.
5. DB TO BE TOP AND BOTTOM ENTRY
6. BUSBAR TO BE SHROUDED
7. EARTH & NEUTRAL BAR TO BE EASY ACCESSIBLE.
8. SUFFICIENT SPACE REQUIRED FOR SAFE ACCESS FOR REWIRING.
9. ACCESS ZONE REQUIRED THROUGH SHROUD
10. ALL 3 PHASES AND SINGLE PHASE OUTGOING CIRCUIT BREAKERS TO BE LABELLED WITH DESCRIPTION OF SERVICES AND CIRCUIT Nos. AS PER DRAWING.



REV	DESCRIPTION	BY	DATE	CHKD.
0	Original Issue	CG	23/06/16	

ENGINEER	DRAWN	DATE:	SCALE:	CHKD.
G.Chetty	C.G	June 16	n.t.s PAPER SIZE: A3	

PROJECT No.	DRAWING No.	SHEET:	REV.
16016	400	1 of 1	0

File Name : Lyr: 0:1:A3

TITLE: Wims No. 063634: Department of Education Sanitation Programme

DRAWING TITLE: Typical DB for Toilet Blocks Single Line Diagram

IBUYA Consulting Engineers
"POWERING DEVELOPMENT"
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WESTVILLE
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TEL: +27 (031) 2667332
FAX: +27 (031) 2667340
E-mail: ibuya@ibuya.co.za

VIP ABLUTION BLOCKS	
TYPE	DESCRIPTION
B(T)	2 SEATER FEMALES 2 SEATER MALES 1 TEACHERS & PARA
B(L)	2 SEATER GIRLS 2 SEATER BOYS 1 TEACHERS & PARA

EXISTING BUILDINGS	
BLOCK	BUILDING TYPE
A	EXISTING BOYS ABLUTION BLOCK
B	EXISTING GIRLS ABLUTION BLOCK
C1-C2	EXISTING ABLUTION BLOCKS FOR DEMOLITION
D1-D3	EXISTING ADMIN OFFICE & CLASSROOM BLOCKS
E	EXISTING GAURDHOUSE

KEY

- EXISTING BUILDINGS
- EXISTING ABLUTION TO BE DEMOLISHED
- PROPOSED NEW TOILETS
- PROPOSED WALKWAY 2.2M WIDE
- PROPOSED COVERED WALKWAY 2.2M WIDE
- 50M PHREPHEGIC RADIUS
- 30M BOREHOLE CLEARANCE RADIUS
- APPROX. PERCOLATION TEST PIT POINT

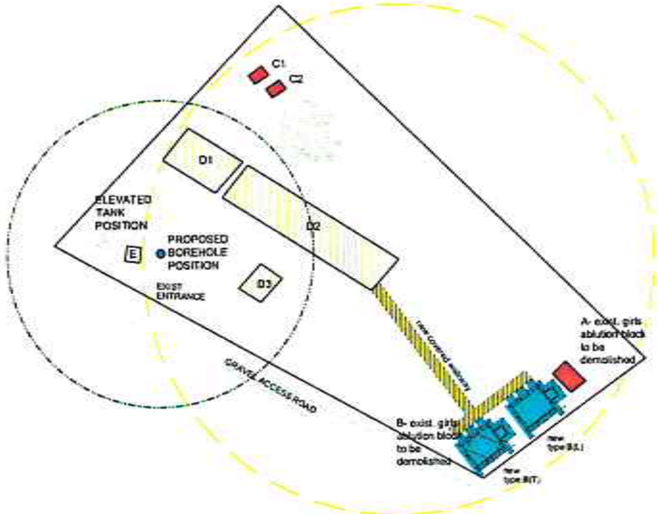
EARTHWORKS

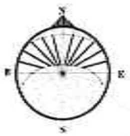
MINOR EARTHWORKS

RETAINING WALLS

NO RETAINING WALLS

PRE-CONSTRUCTION SITE AERIAL PHOTOGRAPH
NOT TO SCALE





SITE PLAN

SCALE 1:500

29°55'40"S 30°42'30"E

1. Please note that the site boundaries do not depict ownership boundaries in the 'notional site plan'. These 'notional' boundaries represent nearest fence lines and the layouts is solely for reference information purposes only.
2. For accurate and true ownership boundaries, cadastral survey diagrams must be obtained.

FOR TENDER

N. FRANCIS

LDM

francisarchitects
architecture + restoration + urban design
think architecture

PROVINCE OF KWAZULU-NATAL
DEPARTMENT OF PUBLIC WORKS

DEPARTMENT OF EDUCATION
SANITATION PROGRAMME
eThekwini Metro Municipality (iLembe)
Dumane S. Comprehensive High School
1603 D Section Hlomantethe, Ndwedwe

SITE PLAN LAYOUT
TYPE B(T), B(L)

Drawn	Checked	Date	Scale	Drawing no.	Revision	Status	Sheet size	Sheet
a. mokoena	a. francis	04-07-23	AS SHOWN	E62-DumaCHS	1	T	A1	1/2

063834	500334961	1

KWAZULU-NATAL PROVINCE
PUBLIC WORKS
REPUBLIC OF SOUTH AFRICA

DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3: ETHEKWINI REGION: DUMANE COMMERCIAL HS

PROVISIONAL SITE PLAN

KZN WATER AND SANITATION PROGRAMME

Field Investigation Form

School:	Dumane S Commercial High School
Region / Cluster:	eThekwini Metropolitan Municipality (Ilembe)
Date:	2016.05.19
Assessor Name:	Clinton Govender
Co-Ordinates:	29°27'28"S 30°54'10"E (S29.45777778; E30.90277778)
Scope:	Demolish Existing Toilets and build new blocks

ABLUTION :	EXTENT :
Block A – Boys Toilet	Demolish and Build new block
Block B – Girls Toilet	Demolish and Build new block
Block C – Staff Toilet	Demolish and Build new block

KWAZULU-NATAL PROVINCE
PUBLIC WORKS
REPUBLIC OF SOUTH AFRICA

DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3: ETHEKWINI REGION: DUMANE COMMERCIAL HS

ANNEXURES

KWAZULU-NATAL PROVINCE
PUBLIC WORKS
REPUBLIC OF SOUTH AFRICA

DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3: ETHEKWINI REGION: DUMANE COMMERCIAL HS

ANNEXURE 1

ASAQS MODEL PREAMBLES FOR ALL TRADES (2017)

NOTE: TENDERERS MAY PURCHASE A COPY OF THE ASAQS MODEL PREAMBLES FOR TRADES – 2017 EDITION, FROM THE ASAQS WEBSITE:
https://www.asaqs.co.za/store/viewproduct.aspx?id=16404663

KWAZULU-NATAL PROVINCE
PUBLIC WORKS
REPUBLIC OF SOUTH AFRICA

DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3: ETHEKWINI REGION: DUMANE COMMERCIAL HS

ANNEXURE 2

GENERAL ELECTRICAL SPECIFICATIONS

GENERAL ELECTRICAL SPECIFICATION

(ALL IN CONTRACTS)

1. CONDUIT AND CONDUIT ACCESSORIES

1.1 Conduit

Conduit shall be of steel galvanised internally and externally, either solid drawn, or welded and not less than 20 mm diameter, with all rough edges removed. All tube ends removed. All tube ends are to be reamed. With screwed conduit one threaded end is to be fitted with a coupling and the other end is to be protected against damage.

UPVC conduit may only be used if permitted by the Head : Works and only in those areas which he may specify. In this case this conduit shall be according to SABS 950.

Conduit accessories, which are secured to the conduit by means of lugs, screws or setscrews, are not acceptable.

General requirements of conduiting to SABS IEC 60614 (1).

Metal conduits shall be fully in accordance with SABS 1065 PART I.

1.2 Conduit Accessories

All conduit accessories shall be galvanised both internally and externally and comply with SABS 1065 – PART II.

All screwed conduit fittings shall be of malleable cast iron.

Where fittings are fitted with covers, the covers shall be of galvanised pressed steel secured with brass screws.

1.3 Flexible Conduit

Flexible conduit shall be of the plastic covered metal type complete with brass connectors to the approval of the Head : Works.

2. INSTALLATION OF CONDUIT

2.1 General

Except where cables are specified for certain circuits, the installation(s) shall be tubed throughout in steel conduit. Split conduit is not permitted. All conduits shall, wherever possible, or unless otherwise specified or agreed, be concealed in the structural work.

Except where agreed or otherwise specified or indicated on the drawings, all conduit to points shall run via the ceiling and floor slabs or roof space. In damp situations and where exposed to the weather, the conduits shall be so installed as to avoid, as far as possible, the condensation of moisture within them. All running joints are to be painted with an approved metal primer.

Mechanical and Electrical continuity must be maintained throughout the installation. Each length of conduit and every conduit fitting must be inspected for defects and all sharp edges or burrs must be removed before it is installed. All joints are to be tightly fitted together.

Running joints with long threads, where used, are to be fitted with a lock nut and the running thread shall not be longer in length than a coupling and lock unit.

In conduits smaller than 32 mm elbows and normal bends are not to be used but conduits are to be set to the required angles.

Flexible connections between conduit and appliance or other equipment shall be by means of flexible tubing (see Par 1.3).

No wiring shall be drawn into conduits until the conduits have been installed.

Where more than one socket outlet is connected on a circuit, the conduit shall be looped from the one outlet box to the following outlet box.

All switch-boxes, socket outlet boxes and any other purpose made metal box including distribution board trays shall be suitable treated against corrosion before installation with "Rustodian" or other approved metal primer.

All conduits shall be securely fixed into chases, and all flush switch and socket outlet boxes must be firmly embedded in cement mortar.

The Contractor shall make himself familiar with the positions of all fittings, such as blackboards, pinning boards, cupboards, shelving, worktops, etc, before commencing the conduit installation. The position of switches and socket outlets as indicated on the drawings are approximate only. The Contractor must verify that the final position of these will not be covered by the installation of the fittings referred to above, or come midway between the junction of any dados and upper wall finishes.

No extras will be entertained for moving switches or socket outlets as a result of the Contractor's failure to verify the final positions of the fittings or type of wall finish.

2.2 **In Roof Spaces**

The conduit in roof spaces shall be installed parallel or at right angles to the roof truss members and shall be secured at centers not exceeding 1,2 m by means of galvanised saddles nailed to the timbers with galvanised clout nails. Crampets will not be allowed.

Crossing of conduits is to be avoided wherever possible. Where unavoidable, one conduit must be neatly set over the other. Where a number of conduits have to run back to the distribution board or switchboard, they shall run parallel to the distribution board or switchboard, and at saddle distance to each other wherever possible.

Conduit runs from distribution boards shall terminate in fabricated sheet steel draw boxes installed in the roof above the distribution boards. Each draw box shall be fabricated from 1,6 mm galvanised sheet steel with welded corners and

suitably treated against corrosion with "Rustodian" or other approved primer and finished in aluminium paint.

Each draw box is to be fitted with slip-on lid with a 13 mm skirt. The box shall be 75 mm deep, shall be rectangular in shape and the size of conduits entering or leaving the box. Conduits shall be fixed to the box by means of couplings and brass male bushes or lock nuts and brass bush-nuts.

Conduit droppers shall be neatly cut into timber wall plates and set to face the right direction. All sets must be uniform. Conduits may be set at angles only where droppers or ceiling points are within 230 mm of roof members.

No conduits are to be run over the top of gangplanks or trapdoors.

Draw-in boxes with metal covers shall be provided where required and shall be installed near the gangplanks, if any. All inspection conduit fittings in open roof spaces shall face upwards to facilitate wiring and to permit easy inspection. Three-way conduit boxes shall be used for tee-off purposed in open roof spaces. Inspection tees are not to be used except where otherwise agreed or specified.

All conduits extended into a roof space with a roof clearance of more than 900 mm shall be set onto the beam and extended into the roof for a distance where there is sufficient clearance. Under flat roofs or where there is less than 900 mm clearance, the conduit shall be installed as specified for tubing in concrete slabs, right angle bends should be kept to a minimum and the shortest route taken.

Where false ceilings occur they shall be tubed as called for in the detailed specification. Conduits in restricted spaces and run as for concrete slabs must however, be installed in a neat and orderly manner.

Conduits to ceiling points for all types of fittings must be firmly supported and shall terminate in a back entry conduit box. The conduit box shall be taken through to the face of the ceiling and finish flush. Where the ceiling brandering interferes with the installation of the ceiling point specified, the Contractor must trim the brandering to allow the conduit box to be taken through to the face of the ceiling as specified. Luminaires must be bonded to the conduit box by means of metal threaded screws.

2.3 In Concrete Slabs

In order not to delay building operations, the Contractor must ensure that all conduits and conduit fittings, which are to be cast in concrete, are laid in good time. The Contractor shall have a competent Electrical Artisan standing by during casting of concrete, etc, to ensure that the conduit boxes are not damaged during casting of concrete.

Draw boxes, expansion joints boxes and round conduit boxes are to be provided where necessary.

Deep type conduit boxes shall be used for side entering conduits and normal shallow boxes may be used for back entry conduits. No elbows, bends or sharp sets will be allowed in concrete slabs except in cases of conduits of 40 mm diameter or when larger sweeping bends will be permitted.

Common drawn and/or inspection boxes shall be used where there is more than one circuit involved. They shall be installed in lavatories, storerooms, or other inconspicuous places. Covers shall be of hardboard neatly finished to match the finished ceiling or wall surface, and shall be fitted parallel to the wall or ceiling.

All boxes, etc. are to be securely fixed to the shuttering to prevent displacement when concrete is cast. All conduits must be laid off the deck, supported and secured at regular intervals and installed as close as possible to the neutral axis of concrete beams and slabs.

Expansion joints shall be shown on layout drawings and shall consist of a metal box in which one conduit is fixed and the other capable of movement with the building's expansion and contraction. Earth continuity of these joints shall be maintained by means of stranded copper conductors bonded to the conduits in the box as shown on the drawing.

Earth conductors and clamps buried in concrete are not permitted.

Conduits must be spaced sufficiently apart to allow for proper concreting. All joints shall be painted with an approved metal primer after completion of the tubing installation, prior to the concreting. All exposed parts of the conduit installation shall be suitably, protected against corrosion at the discretion of the Head : Works.

Before any concrete slab is cast, all conduit droppers to switchboards shall be neatly spaced and rigidly fixed.

2.4 Surface Work

All conduit must be plumbed and leveled and only straight lengths shall be used.

In cases where doorframes are out of plumb, or fittings, beams etc, are out of level, the conduit shall be run parallel with the doorframes, fittings, beams etc.

No threads shall be visible when the conduit installation is complete, except on running couplings.

Running couplings shall only be used where unavoidable and shall be fitted with a sliced coupling as a lock nut.

No inspection or normal bends are to be used on surface work, except with the approval of the Works Inspector and where conduits of 32 mm diameter or larger are used. Conduits shall be set uniformly and inspection couplings shall be used where necessary.

Fittings, tees, boxes, couplings, etc, are to be cut into the surface to allow the conduit to fit flush against the surface or alternatively spacer bar saddles may be used. Conduit is to be bedded into any irregularities to avoid gaps between the surface and the conduit.

Double sets, where used, shall be parallel with no twists and shall be as short as possible. All conduits, which terminate at metal trays, boxes, industrial switches and plugs shall do so by means of couplings and male bushes. No couplings will be permitted in droppers of lengths less than 3.6 m.

Where crossings of conduits is unavoidable, purpose made metal boxes shall be used. The length of the box is to be 8 times the diameter of the largest conduit, the width one and half times the sum of the diameter of al the conduits, and the depth one and half times the diameter of the largest conduit with a minimum depth of 50 mm. The box shall be fitted with a neatly fitting cover and the finish shall be in keeping with the general layout.

Where a number of conduits are to be installed in parallel they shall be evenly spaced and grouped under one purpose made saddle. Conduit spacing shall not exceed 10 mm. The purpose made saddle shall be made of 25 x 2 mm galvanised steel strip or other approved material, formed to suit the curvature of the various conduits and shall be drilled and fixed by means of screws between. Saddles shall be spaced at intervals not exceeding 1.8 m, except for conduit droppers, which shall be saddled centrally between ceiling and accessory box. All saddles are to be secured to the wall by means of black japan or brass rounded head screws. Distribution boards, draw boxes, industrial switches and plugs, etc, shall be neatly recessed into the surface of plastered walls to avoid double sets or alternatively spacer bar saddles may be used. On face brick walls the conduit shall be tightly set into the switch or plug.

In situations where there are not ceilings, the conduits are to be run along the wall plates and tie beams.

No wiring is to be carried out until the tubing has been inspected and approved.

Where spacer bar saddles are used, these shall be installed at centers of 1 m for horizontal and 1.5 m for vertical runs.

All conduits shall be painted with an approved enamel paint to match the background colour.

2.5 Future Extensions

In roof spaces with a minimum clearance of 900 mm, switch and plug drips for future use are to be set 300 mm in the correct direction and shall be threaded and fitted with plugged couplings. Where the roof over a slab is to be removed for future expansions, conduits for future use are to terminate 40 mm above tie beams and shall be threaded and fitted with plugged couplings.

Where future extensions are to be below slabs, all switch, socket outlet and other conduit droppers are to terminate 130 mm below slabs or beams with conduit ends threaded and fitted with plugged couplings.

Where provision is made for future extensions to a concrete slab, all conduits required for future use are to project 130 mm from the slab. Conduit projections are to be painted with an approved anti-corrosive paint and must be fitted with plugged couplings.

All switch, plug and other outlet boxes required for future use shall be fitted with approved blank cover plates.

Unused lighting outlet boxes are to be fitted with round hardboard or plastic covers with brass cover screws, which shall fit flat on the finished ceiling.

2.6 Fixing of Conduits

Conduits shall be fixed to switch and socket outlet boxes by means of couplings and brass male bushes or lock nuts and brass bush nuts. Couplings and male bushes to be used on all surface work.

2.7 Chases and Building Work

Except where otherwise specified conduits, switch boxes, plug boxes and distribution boards are to be built into the brick walls by the Contractor. It will, however, remain the responsibility of the Contractor to ensure that the above-mentioned boxes and distribution boards are correctly built in and are firmly bedded and cemented into the walls, plumb and square.

The Contractor shall, unless otherwise specified, do all necessary chasing and cutting of bricks. All electrical materials (e.g. conduits up to 40 mm for UG cables, conduits, conduit boxes, distribution boards etc) must be supplied by the Contractor who must arrange to have these on site, and positioned when required for the building work. A competent Electrical Artisan must be in attendance and ensure that the conduits etc are correctly installed and positioned.

The Contractor is to ensure that tubing installed in chases is securely nailed and covered by a layer of 5:1 mixture of coarse sand and cement, finished flush with brickwork and that switch and plug boxes finish flush with the finished wall surface.

The Contractor is to ensue that below distribution boards connected by means of under-ground cables, a 230 mm wide by 115 mm deep cavity in the wall from the cable pipe to the distribution board is to be provided by the Contractor, or alternatively, cable sleeves as specified.

3. PLUGGING OF WALLS

Only approved plastic plugs shall be used to secure conduit or equipment up to 5kg mass. The use of round-headed screws only will be permitted.

Heavier equipment shall be secured by means of approved expansion bolts.

Wood plugs and any plugs in the joints in brick walls are not permitted.

4. FIXING TO CONCRETE CEILINGS

Ceilings mounted equipment other than luminaires shall be secured to concrete ceilings by means of expansion bolts, shot bolts or "Robot" tools bolts or as expressly specified for the service.

5. WIRING

5.1 PVC Insulated Single Core Medium Voltage Conductor

The conductor is to be of high conductivity copper wire insulated with Polyvinyl Chloride. The cable shall be finished in the required colours and shall be in accordance with SABS 1507 and 1574.

Circuit wiring shall be of the Loop-in system and no wiring joints in the conduit or conduit fittings will be permitted. Not more than two conductors of a kind will be allowed at any outlet point. the end strands of cables, whether single or looped which have to be connected to terminals of switched, plugs, lamp-holders, fittings and distribution boards, etc, are to be tightly twisted together. Cutting away of wire strands of any cable will not be allowed. Only one circuit in any one conduit will be permitted unless otherwise specified.

Conductor sizes shall be as follows except where otherwise specified:

Lighting circuits	1,5 mm^2	
Bells circuits	1,5 mm^2	
Clock circuits	1,5 mm^2	
Incinerator circuits	2,5 mm^2	
Ironing circuits	2,5 mm^2	with 2,5 mm^2 insulated earth wire
Plug circuits	4,0 mm^2	with 2,5 mm^2 insulated earth wire
Geyser circuits	4,0 mm^2	with 2,5 mm^2 insulated earth wire
Heater circuits	4,0 mm^2	with 2,5 mm^2 insulated earth wire
Stove	10 mm^2	with 6,0 mm^2 insulated earth wire
Motor circuits		
Up to 4kW single phase	4,0 mm^2	with 2,5 mm^2 insulated earth wire
Up to 11kW three phase	4,0 mm^2	with 2,5 mm^2 insulated earth wire

To avoid deformation of PVC insulated cables at temperatures in excess of 57° C, they shall not be brought directly on to the terminals of appliances such as electric heaters, or any other electrical appliances or apparatus (including luminaires) which have a temperature in excess of 57° C. They shall terminate in a suitable terminal box as near to the appliance or fittings as possible and connect up from thereon, with heat resistant conductor.

6. MOUNTING AND POSITIONING OF LUMINAIRES

Luminaires and installation to comply with SABS 1464 Parts 1 to 22 and IEC 598-1 and IEC 60598 as applicable.

The contractor shall, in the case of board and acoustic tile ceilings (i.e. as opposed to concrete slabs), ensure that the luminaires are symmetrically positioned with regard to the ceiling pattern.

The layout of the luminaires as indicated on the drawings shall be adhered to as far as possible. The exact positions must be confirmed on site with the Head : Works.

Except where otherwise specified, pendant luminaires are to be mounted with the bottom of the fittings 2,5 m above finished floor level, mounted on either metal discs or wood blocks.

Under no circumstances shall cover strips be cut to accommodate wood blocks. Wood blocks must be neatly slotted to fit over cover strips and are to be secured by a minimum of two screws, which shall penetrate at least 25 mm into solid wood. Ceiling cover strips shall be neatly cut to accommodate fluorescent luminaires.

Where ceilings are raked, all incandescent luminaires are to be mounted on shaped leveling wood blocks securely fixed to the ceiling. Batten holders shall be secured to woodblocks by suitable brass screws. Fluorescent luminaires are to be mounted direct on raked ceiling without leveling blocks.

Fluorescent luminaires to be mounted on concrete ceilings shall be screwed to the outlet boxes and additionally supported by means of 50 x 6 mm expansion bolts. The bolts are to be ¾ of the length of luminaires apart.

Where a number of luminaires are installed end to end, outlet points must be provided after every second luminaire unless otherwise indicated on the drawing.

The luminaires are to be joined together by means of 20 mm conduit nipples, lock nuts and male brass bushes, and the wiring led through the channels of the luminaires. The Contractor shall ensure that all such rows are correctly lined up and that the rows are parallel with the relevant building line.

The luminaires are to be jointed together by means of 20 mm conduit nipples, lock nuts and male brass bushes, and the wiring led through the channels of the luminaires. The Contractor shall ensure that all such rows are correctly lined up and that the rows are parallel with the relevant building line.

Incandescent luminaires are to be screwed directly to outlet boxes in concrete slabs and in board ceilings. In board ceilings the conduit box and the conduit shall be secured to the timberwork of the ceiling in such a manner that it shall support any incandescent luminaire, which is designed to be fixed to a normal conduit box.

Fluorescent luminaires shall be secured to board ceilings by means of the conduit box and 6 mm bolts passing through the boards and brandering.

7. BATTEN HOLDERS

B.C. batten holders shall be of brass or moulded plastic reinforced type complete with shade ring. The batten holders shall comply with SABS IEC 60238 and SABS IEC 61184. All lamp holders are to have brass terminals with screw type connection.

8. **LAMP HOLDERS**

Edison screw lamp holders	:	SABS IEC 60238
Bayonet lamp holders	:	SABS IEC 61184
Lamp holders for tubular fluorescent lamps	:	SABS IEC 60400

B.C. screwed lamp holders shall be of brass 20 mm E.T. complete with shade ring and shall comply with SABS IEC 60238 and SABS IEC 61184 with screw type connection terminals.

9. **SWITCHES AND SOCKET OUTLETS**

Switches SABS IEC 60669 as applicable and socket outlets SABS IEC 60884 as applicable shall be of the most modern manufacture and bear the SABS mark.

Flush switch and plug cover plates shall, unless otherwise specified, be of anodized aluminium of thickness not less than 0,9 mm, satin or other approved finish as directed and otherwise to be fully in accordance with SABS IEC 1084 for cover plates and SABS 1085 for wall boxes.

10. **POSITIONS OF SWITCHES AND SOCKET OUTLETS**

Except where otherwise specified, lighting switches and socket outlets are to be installed 1,4 m above finished floor level.

All mounting heights specified are to be measured from finished floor level to the bottom of the outlet box.

Where the lower portion of the wall consists of face brickwork and the upper portion of plastered finish, switches and socket outlets are to be mounted in the plastered surface, provided that the lower edge of the plasterwork does not exceed a height of 1,5 m above finished floor level in which case the switches or socket outlets are to be installed in the face brick dado.

Where socket outlet and switch boxes have been installed with fixing lugs below finished wall surface, only approved distance pieces required to compensate for the recess shall be used. The lengths of distance pieces are not to exceed 15 mm.

Unless otherwise approved, light switches adjacent to doors are to be installed at the lock side of the door. Where the lock position is not indicated on the drawings, its position shall be ascertained before the switch box is installed. Switches are to be installed 150 mm from the reveal, or centrally if there is a fitting near the door.

All switch and socket outlet boxes shall be installed plumb, and built into the wall with a 1:1 mixture of cement and sand.

Industrial type switches and socket outlets shall be neatly recessed into the surface of plastered walls to avoid sets or alternatively spacer bar saddles may be used.

Deep type boxes may be used where switches or socket outlets are back to back, but where one side only is to be utilized at the time and the other is for future use, the side for future use shall be suitably covered with a metal cover plate.

11. LOW TENSION SWITCHBOARDS

Low Voltage switch gear and control gear to comply with SABS 1473 and SABS IEC 60947 and SABS 60349.

Where switchboards are to be installed in switch rooms or switch cupboards, the Contractor must ensure that the boards are manufactured to suit the dimensions of the rooms or cupboards.

Low tension switchboards shall be specified in detail for each service, but shall generally conform to the following:

They are to be of strong and rigid construction, with suitable angle, channel or folded steel framework. They are to be flush fronted and totally enclosed with sheet steel panels suitably formed at the edges and reinforced to prevent distortion. Unless otherwise directed, all front panels must be at least 2 mm thick and all other panels at least 1.6 mm thick. Panels are to be secured to the framework with studs and chromium plated dome nuts (self-tapping and similar screws are not permitted).

Switches, etc, are to be mounted on metal frames within the boards to give flush front panels. Equipment of normally surface mounted types such as energy meters, time switches and contractors, are to be mounted on inner metal trays behind hinged front panels. In the case of supply authority meters the hinged front panels must have transparent inserts.

All metal work of the boards must be thoroughly degreased, primed with PA 10 self etching primer and finished with one coat of undercoat and two coats of electrical orange high gloss enamel, unless otherwise specified.

All accessible current carrying parts, bus-bars, connecting strips, collector bars, etc, are to be adequately insulated in phase colours and suitably braced to withstand projected fault currents.

Connecting strips and collector bars must be of sufficient cross sectional area to carry full rated current of the switches served, irrespective of the fuse of trip rating.

The complete distribution board including bus-bars must be suitably constructed to withstand fault currents specified.

Connections to bus-bars are to be made by means of lugs suitably bolted and locked with high tensile bolts and connections to lugs must be effected by means of a crimping tools.

Incoming and outgoing bus-bar studs, where required, must be suitably insulated where they pass through panels of the board, and firmly supported within the board.

Where applicable, incoming and outgoing collector bars for cables in parallel must so arrange that the multiple cable ends can be connected to the bars with reasonably short tails which do not have to cross.
Cable supports must be placed at suitable heights having regard to the bending radius of the cables concerned and convenience in making off.

Wall-mounting and floor-standing back to wall type boards must be provided with full easy access to all equipment and wiring without any necessity of disconnecting or removing of any of the equipment mounted in the board.

Clear visible indication of all switch positions must be provided and the switches must be clearly labeled as directed by the Head : Works.

The details of construction proposed, and the Head : Works must approve all equipment of switchboards: Works before manufacture is commenced.

12. DISTRIBUTION BOARDS

12.1 Approval

The Head : Works must approve the details of construction proposed and all equipment within distribution boards: Works before manufacture is commenced.

12.2 Flush Mounting Distribution Boards

These shall be generally manufactured in accordance with SABS 1765. The board shall consist of two panels fitted side by side with common bonding tray and attached to a common architrave. One panel shall accommodate all single phase MCB's and the second panel shall accommodate the main isolator, main bus-bars and the triple pole MCB's. Chassis shall be of rigid channel section rust proofed steel with clip-on trays for the single pole MCB's. The main isolator is to be mounted at the bottom of the second panel with the triple pole circuit breakers above.

12.3 Surface Mounting Distribution Boards

These shall be generally manufactured in accordance with SABS 1765, with two panels as for flush boards.

12.4 Single Phase Distribution Boards

Single Phased boards shall be generally constructed as three phase boards except they shall have a single panel. Single phase boards shall be mounted with the bottom of the architrave 1,5 m above finished floor level unless specifically directed otherwise.

12.5 Distribution Board – In Roof Spaces

Where distribution boards are installed below a roof space, a minimum of 2 x 20 mm and 1 x 25 mm spare conduits are to be run from the distribution board into the roof space.

13. METER BOXES

The meter box shall be mounted with the top 1,7 m above finished ground level. Surface mounted meter boxes shall be secured by at least 4 x 10 mm expansion bolts.

Service cables entering the meter box shall be protected by means of a suitably sized galvanised pipe extended 450 mm below the ground surface and securely saddled to the wall and bonded to the meter box.

14. CONNECTIONS TO OUTLETS

14.1 General

Where connectors are used to connect to the wiring of luminaires and other appliances, the connectors shall comply with SABS Specification 1239.

14.2 Connection to Stoves

14.2.1 General

The connection to an electric stove, unless otherwise specified shall consist of 2 x 10 mm^2 conductors and a 6 mm^2 insulated earth wire in 25 mm conduit. The stove shall be controlled by a 60 Amp micro gap switch of approved make and the connection shall be by means of a 45 Amp 3 pin stove plug of the "Cape Town" type. Cable ends, which are to be connected to the stove, shall be equipment with suitable soldered or crimped lugs. The connection between the stove plug and stove shall be by means of flexible conduit.

Except for high school domestic science unit kitchens (see Clause 14.2.2), the conduit shall be chased into the wall and fitted with a switchbox for housing the micro gap switch and a 25 mm circular conduit box over which the stove plug will be mounted. The stove plug shall be fitted with an adaptor plate and shall be screwed directly to the conduit box by means of round head metal screws. The plug outlet shall face downward.

The stove plug and switch shall be mounted 430 mm and 1,4 m respectively above finished floor level unless otherwise specified or indicated on the drawings.

14.2.2 Stove Connections in High School Domestic Science Unit Kitchens

Connections to stoves in High School Domestic Science Unit Kitchens, where the stoves are situated in front of a fitting, shall be generally as specified in Clause 14.2.1 except that the 25 mm diameter conduit shall be run in the floor slab, from the distribution board to a position to the right of the stove. A pedestal, which is complete with a 45 Amp 3 pin "Cape Town" type cooker plug, mounted on the back, shall be fitted over the conduit and securely bolted to the floor by means of expansion bolts. The plug circuit, which passes through the pedestal, is to be on a separate circuit.

14.3 Connections to Hot-water Cylinders

The connections to hot-water cylinders not exceeding 3kW loading shall consist of 2 x 4 mm^2 PVC conductors and 1 x 2,5 mm^2 earth wire in a 20 mm diameter conduit from the distribution board. The conduits shall be chased in the wall and shall terminate at the side of the cylinder in a box over which is to be mounted a double pole isolator with pilot light.

The final connection between the isolator and cylinder shall be by means of silicone heat resistant conductors in 20 mm diameter flexible conduit.

Connections to roof mounted hot-water cylinders shall generally be as specified above with an isolator with pilot light mounted adjacent.

14.4 **Connections to Power Points**

Connections to electric motors and fixed apparatus to vibration shall, unless otherwise specified or indicated on the drawings, have final connections consisting of conduit and flexible tubing or reinforced hose in accordance with Clause 1.3 of this specification and PVC cables and earth wire of the required size.

An isolator shall protect all fixed apparatus and where necessary a starter fitted with a no-volt coil and overload protection adjacent to such apparatus.

Power points for connection of fixed apparatus to be installed by others, shall terminate in an approved type wall mounted switch unless otherwise specified.

The minimum conductor size for all power points shall be 4 mm^2 unless otherwise specified.

14.5 **Underground Service Connection**

This clause refers to underground service connections not provided by the Supply Authority.

The service cable and earth wire to be connected at the supply point in accordance with Clause 15.8 of this specification, and unless otherwise specified, shall be aid 600 mm below ground level throughout and otherwise fully in accordance with Clause 15 and all applicable sub-clauses thereof. Cable entries to meter boxes shall be in accordance with Clause 13 and other entries shall be by pipe or duct as directed.

14.6 **Connections to Outbuildings**

Connections to outbuildings shall be made by means of underground cable only, laid in accordance with Clause 15 and all applicable sub-clauses.

Where the cable is run from the roof space of the main building, it shall be enclosed in suitably sized galvanised pipe built into the wall or run surface as directed. Surface run pipes shall be securely saddled at 1,8 m centers. Where the cable connects to the conduit in the roof space, a suitable joint box shall be provided or alternatively the cable may be taken through the roof space, a suitable joint box shall be provided or alternatively the cable may be taken through the roof space with fixings at regular intervals, and down to the main board. At the outbuildings, the cable shall be enclosed in a suitably sized galvanised sleeve pipe built into the wall or run surface and terminated in the distribution board tray.

14.7 **Connection and Mounting of Cable Fed Street/Site Lighting**

Street/site lights shall in all cases, except where otherwise specified, be fed by underground cable. Unless otherwise directed, a suitable terminal board shall be provided in the base of the lighting pole for the connection of the incoming and outgoing cables, the feeds from the terminal board to the fitting shall be as specified.

"Surfix" cable and compression glands shall be installed between terminal board and cross arm/bracket mounted luminaires. The terminal board shall also accommodate a miniature circuit-breaker in the phase connection to the fitting. Poles intended for mounting directly in ground are to be provided with a 300 x 300 mm base plate.

15. UNDERGROUND CABLES

1000 volt PVC SWA and 110 Volt PILCA cable and accessories shall be in accordance with the relevant SABS specifications to SABS 1507.

The storage, transportation, handling and laying of underground cables shall be according to the manufacturer's requirements and the Contractor shall have adequate and suitable equipment and labour to ensure that no damage is done to cables during such operation. All cable pipes and ducts entering buildings are to be sealed against the ingress of vermin, water, etc.

15.1 Trenching

Cables, unless otherwise specifically directed, shall be laid at a depth of 600 mm below ground level. Trenches shall not be less than 300 mm wide for one to three cables, and the width shall be increased where more than three cables are to be laid together so that the cables may be placed at least 75 mm throughout the run.

The Contractor shall take all necessary precautions to prevent trenching work being in any way a hazard to the public and to safeguard all structures, roads, sewer works, or other property from risk of subsidence and damage.

15.2 Cable Joints

Joints in underground cable runs will not be permitted unless unavoidable and at the discretion of the Head : Works. Where cable joints are unavoidable, the cable jointer is to work efficiently and cleanly and so that each end of the cables to be joined may have a minimum of 0,9 m of slack disposed in a loop without stress. Back-filling under joints must be firmly tamped to prevent any subsequent settling.

15.3 Bedding

In trenches made in intermediate, hard rock, or boulder material, the cables shall be laid on a 75 mm thick bed of earth and be covered with a 150 mm layer of earth before the trench is filled in. The Contractor to supply all earth required for trench filling.

15.4 Laying

Cables shall be removed from the cable drum in such a way that no twisting, tension or mechanical damage is caused, and must be adequately supported at short intervals during the whole operation. Particular care must be exercised where it is necessary to draw cables through pipes and ducts, to avoid abrasion, elongation or distortion of any kind. The ends of such pipes and ducts shall be sealed to approval after the drawing in of the cables.

15.5 **Back Filling**

Back filling after bedding (see Clause 15.3) is to be carried out with a proper grading of the material to ensure settling without voids, and the material is to be tamped down after the addition of every 150 mm. The surface is to be made good a required.

Back filling of cable trenches must not be commenced until after the cable trenches and laid cable(s) have been inspected by the Head : Works. Where a Contractor fails to observe this requirement he may, at the discretion of the Head : Works, be required to re-open such cable trenches for inspection at his own expense.

15.6 **Protection of Cables**

Where so directed by the Head : Works, concrete or other warning covers shall be placed over cables above the top bedding layer. Cable pipes when directed are to be installed at road and other crossings.

15.7 **Marking of Cables**

Cable marking tape is to be supplied by the Contractor and is to be laid 150 mm below ground over a cable run and as may be directed by the Head : Works to give early indication of underground cable runs.

15.8 **Joints and Termination of Cables**

Joints in underground cables and terminations shall be made by means of "Scotch Cast" or other approved epoxy-resin pressure type jointing kits. Low tension PVC cables are to be made off with sealing glands and materials designed for this purpose, which must be of approved make.

15.9 **Sealing of Paper Insulated Cable Ends**

Where cables are cut and not immediately made off, the ends must be sealed without delay. If cables are cut and the ends not immediately made off or sealed, the cable may be rejected and the Contractor will be required to replace it at his own expense.

15.10 **Earth Wires**

Except where specifically directed otherwise, earth continuity conductors are to be run with all underground cables constituting part of a low tension distribution system. Such earth continuity conductors shall be bare copper wire of a cross sectional area in accordance with the Code of Practice 0142 but shall not be less than 4 mm^2 nor more than 70 mm^2. The earth continuity conductor is to be bonded to the cable armouring, and to the lead sheath if any, at each termination, as well as to the local earth bard. The earth wire must be secured to the cable at 1,8 m centers.

15.11 **Opening Up of Existing Cables**

Where it is necessary to expose existing buried cables for any purpose, or to excavate in the vicinity of existing buried cables, pipes, etc, every care is to be exercised and only labourers experienced in such work, and duly warned by the Contractor, shall be employed thereon.

15.12 **Definitions for Classifying of Excavation**

(a) Soft Excavation – shall be excavation in material that can be efficiently removed by a back-acting excavator of flywheel power approximately 0,10kW per millimeter of tinned-bucket width, without the assistance of pneumatic tools such as paving breakers, or that can be efficiently loaded without prior ripping or stockpiling by a rubber tyred front-end loader approximately 15T mass and a flywheel power of approximately 100kW.

(b) Intermediate Excavation – shall be excavation in material that requires a back-acting excavator of flywheel power exceeding 0,10kW per millimeter of tinned-bucket width and the assistance of pneumatic tools prior to removal by equipment equivalent to that specified in (a) above.

(c) Hard Rock Excavation – shall be excavation in material that cannot be efficiently removed without blasting or without wedging and splitting prior to removal.

(d) Class A Boulder Excavation – shall be excavation in materials containing more than 40% by volume of boulders of sizes between 0,03 cubic meter and 20 cubic meter in a matrix of softer material or smaller boulders.

Note: (1) Excavation of solid boulders or lumps of size exceeding 20 cubic meter will be classified as hard rock excavation.

(2) Excavation of fissured or fractured rock will not be classed as boulder excavation but as hard rock intermediate excavation according to the nature of the material.

(e) Class B Boulder Excavation – shall be excavation of boulders only in a material containing 40% or less by volume of boulders of size between 0,03 cubic meter and 20 cubic meter in a matrix of softer material or smaller boulders.

Note: Those boulders that required individual drilling and blasting in order to be loaded by a back-acting excavator as specified in (a) above, or by a track type front-end loader, will each be separately classed as Class B Boulder Excavation.

16. EARTHING

16.1 Main Earthing

The type of main earthing shall be as required by the Supply Authority, if other than the Head : Works and in any case as directed by the Head : Works who may require additional earthing to meet test standards.

Where required, an earth mat is to be provided, the minimum size, unless otherwise specified, being constructed from copper straps 950 x 25 x 3 mm at 230 mm centers and braced at all intersections. Alternatively or additionally earth rods or trench earths may be required, as the Head : Works may direct, and installed according to his instructions.

All earth electrodes and connections thereto must be approved "in-situ" by the Head : Works before back-filling.

The electrical installation shall not be earthed by means of the lightning arrester earth electrode, if such is included in the installation, but may be bonded thereto.

16.2 Earthing in Installations

The installation shall be effectively earthed in accordance with the relevant sections of the Code of Practice 0142 and the requirements of the Supply Authority.

All hot and cold water and waste pipes are to be effectively bonded by means of 12 x 1,5 mm solid copper tape (perforated tape or wire will not be permitted), clamped by means of brass bolts and nuts. Bonding tapes exceeding 75 mm in length must be fixed to the wall by means of No. 6 x 20 mm brass screws and plastic plugs not exceeding 150 mm centers. Main earth copper tapes where installed less than 2,5 m from ground level, must be run in 20 mm diameter conduit securely saddled to the wall.

Gutters and down pipes are to be bonded by means of 6 mm round headed brass bolts, with nuts and washers. Self-tapping screws are not permitted.

Connections from the earth bar or terminal on the main board must be made to a visible cold water main, the incoming service conductor, if any, and the earth mat or plate (where such is required) by means of either 12 x 1,5 mm solid copper tape or bare 25 mm^2 copper wire, or such larger conductor as the Head : Works may direct. From each distribution board separate earth conductors are to be taken to the main earth bar or terminal on the main board. Each conductor shall consist to stranded copper conductors drawn into the conduit together with the distribution board feeders. The size of the earth conductors to be in accordance with the requirements of the Code of Practice 0142 or as specified.

Earthing clips shall be made of not less than 0,9 mm thick copper strips not less than 12 mm wide. They are to be complete with 25 x 7,7 mm brass bolts, washers and nuts and must be constructed so that the clips will fit firmly to the conduit without any additional packing.

Adjustable earth clips are not permitted.

17. EXISTING BUILDINGS

17.1 Occupied Buildings

Where work is to be carried out in occupied buildings the Contractor must arrange to carry out the installation with as little interruption to services and discomfort to the occupants as possible.

17.2 Temporary Connections

Temporary connections shall be provided where necessary for continuity of services, and as directed by the Head : Works. The contractor must ensure that such connections are both electrically safe and free from physical hazard.

17.3 Old Materials

Unless otherwise specified all existing materials removed by the Contractor shall remain the property of the Head : Works and are to be handed to the Head : Works.

17.4 Making Good

Any damage which may be done to the plaster work, floors, ceilings, wood and paint work, furniture and other equipment in the building, etc, during the progress of the electrical installation shall be repaired and made good by the Contractor to the satisfaction of the Head : Works.

18. COMPLETION

18.1 Balancing of Load

The Contractor is required to balance the load as equally as possible over multi-phase supplies.

18.2 Tests

The installation shall be tested by the Contractor as the service progresses or as required by the Head : Works and upon completion, for earth continuity and insulation. The final test before the taking over of the installation shall be made in the presence of the Head : Works.

The mandatory "Certificate of Compliance" shall be issued by the Contractor to the Supply Authority, with a copy to the Head : Works prior to first delivery being taken.

18.3 **Labelling**

All circuits and apparatus on switchboards shall be suitably correctly labeled by means of engraved plastic labels (white lettering on black), which are to be either bolted or screwed to the equipment panel, or fitted in channeling provided below the switch gear.

Sub-circuits are to be numbered and a legend detailing the circuits is to be framed and fitted to the door of the distribution board.

All other equipment is to be individually labeled to indicate the function.

All switchboards are to be fitted with a label on which the designation of the board is clearly indicated.

A separate engraved label depicting the origin and cable/conductor size shall be fixed below the main switch.

18.4 **Finishes**

Covers for all boxes, expansion boxes, etc, shall be finished to match the paint work of the ceiling or wall surface or as specified.

18.5 **Site Drawing**

On all completed new work or where specifically called for in the Tender Document, the Contractor shall, on completion of the works, submit to the Head : Works, a marked up site plan indicating the exact underground cable reticulation.

19. **POWER DUCTING FOR SCHOOL SCIENCE LABORATORIES**

The ducting shall be "Ductline 3" supplied by Messrs. Lascon Lighting, 102 Malbourne Road, P.O. Box 2479, Durban 4000: Telephone 031-2075081 or other approved.

20. **SPEAKER AND MICROPHONE OUTLETS**

Speaker and microphone outlets are to conform to the following details:

1. Speaker outlet – To have one flat and one round pin.

2. Microphone outlet – To have one round pin only.

Both female and male parts to be supplied and installed by the Contractor.

21. **BELLS AND BUZZERS**

21.1 **Bells**

Bells for schools and hostels shall be 220 Volt AC or 24 Volt DC as specified for the service. They are to be of robust construction encased in a sturdy cast metal weather-proof case. They are to operate on the frequency of the supply. They shall have an adjustable stabilizing spring, gold-silver contact points and 150 mm gongs.

21.2 **Doorbells, Buzzers and Bell Transformers**

These will be as specified for each service.

21.3 **Bell Pushes**

Except where otherwise specified, bell pushes shall be of the flush type suitable for mounting in a standard 100 x 50 mm box. They shall be clearly marked as a bell push and shall be fitted with satin finished anodized aluminium cover plates.

22. **SIGNAL TIMERS**

22.1 **Primary Schools**

The timer shall be designed to automatically signal the start and finish of school periods by the switching of a bell circuit and is to comply with the following specification:

1. The mechanism may be synchronous motor or quartz movement driven with a 24 hour dial or digital time read-out suitable for operation on a 220V 50Hz supply and is to be provided with a spring or battery reserve of a least 24 (twenty four) hours.

2. The unit is preferably to have minute to minute timing for a 24 (twenty four) hour period although 5 (five) minute intervals are acceptable, and is to be provided with Weekend lockout. Signal periods shall be adjustable from 5 – 45 seconds.

3. The unit shall be housed in a metal or plastic case with detachable front cover suitable for wall mounting.

4. Timers with punch tape programming are not acceptable.

22.2 **High Schools and Colleges**

Timers for these institutions shall generally be as for Primary Schools but are to have at least 3 (three) separate programmes and be fitted with three push buttons for independent manual operations for testing of each programme, plus an on/off switch for each programme, which does not affect the running of the clock.

23. **CLOCKS**

Electric clocks shall be of the quartz electronic battery operated type, with a dial of 250 mm diameter. The dial shall be white, with distinctive minute markings and chapters shall be black Arabic figures. Time adjustment shall be simple. Where mains operated electronic clocks are specified, these shall be of the synchronous self starting type, suitable for a 200 – 250 V 50 Hz AC supply

24. **TIME SWITCHES**

The time switch shall consist of a single pole switch with silver to silver or other approved contacts operated by a quartz movement with a 24 hour reserve.

A suitable 24 hour, night and day dial, with hour indicator and two adjustable strikers, one OFF and one ON must be provided. The whole mechanism is to be totally enclosed in a dust proof case.

The current rating shall be required and the switch is to be suitable for operation on 220 volt 50 Hertz AC supply. Time switches used for under floor heating are to be fitted with weekend cut-out.

25. **MOULDED CASE CIRCUIT BREAKERS (INCLUDING MINIATURE)**

Circuit breakers shall be of the size and type as directed and specified for the service. They shall comply with SABS Specification 156 and SABS IEC 60947-2.

26. **SWITCHES: ON-LOAD FAULT MAKING (CIRCUIT BREAKER TYPE) WITHOUT TRIPS**

The switches shall be triple pole, hand operated, panel mounting air break type, having continuous current rating as specified and suitable for operation of 380 – 440 Volt 50 Hz AC system.

The contacts are to be of silver alloy and the switch mechanism shall be of the quick-make, quick-break type.

27. **SWITCHBOARD EQUIPMENT**

Switchboard equipment such as switches, circuit breakers, etc, shall be as directed and specified in the detail specification for the service.

Circuit breaker equipment of SABS IEC 60934.

28. **FUSE-SWITCH UNITS (WITH HRC FUSES)**

The fuse-switch unit is to be of the double pole, or triple pole or triple pole with neutral link type, and of the required current rating, as specified for the service and must be in accordance with BS EN 60947-3.

The fuse links must be fully isolated when the switch is in the open position, and interlocks must be provided to prevent the switch being operated with the cover open.

The fuse links shall comply with SABS Specification 172 and SABS IEC 60269-1 to 4.

29. **BUS-BAR COPPER**

Bus-bar copper must be fully in accordance with Tables A1 and A2 of SABS 1473-2 and SABS IEC 60439-2.

30. **SPECIFICATION COMPLIANCE**

The complete installation shall comply with the requirements of this specification. Should any differences or contradictions exist between this Specification and the detailed requirements for a specific installation, then the detailed requirements shall take precedence.

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ANNEXURE 3

LIGHTNING PROTECTION SPECIFICATIONS

LIGHTNING PROTECTION INSTALLATION

GENERAL SPECIFICATION

1. SATISFACTORY INSTALLATION

The whole of the installation shall be carried out in accordance with:

(a) The latest S.A.B.S. Code of Practice for the Protection of Structures against Lightning - S.A.B.S. 03 ; SABS IEC 61024 (1) , 61024 (1 -1); SABS IEC 61312 (1) ; SABS IEC 61662 & NRS 042.

(b) The KwaZulu-Natal Department of Works General Electrical Specification.

(c) The Municipal By-Laws and any other special requirements as deemed necessary by the Local Supply Authority;

(d) Local Fire Regulations.

2. S.A.B.S. APPROVED DRAWINGS

SABS Approved drawings are not required for this project.

3. TEST ON COMPLETION

Upon completion of the lightning protection system, the following tests shall be witnessed by an appointed representative of the Employer. The results shall be recorded on suitable test certificates which must be signed by both the Contractor and the Employers representative. A sketch must be included on each test certificate indicating the positions of each earth electrode in relation to some permanent reference point. It must also indicate the positions at which tests were carried out, the type of test and the results of these tests.

3.1 Earth Resistance Test

The Earth Resistance Test shall involve measuring the resistance to earth of each rod-type electrode, or group of rod-type electrodes, or trench earth which would normally be connected to one down-conductor or earth terminal. This test must be made with the electrodes completely disconnected from any part of the structure or lightning protection system.

3.2 Electrical Continuity Tests

(a) **External Down-Conductors**

Electrical continuity between the lower ends of external down-conductors which must all be disconnected from the earthing system during the test shall not exceed 1 (one) ohm.

(b) Metallic Services

Electrical continuity between any metallic structures of services (e.g. rainwater pipes) which form an integral part of the lightning protection system shall not exceed 1 (one) ohm. These tests should be carried out with all other components of the lightning protection system disconnected from the component being tested.

4. DESCRIPTION OF MATERIAL

4.1 Air Terminals and Down-conductors

All conductors must be in accordance with the requirements of BSS 1474 or American Standards Specification 6063. All aluminium conductors shall have a cross-section area of not less than 30 mm² (domestic dwelling only) or 50 mm² for all other applications. The dimensions of flat section conductors to be 20 mm x 3 mm. Where conductors are mounted in stand-off guides, the cross-section area of the conductor must be not less than 70 mm² to give adequate mechanical strength.

4.2 Conductor Guides

The conductor must be mounted in aluminium alloy guides conforming with the material specification given in 4.1 above. The guides must allow for free longitudinal movement of the conductor to cater for expansion and contraction of the system caused by temperature variation. The minimum thickness of any part of the guide shall not be less than 3 mm. The guides must be securely attached to the structure using two stainless steel screws and plugs, the use of plated screws is not permitted.

The conductor system shall be supported in guides so that an air gap exists at all times between the aluminium and the surface of the structure, the guides being seated upon plastic or other similar insulating material. Should conductors be installed directly upon the surface of concrete or cement plaster, an insulating strip is to be installed over its whole length to prevent contact between the two surfaces. Guides shall be installed to support the conductor at intervals not exceeding 1,2 metres horizontally or 1,5 metres vertically.

N.B.: No part of an aluminium conductor system must be allowed to come into direct contact with concrete or cement plaster as this may cause the aluminium to corrode.

4.3 Expansion Loops

Where conductors are installed horizontally without deviation from a straight line over long distances, expansion loops must be provided at distances not exceeding 30 metres. These expansion loops must have a cross-sectional area which is at least equal to that of the conductor.

4.4 Protection of Down-conductors

Where external down-conductors are installed in areas which are readily accessible to the public, the lower ends of the conductors shall be enclosed in a semi-rigid insulating material. In the case of a circular section conductor this shall comprise a 2 metre length of 20 mm diameter P.V.C. conduit. This conduit shall be securely attached to the wall by means of galvanized steel saddles fixed with stainless steel screws and plugs, spaced at intervals not exceeding 1 m. Where a flat section conductor is used this shall be covered by a similar length of 25 mm P.V.C. conduit. The lower end of the conduit shall be positioned as close as practicable to ground level, i.e. immediately above an aluminium to copper joint. The ends of the conduit shall not be sealed.

4.5 Earthing Electrodes

Earthing electrodes must consist of either copper-clad steel rods not less than 12 mm in diameter and having a minimum copper thickness of 0,20 mm driven into the ground, or a 50 mm² (35 mm² for domestic dwellings) bare copper conductor buried in a trench, or a combination thereof. Where copper clad steel electrodes are used they must have a suitable bond between the steel core and copper exterior to prevent moisture ingress between the two metals. Where it is necessary to extend earth rods, an electrolytically compatible corrosion resistant, coupling device, which prevents ingress or moisture into the joint shall be used. The copper conductor below the down-conductor joint shall be covered by a semi-rigid P.V.C. conduit for a distance of approximately 200 mm above ground and 400 mm below ground.

4.6 Joints Above Ground

Circular section aluminium conductors shall be jointed by aluminium ferrules or lugs which are securely crimped into place. Aluminium lugs must be bolted together using 10 mm diameter aluminium bolts and washers. The material specification for these components must conform with that laid down in paragraph 4.1. Alternatively heavily tinned copper lugs and ferrules may be used. The lugs should be joined together by means of 10 mm diameter copper, brass or bronze bolts and washers. Care should be taken to inhibit corrosion where dissimilar metals are used by thoroughly cleaning the surfaces of the metal before assembly and subsequently sealing the joint with an inert tenacious compound or tape.

Flat section aluminium conductors shall be joined by double riveting, using aluminium rivets which comply with the material specification laid down in 4.1. Alternatively 2 x 6 mm diameter stainless steel bolts, nuts and washers may be used. Fold over type bends will not be permitted.

Down-conductors are to be terminated approximately 200 mm above finished ground level. Circular section aluminium is to be jointed to a 50 mm^2 (35 mm^2 in the case of domestic dwellings) stranded copper conductor by securely crimping in place two heavily tinned lugs and bolting these together using 10 mm diameter copper, brass or bronze nuts, bolts and washers.

N.B. : Under no circumstances shall aluminium conductors be buried in the ground.

4.7 Joints Below Ground

A joint in the stranded copper conductor which forms part of the earthing system must be made by using a crimped copper ferrule clamping (not lugs) using two copper line taps of suitable dimensions, or exothermic welding. The copper earth conductor must be joined to an earth rod by either clamping, using a standard earth rod clamp or copper line tap or by exothermic welding. Joints which are made between dissimilar metals (i.e. copper conductor to galvanized steel water main), must be thoroughly cleaned before assembly. They shall be rendered watertight using waterproof adhesive tape on a suitable compound for a minimum distance of 200 mm in all directions from the joint.

4.8 Bonds

Where it is necessary to bond the aluminium conductor to any other metallic surface, this must be done by bolting or riveting. When attaching aluminium to a dissimilar metal the joints are to be thoroughly cleaned and sealed to prevent corrosion.

5. GENERAL INSTALLATION PROCEDURE

5.1 Air Terminals for Non-metallic Pitched Roofs

Aluminium conductors are to be installed along all ridges of roofs and projections such as dormer windows, etc., terminating at the ends with conductors running downwards over the surface of the roof and the eaves. Non-metallic chimneys must be protected by means of a finial of sufficient length to cover the chimney within a 45° angle struck downwards from its point. Alternatively it should have a conductor installed in the form of a closed loop upon the upper surface. The conductors are to follow the outer contour of the stack and must be bonded at a convenient point to the nearest component of the air terminal system.

N.B. : This bond may run in a horizontal or downward direction, but under no circumstances must any part of it run above horizontal.

Conductors may be dead-ended (i.e. have one end free and unbonded), providing that the length of such a conductor does not exceed 10 metres and that the unbonded end is either at the same level or higher than the bonded end. This technique may be used where ridge conductors are installed over dormer windows, etc.

In all cases where metallic gutters have been installed along the eaves of a pitched roof, these must be bonded to the air terminal system. Where metallic gutters do not exist, however, a conductor must be installed over the surface of the roof at eaves level to which the remainder of the air terminal system is to be bonded, with the following exceptions :

(a) Where the maximum distance from the ground level to the eaves of the building is less than 4 metres and the pitch of the roof is more than 1 in 2 (27° from the horizontal).

(b) Where the maximum distances from ground level to the eaves is less then 7 metres and the pitch of the roof is more than 1 in 1,5 (34° from the horizontal).

(c) Where the distance from the ground level to the eaves is more than 7 metres and the pitch of the roof is more than 1 in 1 (i.e. the included angle at the apex of the roof is less than 90°).

Under these circumstances eaves conductors need not be installed.

Any non-metallic objects which protrude above the general roof lines, such as Cape Dutch gable ends, must be protected as described above with a suitable air terminal system. Any metallic objects which protrude above the general roof line, such as hot water expansion pipes must be bonded as directly as possible to the nearest eaves conductor, gutter or other part of the lightning system.

N.B. : These bonding conductors must run in a horizontal or preferably a downward direction, from the vent pipe, etc., to the lightning protection system.

5.2 Air Terminals for Metallic Pitched Roofs

Buildings with roofs covered with electrically continuous metal sheets do not require separate air terminals but must be earthed via down conductors generally as described in 5.6 and 5.7. Any non-metallic objects projecting above the general roof line must be separately protected as described in 5.1 and bonded to the metal roof covering.

5.3 Air Terminals for Non-metallic flat or Mono-pitched Roofs

For flat or mono pitched roofs of non-metallic construction the air terminal system must consist of aluminium alloy conductors installed around the outer perimeter of each section of the roof structure. These conductors must be installed on top of parapet walls if these exist. Lift motor rooms, tank rooms, penthouses, etc., which protrude above the general roof line must have air terminal conductors installed around the outer perimeter of each roof slab or parapet wall. Any metallic objects which protrude above the roof line, such as expansion pipes, signs, flag poles, handrails, etc., must be bonded directly to the nearest component of the lightning protection system as described in 5.1.

N.B. : It is not permissible for the ends of conductors to be bonded directly to the perimeter air terminal system if the latter is installed upon a parapet wall having a height exceeding 500 mm above roof slab level. In these circumstances the conductors are to be bonded directly to the down conductors.

5.4 Air Terminals for Metallic flat or Mono Pitched Roofs

Metallic flat or mono pitched roofs do not require separate air terminal conductors, providing that there is electrical continuity between the metallic roofing sheets, (see 5.2). A metallic roof surrounded by a non-metallic parapet wall shall have conductors installed at the top of the parapet wall and these must be bonded to the metallic roof at intervals not exceeding 20 metres. If the parapet wall is clad with metal over its upper surface or a handrail is installed which affords good electrical continuity, separate air terminal conductors need not be installed. Under these circumstances the metal handrail or cladding must be bonded to the metal roof covering at intervals not exceeding 20 metres.

All non-metallic covering such as slates, tiles, asbestos cement sheeting, etc., supported by a steel structure being electrically continuous throughout may be treated as being of a complete metal construction. In these circumstances no separate air terminal system need be installed providing the steel roof structure is bonded to earth at intervals given in 5.5.

5.5 Down Conductors for Non-metallic Structures

Down conductors must be installed at regular intervals around structures and to run as directly as possible between the air terminal and earthing system. They must, where practicable, be positioned at the external corners of the structure. The maximum separating distance between down conductors around the perimeter of the structure must not exceed 30 metres. In the case of very tall buildings having a slender base (i.e. chimney stacks, water towers, etc.), a minimum of two down conductors must be installed.

The lower ends of down conductors are to be terminated and bonded to the earthing system approximately 200 mm above finished ground level. Under no circumstances must aluminium conductors be buried underground. Test joints must be provided between the down conductors and earthing system. Down conductors must run vertically between the air terminal and earthing systems. Where this is impracticable, their course may be deviated to run at any angle up to and including horizontal.

Where it is necessary to run conductors horizontally over the upper surface of a structural protrusion, such as an exposed concrete slab, the conductor may run down vertically over the edge of the slab and return to the main structure, so that the distance between the upper and lower conductors exceeds one third of the length of the horizontal run. Looped down conductors are not permitted. Down conductors must not run over the underside of large overhangs which are less than 6 metres above ground level, or other areas where people are likely to be present during a thunderstorm.

External or internal metallic rainwater pipes may be used as down conductors providing these are of substantial section and are jointed by screwing one length into another or welding. Thin gauge galvanized steel pipes whose sections are held together by friction, rivets or screws must not form part of a lightning protection system.

5.6 Down conductors for reinforced concrete framed structures

The steel reinforcement of this type of structure may be used in place of down conductors. Where the reinforcing system is used, the air terminal system must be bonded to it at a maximum of 30 metre intervals using steel clamps. This bond may be achieved by clamping, with a steel clamp, a steel conductor to a selected reinforcing bar, the opposite end of this conductor must terminate at a corrosion resistant metallic terminal such as Grade 316 stainless steel.

The reinforcing system of prefabricated concrete buildings must not be used unless special provision is made for bonding the various prefabricated sections together.

The terminals should be mounted flush with the face of the concrete. An aluminium alloy bond must then be taken from the air terminal system and be connected to the stainless steel terminal by means of a heavily tinned crimp lug for circular section aluminium, or a suitable bi-metallic joint in the case of flat section aluminium. A similar system must be used to bond the reinforcing system at ground level to the earthing system at points directly below the air terminal bonds. Here copper conductors must be used as the external bonding material.

Under no circumstances must copper, or other non-ferrous material be allowed to come into contact with steel reinforcing bars, as this may cause severe corrosion and subsequent structural damage. The lightning protection system must not be bonded to any part of the structure which is electrically isolated from the remainder of the building, i.e. cantilevered sections. In these circumstances, or where it is otherwise impracticable to use the reinforcing system, external down conductors must be installed as described in 5.5.

5.7 Down conductors for steel framed structures

Where the framework of a building is constructed of structural steel columns, these may be used in place of down conductors providing the separating distance between them does not exceed 30 metres. The upper ends of the columns must be bonded to the air terminal systems and the lower ends to the earthing system.

5.8 Earthing by means of vertically installed rod type electrodes

Rod-type electrodes must be driven into the ground at a position directly below each down connector. The maximum earthing resistance of each electrode or number of electrodes bonded to any one down conductor shall not exceed N X 30 ohms, where N equals the total number of down conductors which are bonded to a common air terminal system, or 200 ohms whichever is the lower value.

The minimum horizontal separating distance between rod-type electrodes bonded together must not be less than their installed depth. The upper ends of installed rod-type electrodes are to be terminated approximately 500 mm below finished surface level. A 50 mm^2 copper bonding conductor must be installed to run between each earthing electrode system and the lower ends of the adjacent down conductors. A joint is to be made between each of these bonding conductors and the down conductors at a position approximately 200 mm above finished ground level. These bonding conductors must be installed in P.V.C. conduit securely affixed to the wall (see 3.4). The length of this P.V.C. conduit must be approximately 600 mm and must be installed so that approximately 200 mm protrudes above ground level, the remainder being buried into the soil.

5.9 Earthing by means of metallic water mains

Where two or three down conductors are installed the water mains may serve as an earth terminal for one of these. Where three of more down conductors are installed the water mains may serve as an earth terminal for two of these. Regardless of whether the water mains are used as an earth terminal or not, the incoming metal water pipe must be bonded to the lightning protection earthing system underground.

5.10 Earthing by means of trench type electrodes

Where the soil conditions prevent the satisfactory installation of rod-type electrodes, a trench earth system must be installed. This method is to comprise a 50 mm^2 stranded copper conductor installed horizontally into a trench at a depth of 500 mm below finished ground level. The conductor is to follow the general outline of the structure to be protected and be installed 1 metre away from the outside walls. Where the building stands on rocky ground, the trench earth may be attached to the lower part of the wall in areas where rock protrudes through the soil. The conductor must, however, be buried wherever possible as described above.

Each down conductor must be bonded to the trench earth system as directly as possible by means of a copper conductor.

Trench earth systems must have a maximum earth resistance of 30 ohms. An isolated length of trench earth mat must be bonded to the down conductor system in such a way as to reduce the length of dead-ends to the minimum.

Should trench earths be installed beneath pathways where people are likely to be present during a thunderstorm, a plastic, bitumastic or ceramic pipe must be installed having a length similar to the width of the pathway and the trench earth conductor run inside it.

N.B. : The maximum useful length of a dead-ended trench earth is 80 metres.

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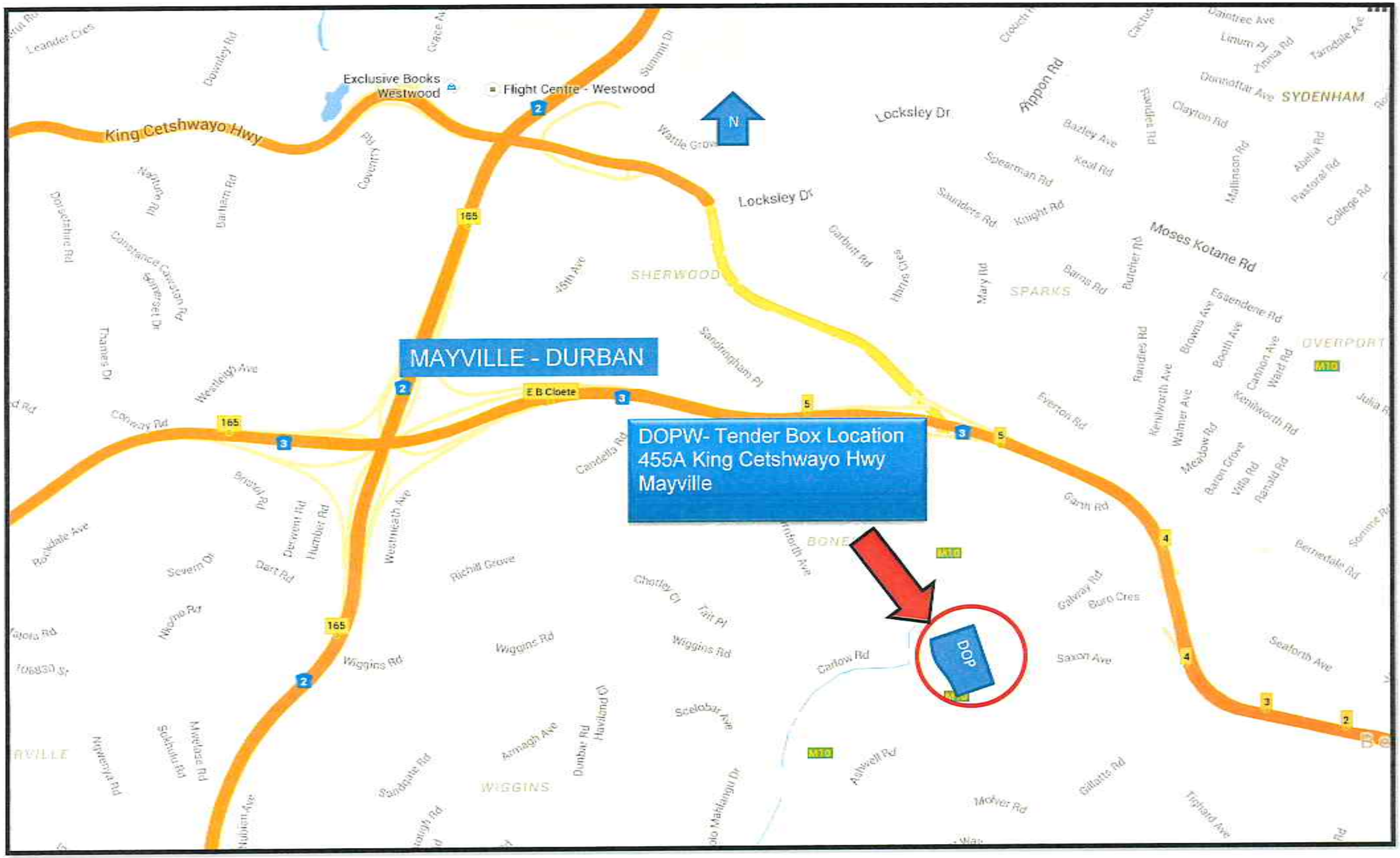
ANNEXURE 4

MAP OF BID SUBMISSION LOCATION


MAYVILLE - DURBAN
DOPW- Tender Box Location
455A King Cetshwayo Hwy
Mayville
DOP
N
King Cetshwayo Hwy
Exclusive Books Westwood
Flight Centre - Westwood
Locksley Dr
Rippon Rd
Moses Kotane Rd
E B Cloete
SHERWOOD
SPARKS
SYDENHAM
OVERPORT
WIGGINS
Wiggins Rd
Westmeath Ave
Carlow Rd
Saxon Ave

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ANNEXURE 5

JOINT VENTURE AGREEMENT

KWAZULU-NATAL PROVINCE
PUBLIC WORKS
REPUBLIC OF SOUTH AFRICA

Joint Venture Agreement
(March 2004)
(First Edition of CIDB document 1017)

1. **PREAMBLE**

This agreement is made and entered into by and between

_____

_____

_____

of the first part and

_____

_____

_____

of the second part and

_____

_____

_____

of the third part.

(allow for additional parties as necessary).

Whereas the foregoing parties have resolved to form a Joint Venture under the title of

_____

_____

_____

for the exclusive purposes of securing and/or executing the Contract to be awarded by

(name of Employer)

to the KZN Department of Public Works in respect of the following project:

for *(brief description of Contract)*

DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3: ETHEKWINI REGION: DUMANE COMMERCIAL HS

Now it is hereby agreed as follows :

2. DEFINITIONS AND INTERPRETATION

2.1 Definitions

The following words and expressions shall have the meanings indicated, except where the context otherwise requires. Defined terms and words are, in general, signified in the text of the Agreement by the use of capital initial letters, but the absence of such letters does not necessarily signify that a term, or word, is not defined.

'Agreement' means the agreement between the Members of the Joint Venture and includes this model form of agreement together with the Preamble, Specific Provisions, if any, Schedules 'A', 'B' and 'C' and any relevant Documents prepared prior to the signing of the Agreement and appended thereto.

'Contract' means the contract with the Employer for the supply of the Deliverables, for the purposes of securing and executing which, the Joint Venture has been formed.

'Deliverables' means the works and/or services, equipment, materials, goods, etc. to be furnished by the Joint Venture to the Employer in terms of the Contract.

'Document' means any written, drawn, typed, printed, or photographic material, which relates to the Agreement

'Employer' means the person, or body, which is to award the Contract and will employ the Joint Venture if it is awarded the Contract.

'Joint Venture' means the joint venture formed by the Members in accordance with the Agreement

'Management Committee' means the body established in terms of the Agreement to manage all aspects of the work of the Joint Venture in securing and executing the Contract and in meeting the provisions for the Agreement.

'Member' means a person, or body which, being a party to the Agreement, is a member of the Joint Venture

'Member's Interest' means the proportion expressed as a percentage, which the total monetary value of all resources provided and contributions made by a Member towards the execution by the Joint Venture of the Contract bears to the total of such values by all Members and, unless otherwise indicated in the Agreement, represents the extent to which the Member participates in the fortunes of the Joint Venture.

'Representative' means the person representing a Member on the Management Committee

'Schedules' means Schedules 'A', 'B' and 'C' which set out general, financial and other information relating to the Members and the obligations, duties, rights, risks and benefits arising from their participation in the Joint Venture.

'Specific Provisions' means the variations, if any, required to this standard form of agreement for the specific purposes of the Agreement.

2.2 Interpretation

Unless inconsistent with the context, an expression in the Agreement which denotes:

- any gender shall include the other genders
- a natural person shall include a juristic person and vice versa
- the singular shall include the plural and vice versa

2.3 Headings

The headings to clauses of the Agreement shall not be considered part thereof, nor shall the words they contain be taken into account in the interpretation of any clause.

2.4 Law

The Agreement shall be construed in accordance with and governed by the laws of the Republic of South Africa and the English language versions shall prevail.

2.5 Language

English shall be exclusively used by the Members in the preparation of Documents unless otherwise indicated.

2.6 Conflict between Agreement and Contract

Should any provision of the Agreement be in conflict with the terms of the Contract, the Agreement shall be amended to the approval of the Management Committee so as to eliminate the conflict.

3. JOINT VENTURE GENERAL

3.1 Establishment and Purpose

The Joint Venture established by the Members in terms of the Agreement is an unincorporated association with the exclusive purposes of securing and executing the Contract for the benefit of the Members.

3.2 Termination

The operation of the Joint Venture and the validity of the Agreement shall terminate if and when it becomes evident that the Joint Venture will not be awarded the Contract, or, if the Joint Venture secures the Contract, when all obligations and rights of the Joint Venture and the Members in connection with the Contract and the Agreement have ceased and/or been satisfactorily discharged.

Unless otherwise decided by the Management Committee, the Agreement shall not terminate if a Member changes its name, or is taken over by, or merged with, another body.

This agreement will terminate when any one of the Members resigns, are liquidated or opts out of this agreement and the Joint Venture will be in breach of contract with the Employer and their contract could be cancelled.

3.3 Exclusivity

Unless otherwise agreed by the Management Committee, or provided for in the Contract no Member shall engage in any activity related to the Contract other than as a Member of the Joint Venture and Members shall ensure that their subsidiaries and other bodies over which they have control comply with this requirement.

3.4 Participation of Members

Except as may otherwise be stipulated in the Agreement, each Member shall be responsible for all costs incurred by it prior to the date of inception of the Agreement.

Subsequent to the date of inception of the Agreement, each Member shall, participate in the operations, risks, responsibilities and fortunes of the Joint Venture including, inter alia, the provision of funding, sureties, guarantees, insurances, human and other resources and participation in profits and losses to the extents indicated in the Schedules. Participation in any aspect not covered in the Schedules shall, if an agreement cannot be reached between the Members, be to the same extents as indicated by the Members Interests.

3.5 Management

The affairs of the Joint Venture shall be directed and controlled by the Management Committee, as set out in Section 4 hereof.

3.6 Confidentiality

All matters relating to the Agreement and the Contract shall be treated by the Members as confidential and no such matter shall be disclosed to any third party without the prior written approval of the Management Committee.

No Member shall be party to the dissemination of publicity relating to the Contract, or the Agreement, without the prior written approval of the Management Committee and the Employer.

3.7 Assignment

No Member shall cede, assign, or in any other way make over any of its rights, or obligations, under the Agreement without the prior written consent of the Management Committee.

3.8 Subcontracting

No Member shall subcontract any obligation, work or duty for which it is, itself, responsible in terms of the Agreement without the prior written consent of the Management Committee.

3.9 Variations to Agreement

No variation, modification, or waiver of any part of the Agreement shall be of any force, or effect, unless unanimously agreed by the Members and reduced to writing.

3.10 Liability

Each Member warrants that it will indemnify the other Members against all legal liabilities arising out of, or in connection with the performance of its obligations under the Agreement.

It is acknowledged by the Members that they may be held jointly and severally liable in respect of claims against the Joint Venture by the Employer or third parties.

4. MANAGEMENT OF JOINT VENTURE

4.1 General

The affairs of the Joint Venture shall be directed, controlled and managed by the Management Committee, which, within the terms of the Agreement and the Contract, shall have full authority to bind the Members in all matters relating to the affairs of the Joint Venture.

Communication between the Joint Venture and the Employer, or third parties, relating to the Contract shall be conducted exclusively by the Management Committee, or by such person as it may delegate to perform this function.

The Management Committee shall have the power to appoint a project manager and/or such other persons as it may see fit to appoint for the purpose of executing the Contract and may delegate such of its powers, responsibilities and duties as it may consider necessary, or desirable, to persons or bodies appointed or seconded for this purpose.

Such administrative functions as are necessary to ensure the effective operation of the Management Committee shall be performed by its chairman.

4.2 Management Committee

4.2.1 *Composition*

The Management Committee shall, unless otherwise agreed by all the Members, consist of one Representative of each Member and each Member shall be obliged, at all times, to maintain a Representative on the Management Committee.

Each member shall, not later than three working days after the signing of the Agreement, appoint its Representative and notify the other Members of the name and contact details of the Representative. Such Representative shall have the power to bind the Member that he represents in all matters relating to the execution of the Contract and the performance of the Agreement.

A Member shall be entitled, after giving the other Members not less than three working days written notice of his intention to do so, appoint, remove and/or replace, an alternate who shall, at any meeting of the Management Committee from which the Representative whom he represents is absent, be vested with all rights and powers and subjected to all the obligations of the absent Representative.

The chairman of the Management Committee shall be the Representative of the Member which has the largest Member's Interest. If two, or more, Members have the same, largest Member's Interest, the chairmanship shall rotate between the Representatives of such Members at three monthly intervals, the order of rotation to be determined by ballot.

Notwithstanding the foregoing, the chairmanship of the Management Committee may be determined, or changed, at any time by unanimous decision of the Management Committee.

No remuneration shall be paid by the Joint Venture to Representatives or their alternates for serving on the Management

4.2.2 *Meetings*

Meetings of the Management Committee shall take place at such times and places as the Management Committee may determine, provided that the chairman shall convene a meeting of the Management Committee to be held not later than ten working days after he has been requested, in writing, by a Member to do so. Not less than five working days written notice of any meeting of the Management Committee shall be given to all Representatives and their alternates.

The Management Committee may permit, or invite, persons other than Representatives or alternates to attend any of its meetings, but such persons shall not have voting rights.

4.2.3 *Decisions*

Each Representative shall have one vote on the Management Committee and where, in terms of this clause, a casting vote is required, this shall be exercised by the chairman.

All decisions of the Management Committee shall, desirably, be unanimous. Accordingly, if unanimity cannot, initially, be achieved in regard to a decision, the meeting at which that decision is sought shall be adjourned for a period of 48 hours to enable Representatives to consult with their principals. If, on resumption of the adjourned meeting, unanimity can still not be achieved, the decision, provided it is not one requiring unanimity of the Members, shall be taken by majority vote and, in the event of a tie, the chairman shall exercise a casting vote.

A Member not satisfied with a majority decision of the Management Committee may declare a dispute, to be dealt with in terms of Clause 8 hereof, but the majority decision shall, nevertheless, be implemented with immediate effect.

Decisions of the Management Committee, whether taken at a meeting, or otherwise, shall be recorded in written minutes, which shall be distributed by the chairman to reach the Representatives not later than five working days after those decisions were taken. Such minutes shall be deemed to have been affirmed by the Representatives unless written notice of dissent is received by the chairman not later than three working days after receipt of the minutes by the Representative.

4.2.4 Powers and duties

The functions, responsibilities and powers of the Management Committee shall include, inter alia, those listed below:

4.2.4.1 Formulating overall policy in regard to the achievement of the objectives of the Joint Venture.

4.2.4.2 Managing the day to day affairs of the Joint Venture.

4.2.4.3 Monitoring, directing and co-ordinating the activities of the Members to ensure that the objectives of the Joint Venture are achieved and that the obligations and responsibilities of the individual Members are met.

4.2.4.4 Monitoring and controlling the financial affairs of the Joint Venture and ensuring that proper books of account and financial records relating to affairs of the Joint Venture are maintained in an approved form and submitted to the Management Committee for approval at regular intervals, which shall not be longer than one month.

4.2.4.5 Determining the necessity for and the details of any changes in the duties and responsibilities of Members provided that any resulting changes in Members' Interests shall be unanimously approved by the Members.

4.2.4.6 Determining the terms and conditions of employment of personnel and the emoluments applicable to staff seconded to the Joint Venture by the Members.

4.2.4.7 Controlling and approving the appointment of all subcontractors.

4.2.4.8 Procuring, after the completion of the Contract and the release of all bonds, guarantees and sureties given in respect of the performances of the Joint Venture and the Members, the preparation and auditing of a final set of accounts, on the basis of which the final profits, or losses, attributable to the individual Members shall be determined and any necessary adjustments effected.

5 RESOURCES OF JOINT VENTURE

The resources to be utilised by the Joint Venture in securing and executing the Contract shall, insofar as these are to be provided directly by the Members, be as set out in the Schedules and may, from time to time, be amended by decision of the Management Committee, provided that the Member's Interests are not, except with the unanimous approval of the Members, affected thereby.

Similarly, specific areas of responsibility of the Members for the performance of work and the provision of facilities shall be as set out in the Schedules and may, from time to time, be amended by decision of the Management Committee, provided that the Members' Interest are not, except with the unanimous approval of the Members, affected thereby.

5.1 Schedule 'A' (General)

Schedule 'A' shall contain general information relating to the Joint Venture including, inter alia, the following :

1. The Employer's name and address.
2. A brief description of the Contract and the Deliverables.
3. The name, physical address, communications addresses and domicilium citandi et executandi of each Member and of the Joint Venture.
4. The Members' Interests.
5. A statement indicating whether, or not, Specific Provisions apply to the Agreement.
6. A schedule of insurance policies which must be taken out by the Joint Venture and by the individual Members.
7. A Schedule of sureties, indemnities and guarantees that must be furnished by the Joint Venture and by the individual Members.
8. Details of the persons, who, in the event of failure by the Members to reach agreement on the appointments of mediator and arbitrator, will nominate appointees to these positions in terms of Clauses 8.2 and 8.3.

5.2 Schedule 'B' (Financial)

Schedule 'B' shall contain information regarding the financial affairs of the Joint Venture including, inter alia, the following :

1. The working capital required by the Joint Venture and the extent to which and manner whereby this will be provided and/or guaranteed by the individual Members from time to time.
2. The banking accounts that are to be opened in the name of the Joint Venture and the manner in which these are to be operated.
3. The rates of interest that will be applicable to amounts by which Members are in debit, or credit, to the Joint Venture.
4. The names of the auditors and others, if any, who will provide auditing and accounting services to the Joint Venture.
5. The intervals at which interim financial accounts and forecasts will be prepared for approval by the Management Committee.
6. Insofar as not covered in Schedule 'C', the basis on which contributions of various types by the Members towards the work of the Joint Venture in securing, executing, managing and satisfactorily completing the Contract, will be valued.
7. The basis on which profits and/or surplus cash will, if available from time to time, be distributed to Members.
8. The basis upon which losses, if any, are to be apportioned to Members.

5.3 Schedule 'C' (Contributions by Members)

Schedule 'C' shall set out the contributions of various types, other than cash, that will be made by the individual Members towards the work and obligations of the Joint Venture and shall, as far as possible, indicate the monetary values to be placed on such contributions, which may include, inter alia, the following :

1. Staff seconded to the Joint Venture.
2. Work carried out and services provided to, or on behalf of, the Joint Venture.
3. Plant, equipment, facilities etc. made available for use by the Joint Venture.
4. Materials and goods supplied to, or on behalf of, the Joint Venture.
5. Licences, sureties, guarantees and indemnities furnished to, or on behalf of, the Joint Venture.
6. Joint Venture Disclosure form required for the Contract.

6. BREACH OF AGREEMENT

If a Member breaches any material provision of the Agreement, or delays or fails to fulfil its obligations in whole, or in part, and does not remedy the situation within fourteen calendar days of receipt of notice from the Management Committee, or another Member, to do so, the other Members shall have the right, without prejudice to any other rights arising from the default, to summarily terminate the Agreement and re-assign the defaulting Member's rights and obligations in the Joint Venture as they see fit and withhold any moneys due to the defaulting member by the Joint Venture.

Each Member shall indemnify the other Members against all losses, costs and claims which may arise against them in the event of the Agreement being terminated as a result of breach of the Agreement by the said Member.

7. INSOLVENCY OF MEMBER

Should a Member be placed in liquidation, or under judicial management, whether provisionally or finally, or propose any compromise with its creditors, the other Members shall be entitled to proceed in terms of Clause 6, as if the Member had breached the Agreement.

8. DISPUTES

8.1 Settlement

The Members shall negotiate in good faith and make every effort to settle any dispute, or claim, that may arise out of, or relate to, the Agreement.

If agreement cannot be reached, an aggrieved Member shall, if he intends to proceed further in terms of Clause 8.2 hereof, advise all other Members in writing that negotiations have failed and that he intends to refer the matter to mediation in terms of Clause 8.2.

8.2 Mediation

Not earlier than ten working days after having advised the other Members, in terms of Clause 8.1, that negotiations in regard to a dispute have failed, an aggrieved Member may require that the dispute be referred, without legal representation, to mediation by a single mediator.

The mediator shall be selected by agreement between the Members, or, failing such agreement, by the person named for this purpose in Schedule 'A'. The costs of the mediation shall be borne equally by all Members.

The mediator shall convene a hearing of the Members and may hold separate discussions with any Member and shall assist the Members in reaching a mutually acceptable settlement of their differences through means of reconciliation, interpretation, clarification, suggestion and advice. The Members shall record such agreement in writing and thereafter they shall be bound by such agreement.

The mediator is authorised to end the mediation process whenever in his opinion further efforts at mediation would not contribute to a resolution of the dispute between the Members.

8.3 Arbitration

Where a dispute or claim is not resolved by mediation, it shall be referred to arbitration by a single arbitrator to be selected by agreement between the Members or, failing agreement, to be nominated by the person named for this purpose in Schedule 'A'.

The Member requiring referral to arbitration shall notify the other Members, in writing, thereof, not later than thirty calendar days after the mediator has expressed his opinion, failing which the mediator's opinion shall be deemed to have been accepted by all Members and shall be put into effect.

Arbitration shall be conducted in accordance with the provisions of the Arbitration Act No. 42 of 1965, as amended, and in accordance with such procedure as may be agreed by the Members or, failing such agreement, in accordance with the rules for the Conduct of Arbitrations published by the Association of Arbitrators and current at the date that the arbitrator is appointed.

The decisions of the arbitrator shall be final and binding on the Members, shall be carried into immediate effect and, if necessary, be made an order of any court of competent jurisdiction.

9. DOMICILIUM

The Members choose domicilium citandi et executandi for all purposes of and in connection with the Agreement as stated in Schedule 'A'. A Member shall be entitled to change his domicilium from time to time, but such change shall be effective only on receipt of written notice of the change by all other Members.

Member No. 1

Thus done and signed at _____ this _____ day of _____ 20___

For and on behalf of _____ *[Company]*

by *[name]* _____ who warrants his authority to do so.

_____

As witnesses 1. _____ As witnesses 2. _____

Member No. 2

Thus done and signed at _____ this _____ day of _____ 20___

For and on behalf of _____ *[Company]*

by *[name]* _____ who warrants his authority to do so.

_____

As witnesses 1. _____ As witnesses 2. _____

Member No. 3

Thus done and signed at _____ this _____ day of _____20___

For and on behalf of_____ *[Company]*

by *[name]* _____ who warrants his authority to do so.

_____

As witnesses 1. _____ As witnesses 2. _____

[Allow for additional parties as necessary].

KWAZULU-NATAL PROVINCE
PUBLIC WORKS
REPUBLIC OF SOUTH AFRICA

DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3: ETHEKWINI REGION: DUMANE COMMERCIAL HS

ANNEXURE 6

PROJECT SPECIFIC HEALTH AND SAFETY SPECIFICATION

Edited: July 2023

KWAZULU-NATAL PROVINCE

PUBLIC WORKS
REPUBLIC OF SOUTH AFRICA

Occupational Health and Safety Specification

Project Name : Dumane Commercial High School, Ndwedwe: Water and Sanitation Programme (Phase 3)

WIMS no. : 063634

Client OHS Representative : M. K. Shandu

Region : eThekwini Region

District : N/A

Ward : N/A

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1. Introduction

The *KwaZulu Natal Department of Public Works* is deemed as the "**Client**" in terms of the definitions of Construction Regulations of 2014as published in *Government Gazette No. 37305*.TheConstruction Regulations of 2014under *CR(5)(1)* stipulates that that the client must prepare a suitable, sufficiently documented and coherent site specific Occupational Health and Safety Specification for the intended construction work based on the baseline risk assessment.

The purpose of this Occupational Health and Safety Specification document (which hereinafter will be referred to as OHSE Spec)is to provide designers and the successful tenderer with essential OHS information to ensure effective safety management during the design and construction phase of the project.

This OHSE Spec forms an integral part of the contract between the Client and the Principal Contractor, so as to ensure compliance with the Occupational Health and Safety Act, Act 85 of 1993 and its applicable regulations and must serve as the basis for the Principal Contractor to develop his/her Project Safety, Health and Environmental Management Plan. As with any other plan for it to be implemented and managed effectively it requires the allocation of sufficient funds to achieve the objectives set out in the plan. In line with this requirement Construction Regulation 5(1)(g) requires the Client to ensure that the Principal Contractor has made adequate provisions for the cost of Health and Safety Measures in their tenders.

It must be noted that this OHSE Spec as much as it is detailed it is not exhaustive and the onus is on the Principal Contractors to ensure that they comply with Section 8 of the OHS Act, Act 85 of 1993 which states that "*Every Employer shall provide and maintain, as far as is reasonably practicable, a working environment that is safe and without risk to the health of his employees.*" this means that Principal Contractors as they are employers in their own right must at all times ensure continuous assessments are done for continued provision and maintenance of a healthy and safe working environment.

2. Definitions

For the purpose of the OHSE Spec, the abbreviations or definitions given hereunder shall apply and the reference to on gender will also apply to the other gender.

"CR" refers to the Construction Regulations 2014

"Agent (*Pr.CHSA*)" means a competent person who acts as a representative for a Client in terms of regulation (5)5.

"Client" means Department of Public Works

"Competent person" means a person who-

(a) Has in respect of the work or task to be performed the required knowledge, training and experience and, where applicable, qualifications, specific for that work or task: Provided that where appropriate qualifications and training are registered in terms of the provisions of the National Qualifications Framework Act, 2000 (Act No.67 of 2000), those qualifications and that training must be regarded as the required qualifications and training; and

(b) Is familiar with the OHS Act, Act 85 of 1993 and with the applicable regulations made under the Act;

"Construction Manager (*Site Agent*)" means a competent person responsible for the management of the physical construction processes and the coordination, administration and management of resources on a construction site;

"Construction Site" means a work place where construction work is being performed;

"Construction Supervisor" means a competent person responsible for supervising construction activities on a construction site;

"Construction Vehicle" means a vehicle used as a means of conveyance for transporting persons or material, or persons and material, on and off the construction site for the purposes of performing construction work;

"Construction work" means any work in connection with –

(a) The construction, erection, alteration, renovation, repair, demolition or dismantling of or addition to a building or any similar structure; or

(b) the construction, erection, maintenance, demolition or dismantling of any bridge, dam, canal, road, railway, runway, sewer or water reticulation system; or the moving of earth, clearing of land, the making of excavation, piling, or any similar civil engineering structure or type of work;

"Construction Work Permit" means a document issued in terms of regulation 3 of the Construction Regulations 2014;

"Contractor" means an employer who performs construction work;

"Demolition Work" means a method to dismantle, wreck, break, pull down or knock down of a structure or part thereof by way of manual labour, machinery, or the use of explosives;

"Fall Protection Plan" means a documented plan, which includes and provides for-

(a) All risks relating to working from a fall risk position, considering the nature of work undertaken;

(b) The procedures and methods to be applied in order to eliminate the risk of falling; and

(c) A rescue plan and procedures;

"Health and Safety File" means a file, or other record containing the information in writing required by these Regulations;

"Health and Safety Plan" means a site, activity or project specific documented plan in accordance with the client's health and safety specification;

"Health and Safety Specification" means a site, activity or project specific document prepared by the client pertaining to all health and safety requirements related to construction work;

"Medical Certificate of Fitness" means a certificate contemplated in regulation 7(8) of Construction Regulations 2014;

"Principal Contractor" means an employer appointed by the client to perform construction work;

"Safety Officer" – a person deemed competent by SACPCMP under the relevant category of registration.

"Professional Engineer or Professional Certificated Engineer" means a person holding registration as either a Professional Engineer or Professional Certificated Engineer in terms of the Engineering Profession Act, 2000 (Act No. 46 of 2000);

3. Scope of Application

3.1 This OHSE Specification document stipulates the minimum Occupational Health, Safety, and Environmental requirements that the tenderer need to address in his / her OHSE Plan. This Specification also addresses legal compliance, hazard identification, risk assessment, risk control, and the promotion of a Health and Safety culture amongst those working on the project.

3.2 This Specification also makes provision for the protection of persons other than employees. This OHSE Spec is exclusively applicable to the following project pending any change of scope which may necessitate changes to the OHSE Specification;

Dumane Commercial High School, Ndwedwe: Water and Sanitation Programme (Phase 3)

4. Purpose of OHSE specification

This OHSE Specification further seeks to achieve the following;

(a) To provide Principal Contractors with the Structure of the Detailed OHSE Plans they will have to prepare and submit for this project. ***See Annexure A.***

(b) Provide the overarching framework within which the Principal Contractor is required to demonstrate compliance with certain requirements for occupational health and safety established by the Occupational Health and Safety Act, Act 85 of 1993, all applicable regulations and Client Specific Requirements. ***See Annexure B.***

(c) To bring to the attention of the Bidding Principal Contractors that they need to make an undertaking that the costs for executing the project includes the costs of complying with the OHS Act, Act 85 of 1993, all applicable regulations including Client Specific requirements. Such undertaking is made by appending signatures on the OHS Declaration for Tenders. ***See Annexure C.***

(d) Ensure that the Principal Agent as the Professional Service Provider appointed by the Department to manage the project on its behalf in terms of the Conditions of Contract applicable to this project ensures that the contents of this document and the attached Baseline Risk Assessment are taken into consideration during design by all professions appointed and that the OHSE Specification is incorporated into the tender documents. ***See Annexure D***

5. Contractual Issues

(a) Acceptance by the Principal Contractor of the contract with KZN DOPW shall constitute acknowledgement that the Principal Contractor has familiarised him / herself with the contents of the OHSE Spec and that he / she will comply with all its obligations in respect thereof.

(b) Due to fact that this document is based on legislative requirements, the Client requires that all Contractors comply with the requirements of this document and all other relevant legislative requirements not covered by this document.

(c) The Client or its duly appointed Construction H & S Agent reserves the right to stop any Principal Contractor or Sub-Contractors from working whenever Safety, Health or Environmental requirements are being violated as required by regulation *5(1)(q)*. Any resultant costs of such work stoppages will be for the relevant Contractor's account.

(d) The requirements as specified by the Client in this document must not be deemed to be exhaustive and the Client reserves the right to make changes as and when the Client deems fit to address issue of OHSE Compliance.

(e) The Client will not entertain any claim of any nature whatsoever which arises as a result of costs incurred or delays being experienced due to the Contractor not complying with the requirements of this document and / or any other applicable legislative requirements imposed on the Contractor.

6. Administrative Requirement

Notification of Construction Work

The successful tenderer must at least within 07 working days before commencing with construction work notify the Provincial Director in writing using **Annexure "2"** attached on the Construction Regulations, 2014. A copy of the notification once stamped by the official from the *Department of Labour* Official must be submitted to the **client prior** to commencing with construction work.

7. Appointment of a fulltime Safety Officer – SACPCMP registered

The Principal Contractors will have to appoint a competent fulltime Construction H&S Officer who must be present on site at all times to conduct inductions, safety inspections on site and to the sub-contractors. The CHS officer must also ensure the administration of safety related documents is conducted and submit the SHE report to the client on a monthly basis.

7.1 Communication, Documentation and Site Audit

All H&S communication during the project between the parties will be in writing, including the issue and responses to non-conformances and H&S audit results. Communication between the DPW OHS practitioner and the principal contractor will be via the Project Manager. A comprehensive site SHE audit will be conducted monthly and DTSI`s to be completed by construction work supervisor (CR8.7) prior to work daily. The site will be inspected by the appointed CHSO (CR8.5) and the documentation audited relative to verify past or completed activities, verify compliance of current activities and the H&S plan.
The CHSO must accompany the, client on all audits and inspections. It is preferable that a H&S representative is present during all audits. The CHSO is to apply a similar approach to managing their Contractors. The frequency of the audits may be increased if the principal

contractor, or contractors are not performing adequately. SHE audit results will be acted upon as per section 5© of this document. The client, designer may act, or require further outcomes if non-compliances are noted or unsafe acts are noted on site. Weekly internal audits are to be completed and include site conditions as well as ensuring H&S files are appropriate and compliant. Comprehensive audit reports are to be made available, the format of the audit reports are to be agreed upon between the CHSO and DPW.

7.2 The Project Team

Initials & Surnames	Organisations	Disciplines	Telephone Numbers	Emails

Annexure A
Structure of the Detailed OHSE Plan

A detailed OHSE Plan is to be submitted by the successful tenderer as per section 3.3.1 above.
The following are the minimum standard legal documentation that must form part of the OHSE Plan based on the risks attached in executing this project –

Dumane Commercial High School, Ndwedwe: Water and Sanitation Programme (Phase 3)

1. The notification to commence with construction work made to the Provincial Director of Labour using Annexure 2. *(Filled in only to be submitted on approval of the Safety Plan).*
2. Letter of Good Standing with Compensation Commissioner or Compensation insurer.
3. The Contractor's Health, Safety & Environmental Policy, signed by the chief executive officer, which outlines the Contractor's OHSE compliance objectives and how they will be achieved.
4. Pre-Construction risk assessment.
5. Fall Protection Plan.
6. Relevant checklists and registers.
7. Site specific OHSE Organogram
8. Preliminary Induction Program
9. Demolition Plan
10. Environmental Management Plan
11. Personal Hygiene and Infectious Disease Management Plan
12. Proof of competency for the following legal appointees;

    12.1. ***Construction Manager*** – *Detailed CV reflecting qualification, relevant experience and references from previous clients.*

    12.2. ***Construction Supervisor*** - *Detailed CV reflecting qualification, relevant experience and references from previous clients.*

    12.3. ***Assistant Construction Supervisor*** - *Detailed CV reflecting qualification, relevant experience and references from previous clients.*

    12.4. ***Construction H&S Officer*** – *SACPCMP certificate*

    12.5. ***Risk Assessor*** – *SAMTRAC or equivalent*

    12.6. ***Fall Protection Planner*** - *SAMTRAC or equivalent*

    12.7. ***Demolition work inspector*** – *Registered Engineer or Technologist*

    12.8. ***Electrician*** – *wireman's licence*

Legal appointments to be appointed	
Prior Site Handover	**After Site Handover on commencement with Construction work**
• 16.2 • Construction Manager • Construction Work Supervisor • Assistant Construction Work Supervisors *(Necessity to be determined)* • Construction H&S Officer • Risk Assessor • Fall Protection Planner • Incident / Accident Investigator • Electrician	• Scaffold Erectors • Scaffold Inspectors • Excavation inspector • Demolition Work Supervisor • Bulk Mixing Plant Supervisor • First Aider • SHE Representative • Ladder Inspector • Emergency co-ordinator • Fire Marshalls • Fire team members • Portable Electrical tool inspector • Hand tools inspector • Housekeeping inspector • Stacking and storage inspector • Temporary electrical installation inspector • Mobile plant Operator • Flammable liquids Storage Inspector • Hazardous substance storage inspector

Annexure B

Client Specific Requirements

Items	Client Specific Requirements
Site Office location	• The location of the site office should be in an area that will not require visitors to pass through or enter area where construction work is active and will not require the re-location of the office as the project progresses.
Medical Certificates	• In compliance with the requirements of the Construction Regulations 2014 section 7(8) the Contractor must ensure that all of his employee's onsite have a valid medical certificate of fitness specific to the construction work to be performed and issued by an occupational health practitioner in the form of Annexure 3.
Public Safety	• When working in a occupied facility the contractors risk assessment and subsequent safe work method statement must take into consideration the negative effect the Contractors activities may have on the health and safety of the occupants of the facility and make provisions for the implementation of all reasonably practicable measures to ensure the health and safety of the occupants of the building.
Personal Hygiene and infectious disease management plan for construction sites	• To comply with Regulations for Hazardous Biological Agents Regulations as amended. • To Comply with CR 9 (1)(3)(4)(5)(6) and (7)
Extreme weather conditions	• If the weather condition poses a threat to the health & safety of employees be it extreme heat, cold, lighting or any adverse weather condition appropriate safety measures have to be taken.
Change to scope of work	• Should there be changes to the original scope of work, the Principal Agent must inform appointed Construction Health and Safety Agent to effect changes to the OHSE Specification.
Safety Plan Submission	• The successful Tenderer must submit a copy of the detailed OHSE Plan for approval and keep the original for onsite use during construction. The principal Contractor will not be allowed to start site establishment before his/her SHE Plan has been approved in writing.
Bylaws	• The Principal Contractor must incorporate any aspects of the Local Municipal bylaws which affect the, Safety and Environmental wellbeing of the employees and the public into his/her OHSE Plan and ensure compliance to such bylaws.
Risk assessment for construction work	• To comply with CR(9) and to also address environmental issues *See the attached baseline risk assessment to be considered by both the designer and the principal contractor.*
Fall protection	• To comply with CR (10), • Edge protection and protection of floor openings need to be of such a manner as to properly protect employees from falling off elevated positions or falling into floor openings
Structures	• To comply with CR (11)
Temporary work	• To comply with CR (12)
Excavations	• To comply with CR(13) and the following; • If the risk exists of a person in an excavation being enclosed in an event of a collapse the following will apply; shoring sufficient to prevent enclosure, any

	excavated material must be placed at least 1metre from the edge and at the maximum angle of repose to the horizontal. • No excavation may affect the stability of any adjoining structure or road unless steps have been taken as identified by an Engineer or a Technologist. • Adequate provisions must be made to ensure that water is drained from excavations where water may enter such excavations as a result of seepage or rain • All excavations made by the Principal or Sub Contractors must be barricaded by means of solid barricading and barricading tape may only be used to make such barricading more visible
Scaffolding	• To comply with CR(16) and the following; • Scaffolding Inspectors and Scaffolding Erectors must be different individuals. • Scaffold Harness must be used on Scaffolding, normal Harnesses may not be used on scaffolding • Sufficient Scaffolding material e.g., tags, trapdoors etc. need to be on site as determined by the activities on site • Scaffold bases may not be supported by materials such as bricks and chipboard. Suitable material needs to be used as per SANS 10085.
Construction vehicles and mobile plant	• To comply with CR (23) and the following;
Electrical installations and machinery on construction sites	• To comply with **CR (24)** • Over and above the requirements of CR24, the contractor must issue a CoC for temporary and final electrical connection to buildings and parkhomes where connection work has been undertaken prior any usage of such infrastructure.
Use and temporary storage of flammable liquids on construction sites	• To comply with **CR (25)**
Water environments	• To comply with **CR (26)**
Housekeeping and general safeguarding on construction sites	• To comply with CR (27) and the following; • Contractor to designate areas for placing refuse and rubble prior to being removed from site • Contractor must implement a daily task site clean-up for all activities these should cover work areas, stairways, walkways etc. to free of any construction debris obstruction. • Refuse to be separated for recycling purposes • Hazardous materials such as asbestos may not be included in general rubble and need to be disposed of as per applicable legislative requirements.
Stacking and storage on construction sites	• To comply with CR (28).
Fire precautions on construction sites	• To comply with CR (29) and the following; • No smoking may be permitted on site except in designated smoking areas
Construction employees' facilities	• To comply with CR (30) and the following; • Gender signs to be placed at appropriate locations • All welfare facilities to be kept in a hygienic condition at all times • Employees to be trained in good hygiene practices

Public Safety & Signage	• The Principal Contractor engaged in construction work must ensure that each person working on or visiting a site, and the general public in the vicinity of the construction site, shall be made aware of the dangers likely to arise from onsite activities and the precautions to be observed to avoid or minimise those dangers. • Appropriate signage shall be posted at conspicuous points within and around the perimeter of the site. The steps to comply with this requirement must be outlined in the OHSE Plan. • The public or visitors may only be permitted on site if they go through an appropriate health and safety induction detailing hazards and risks they may be exposed to and what measures are in place to control these hazards and risks • The entire project site must be secured against unauthorized access and provided with appropriate warning signage. Where roadways or walkways must be encroached or closed due to work, adequate barriers shall be installed to safely redirect the flow of vehicles and pedestrians and protect them from construction activities. • Whenever it is necessary to maintain public use of work areas (such as sidewalks, ramps, entrances to buildings, corridors, or stairways), the public shall be protected with appropriate guardrails, barricades, temporary fences, overhead protection, or temporary partitions and hoarding. The public must also be adequately protected from any work created hazards, such as excavations. Appropriate warnings, signs, warning lights and instructional safety signs shall be conspicuously posted and placed where necessary. • The public must also be protected from falling debris and objects from the project site. Overhead protection shall be provided that will fully protect the public and be capable of withstanding the maximum forces that could be applied from potential falling objects. Special attention shall also be given to developing adequate means to protect against wind-blown debris and construction-related materials.
On Site Health and Safety Training & Induction	• The Principal Contractor shall ensure that all site personnel and visitors undergo a risk-specific health & safety induction training session before starting work or being permitted to enter the site. A record of attendance shall be kept in the health & safety file. • The Principal Contractor shall ensure that, on site periodic toolbox talks take place at least once per week. These talks should deal with risks relevant to the construction work at hand. A record of attendance shall be kept in the health & safety file. The above should also cover all sub-contractors that are onsite. • All Contractors have to comply with this minimum requirement. Environmental issues to be included in toolbox talks where required.
General Record Keeping	• The Principal Contractor and all Sub Contractors must keep and maintain Health and Safety records to demonstrate compliance with this Specification, The OHS Act 85/1993; and with the Construction Regulations of 2014. The Principal Contractor shall ensure that all records of incidents/accidents, training, inspections; audits, etc. are kept in a health & safety file held in the site office, which must be present on site at all times. The Principal Contractor must ensure that every Sub Contractor opens its own health & safety file, maintains the file and makes it available on request.
Health &Safety Audits, Monitoring and reporting	• The Client or its duly appointed Agent shall conduct monthly health & safety audits. The Principal Contractor is obligated to conduct similar audits on all Sub Contractors appointed by them at least once a month. Detailed audit reports must be presented and discussed at all levels of project

	management meetings and a copy of such audit will be provided to the Client or its duly appointed Agent within 7 working days of such audit. Copies of the Client's audit reports shall be kept in the Principal Contractors Health & Safety File.
Emergency Procedures	• The Principal Contractor shall submit a detailed Emergency Plan for approval by the Client prior to commencement on site. The plan shall detail the response procedure including the following key elements: 1. List of key competent personnel; 2. Details of emergency services; 3. Actions or steps to be taken in the event of the specific types of emergencies; 4. Information on hazardous material/situations.
First Aid Boxes and First Aid Equipment	• The appointed First Aider(s) to be in possession of a valid first aid training certificate Level 2. Valid certificates are to be kept in the Site Safety File. All Sub Contractors with more than 5 employees shall supply their own first aid box, except if otherwise agreed upon between Principal and Sub- Contractor in writing.
Accident / Incident Reporting and Investigation	• Injuries are to be categorised into Near miss, first aid, LTI, fatal etc. Fatal accidents to be reported in addition to applicable legislative requirements to the Client or its duly appointed Agent with immediate effect. The Principal Contractor must stipulate in its construction phase OHSE Plan how it will handle each of these categories. When reporting injuries to the Client, these categories shall be used. The Principal Contractor shall investigate all injuries, with a report being forwarded to the Client immediately. All Sub-Contractors have to report on the abovementioned categories of injuries to the Principal Contractor at least monthly. All categories of incidents/accidents must be in the Statistics Section of the Monthly Audit Reports, submitted to the Client or it's duly appointed Agent.
Hazards and Potential Situations	• The Principal Contractor shall immediately notify other Sub Contractors as well as the Client of any hazardous or potentially hazardous situations that may arise during performance of construction activities. • Should a hazardous situation require work stoppages, the work must be stopped and corrective steps taken such as the issue of Written Safe Work Procedures and the issue of Personal Protective Equipment.
Personal Protective Equipment (PPE) and Clothing	• The Principal Contractor must ensure that all workers are issued with the required PPE as required by the risks associated with the activities they perform .The minimum PPE to be worn on site will be Safety Shoes/Boots, Hard Hats, Overalls. No Visitors may enter the site without Safety Shoes/Boots and Hardhats. The Principal Contractor and all Sub Contractors shall make provision and keep adequate quantities of SABS approved PPE on site at all times. All employees issued with PPE to be trained in correct use, records of training and issue to be kept in the Site SHE File .Procedure to be in place to deal with: 1. Lost or stolen PPE; 2. Worn out or damaged PPE replacement. 3. Employees not utilising PPE as required • The above procedure applies to Principal Contractors and their appointed Sub- Contractors, as they are all employers in their own right.
Permits	1) The Principal Contractor shall prepare and issue the required written permits relating to but not limited to the following: • Hot Work • Roof Work; and

	• Electrical work (both temporary and permanent) • Confined Space Entry 2) The Principal Contractor must ensure that where permits are required that they are properly implemented and adhered to.
Speed Restrictions and Protections	Unless otherwise stipulated, the maximum speed limit on sites must be limited to 10 km/h. 1) Vehicle movement routes on site must be clearly indicated where applicable. 2) Signage to ensure the safe movement of vehicles on site, as well as to ensure the health and safety of all employees and visitors on site, must be displayed in strategic locations.
Hazardous Chemical Substances (HCS)	1) To comply with Hazardous Chemical Substances Regulations as published in Government Notice No. R. 1179 dated 25 August 1995. 2) In addition to the abovementioned, Material Safety Data Sheets must be kept on site for all materials, which may contain hazardous chemical substances
Fire Extinguishers and Fire Fighting Equipment	1) The Principal Contractor and Sub-Contractors must allow for and provide adequate provision of regularly serviced temporary fire fighting equipment located at strategic points on site, specific for the classes of fire likely to occur. 2) The appropriate notices and signs must be allowed for and be erected as required. 3) Contractors may not utilize fire protection equipment belonging to the Client without prior consent.
Ladders and Ladder Work	1) The Principal Contractor must allow for and ensure that all ladders are inspected at least monthly, are in a good safe working order, are the correct height for the task, extend at least 1m above the landing, are fastened and secured and are placed at a safe angle. 2) Records of inspections must be kept in a register on site.
General Machinery	To comply with Driven Machinery Regulations as published in Government Notice No. R. 1010 dated 18 July 2003
Portable Electrical Tools and Hand Tools	1) The Principal Contractor shall ensure that all electrical tools, electrical distribution boards, extension leads, and plugs are kept in a safe working order. 2) The Principal Contractor shall ensure that all portable electrical Equipment, is clearly numbered, inspected by a Competent appointed person and records of such inspections to be kept on record in an appropriate register on the site SHE file. 3) The Principal Contractor shall allow for and ensure the following in relation to hand Tools: That a "Competent Person" undertakes routine inspections and records are kept on site. o That only authorized trained persons use the tools. o That safe working procedures apply. o That PPE is provided and used.
High Voltage Electrical Equipment Installations and Equipment	1) All Employees must be made aware of the presence and location of High Voltage Equipment such as underground cables and overhead lines, and ensure that the necessary precautionary steps are taken where work has to be executed in the vicinity of such equipment.. 2) Precautionary measures such as Isolation and Lock-Out of electrical systems or the use of electrically isolated tools must be used.
Adequate Lighting	All Contractors must allow for and ensure that adequate lighting is provided to allow for work to be carried out safely.

Transportation of Workers	1) In addition to CR 23 the following will apply The Principal Contractor and Sub-Contractors shall not: • Transport persons together with goods or tools unless there is an appropriate area or section of the vehicle in which to store such goods. • Transport persons on the back of trucks except if a proper canopy (properly covering the sides and top) has been provided with suitable seating areas. • Permit workers to stand or sit on the edge of the transporting vehicle. • Transport workers in LDVs unless they are closed/covered and have the correct number of seats for the passengers • No driver may transport more than six people on the back of a 1 Ton LDV and more than four passengers on the back of a ½ Ton LDV. 2) The driver of any LDV may not permit more than two passengers to occupy the cab of any LDV. 3) Drivers of such vehicles must have a valid driver's license for the code of vehicle being driven by them. 4) No servicing of vehicles will be permitted on a Construction Site. No Vehicles or machinery leaking oil will be permitted on site due to the risk posed to the environment. 5) Any oil or diesel spilled on site must be cleaned up as per accepted environmental practice In the event that Earth Moving Machinery is present on site the following must be adhered to: • Drivers of vehicles must be instructed to avoid parking behind earth moving machinery in order to ensure that their vehicles are visible to the operators of earth moving machinery. • Right of way must be afforded to earth moving machinery at all times. • Vehicles must only be permitted to park, where possible, in designated areas
Occupational Hygiene	1) Occupational exposure is a major problem and all Contractors must ensure that proper health and hygiene measures are put in place to prevent exposure to these hazards. 2) All Contractors must prevent inhalation, ingestion and absorption of any harmful chemical or biological agents 3) Water to be utilized for drinking purposes may only be drawn from taps designated for drinking water purposes. Fire hydrants and fire hose reels may not be utilized for drinking water purposes.
Environmental Management	• The Principal Contractor and Sub-Contractors must comply with the requirements of NEMA Act 107 of 1998 • The Principal Contractor must develop a waste management plan, implement and maintained it onsite • Cement mixing to be done at a predetermined location on site which must include a solid, slab, and bunded edges to prevent runoff • Contaminated run off water from the site must be treated such as to ensure that it does not pose a risk to the environment • Any material which may have a harmful effect when disposed of by normal means must be disposed of in an appropriate manner to eliminate its harmful effect on the environment after disposal. • The Principal Contractor must allow for and ensure that adequate procedures are implemented and maintained to ensure that waste generated is placed in suitable receptacles and removed from the site promptly. • Plans to deal with spillages must be in place and maintained.

	• No waste materials (liquid or solid) may be disposed of in drains. • No burning of waste material may take place on site as such material being burned may result in pollution of the air or give off toxic vapours which could be harmful to the health of employees or any other person present on site.
Alcohol and other Drugs	• No alcohol and other drugs will be allowed on site without the express permission of the Principal Contractor • No person may be under the influence of alcohol or any other drugs while on the construction site. • Any person on the construction site who is on prescription drugs must inform his/her Employer accordingly and the Employer shall in turn report this to the Principal Contractor immediately. • Any person on the construction site who is suffering from any illness/condition that may have a negative effect on his/her safety performance must report this to his/her Employer, who in turn must report this to the Principal Contractor forthwith. • Any person on the construction site who is suspected of being under the influence of alcohol or other drugs must be removed from site immediately and be instructed to report back the next day for a preliminary inquiry. A full disciplinary procedure must be followed by the Contractor concerned and a copy of the disciplinary action must be forwarded to the Principal Contractor for his records.

Annexure C

CONTRACTOR'S SAFETY, HEALTH AND ENVIRONMENTAL DECLARATION

Project title:	**Dumane Commercial H. School, Ndwedwe: Water and Sanitation Programme (Phase 03) - eThekwini Region**		
EMIS No.:		**WIMS no:**	**063634**

INTRODUCTION

In terms of *Construction Regulation 5(1)(h)* of the *Construction Regulations of February 2014* a Contractor may only be appointed to perform construction work if the Client is satisfied that the Contractor has the necessary competencies and resources to carry out the work safely in accordance with the *Occupational Health and Safety Act, Act 85 of 1993* and the Construction Regulations of February 2014. In line with this requirement the Contractor is required to read through this document carefully, sign it and submit it with his/her Tender.

DECLARATION

1. I the undersigned hereby declare and confirm that I am fully conversant with the Occupational Health and Safety Act, Act 85 of 1993, the Construction Regulations of February 2014 and the Construction Safety, Health and Environmental Specification attached in the tender document.

2. I hereby declare that my company and its employees has the necessary competency and resources to safely carry out the construction work under this contract in compliance with the Occupational Health and Safety Act, Act 85 of 1993,the Construction Regulations of February 2014 and the Construction Safety, Health and Environmental Specification.

3. I hereby confirm that adequate provisions has been made in my tender to cover the cost of all Safety, Health and Environmental duties and responsibilities imposed on me by the Occupational Health and Safety Act, Act 85 of 1993, the Construction Regulations of February 2014 and the Construction Safety, Health and Environmental Specification.

4. I confirm that I may not commence with any part of construction work under the contract until my Construction Safety, Health and Environmental Plan has been approved in writing by the Client.

5. I hereby confirm that copies of the following documentation will be kept on site for viewing and inspection purposes for the duration of the construction work:
    a) Client's Construction Safety, Health and Environmental Specification,
    b) Approved Construction Safety, Health and Environmental Plan,
    c) Occupational Health and Safety Act, Act 85 of 1993,
    d) Construction Regulations of February 2014, and
    e) Regulations for Hazardous Biological Agents, 2022.

6. I agree that my failure to complete and execute this declaration to the satisfaction of the Client will mean that I am unable to comply with the requirements of the Occupational Health and Safety Act, Act 85 of 1993 and Construction Regulations 2014, and accept that my tender will be rejected.

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

(*Person duly authorised to sign on behalf of Tenderer*)

Annexure D
Baseline Risk Assessment

Main Activity	Sub Activity	Safety	Health Risk	Environmental Risk	Public Safety Risk	Control Measures	Responsible Person
Site Establishment	Barricading and Installation of temporary gates and fencing	Struck by tools, tripping, falling into small excavations	Back strain, cuts, abrasion, heat exhaustion, noise exposure, dust inhalation	Littering from poor housekeeping	Tripping hazard, dust , noise	Risk Assessment Training to employees; Safe & proper use of hand tools; Wearing required PPE, practise of proper manual lifting of material	Contractor
	Placement / building of site office	Struck by tools, electrocution, tripping.	Back strain, cuts, abrasion, heat exhaustion, noise exposure, dust inhalation	Littering from poor housekeeping	Tripping hazard, dust , noise	Safety Induction Training to employees; Safe & proper use of hand tools; practise of proper manual lifting of material; Wearing required PPE	Contractor
	vehicles entering and exiting	Vehicles colliding with other vehicles, employees nocked / run-over by construction vehicles	Cuts, abrasions, death	Leaking of petrol and oil from construction vehicles.	Noise, dust, collisions, death	Construction vehicles operated by competent operators; Vehicle route to be demarcated; Display speed limit.	Contractor
	Establishing water connections	Struck by tools, Tripping, Falling into excavations	Back strain, cuts, abrasion, heat exhaustion, noise exposure, dust inhalation	none	none	Safety Induction Training to employees; Safe & proper use of hand tools; Wearing required PPE	Contractor
	Establishing Electricity connections	Struck by tools, electrocution, tripping, Falling into excavations	Back strain, cuts, abrasions, Heat exhaustion, noise , dust, etc.	none	none	Risk Assessment Training to employees; Safe & proper use of portable electrical tools; Wearing required PPE	Contractor

Roof removal & Demolition work							
Main Activity	**Sub Activity**	**Safety**	**Health Risk**	**Environmental Risk**	**Public Safety Risk**	**Control Measures**	**Responsible Person**
Removal of asbestos roof	Removal of asbestos Sheets & trusses, ***Asbestos Regulations to be followed***)	Falls, struck by portable electrical tools, bumping against objects	Back strain, cuts, abrasions, Falls, Heat exhaustion, noise , dust etc.	Land pollution, Littering from poor housekeeping	Sheets being removed falling on public, noise	Fall Protection Plan Trainings to employees to work at heights; Training in fall arrest equipment. Training in safety harnesses and lifelines; Medical Certificates to declare them fit to work at heights; Wearing required PPE; Develop a method of demolition & safety work procedure; Site supervision must be Visible	**Contractor**
	Demolition work	Falls, struck by portable electrical tools, bumping against objects.	Back strain, cuts, abrasions, Falls, Heat exhaustion, noise, dust.	Land pollution, Littering from poor housekeeping.	Brick's being removed falling on public, noise.	Demolition Plan Trainings to employees to work at heights; Training in fall arrest equipment. Training in safety harnesses and lifelines; Medical Certificates to declare them fit to work at heights; Wearing required PPE; Develop a method of demolition & safety work procedure; Site supervision must be Visible	**Contractor**
	Removing of rubble, machine and labour	Tripping, struck by, bumping against,, machine colliding with vehicles &People	Back strain, heat exhaustion, bruising,, cuts, abrasions, death	Spilling of oil, diesel, petrol	Noise, dust, collisions, death	Training in pre-use inspection, maintenance; Training in using correct tools, inspection; Wearing required PPE *(i.e. Overalls, hard hats, safety shoes, goggles, etc.)*	**Contractor**

Main Activity	Sub Activity	Safety	Health Risk	Environmental Risk	Public Safety Risk	Control Measures	Responsible Person
Desludging of Toilets	Desludging truck coming on site	Accidents, bumping onto objects, buildings collapse, injuries, vehicle capsizing, drowning of learners.	Dust, noise, smells	Vehicle emissions, oil spillages to the ground, soil erosion.	School property damage	Training, PPE, Barricading, safe systems of work and supervision	Contractor
	Desludging of toilets	Spillages, slipping, falls, injury, poor lifting	Fatigue, offensive smells	None	School ground pollution, environment pollution, water resources pollution.	Training, PPE, Barricading, safe systems of work and supervision	Contractor
	Driving sludge away for emptying	Accidents, bumping onto objects, buildings collapse, injuries, vehicle capsizing, bursting of sludge valve, slipping, falls.	Dust, noise, smells,	Vehicle emissions, oil spillages to the ground, soil erosion.	Ground Pollution, pollution of water resources	Training, PPE, safe systems of work and supervision	Contractor
	Emptying of sludge	Spillages, slipping, falls, injury, poor lifting, bursting of sludge pipe	Fatigue, offensive smells, diseases, fatigue, extreme weather conditions, death	Pollution of water resources, Sanitation communicable diseases.	School ground pollution, environment pollution, water resources pollution.	Training, PPE, Barricading and isolation of sludge, safe systems of work and supervision	Contractor
Excavations and pipe laying	Setting out for excavations	Tripping, struck by, bumping against,	Back strain, dust inhalation, cuts and abrasions	none	none	Training, PPE, Barricading, safe systems of work and supervision.	Contractor
	Digging of Excavations manually	Struck by tools , tripping, Falling into excavations, Hidden services	Back strain, heat exhaustion, bruising, cuts, abrasions	Spilling of oil, diesel, petrol	Noise, dust, collisions, death	Training, PPE, Barricading, safe systems of work and supervision.	Contractor
	Pipe laying	Hit by swinging pipes, buried by collapsing trenches, hands caught in between pipes	Inhalation of dust where pipes have to be cut, back strain	None	None	Training, PPE, Barricading, safe systems of work and supervision.	Contractor

	Backfilling	Falling into trenches, struck by tools.	Inhalation of dust, dust particles getting into the eyes	None	None	Training, PPE, safe systems of work and supervision	Contractor
Brick work	Cement mixing	Striking against area, sharp edge, hazardous substance	Cuts &abrasions, inhalation of duct, contact dermatitis	Cement spillage	None	Training, PPE, safe systems of work and supervision	Contractor
	Brick work	Rough surfaces, hazardous substances, flying particles, falling objects	Cuts, abrasions, burns, fractures, death	None	None	Training, PPE, safe systems of work and supervision	Contractor
	Scaffolding Erection	Struck by, tools, bumping against, falls	Cuts, abrasions, fractures, death	none	none	Training, PPE, safe systems of work and supervision	Contractor
Installation of Roof Trusses and Roof Covering	Installation of timber roof Trusses	Falls, Struck by, hands caught between,	Back strain, cuts, abrasions, Heat exhaustion, noise, fractures and death/	None	None	Training, PPE, safe systems of work and supervision	Contractor
	Fitting of battens	Falls, Struck by, hands caught between,	Back strain, cuts, abrasions, Heat exhaustion, noise, fractures and death	None	None	Training, PPE, safe systems of work and supervision	Contractor
	Fitting of roof sheets	Falls, struck by, bumping against objects, sharp edges	Back strain, cuts, abrasions, Heat exhaustion, noise, fractures and death etc.	none	Sheets being fitted falling on public	Training, PPE, safe systems of work and supervision	Contractor
Installation of Ceilings	Securing ceiling sheets	Falls, hazardous dust, bumps, sharp edges,	Muscular strains, dust inhalations, cuts and abrasions	None	None	Training, PPE, safe systems of work and supervision	Contractor

	Fitting cornices	Bumps, sharp edges, hazardous dust and substances	Muscular strains, dust inhalations, skin absorption of hazardous substances, cuts and abrasions	Contamination of environmental resources	None	Training, PPE, safe systems of work and supervision	Contractor
	Skim filling and finishing	Bumps, sharp edges, hazardous dust and substances, abrasions	Muscular strains, dust inhalations, skin absorption of hazardous substances, cuts and abrasions	Contamination of environmental resources	None	Training, PPE, safe systems of work and supervision	Contractor
Fitting Doors/windows	Fitting doors/windows into frames /openings	Struck by items, hands caught between areas, falling items, sharp edges, noise, dust	Cuts, abrasions, fractures, death	none	None	Training, PPE, safe systems of work and supervision	Contractor
	Fitting glass panes	Struck by items, hands caught between areas,, falling items, sharp edges	Cuts, abrasions, fractures, severe injuries, death	None	None	Training, PPE, safe systems of work and supervision	Contractor
	Glazing	Contact with sharp edges , Hazardous substances, falling	Cuts and lacerations ,, fractures , death	None	None	Training, PPE, safe systems of work and supervision	Contractor

EXTERNAL WORKS							
Main Activity	**Sub Activity**	**Safety**	**Health Risk**	**Environmental Risk**	**Public Safety Risk**	**Control Measures**	**Responsible Person**
Installation of a Jo-Jo tank	Concrete pouring & positioning tank onto concrete base	Struck by vehicle, vehicle colliding with other vehicles, Impact hazard, falling	Back strain, heat exhaustion, abrasions, fractures, death	Pollution due to cement spillage, leaking of oil and diesel	Noise	Training of personnel on the use of HCS; Wearing required PPE, Supervision	**Contractor**
New concrete aprons	Excavation	Poor posture, Bumps, sharp edges etc	Muscular strains, dust inhalation, cuts and abrasions	None	None	Training, PPE, safe systems of work and supervision	**Contractor**
	Formwork	Tripping, poor posture, bumps,, sharp edges etc	Muscular strains, dust inhalation, cuts and abrasions	None	None	Training, PPE, safe systems of work and supervision	**Contractor**
	Concrete pouring	Struck by vehicle, vehicle colliding with other vehicles, Impact hazard, Caught between parts, falling	Back strain, heat exhaustion, abrasions, fractures, death	Pollution due to cement spillage, leaking of oil and diesel	Noise	Minimal speed limit and flag man. Training of personnel on the use of HCS; Wearing required PPE Supervision	**Contractor**

Main Activity	Sub Activity	Safety	Health Risk	Environmental Risk	Public Safety Risk	Control Measures	Responsible Person
Electrical Installations	Chasing	Electricity, moving part, entanglement, struck by flying items, sparks, noise , dust, entanglement	Burns, Electrocution, cuts abrasions, dust inhalation, noise induced hearing loss	None	None	Training, PPE, safe systems of work and supervision	Contractor
	Fitting of plug boxes, junction boxes ,Distribution boards	Noise , dust , Electricity ,bumping against, struck by flying items, entanglement , moving parts	Electrocution ,cuts and abrasions , dust inhalation ,noise induced hearing loss	None	None	Training, PPE, safe systems of work and supervision by a registered person as per EIR	Contractor
	Wiring	Muscular exertion ,bumping against , sharp surfaces	Muscular strain ,cuts and abrasions ,	None	None	Training, PPE, safe systems of work and supervision by a registered person as per EIR	**Contractor**
	Use of Installation	Electrocution	Burns	None	Electrocution	Lock-out procedure, issuing of CoC before use. a registered person as per EIR	**Contractor & Consultant**

Health & Safety Bill of Quantities					
ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
1	Hi Visibility conti-suit	Annual/ As required or needing replacing			R-
2	HI- Visibility T-Shirts	Annual/ As required or needing replacing			R-
3	Steel Toe-Capped Safety Boots	Annual/ As required or needing replacing			R-
4	Hi-Visibility Safety Vest	Annual/ As required or needing replacing			R-
5	SABS Approved Hard Hat	Annual/ As required or needing replacing			R-
6	Hi-Viability Rain Suits	Annual/ As required or needing replacing			R-
7	Steel Toe Capped Gumboots	Annual/ As required or needing replacing			R-
8	Dust Masks (Stipulate FFP):	Annual/ As required or needing replacing			R-
9	Safety Glasses	Annual/ As required or needing replacing			R-
10	Gloves (Stipulate Type):	Annual/ As required or needing replacing			R-
11	Safety Harnesses	Annual/ As required or needing replacing			R-
12	Other:				R-
13	Trainings:				R-
14	Safety Representative Training	Once off			R-
15	First Aider Training	Once off			R-
16	Fire Fighting Training	Once off			R-
17	Legal liability	Once off			R-
18	H&S Salaries:				R-
19	CHS Manager	Monthly			R-
20	CHS Officer	Monthly			R-
21	Other:				R-
22	Specific H&S Items:				R-
23	Medicals	Pre-placement, Annual & Exit			R-
24	Spill Kit	Once off			R-
25	Accommodation of Traffic as per Client tender BOQ	Once off			R-
26	Inductions	Annual			R-
27	First Aid Kits	Once off			R-
28	Fire Extinguishers	Once off			R-
29	Ablutions	Once off			R-
30	Barrier Netting	Once off			R-
31	Appointment of AIA for asbestos	Not applicable			R-
32	Asbestos Management plan	Not applicable			R-
33	Asbestos removal by competent asbestos contractor	Not applicable			R-
34	Disposal of products containing asbestos	Not applicable			R-
35	Disposal of hazardous chemicals and contaminated soil	Once off			R-
36	Safety Signage:				R-
37	Construction Boards	Once off			R-
38	Fire Extinguisher	Once off			R-
39	Directional signs	Once off			R-
40	Emergency Assembly point	Once off			R-
41	No Smoking	Once off			R-
42	Ladies and Men's Toilets (Gender sign)	Once off			R-
43	No Naked Flames	Once off			R-
44	Other:				R-
45					
46					

Principal Contractor

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CHS

KWAZULU-NATAL PROVINCE
PUBLIC WORKS
REPUBLIC OF SOUTH AFRICA

DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3: ETHEKWINI REGION: DUMANE COMMERCIAL HS

ANNEXURE 7

HEALTH AND SAFETY BILL OF QUANTITIES

HEALTH AND SAFETY IMPLEMENTATION COSTING

Contractor to give a breakdown of his Health and Safety costs on this sheet.

ITEM	DESCRIPTION	UNIT	QUAN-TITY	MONTHS (Indicative)	RATE	AMOUNT
			(a)		(b)	(a) x (b)
1	**MEDICALS**					
1.1	Pre-employment medical	Nr.	-			
1.2	Re-medicals - yearly	Nr.	-			
	TOTAL					
2	**PERSONAL PROTECTIVE EQUIPMENT**					
2.1	Overalls	Nr.				
2.2	Hard Hats	Nr.				
2.3	Safety boots/shoes	Nr.				
2.4	Gloves	Nr.				
2.5	Gumboots steel toe cap	Nr.				
2.6	Safety glasses	Nr.				
2.7	Reflector Bibs	Nr.				
2.8	Barricading Material	M				
2.9	Dust masks	Box 20				
	TOTAL					
3	**FIRE FIGHTING**					
3.1	Fire extinguishers - 4.5Kg	Nr.				
3.2	Surveys - Annual Service	Nr.				
	TOTAL					
4	**HEALTH AND SAFETY PERSONNEL**					
4.1	Safety Manager	Nr.				
4.2	Safety Officer	Nr.				
4.3	Construction Phase Safety, Health, Environmental and Waste Management Plan	Nr.				
	TOTAL					
5	**FACILITIES**					
5.1	Provision of ablution facilities	Nr.				
5.2	Service and maintenance of ablution facilities	Nr.				
5.3	Provision of eating areas	Nr.				
5.4	Cleaning of Lay down and other storage areas	Nr.				
5.5	Wash hand basin	Nr.				
5.6	Hot and Cold running water	Nr.				
5.7	Degreasing & Toilet soap	Nr.				
	TOTAL					
6	**FALL PREVENTION / PROTECTION**					
6.1	Safety harnesses with double lanyards	Nr.				
6.2	Safety harnesses with Scaffold hooks	Nr.				
6.3	Lifelines and vertical fall arrest systems	Nr.				
6.4	Scaffolding – material, erection and inspection (Estimate for project)	Nr.				
6.5	Temporary hand railing material and kick flats	Nr.				
6.6	Chin Straps	Nr.				
	TOTAL					

7	**FIRST AID**					
7.1	Replenishment of boxes and other supplies	Nr				
	TOTAL					
8	**TRAINING**					
8.1	SHE Representative	Nr.				
8.2	First Aid Level 1	Nr.				
8.3	Fire Fighting	Nr.				
	TOTAL					
9	**SIGNAGE**					
9.1	All Signage as required by Law, regulatory, warning and information	Nr.				
9.2	Posters for awareness	Nr.				
	TOTAL					
10	**ELECTRICAL**					
10.1	Replacement of Locks required for lockouts	Nr.				
10.2	Replacement of tags	Nr.				
10.3	Replacement for Permit books	Nr.				
10.4	Replacement of Calipers	Nr.				
	TOTAL					
11	**OTHERS (Project Specific)**					
11.1		Nr.				
	TOTAL					
GRAND TOTAL TO BE CARRIED TO THE PRELIMINARIES AND GENERAL IN BILL OF QUANTITIES						

KWAZULU-NATAL PROVINCE
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DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3: ETHEKWINI REGION: DUMANE COMMERCIAL HS

ANNEXURE 8

BUILDERS LIEN AGREEMENT

WAIVER OF CONTRACTOR'S LIEN

DEFINITIONS

Contractor: _____

Employer: Head: Public Works (KZN Department of Public Works: Province of KwaZulu-Natal)

Agreement: GCC FOR CONSTRUCTION WORKS - SECOND EDITION 2010

Works (description): **DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3: ETHEKWINI REGION: DUMANE COMMERCIAL HS**

Site: GPS CO-ORDINATES: 29°27'28"S 30°54'10"E (S29.45777778; E30.90277778)

AGREEMENT

The Contractor waives, in favour of the Employer, any lien or right of retention that is or may be held in respect of the Works to be executed on the Site

Thus done and signed at _____ on _____
[Date]

_____ _____
Name of signatory Capacity of signatory

_____ _____
As witness For and on behalf of the contractor who by signature hereof warrants authorisation hereto

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ANNEXURE 9

EPWP SPECIFICATION

THE EPWP CONDITIONS AND SPECIFICATIONS

Changes to be effected in the Bill of Quantities in P&G's Section C12 (page 11of 13)

C 12 EPWP Conditions and Specifications

C12 to be expanded from C 12.1 to C12.10 as follows;

	C 12 EPWP CONDITIONS AND SPECIFICATIONS			
	C12.1(a) Employment Targets The contractor needs to provide a realistic estimate on the number of jobs that the project has a potential to create throughout the project duration as the project will be implemented using Labour Intensive Construction methods on elements where it is economical and feasible. No of jobs estimated to be created equals to a **minimum of 5 unskilled labour** F.....V.....T..... Item It is a general requirement of this contract that persons normally resident in the ward of the works (local labour) be given preference for employment on the contract. Provided, however, that **should adequate and appropriate labour not be available within the ward**, others may be employed subject to satisfactory proof being provided that every reasonable endeavour has been made to employ local labour **(Local Sub-contractor(s); Skilled; Semi-Skilled and Unskilled).** The contractor shall in consultation with the local community leaders (**Project Steering Committee**) with the purpose of negotiating with them regarding the utilization of local resources in the construction process. In this regard, the contractor shall furthermore give preference, wherever possible to the employment of single heads of households, women and youth as well as families declared as most indigent by War on Poverty/ Sukuma Sakhe program profiling process. The contractor should aim, in general, to maximise the involvement of the local community, however workers from other communities should not exceed 20% of all persons working on the project, where local employees possess skills at level of competency that meet contractors requirements			
	C12.1 (b) Employment requirements Tenderers are advised that this contract will be subject to the Expanded Public Works Program (EPWP) aimed at alleviating and reducing unemployment. Tenderers must allow for any costs for the following employment requirements of the EPWP 1. 55% of unskilled labour to be women 2. 55% of unskilled labour to be youth aged between 18 and 35 years 3. 2% of unskilled labour to be people with disability 100% unskilled labour utilized must reside within the boundaries of the Municipality Ward where this contract is executed, with preference to the local community closest or a walking distance to the contract site. Wherever possible local skilled tradesmen are to be employed on this contract with the view to maximize utilization of local resources. F.....V.....T..... Item			

C12.1 (c)Labour rate and payment intervals

The contractor should ensure that the labour rate paid to unskilled local labour is commensurate to the daily task. When determining the rate, consideration should be given to that EPWP beneficiaries are mostly bread winners in their families, as the program intends alleviating poverty. There should also be consideration that the labour rate promotes creation of expanded number of jobs created and person days of work.

Contractors should make endeavours to ensure that labourers, particularly unskilled are remunerated on fortnight basis and prior notification be made should there be a shortfall on their wages.

The labour rate for local unskilled shall also be determined in consideration of the location of the project, i.e. for projects implemented in urbanized municipalities will not be the same as that for rural municipalities.

F.....V.....T.....
Item

C12.2 (a) Labour Intensive Construction Method

Those parts of the contract to be constructed using Labour Intensive methods will be marked in the BoQ with letter LI (indicating Labour Intensive) against every item so designated. Such works will only be constructed using the method so indicated.
Reference to be made to Guidelines for the implementation of Labour Intensive Infrastructure projects under EPWP.

"Scope of Work in Respect of Work Relating to the Expanded Public Works Programme (EPWP)"

Labour-intensive component

Due to the nature of the work involved, this type of project lends itself to be feasible as a labour Intensive project i.e. the construction activities will indeed require skilled/unskilled labour.

The aim of the projects is to provide some form of economic benefit whilst generating and increasing the acquired skills shortage to improve sustainability in the local area. The following are potential focus areas where employment creation can be optimized per project:

(i) Trenching works not exceeding depth of 1.5m, including trenching for Foundation, Electrical, Water, Mechanical & Civil Services Works including backfilling where ground conditions permit
(ii) Building Works; All masonry works (which include concrete mixing on site; brickwork; block work ; plastering; screed works; jointing; etc.); Painting, Plumbing, Ironmongery; roof cladding; glazing; tilling; carpentry; flooring; waterproofing; etc.
(iii) Sewers works including Construction of manholes, laying of Sewer pipes, bedding, backfilling and compaction.
(iv) Water Reticulation works including excavation, bedding, laying of pipes and compaction
(v) Site Clearance Works
(vi) Electrical Reticulation works.
(vii) Stormwater water drainage using in-situ concrete
(viii) Landscaping and Grassing of Sports Field
(ix) Cleaning and Fencing Works

The above identified activities are deemed suitable to be constructed using the LIC methods; to build, upgrade and maintain the social and economic of the underdeveloped area, promoting community participation, development of skills and creating more work opportunities.

	The above identified activities should be marked in the Bill of Quantities with the letter (LI). Contractor to price the above items in the Bill of Quantities bearing in mind that they are regarded as the main sources of job creation, whether sub contracted or undertaken by the main contractor. The use of plant to provide such works, other than plant specifically provided for in the scope of work, is a variation to the contract. The items marked with the letter LI are not necessarily an exhaustive list of all the activities which must be done by hand. Payment for items which are designated to be constructed labour-intensively (either in this schedule or in the Scope of Works) will not be made unless they are constructed using labour-intensive methods. Any unauthorised use of plant to carry out work which was to be done labour-intensively will not be condoned and any works so constructed will not be certified for payment. F.....V.....T ..... Item			
	C12. 3 Record Keeping 12.3.1 Every employer must keep in the project site office the following minutes of site progress minutes; contractors' monthly site progress reports; accurately recorded attendance register; proof of payment as means to verify authenticity of data in the EPWP Beneficiary form submitted with payment certificates. Copies of submitted EPWP beneficiary data forms should also be kept in the site office. 12. 3.2 The employer must keep this record for a period of at least three (3) years after the completion of the project in his/her office as the project site office would have been relocated. This should be safely kept for job creation data verifications and periodical audits on projects conducted by National and Provincial Department of Public Works after one (1) or two (2) quarters of submitting captured EPWP Data to the National EPWP coordinating Department. F.....V.....T..... Item			
	C12.4 EPWP Monthly Reporting documents: At the end of each month the contractor must submit: • EPWP monthly data collection form • Worker monthly payment upload • Worker monthly acknowledgement of receipt of payment • Worker monthly Payment register • Worker monthly training form • Monthly attendance Register • Worker Monthly pay slips • Unskilled labour certified ID copies (once off) • Beneficiary ID-size photos • Proof of UIF • Proof of COIDA F.....V.....T..... Item			
	C12.5 EPWP Promotion 12.5.1 EPWP signage board			

EPWP Program at the project level shall always be promoted through the provision of projects signage board that embraces EPWP logo at the bottom, correct measurement for this sign board will be provided by the project leader during the site handing over meeting.

F.....V.....T..... ..... Item

12.5.2 Branding of labour apparel

Contractor & Sub-contractors' labourers shall be provided with EPWP branded Personal Protective Equipment (PPE), reflector vest with EPWP acronym at the back as an ideal and cost effective means of promoting program on site.

The contractor is advised to price for both items 12.5.1 and 12.5.2

F.....V.....T..... Item

C12.6 COMMUNITY LIAISON OFFICER (CLO)

UTILISATION OF A COMMUNITY LIAISON OFFICER

The Contractor shall allow for and pay any and all costs necessary for the engagement of the services of a Community Liaison Officer (CLO) for the full duration of this contract

A CLO will be identified by the local structures (Project Steering Committee) of the ward areas and appointed following fair and transparent interviewing process, to be conducted in the presence of local structures and the contractor representative, in order to assist the Contractor in the procurement of any local labour, etc. required for this project. The Contractor is to liaise with the CLO and afford him any assistance needed in ensuring sound working relations with the local community.

Key Responsibilities of the CLO are envisaged to include and not necessary be limited to:

1. Assisting local leadership in conducting skills and resources audit which facilitates sourcing labour from within the ward or targeted areas for employment, as required by contractor

2. Assisting in sourcing labour-only domestic sub-contractors and the procurement of materials from local resources, as required by the contractor.

3. Assisting the contractor by identifying areas of potential conflict and or threats to the project or to stakeholders in the project and recommend appropriate action to the contractor.
4. Assisting contractor and stakeholders in the project in the resolution of any conflict which may arise.

5. Establishing and ensuring that sufficient and open communication channels between the contractor and the work force are maintained.

6. Establish and ensuring that efficient and open communication channels between the contractor and the community are maintained

7. Identifying and reporting to the Contractor regarding issues where communication between stakeholder is necessary, recommend courses of action and facilitate such communications

	8. Assisting the Contractor and the work force in the establishment of grievance procedures and necessary recommendation to the Contractor regarding the grievances and solution thereto. 9. Attending to site meetings and project implementation meetings as required by the Contractor and prepare and submit periodic reports as may be required by the Contractor from time to time. 10. Attending to such other duties which are consistent with the functions of a CLO, as may be required by the Contractor from time to time. Tenderers are to price twice the rate of unskilled local labour rate for the Community Liaison Officer (CLO) against this item for any and all costs arising out of compliance with the foregoing and in the event of a Tenderer failing to price against this item or making inadequate financial provision against this item for compliance as aforesaid, then no claim for costs or additional cost incurred will be entertained by the Head: Public Works F:..... V:..... T:..... Item			
	C12.7 Skills development on site The Contractor is conforming to the objectives of EPWP if his beneficiaries are capacitated with skills that will render them employable in the future. It is then the responsibility of the contractor that mandatory life skills are provided to 100% of workforce on site and on the job training to labourers from whom the potential for further development has been identified. The latter is not mandatory to all as it covers technical skills. Contractor should also make provision for the possibility that there might be local youth that will need to be placed on the project with an intention to be provided support towards improving their level of competency and productivity. Contractor shall also provide all necessary on-the-job training to targeted labour to enable such labour to master and advance on techniques required to undertake the work in accordance with requirements of the contract in a manner that does not compromise workers health and safety. F.....V.....T.....Item			
	C12.8 Sub-Contracting for local emerging enterprises The project can support the notion of one main contractor to be appointed whilst several subcontractors, possibly from the local Small, Medium and Micro Enterprises (SMME) group, are employed to undertake various smaller activities however due to the nature of the project, there will be no **local** subcontracting. **C12.8.1 Subcontractor Procedure** The recommendation will be that the Contractor shall advertise and call for competitive tenders in respect of each portion of the works that are required to be subcontracted. The tenders received are then evaluated by both the employer and the contractor. The evaluation panel shall comprises equal representatives from the Employer and from the Contractor The Contractor shall without delay enter into contract with the successful tendering subcontractor based on their accepted tender submission.			

This will promote the cost effective participation and development of smaller registered contractors in larger valued contracts without losing single point of accountability for projects. This will allow the emerging contractors to tender for work in a fair, transparent and equitable manner rather than having to negotiate such contracts with the main contractor. Also guarantees the participation of contractors registered in lower contractor grading designation.

F.....V.....T.....Item

C12.8.2 Subcontractor Mentoring

Once the Subcontractors have been identified and engaged, the Contractor shall closely monitor their performance in the execution of their contracts.

The Contractor will be responsible for drawing implementation plan that will assist in managing the development of sub-contractors undertaking Labour Intensive work.

The Contractor will be responsible for management of the sub-contractors and to ensure that they comply with all EPWP requirements as set-out in this specification.

The Contractor and sub-contractors will be required to compile monthly progress reports to be submitted with payment certificates. The reports shall include planned targets with regards to the works and employment, employment of EPWP beneficiaries and project expenditure. Failure to produce monthly reports will render payment certificates incomplete

The contractor will be required to assist, train, mentor and monitor its Sub-contractors and report through monitoring tool on progress of each Sub-contractor.

F.....V.....T.....Item

C12.8.3 Portfolio of Evidence

The Contractor is to develop and /or maintain a portfolio of evidence for each sub-contractor. The Portfolio of Evidence is a collection of proof of the training, coaching, guidance and monitoring inputs provided to the Sub-contractor. It is the document which records the development progress of the Sub-Contractor and will need to be updated continually throughout the duration of the contract.

The Portfolio of Evidence should include but not limited to the following documentation:

- The development path designed for each Sub-Contractor,
- The Training course completed by the Sub-Contractor,
- The hours of guiding, coaching and mentoring received for each activity listed in the developmental plan,
- A list of outcomes achieved at each level for each activity.

F.....V.....T.....Item

. **Performance and penalties**

The Contractor performance will be monitored throughout the contract. Should the Contractor fail to fulfil his obligation he will be liable for penalties. Payment of the penalty shall not absolve the Contractor of any claim, or relieve the Contractor of any of his duties, obligations or responsibilities under the contract.

- Utilisation of the Sub-Contractors

The Contractor's achievement of the targets will be measured quarterly to determine the progress made to date.

C12.8.4 Local Suppliers

Local material suppliers within the vicinity of the site to be utilise as long as their materials meets the required specification. However, quality and suitability would have to be checked by the employer, if the local suppliers are unable to meet the demand the nearest suitable suppliers are to be used.

Production of materials should be done on site, where economies of scale allow e.g. concrete paving blocks should be encouraged which will enable employment creation and also allow for enterprise development.

F.....V.....T.....Item

C12.8.5 TENDERER'S TO NOTE CONDITIONS

a) The contract to be entered into between the Contractor and the PPG's will be a LABOUR ONLY sub-contract.

b) The Contractor will be responsible for ensuring that all materials for use by the PPG's in the works are to be on site timeously. The Contractor shall liaise with The Mentor and PPG to determine the nature and extent of materials required and the lead time necessary.

F.....V.....T.....Item

c) The Contractor shall be responsible for the overall programming of the Works and he is to allow for monitoring the PPG's programme and progress.

d)In conjunction with the Mentor, he is to allow for the supervision and mentoring (where necessary) of the PPG to ensure quality and adherence to standard building practice

F.....V.....T.....Item

e) The Contractor is to allow for extra storage facilities on site for the PPG's tools and equipment.

F.....V.....T.....Item

f) Basic tools shall be provided by the PPG's and where these are not available; the Contractor will supply him with the necessary tools and equipment and deduct the costs thereof from the interim claims made by the PPG.

g) Work requiring specialized tools will be provided free of charge by the Contractor with the provision that these be returned upon completion of the Work.

CO-ORDINATION

The Contractor is to co-ordinate the work of all the PPG's, Sub-Contractors and Nominated Sub-Contractors appointed direct by the Employer in such a manner and at all times as will suit the

	building programme and he is to allow adequate access, for the PPG's, where required, to carry out their work in an efficient manner as no claims for extras in this connection will be entertained. **ATTENDANCE** The Contractor may allow for attendance upon the PPG's concerned to execute the work. The Contractor is to allow the PPG's the use of any scaffolding belonging to him while it remains so erected on the site. Where scaffolding is necessary for the use by any PPG and the Contractor has not erected any for his own use or has removed same after his own use, the Contractor shall supply sufficient scaffolding to the PPG to be erected and dismantled by the PPG and returned to the Contractor. This attendance upon PPG's to execute the work is to include for the scaffolding provisions as aforesaid and, in addition, is to include for co-operating to the fullest extent with all the parties, attending on off-loading materials, providing suitable storage for tools and materials used by the PPG's, use of general facilities such as latrines, etc., supply and cost of power, lighting, water and the like. F.....V.....T..... **Item**			
	C12.9 EPWP contract for labour It is compulsory that shortly after the contractor and or sub contractor has appointed local labour, the employment contract should be signed by both parties, prior to commencement with works on site. The employment contract forms part of the Ministerial Determination or from the regional EPWP officials. F.....V.....T.....Item			
	C12.10 EPWP Scope of Work For This Project **Contractors are to price the items on the Bill of Quantities highlighted below, bearing in mind that they are regarded as main sources of job creation, whether sub contracted or undertaken by the main contractor.** **Elements of the scope of work where the application of Labour Intensive Construction methods are indicated with the letters (LI) are as follows;** i) Excavating trenches for foundations and any other civil works with the depth not more than 1.5 m ii) All masonry works which include concrete mixing on site; brickwork; plastering; screed works; jointing; etc. iii) Painting, Plumbing, Ironmongery; roof cladding; glazing; tilling; carpentry; flooring; waterproofing; etc. iv) External works such as landscaping; cleaning; paving; fencing; tarmac; etc. .			

KWAZULU-NATAL PROVINCE
PUBLIC WORKS
REPUBLIC OF SOUTH AFRICA

DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3: ETHEKWINI REGION: DUMANE COMMERCIAL HS

ANNEXURE 10

STRUCTURAL ENGINEERS PROJECT SPECIFICATION BOOKLET

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MAP AFRICA
CONSULTING ENGINEERS

WIMS NO. 063634
DEPARTMENT OF EDUCATION
WATER & SANITATION PROGRAMME

TYPICAL DETAILS AND SPECIFICATIONS BOOKLET

SEPTEMBER 2018

PRELIMINARY

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SECTION 1
GENERAL SPECIFICATIONS

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REPAIRS TO EXISTING ROOF SHEETING

1. PREPARE AND CLEAN EXISTING SURFACE WHERE THE ROOF APPEARS TO BE LEAKING.
2. APPLY A GENEROUS COAT OF SIKA RAIN TITE BY BRUSH OR ROLLER.
3. EMBED THE SIKA RAIN TITE MEMBRANE INTO THE BASE COAT WHILE IT IS STILL WET.
4. REMOVE AND SMOOTH OUT AIR POCKETS AND CREASES.
5. APPLY A SECOND COAT OF SIKA RAIN TITE ONTO THE MEMBRANE.
6. WHEN TOUCH DRY, APPLY AN ADDITIONAL COAT OF SIKA RAIN TITE.
7. REPAIRED AREA OF ROOF SHEETING TO BE PAINTED WITH 2 COATS OF PAINT. COLOUR TO MATCH EXISTING ROOF SHEETING.

NOTE: REFER TO MANUFACTURER'S SPECIFICATIONS ON SIKA RAIN TITE

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A. ASBESTOS ROOF SHEETING

1. ANY PERSON WHO ERECTS, MAINTAINS, ALTERS, RENOVATES, REPAIRS OR DISMANTLES ASBESTOS ROOF SHEETING, GUTTERS, FASCIA BOARDS AND BARGE BOARDS SHALL ENSURE THAT:
   a) WRITTEN WORK PROCEDURES ARE LAID DOWN AND FOLLOWED TO PREVENT THE RELEASE OF ASBESTOS DUST INTO THE ENVIRONMENT.
   b) ALL RUN-OFF WATER MUST BE FILTERED BEFORE ENTERING THE STORMWATER SYSTEM.
   c) FULL COMPLIANCE WITH THE DEPARTMENT OF LABOUR REQUIREMENTS IN TERMS OF THE SAFE REMOVAL AND/OR THE SAFE REPAIR (PATCHING) OF THE ASBESTOS ROOF SHEETING.
   d) NOTIFICATION IN TERMS OF AN 'ASBESTOS PLAN' MUST BE SUBMITTED TO AN APPROVED INSPECTION AUTHORITY AND THEN TO THE DEPARTMENT OF LABOUR FOR APPROVAL PRIOR TO WORKING ON ANY ASBESTOS ROOF SHEETING.

2. IF ANY HOLES ON THE SHEETING ARE LARGER THAN 75mm X 75mm OR OTHERWISE BADLY DAMAGED OR CRACKED IN MANY AREAS OF THE SHEET, THEN THE EXISTING ASBESTOS ROOF SHEET MUST BE REMOVED AND REPLACED WITH 'NUTEC' FIBRE CEMENT ROOF SHEETING. PROFILE AND COLOUR TO MATCH THE EXISTING ROOF SHEETING. REFER TO ITEM 1 ABOVE FOR THE DEPARTMENT OF LABOUR REQUIREMENTS FOR THE SAFE HANDLING OF ASBESTOS SHEETING.

3. WHEN REMOVING AND REPLACING THE ENTIRE ASBESTOS ROOF SHEETING WITH 'NUTEC' ROOF SHEETING, ENSURE THAT THE NEW TIMBER PURLINS ARE 76 X 50 GRADE 5 TYPE SA PINE TIMBER WITH THE 76mm DIMENSION PLACED VERTICALLY. NOTE : PURLIN SPACING SHOULD NOT EXCEED 900mm CENTRES. THE USE OF 76 X 50 GRADE 5 TYPE SA PINE TIMBER PURLINS ARE ONLY ACCEPTABLE WHEN TRUSS SPACINGS DO NOT EXCEED 1200mm CENTRES. WHERE TRUSS SPACINGS EXCEED 1200mm CENTRES, THE CONTRACTOR IS TO ENGAGE THE ENGINEER FOR FURTHER RECOMMENDATIONS.

B. STEEL ROOF SHEETING

1. SHEETING SPECIFICATION FOR A COMPLETE NEW ROOF: USE 0,53mm COLOUR BOND OR 0,55mm COLOUPLUS (AZ150) IBR PROFILE SHEETING, SUPPLIED IN SINGLE LENGTHS (FROM ROOF RIDGE TO EAVES GUTTER) FIXED ONTO 76 X 50 GRADE 5 TYPE SA PINE TIMBER PURLINS WITH THE 76mm DIMENSION PLACED VERTICALLY. NOTE : PURLIN SPACING SHOULD NOT EXCEED 900mm CENTRES. THE USE OF 76 X 50 GRADE 5 TYPE SA PINE TIMBER PURLINS ARE ONLY ACCEPTABLE WHEN TRUSS SPACINGS DO NOT EXCEED 1200mm CENTRES. WHERE TRUSS SPACINGS EXCEED 1200mm CENTRES, THE CONTRACTOR IS TO ENGAGE THE ENGINEER FOR FURTHER RECOMMENDATIONS.
   COLOUR OF THE NEW SHEETING TO MATCH THE ROOF SHEETING ON EXISTING CLASSROOM BLOCKS OR OTHERWISE DIRECTED BY PROJECT MANAGER.
2. MINOR DAMAGE TO EXISTING STEEL ROOF SHEETING: REMOVE AND REPLACE DAMAGE ROOF SHEETING WITH NEW STEEL SHEETING. NEW SHEETING TO MATCH THE EXISTING SHEETING PROFILE, TYPE, OVERALL THICKNESS AND COLOUR. SHEETING TO BE SUPPLIED IN SINGLE LENGTHS (FROM ROOF RIDGE TO EAVES GUTTER).

C. CONCRETE ROOF TILES

1. ALL DAMAGED AND CRACKED CONCRETE ROOF TILES ARE TO BE REMOVED AND REPLACED WITH NEW CONCRETE TILES TO MATCH THE EXISTING ROOF TILES. COLOUR OF THE NEW CONCRETE TILES TO MATCH THE EXISTING ROOF TILES.

D. DAMAGED ROOF TRUSSES REPLACED WITH COMPLETE NEW 'GANG NAILED' ROOF STRUCTURE

1. EXISTING DAMAGED TIMBER ROOF TRUSSES TO BE REMOVE AND CARTED OF SITE.
2. THE INSTALLATION OF THE GANG-NAILED ROOF STRUCTURE BY THE MAIN CONTRACTOR IS TO BE : **A DESIGN, SUPPLY, INSTALL AND CERTIFY** CONTRACT.
3. IT IS THE RESPONSIBILITY OF THE MAIN CONTRACTOR TO SUBMIT THE REQUIRED TR1 AND TR2 CERTIFICATES TO US FOR OUR RECORDS AT THE RELEVANT STAGE OF THE PROJECT. THE TR1 AND TR2 CERTIFICATES CERTIFY THAT THE OVERALL ROOF STRUCTURE IS STRUCTURALLY STABLE.
4. IT IS THE RESPONSIBILITY OF THE MAIN CONTRACTOR TO ENSURE THAT THE APPROVED COMPETENT PERSON (REGISTERED WITH ECSA) ISSUING THE TR1 CERTIFICATE HAS INSPECTED THE SITE, COMPLIED WITH ALL THE REQUIRED SPECIFICATIONS AS NOTED ABOVE, AND HAS PROVIDED HIS OWN SPECIFICATIONS / DRAWINGS FOR THE TRUSS TIE-DOWNS, BRACING, ETC.
5. THE TR1 CERTIFICATE CONFIRMS THAT THE GANG-NAILED ROOF TRUSSES HAVE BEEN DESIGNED BY AN APPROVED COMPETENT PERSON (REGISTERED WITH ECSA) AND THE TR2 CERTIFICATE CONFIRMS THAT THE INSTALLATION OF THE GANG-NAILED ROOF TRUSSES ON SITE HAS BEEN INSPECTED, CHECKED FOR COMPLIANCE WITH THE ROOF TRUSS SHOP DRAWINGS AND APPROVED BY AN APPROVED COMPETENT PERSON (REGISTERED WITH ECSA).

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DAMAGED CEILINGS AND CORNICES

1. REMOVE DAMAGED CEILING AND CART RUBBLE OFF SITE.
2. PREPARE SURFACE TO RECEIVE NEW CEILING.
3. CONSTRUCT NEW CEILING WITH 9.5mm THICK GYPSUM BOARD. 44mm x 10mm TIMBER COVER STRIP OR 'PLASTIC M-STRIP' TO BE INSTALLED AT CEILING JOINTS. ALL TO BE INSTALLED ACCORDING TO MANUFACTURER'S SPECIFICATIONS.
4. CONSTRUCT CEILING CORNICES WITH NUTEC EVERITE 75mm COVED CORNICES. ALL TO BE INSTALLED ACCORDING TO MANUFACTURES SPECIFICATIONS.
5. ALL CEILING BOARDS TO BE FIXED ONTO NEW 38mm x 50mm (WITH 50mm DIMENSION PLACED VERTICALLY) GRADE 5 SA PINE TIMBER BATTENS. BATTENS SPACING TO BE MAX. 400mm C/C.
6. ALL MATERIALS TO BE SABS APPROVED.

RECOMMENDED TIMBER BATTEN SIZES FOR 9.5mm thk. GYPSUM CEILING BOARDS	
TIMBER JOIST / TRUSS SPACING	TIMBER BATTEN SIZE
< 1000mm	38mm x 38mm GRADE 5 SA PINE
1001mm to 1200mm	38mm x 50mm GRADE 5 SA PINE (WITH 50mm DIMENSION PLACED VERTICALLY)
1201mm to 1400mm	50mm x 76mm GRADE 5 SA PINE (WITH 76mm DIMENSION PLACED VERTICALLY)
> 1401mm	CONSULT WITH APPOINTED STRUCTURAL ENGINEER.

PROJECT:	DETAILS:	DATE	REVISION
WIMS NO. 063634 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	GENERAL SPECIFICATIONS: REPLACE DAMAGED CEILINGS AND CORNICES	2018.09.06	P1
		PROJ. No. 447	SKETCH No. Sk 102

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REPLACEMENT OF SISALATION :

1. REMOVE EXISTING ROOF SHEETING AND STORE FOR RE-USE OR TO BE ASSESSED (BY THE APPOINTED STRUCTURAL ENGINEER) ON SITE IF ROOF SHEETING NEEDS TO BE REPLACED.
2. INSTALL MULTIPURPOSE ROOF SISALATION. SPECIFICATION - SISALATION MULTIPURPOSE LIGHT DUTY 439. ALL TO BE INSTALLED ACCORDING TO MANUFACTURER'S SPECIFICATION.
3. RE-INSTALL OR REPLACE ROOF SHEETING AS REQUIRED / INSTRUCTED BY THE APPOINTED STRUCTURAL ENGINEER.
4. ALL MATERIAL TO BE SABS APPROVED.

PROJECT:	DETAILS:	DATE	REVISION
WIMS NO. 063634 DEPARTMENT OF EDUCATION WATER &SANITATION PROGRAMME	GENERAL SPECIFICATIONS: REPLACE DAMAGED SISALATION	2018.09.06	P1
		PROJ. No. 447	SKETCH No. Sk 103

NOTE: BATCHING AND MIXING MATERIAL :

- 1 BAG OF CEMENT HAS A VOLUME OF 33 LITRES.
- 1 BUILDERS WHEELBARROW HAS A VOLUME OF 65 LITRES WHICH IS EQUIVALENT TO 2 BAGS OF CEMENT.
- DO NOT SPLIT BAGS WHEN BATCHING EXCEPT FOR SMALL OR NO STRUCTURAL WORK.
- USE A CONCRETE MIXER OR HAND MIXER ON A DRY, CLEAN, NON-ABSORBENT SURFACE.
- WHEN MIXING CONCRETE BY HAND, FIRST MIX THE CEMENT, SAND AND WATER THOROUGHLY AND MIX THE STONE LAST - THIS SAVES A LOT OF EFFORT.
- MIX UNTIL COLOUR AND WORKABILITY IS UNIFORM.
- ALL CONCRETE TO BE VIBRATORED WHEN PLACING.
- CONCRETE CUBE TEST RESULTS TO BE SUBMITTED TO THE ENGINEER AS PER BELOW:
  - > 3No. CUBES TESTS FOR 7 DAY RESULTS
  - > 3No. CUBES TESTS FOR 28 DAY RESULTS

CONCRETE STRENGTH	CEMENT (50KG BAGS)	SAND (WHEELBARROWS)	STONE (WHEELBARROWS)	WATER (LITRES)
20 MPa	2	4	4	55
25 MPa	2	3	3	55

TYPICAL CONCRETE MIX DESIGN

PROJECT:	DETAILS:	DATE	REVISION
WIMS NO. 063634 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	CONCRETE MIX DESIGN FOR 20MPA CONCRETE AND 25MPA CONCRETE	2018.09.06	P1
		PROJ. No. 447	SKETCH No. Sk 104

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GUTTERS AND DOWNPIPES

1. GUTTERS AND DOWNPIPES TO A COMPLETELY NEW ROOF AND EXISTING ROOFS:

   ALL GUTTERS TO BE SEAMLESS 150mm x 150mm ALUMINIUM SQUARE GUTTERS WITH WHITE BAKED ENAMEL FINISH FIXED WITH CONCEALED BRACKETS, TOGETHER WITH ALUMINIUM 'DROP BOX FUNNELS' WITH WHITE BAKED ENAMEL FINISH SUITABLE FOR A 150mm 'O.G.' GUTTER. DOWNPIPES TO BE 100mm x 75mm FLUTED ALUMINIUM DOWNPIPES WITH WHITE BAKED ENAMEL FINISH, ALL FIXED AS PER SUPPLIER'S SPECIFICATIONS.
   NOTE : GUTTER BRACKETS ARE TO BE FIXED AT A MAXIMUM OF 750mm CENTRES.

2. GUTTER SUPPORT :

   NUTEC FASCIA BOARDS ARE TO BE FIXED (AT MAXIMUM 750mm CENTRES) TO A 114x38 (GRADE 5) SA PINE TIMBER CLOSURE PIECE OF WHICH IS FITTED AT THE GUTTER END OF THE VERANDAH OVERHANG AND BETWEEN ALL ROOF TRUSSES TO SUPPORT THE NEW FASCIA BOARD AND GUTTERS.

3. COMPLETE DAMAGE TO ALL EXISTING ALUMINIUM GUTTERS AND DOWNPIPES ONLY :

   INSTALL NEW GUTTERS AND DOWNPIPES AS PER ITEM 1 ABOVE.

PROJECT	DETAILS	DATE	REVISION
WIMS NO. 063634 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	REPLACEMENT OF GUTTER AND RAINWATER DOWNPIPES	2018.09.06	P1
		PROJECT No. 447	SKETCH No. SK 105

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REPLACING GLAZING

1. REMOVE EXISTING PUTTY.
2. RUB THE WINDOW FRAME WITH A WIRE BRUSH TO REMOVE ANY REMAINING GLAZING PUTTY OR OLD CAULK FROM THE GROOVES.
3. SAND THE WINDOW FRAME LIGHTLY WITH GRIT SANDPAPER TO REMOVE STUCK-ON CAULK, PUTTY OR WOOD SPLINTERS.
4. ALIGN THE GLAZING WITH THE GROOVE IN THE FRAME AND PUTTY INTO PLACE. USE 4mm thk. (SABS APPROVED) CLEAR GLAZING FOR ALL WINDOWS.
5. HOLD A METAL PUTTY KNIFE AT A LOW ANGLE TO THE WINDOW FRAME AND PUSH THE KNIFE ALONG THE WINDOW FRAME TO REMOVE THE EXCESS PUTTY.

PROJECT	DETAILS	DATE	REVISION
WIMS NO. 063634 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	REPLACING GLAZING	2018.09.06	P1
		PROJECT No. 447	SKETCH No. SK 106

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ROOF SHEETING PAINT SPECIFICATION

1. EXISTING ASBESTOS ROOF AND EXISTING FIBRE CEMENT ROOF:
   EXISTING ASBESTOS ROOF COVERING AND FIBRE CEMENT ROOF COVERING & ASSOCIATED RAINWATER PRODUCTS TO BE HIGH PRESSURE POWER CLEANED OR IN SOME CIRCUMSTANCES SCRUBBED CLEAN. APPLY 2 COATS 'DULUX ROOFGUARD' EXTERIOR ROOF COATING WITH SOLARFLEX PROPERTIES.
2. EXISTING GALVANISED STEEL ROOF:
   PLEASE ENSURE SURFACES ARE SOUND, CLEAN AND HAVE BEEN CORRECTLY PREPARED USING APPROPRIATE PRIMERS WHERE RELEVANT. THEN APPLY 2 COATS OF 'DULUX ROOFGUARD' EXTERIOR ROOF COATING WITH SOLARFLEX PROPERTIES.
   APPLICATION TO BE WITH A BRUSH OR ROLLER. RE-COAT AFTER 4 HOURS. TOUCH DRY AFTER 1 HOUR.
   PLEASE NOTE COVERAGE MAY VARY ACCORDING TO SURFACE POROSITY.

PROJECT:	DETAILS:	DATE	REVISION
WIMS NO. 063634 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	GENERAL SPECIFICATIONS: ROOF SHEETING PAINT SPECIFICATIONS	2018.09.06	P1
		PROJ. No. 447	SKETCH No. Sk 107

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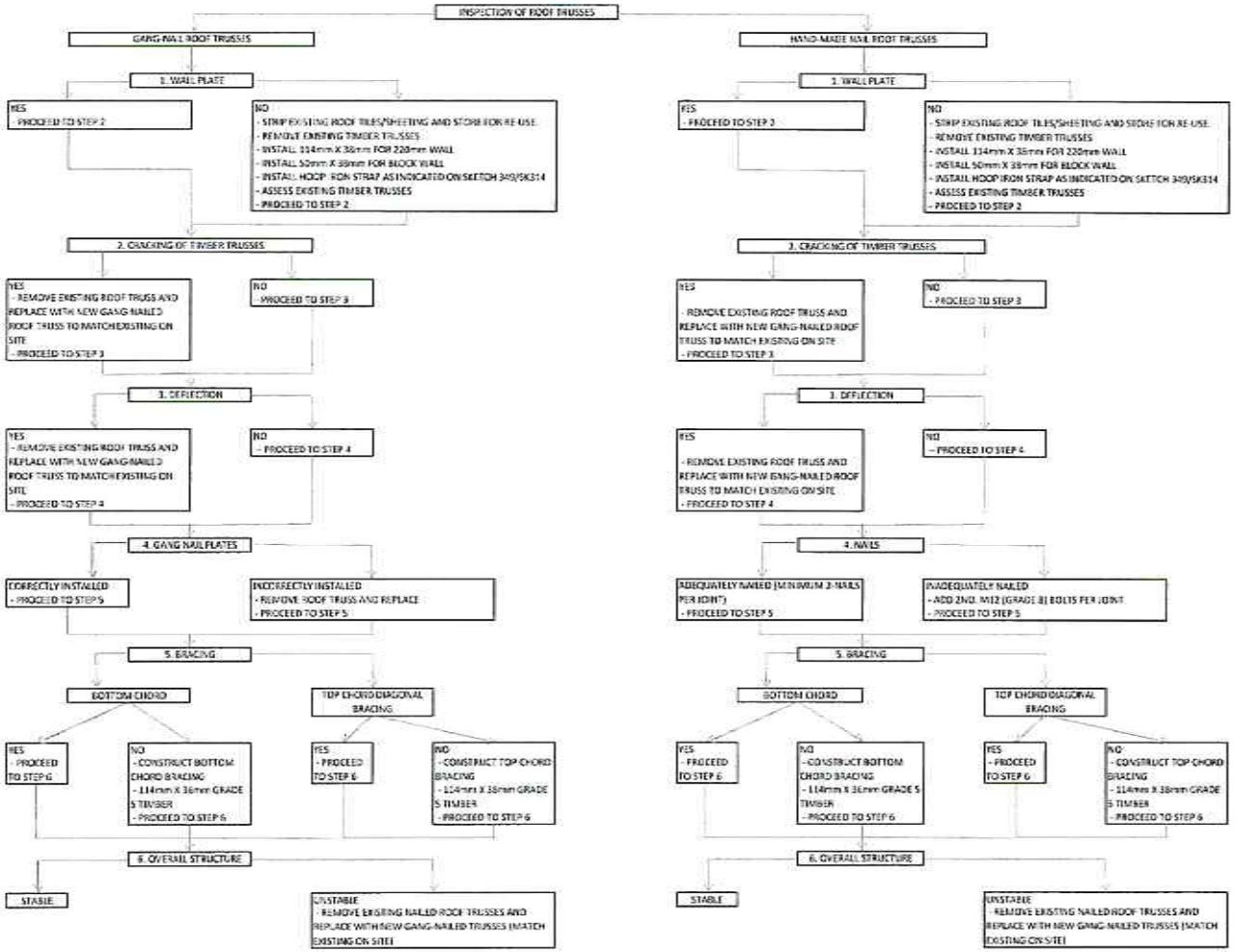
NEW DOORS

1. DOOR FRAMES
   GALVANISED STOCK STEEL DOUBLE REBATED DOOR FRAMES (1.2mm THICK) FOR 115mm AND 230mm WALLS - NOT PAINTED WITH 1 PAIR OF 100mm GALVANISED STEEL LOOSE-PIN HINGES WELDED IN POSITION

2. DOORS
   VENEER DOORS AS PER ARCHITECTS LAYOUT. ALL DOORS TO BE PRIMED, UNDERCOATED AND PAINTED WITH 2 COATS OF GLOSS ENAMEL PAINT.

PROJECT:	DETAILS:	DATE	REVISION
WIMS NO. 063634 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	GENERAL SPECIFICATIONS: NEW DOORS	2016.07.06	P1
		PROJ. No. 447	SKETCH No. Sk 108



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PROJECT:
WIMS NO. 063634
DEPARTMENT OF EDUCATION
WATER & SANITATION
PROGRAMME

DETAILS:
ROOF TRUSS INSPECTION
SPECIFICATIONS

DATE	REVISION
2018.09.06	P1
PROJ. No.	SKETCH No.
447	Sk 109

SECTION 2
STRUCTURAL TYPICAL DETAILS AND SPECIFICATIONS

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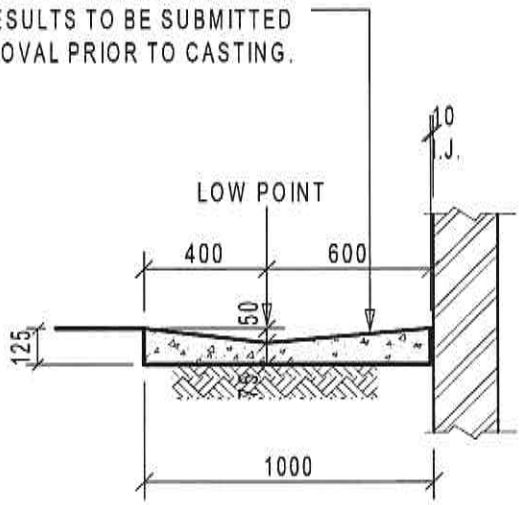
CONCRETE CHANNELS/APRON:
125mm thk. x 20MPa CONCRETE APRONS
REINFORCED WITH MESH REF 193 PLACED 30mm
FROM BOTTOM LAID TO A FALL TO RELIEF POINTS
CAST IN ALTERNATE PANELS OF 2000mm ON
FILL COMPACTED TO 95% MOD AASHTO.
COMPACTION TEST RESULTS TO BE SUBMITTED
TO THE ENGINEER FOR APPROVAL PRIOR TO CASTING.



TYPICAL SECTION
THRU' 'V' DRAIN APRON / CHANNEL

NOTE :
ALL 'V' DRAIN TEMPLATES ARE TO BE INSPECTED BY THE ENGINEER PRIOR TO ANY WORK BEING PUT TO HAND.

PROJECT	DETAILS	DATE	REVISION
WIMS NO. 063634 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	EXTERNAL CONCRETE 'V' DRAIN APRON CHANNEL	2018.09.06	P1
		PROJECT No. 447	SKETCH No. SK 300

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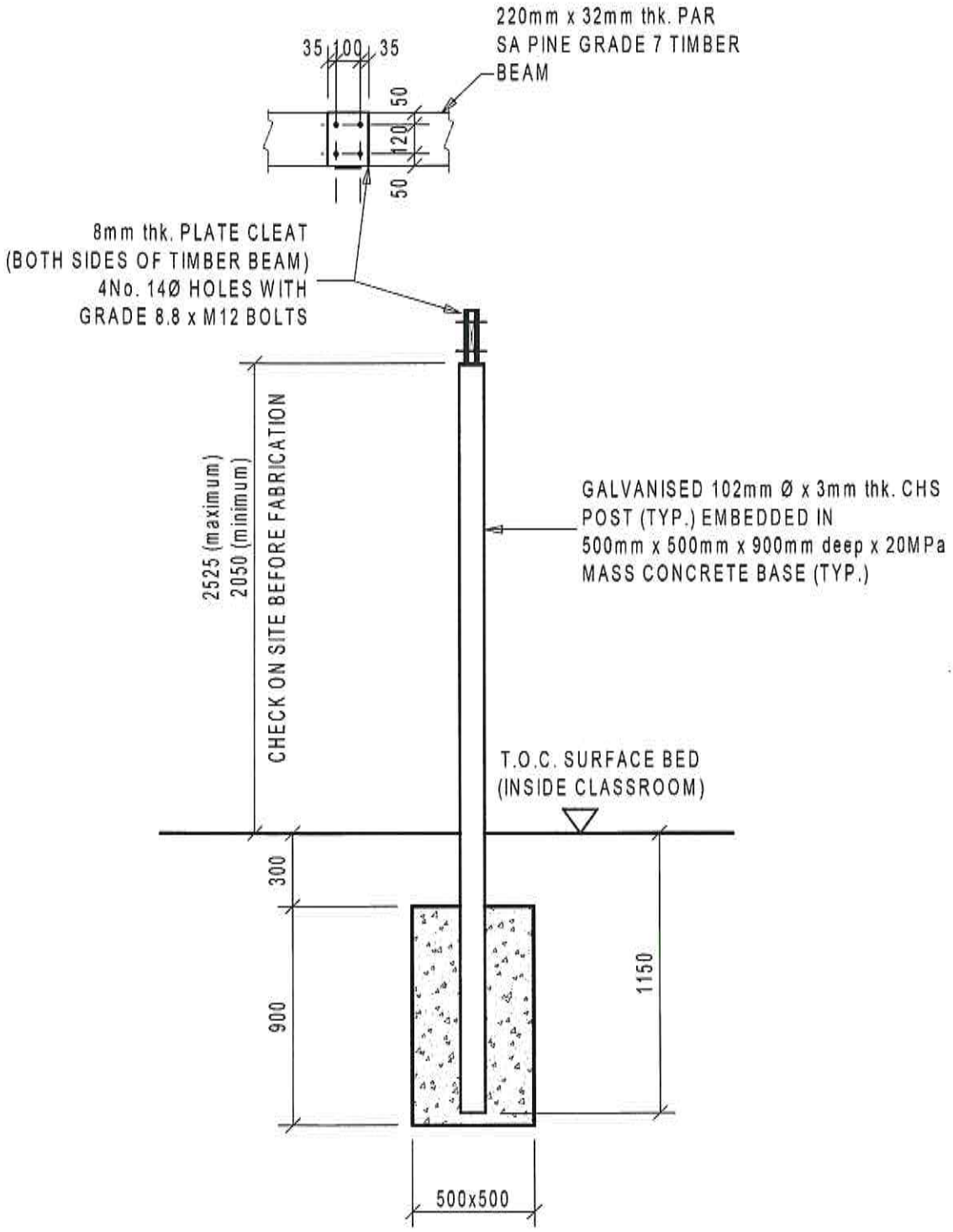

STEEL POST DETAIL

PROJECT	DETAILS	DATE	REVISION
WIMS NO. 063634 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	WALKWAY ROOF SUPPORT: STEEL POST DETAIL	2018.09.06	P1
		PROJECT No. 447	SKETCH No. SK 301

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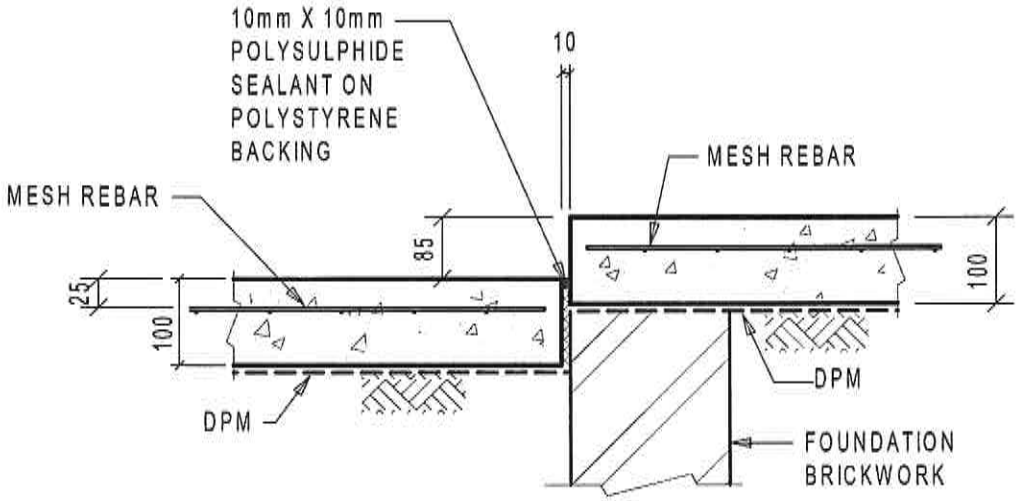

EXTERNAL DOOR THRESHOLD (E.D.T.)

PROJECT	DETAILS	DATE	REVISION
WIMS NO. 063634 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	EXTERNAL DOOR THRESHOLD DETAIL (E.D.T.)	2018.09.06	P1
		PROJECT No. 447	SKETCH No. SK 302

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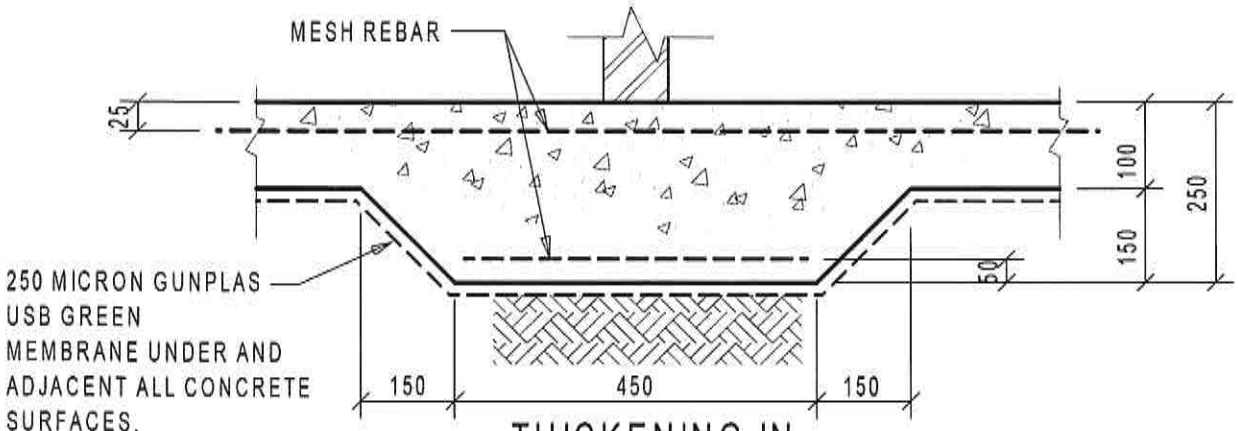

THICKENING IN SURFACE BED (TYP)

PROJECT	DETAILS	DATE	REVISION
WIMS NO. 063634 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	THICKENING IN SURFACE BED FOR 110mm WALL	2018.09.06	P1
		PROJECT No. 447	SKETCH No. SK 303

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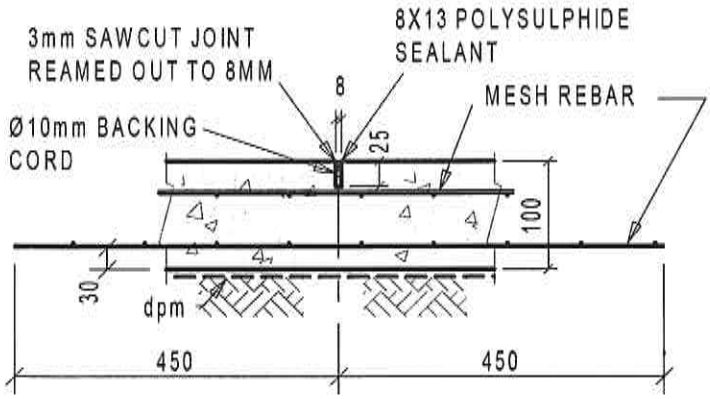
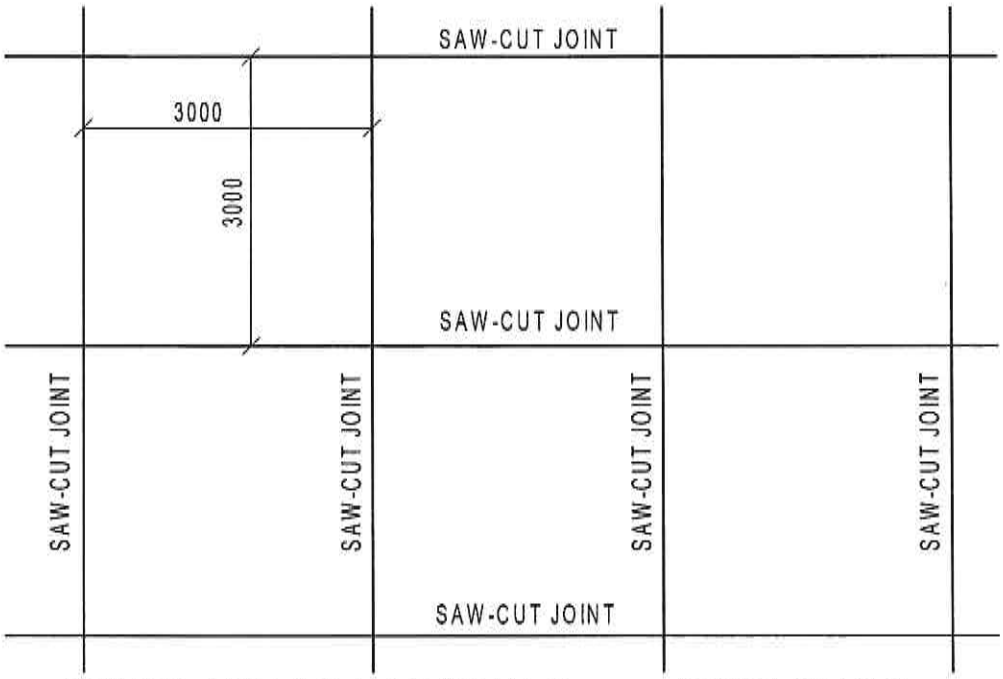


TYPICAL SAW-CUT JOINT DETAIL



JOINTS ARE AT MAXIMUM 3m crs BOTH WAYS

PROJECT	DETAILS	DATE	REVISION
WIMS NO. 063634 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	TYPICAL SAW-CUT JOINT DETAIL	2018.09.06	P1
		PROJECT No. 447	SKETCH No. SK 304

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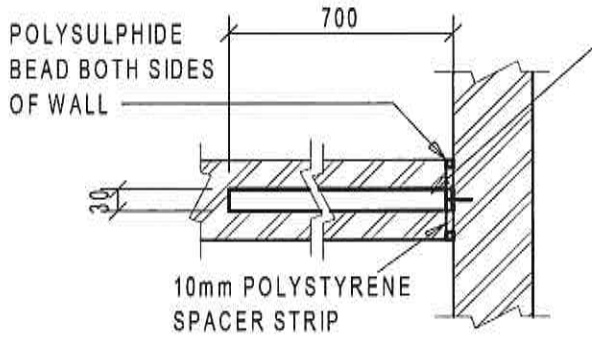
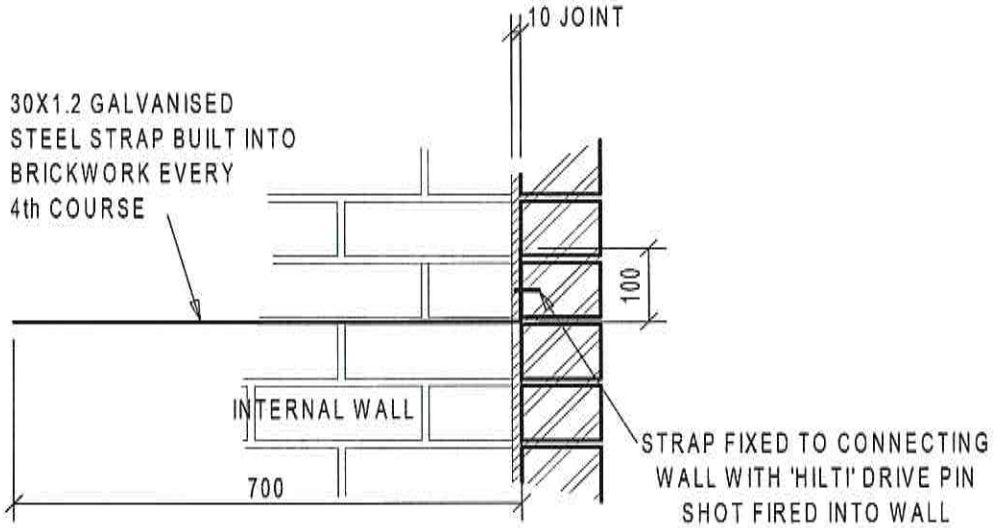


PLAN 110 WALL



ELEVATION 110 WALL

PROJECT	DETAILS	DATE	REVISION
WIMS NO. 063634 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	INTERNAL WALL CONNECTION DETAIL	2018.09.06	P1
		PROJECT No. 447	SKETCH No. SK 305

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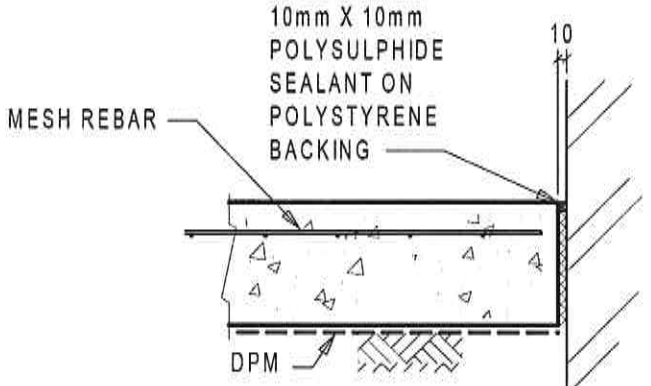
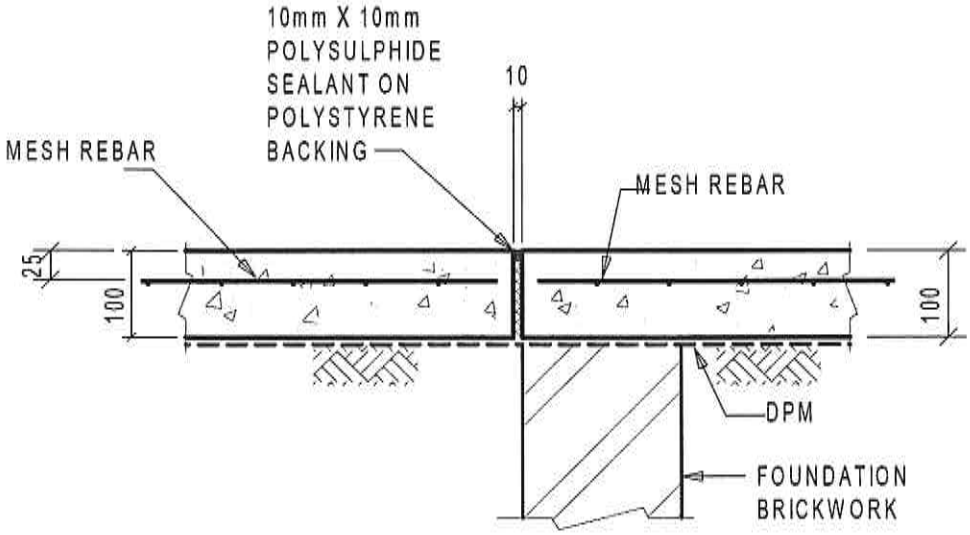


TYPICAL ISOLATION JOINT DETAIL (I.J.)

PROJECT	DETAILS	DATE	REVISION
WIMS NO. 063634 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	TYPICAL ISOLATION JOINT DETAIL (I.J.)	2018.09.06	P1
		PROJECT No. 447	SKETCH No. SK 306



INTERNAL DOOR THRESHOLD (I.D.T.)

PROJECT	DETAILS	DATE	REVISION
WIMS NO. 063634 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	INTERNAL DOOR THRESHOLD (I.D.T.)	2018.09.06	P1
		PROJECT No. 447	SKETCH No. SK 307

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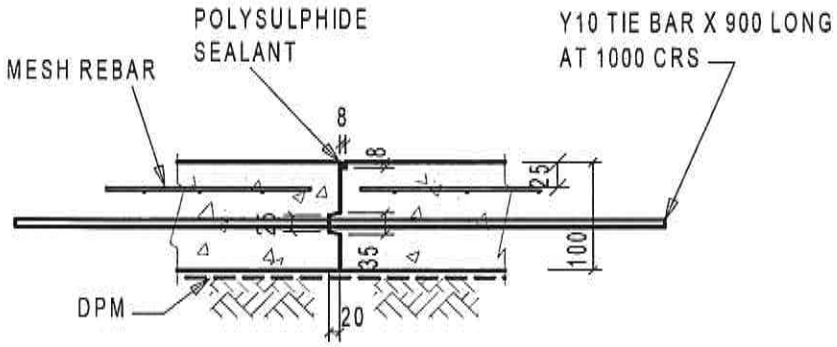

TYPICAL CONSTRUCTION JOINT DETAIL

PROJECT	DETAILS	DATE	REVISION
WIMS NO. 063634 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	TYPICAL CONSTRUCTION JOINT DETAIL	2018.09.06	P1
		PROJECT No. 447	SKETCH No. SK 308

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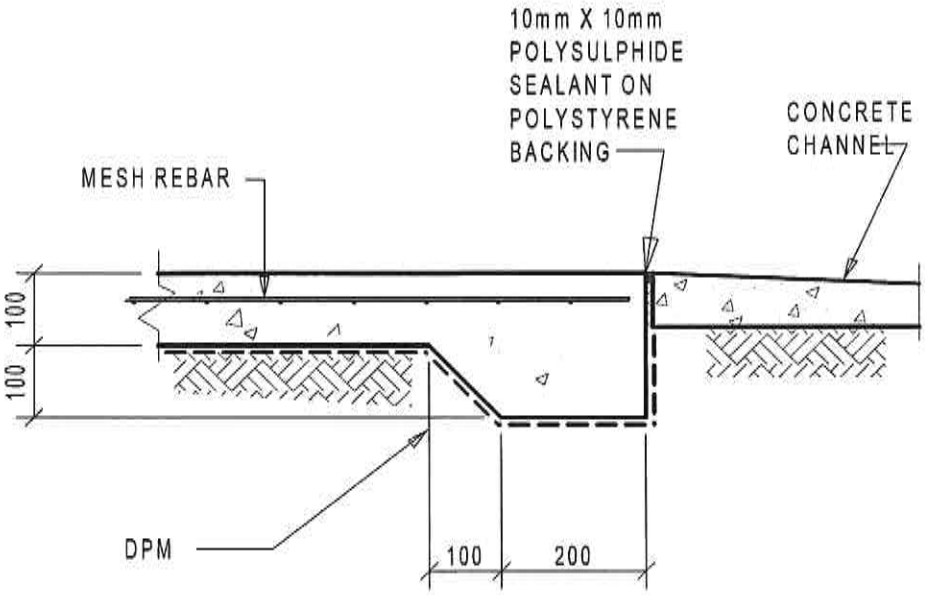

TYPICAL EDGE THICKENING DETAIL

PROJECT	DETAILS	DATE	REVISION
WIMS NO. 063634 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	TYPICAL EDGE THICKENING DETAIL	2018.09.06	P1
		PROJECT No. 447	SKETCH No. SK 309

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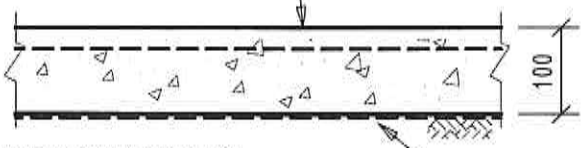
100mm thk. X 25MPa STEEL FLOATED CONCRETE SLAB REINFORCED WITH MESH REF 193 PLACED 25mm FROM TOP ON 250µM 'GUNPLAS USB GREEN' DPM ON 50mm TREATED & RAMMED RIVERSAND ON WELL WATERED CLEAN EARTH FILL COMPACTED TO 90% MOD AASHTO IN LAYERS NOT EXCEEDING 150mm. SOIL TO BE POISONED IN ACCORDANCE WITH SABS 1165. CERTIFICATE MUST BE PROVIDED. COMPACTION TEST RESULTS TO BE SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO CASTING OF CONCRETE.



IN-SITU SUBBASE COMPACTED TO MIN. 90% MOD AASHTO. COMPACTION TEST RESULTS TO BE SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO CASTING OF CONCRETE.

250 MICRON GUNPLAS USB GREEN HYPERLASTIC MEMBRANE UNDER AND ADJACENT ALL CONCRETE SURFACES.

TYPICAL SECTION THRU' SURFACE BED

PROJECT	DETAILS	DATE	REVISION
WIMS NO. 063634 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	TYPICAL SECTION THRU' SURFACE BED	2018.09.06	P1
		PROJECT No. 447	SKETCH No. SK 310

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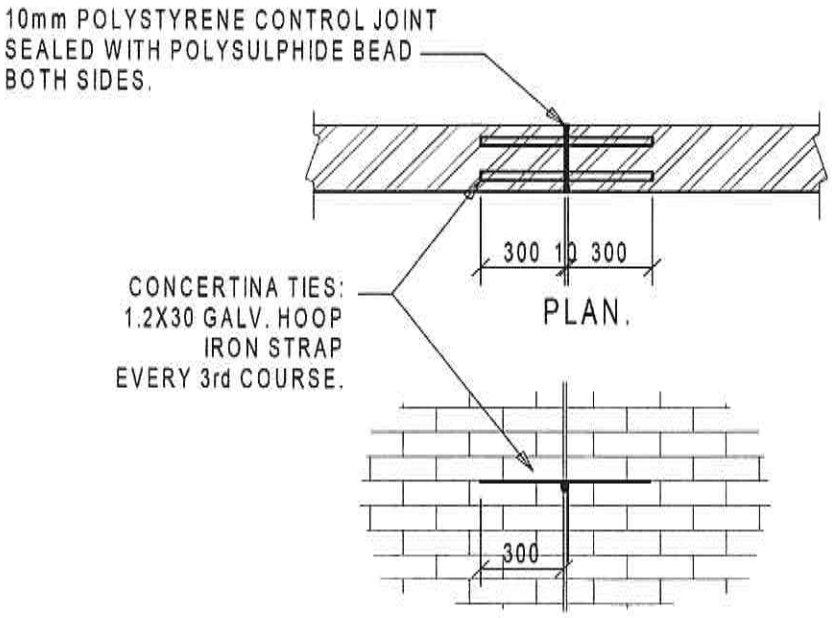

ELEVATION

TYPICAL CONTROL JOINT DETAIL FOR BRICKWORK

PROJECT	DETAILS	DATE	REVISION
WIMS NO. 063634 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	TYPICAL CONTROL JOINT DETAIL FOR BRICKWORK	2018.09.06	P1
		PROJECT No. 447	SKETCH No. SK 311

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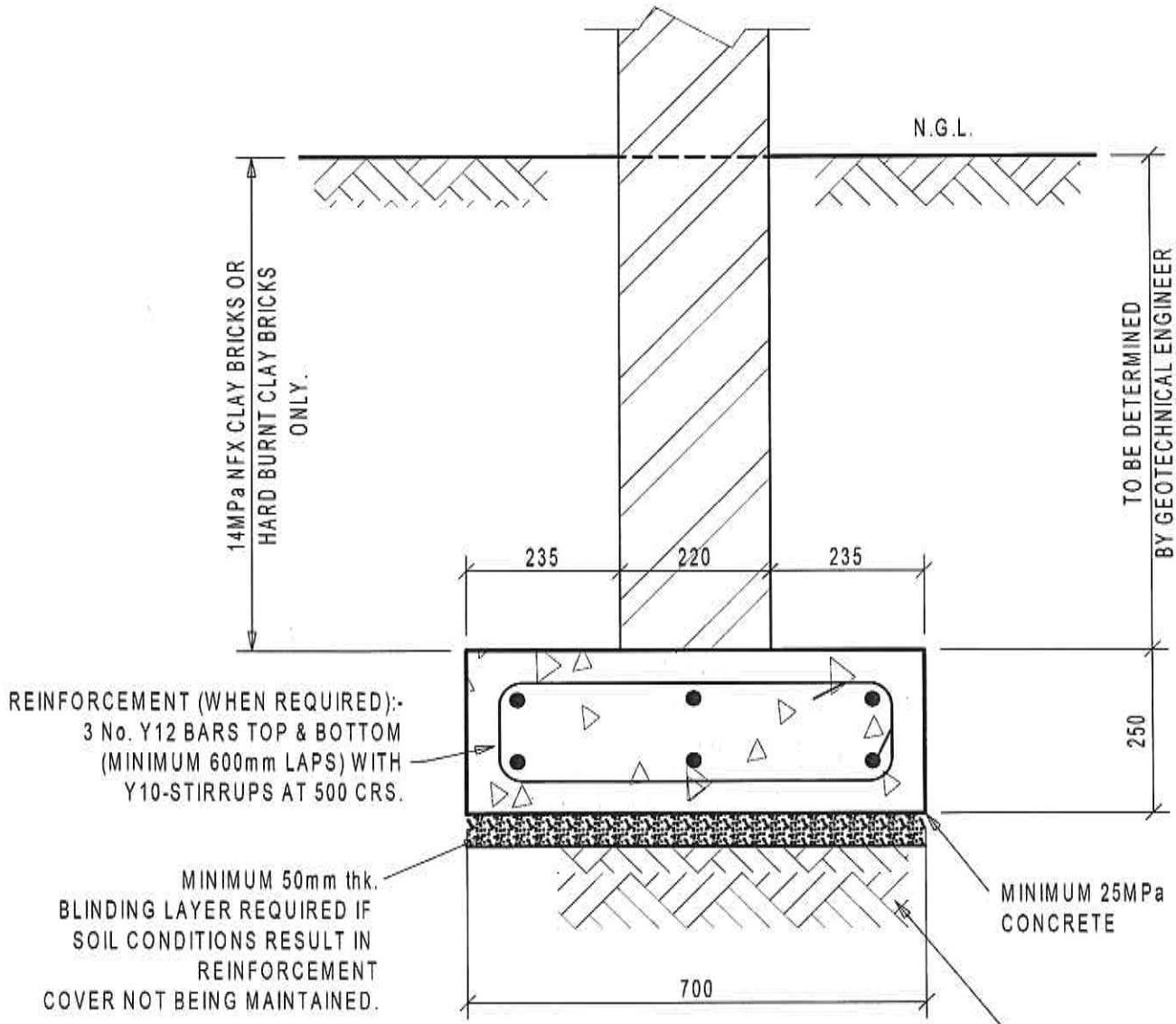
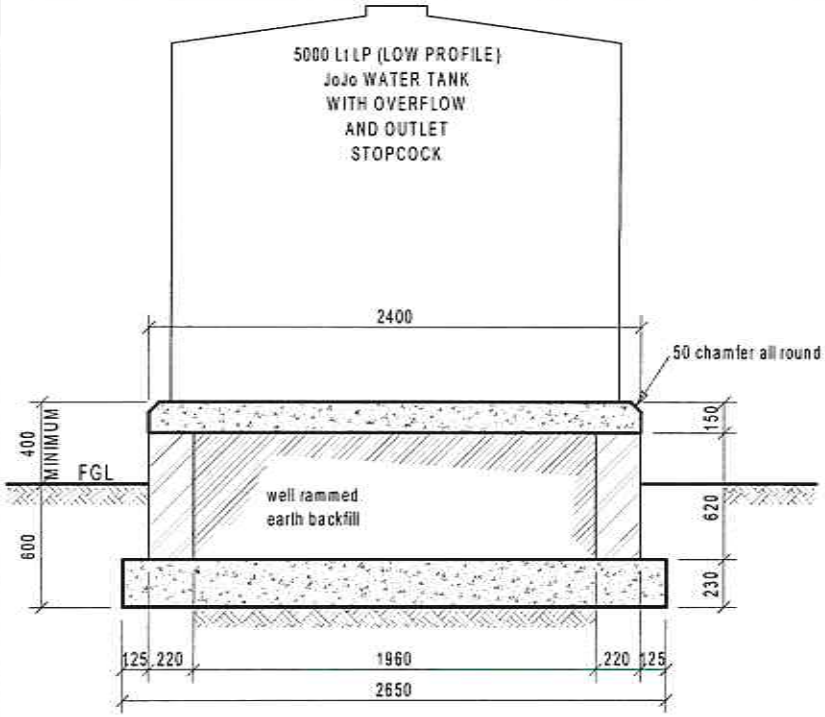


50mm COVER TO
REINFORCEMENT
ALL ROUND

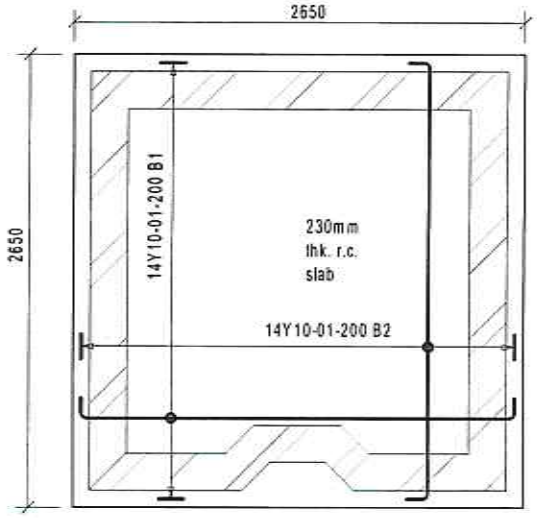
220mm WALL FOUNDATION DETAIL

INSITU SUBBASE SOIL MATERIAL TO BE
COMPACTED TO MIN. 90% MOD AASHTO.
COMPACTION TEST RESULTS TO BE
SUBMITTED TO THE ENGINEER FOR
APPROVAL PRIOR TO CASTING OF CONCRETE

PROJECT	DETAILS	DATE	REVISION
WIMS NO. 063634 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	220mm WALL FOUNDATION DETAIL	2018.09.06	P1
		PROJECT No. 447	SKETCH No. SK 312

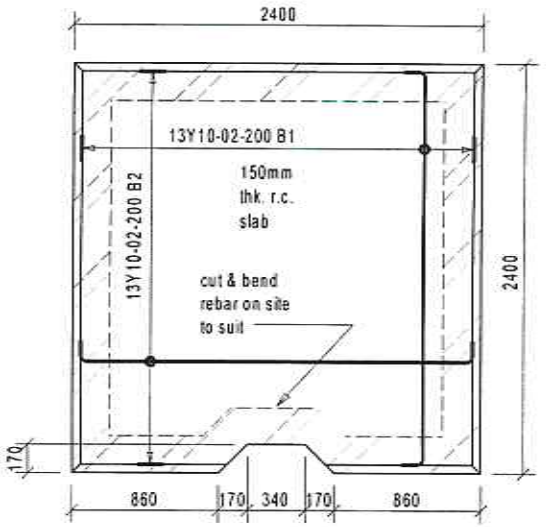


TYPICAL SECTION



PLAN ON FOOTING

50mm cover to reinforcement all round



PLAN ON TANK SUPPORT SLAB

25mm cover to reinforcement all round

NOTES:
1. SEE ARCHITECTS LAYOUT FOR LOCATION OF TANK.
2. ALL FOUNDATION EXCAVATIONS TO BE COMPACTED TO A MINIMUM OF 93% MOD AASHTO PRIOR TO CONCRETE BEING CAST. COMPACTION TEST RESULTS ARE TO BE SUBMITTED TO THE ENGINEER PRIOR TO CASTING OF CONCRETE.
3. MINIMUM 25MPa CONCRETE STRENGTH AT 28 DAYS
4. MINIMUM 14MPa NFX BRICKWORK IN CLASS II MORTAR

JoJo Tank – 'strapping' down specifications

All JoJo tanks are to be strapped down (at each of the 4 stubs on top of the tank) to the supporting concrete base with 2 no. off 4mm diameter fully galvanized stay wires (allow for 'turnbuckles' to tighten each of the 'double strap' stay wires). Each of the 'double strap' stay wires are to be tied to a M12 eye bolt of which is to be drilled and fixed to the 4 corners of the concrete supporting base. The specification for the eye bolt is as follows : galvanised mild steel - M12 eye bolt with 25mm eye inside diameter and with 80mm long shank.

MEMBER	No OF	BARS PER MEMB	DIA.	LENGTH	TOTAL NUM-BER	MARK	S C	BENDING A
	1	28	Y10	2750	28	01	35	2550
		26	Y10	2500	26	02	35	2300

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MAP AFRICA
CONSULTING ENGINEERS

PROJECT
WIMS NO. 063634
DEPARTMENT OF EDUCATION
WATER & SANITATION PROGRAMME

DATE
2018.09.06

REVISION
P1

DETAILS
TYPICAL WATER TANK SUPPORT
CONCRETE & REINFORCEMENT
LAYOUT & DETAILS

DRG. No.
447 / Sk 313

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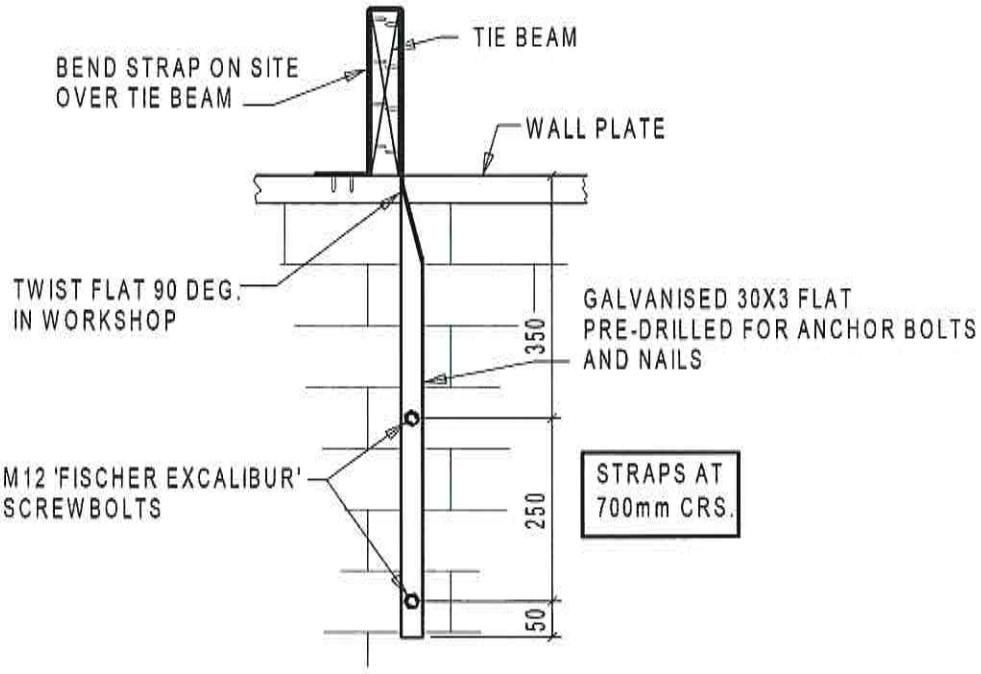

SUGGESTED METHOD TO FIX NEW PRE-FABRICATED TIMBER ROOF TRUSSES TO EXISTING BRICKWORK

ALL DAMAGED ROOF TRUSSES TO BE REPLACED
WITH PRE-FABRICATED TIMBER ROOF TRUSSES
TO MATCH EXISTING.
ALL OTHER DAMAGED TIMBER BATTENS, WALL PLATES, ETC.
TO BE REMOVED AND REPLACED WITH NEW TIMBER
TO MATCH EXISTING.

PROJECT	DETAILS	DATE	REVISION
WIMS NO. 063634 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	TIMBER ROOF TRUSS ANCHOR DETAIL	2018.09.06	P1
		PROJECT No. 447	SKETCH No. SK 314

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GENERAL PLASTER REPAIRS &
BRICKWORK/BLOCKWORK STITCHING REPAIRS SPECIFICATIONS

GENERAL PLASTER 'CRACK' REPAIRS:

1. RECOMMENDATIONS & SPECIFICATIONS:

ALL PLASTER 'CRACKING' MUST BE REPAIRED AS SPECIFIED BELOW. THE CONTRACTOR IS ALSO REQUIRED TO DETERMINE IF ANY CRACKS IN THE PLASTER HAVE BEEN TRANSFERRED TO THE BLOCKWORK/BRICKWORK. (CONTRACTOR IS REQUIRED TO CUT 100mm LONG X 20mm WIDE INSPECTION SLOT). IF A CRACK HAS TRANSFERRED TO THE BLOCKWORK/BRICKWORK, THEN IT NEEDS TO BE REPAIRED AS SET OUT IN THE SPECIFICATION FOR BLOCKWORK/BRICKWORK 'STITCHING'.

1.1 SPECIFICATION FOR GENERAL 'PLASTER' REPAIR:

BREAK OUT AND REMOVE DAMAGED PLASTER TO 50MM INTO SOUND PLASTER. CLEAN WALL AND APPLY 'SIKA PLASTERSTIK' OR SIMILAR APPROVED BONDING AGENT TO MANUFACTURER'S SPECIFICATIONS. RE-PLASTER WALL AND PAINT TO ARCHITECTS SPECIFICATIONS.

1.2 SPECIFICATION FOR PLASTER REPAIR 'CRACKING':

RAKE OUT CRACK 6MM X 6MM DEEP. CLEAN OUT ALL DEBRIS/LOOSE MATERIAL. FILL WITH ACRYLIC FILLER - 'SIKACRYL' OR SIMILAR APPROVED TO MANUFACTURERS SPECIFICATIONS. PAINT TO ARCHITECTS SPECIFICATIONS.

1.3 SPECIFICATION FOR BLOCKWORK/BRICKWORK 'STITCHING' REPAIR:

- RAKE OUT CRACK. REMOVE ALL DEBRIS/LOOSE MATERIAL.
- STITCH CRACK IN BLOCKWORK/BRICKWORK WITH R8 REINFORCING RODS.
- R8 REINFORCING RODS ARE TO BE 300mm LONG WITH 50mm BENDS AT BOTH ENDS - TOTAL LENGTH = 400mm.
- R8 REINFORCING RODS ARE TO BE EPOXY GROUTED WITH 'PROSTRUCT 617 GENERAL PURPOSE EPOXY ADHESIVE' OR SIMILAR APPROVED AT 250mm CENTRES, AND GROUTED INTO (10mm DEEP) SLOTS CUT INTO BLOCKWORK/BRICKWORK AND WITH (60mm DEEP) 10mm DIA. DRILL HOLES AT EACH END TO ACCOMMODATE THE BENDS OF THE REINFORCING RODS.
- ALL SLOTS AND DRILL HOLES TO BE COMPLETELY FILLED WITH EPOXY ADHESIVE.
- ALL SLOTS TO BE CUT PERPENDICULAR TO THE CRACK IN THE BLOCKWORK/BRICKWORK.
- EPOXY ADHESIVE APPLICATION TO BE AS PER MANUFACTURERS' SPECIFICATIONS.
- APPLY 'SIKA PLASTERSTIK' AND RE-PLASTER WALL, HOWEVER IF LARGE AREAS OF PLASTER HAS BEEN REMOVED, 450mm WIDE 'CHICKEN WIRE MESH' MUST BE 'TACKED ON' OVER THE CRACKED AREA PRIOR TO RE-PLASTERING.
- RE-PAINT PLASTER TO ARCHITECTS SPECIFICATIONS.

PROJECT	DETAILS	DATE	REVISION
WIMS NO. 063634 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	GENERAL PLASTER REPAIRS & BRICKWORK/BLOCKWORK STITCHING REPAIRS SPECIFICATIONS	2018.09.06	P1
		PROJECT No. 447	SKETCH No. Sk 315

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CONCRETE SPALLING REPAIRS
FOR REPAIRS UP TO 30mm THICK :

SURFACE PREPARATION :

" REMOVE ALL LOOSE, UNSOUND CONCRETE FROM THE AREAS TO BE REPAIRED.
" CUT OUT AROUND THE AREAS TO BE REPAIRED TO A MINIMUM DEPTH OF 10mm TO AVOID FEATHER EDGING.
" HIGH PRESSURE WATER BLAST THE PREPARED AREAS TO REMOVE ANY CONTAMINANTS.
" ENSURE THAT THE SUBSTRATE ONTO WHICH THE REPAIR MORTAR IS TO BE APPLIED IS SOUND AND FREE FROM LOOSE MATERIAL.
" IF REINFORCING IS EXPOSED & SHOWS SIGNS OF CORROSION, THE REINFORCING SHALL BE OPENED UP BY BREAKING OUT THE CONCRETE TO A DEPTH OF 20mm BELOW THE REINFORCING AND 50mm BEYOND THE CORRODED LENGTH OF THE REINFORCING.
" ANY EXPOSED STEEL MUST BE MECHANICALLY CLEANED AND COATED WITH 1 COAT OF PRO-STRUCT 688 : ZINC RICH PRIMER @ 4m²/LT.
" REMOVAL OF BADLY CORRODED REINFORCEMENT AND ITS REPLACEMENT-ALL TO ENGINEERS INSTRUCTIONS ON SITE.

PRIMING :

" PRE-DAMPEN PREPARED SURFACE WITH WATER.
" DO NOT ALLOW TO DRY OUT PRIOR TO THE APPLICATION OF THE PRO-STRUCT 528 : STRUCTURAL CONCRETE .

REPAIR MORTAR :

" APPLY PRO-STRUCT 528 : STRUCTURAL CONCRETE INTO THE PRE-SATURATED SURFACE.
" COVERAGE WILL BE APPROXIMATELY 1.4m² @ 10mm THICK PER 25KG BAG OF PRO-STRUCT 528.
" ENSURE COMPLETE SUBSTRATE CONTACT AND MAXIMUM COMPACTION.
" CURE THE REPAIRS BY KEEPING THEM DAMP FOR 24 HOURS AFTER THE INITIAL SET HAS TAKEN PLACE.

PROJECT	DETAILS	DATE	REVISION
WIMS NO. 063634 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	CONCRETE SPALLING REPAIRS - FOR REPAIRS UP TO 30mm THICK	2018.09.06	P1
		PROJECT No. 447	SKETCH No. SK 316

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CONCRETE SPALLING REPAIRS
FOR REPAIRS OVER 30mm THICK :

SURFACE PREPARATION :

" REMOVE ALL LOOSE, UNSOUND CONCRETE FROM THE AREAS TO BE REPAIRED.
" CUT OUT AROUND THE AREAS TO BE REPAIRED TO A MINIMUM DEPTH OF 10mm TO AVOID FEATHER EDGING.
" HIGH PRESSURE WATER BLAST THE PREPARED AREAS TO REMOVE ANY CONTAMINANTS.
" ENSURE THAT THE SUBSTRATE ONTO WHICH THE REPAIR MORTAR IS TO BE APPLIED IS SOUND AND FREE FROM LOOSE MATERIAL.
" IF REINFORCING IS EXPOSED & SHOWS SIGNS OF CORROSION, THE REINFORCING SHALL BE OPENED UP BY BREAKING OUT THE CONCRETE TO A DEPTH OF 20mm BELOW THE REINFORCING AND 50mm BEYOND THE CORRODED LENGTH OF THE REINFORCING.
" ANY EXPOSED STEEL MUST BE MECHANICALLY CLEANED AND COATED WITH 1 COAT OF PRO-STRUCT 688 : ZINC RICH PRIMER @ 4m²/LT.
" REMOVAL OF BADLY CORRODED REINFORCEMENT AND ITS REPLACEMENT- ALL TO ENGINEERS INSTRUCTIONS ON SITE.

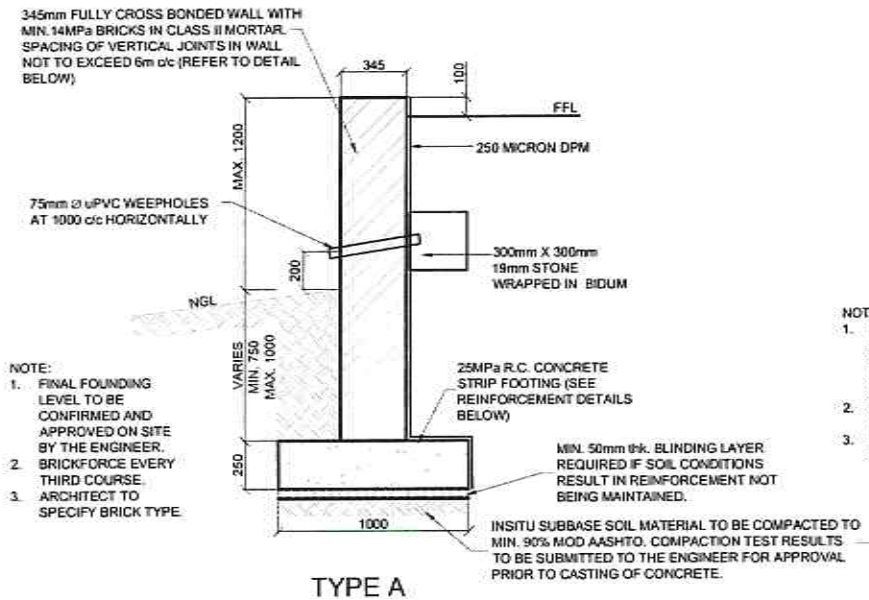
PRIMING :

" PRE-DAMPEN PREPARED SURFACE WITH WATER AS DESCRIBED BELOW.

REPAIR MATERIAL:

" SHUTTER UP SIDES AND/OR SOFFIT OF AREA TO BE REPAIRED.
" THOROUGHLY WET THE SURFACE OF THE CONCRETE WITHIN THE REPAIR AREA WITH WATER.
" DRAIN EXCESS WATER.
" MIX PRO-STRUCT 531m AS PER DETAILED INSTRUCTIONS AND POUR REPAIR GROUT INTO THE SHUTTERED AREA FROM ONE SIDE, ENSURING THAT THE GROUT FILLS THE ENTIRE SHUTTERED AREA WITH NO AIR POCKETS.
" COVERAGE WILL BE APPROXIMATELY 1,4m² @ 10mm THICK PER 25KG BAG OF PRO-STRUCT 531m.
" LEAVE SHUTTER IN POSITION FOR AT LEAST 24HRS AND THEN STRIP AND CLEAN DOWN THE NEWLY REPAIRED SURFACE.
" REPAIRED AREAS MUST BE WET CURED FOR A MINIMUM OF 3 DAYS ONCE SHUTTERS HAVE BEEN STRIPPED.

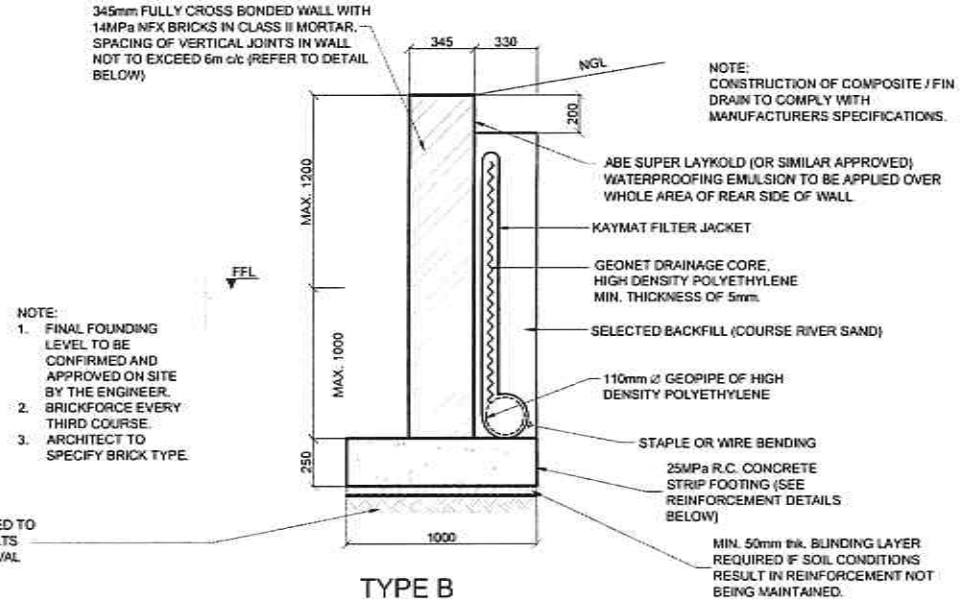
PROJECT	DETAILS	DATE	REVISION
WIMS NO. 063634 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	CONCRETE SPALLING REPAIRS - FOR REPAIRS OVER 30mm THICK	2018.09.06	P1
		PROJECT No. 447	SKETCH No. SK 317



TYPE A

TYPICAL 345mm CROSS BONDED BRICK RETAINING WALL WITH WEEP HOLES

N.T.S

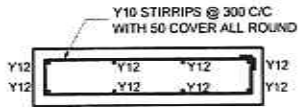


TYPE B

TYPICAL 345mm CROSS BONDED BRICK RETAINING WALL WITH COMPOSITE/FIN DRAIN DETAILS

N.T.S

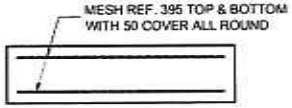
OPTION 1 OR OPTION 2 TO BE CONFIRMED BY ENGINEER ON SITE



OPTION 1

WALL FOUNDATION REINFORCEMENT DETAILS

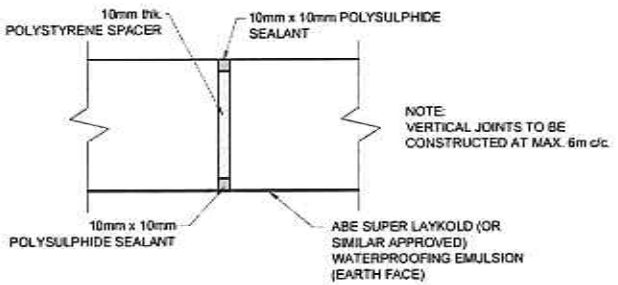
N.T.S



OPTION 2

WALL FOUNDATION REINFORCEMENT DETAILS

N.T.S



TYPICAL VERTICAL ISOLATION JOINT DETAIL

N.T.S

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PROJECT: WIMS NO. 063634 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	DETAILS: TYPICAL 345mm FULLY CROSS BONDED BRICK RETAINING WALL DETAILS	DATE: 2018.09.05	REVISION: P1
		PROJ. No: 447	SKETCH No: Sk 318

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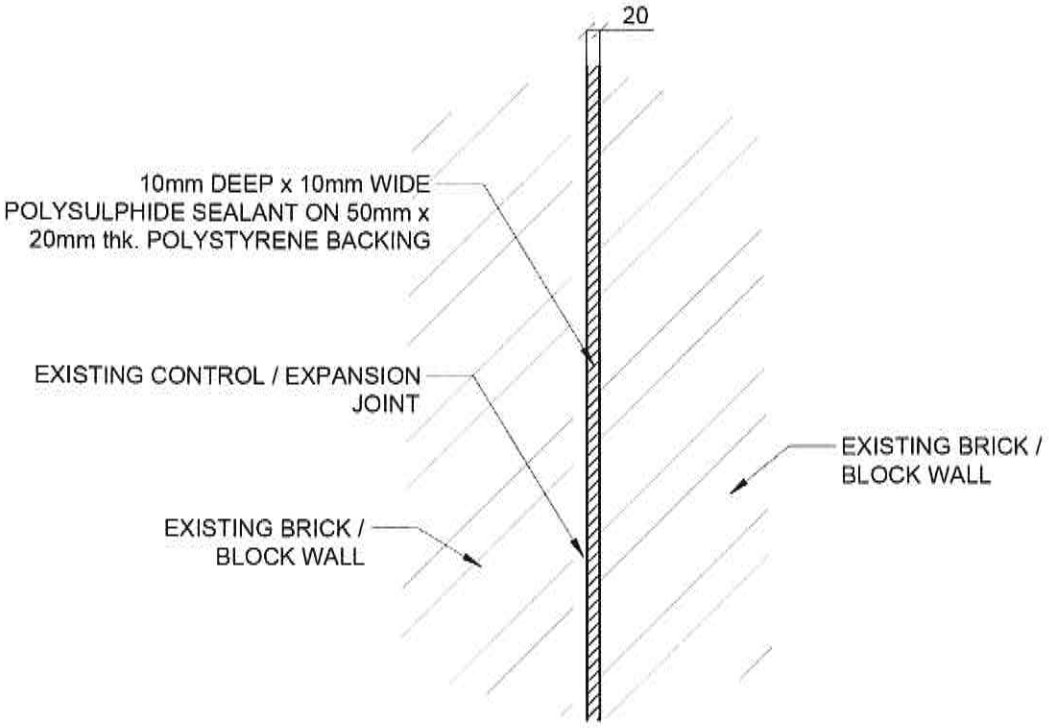
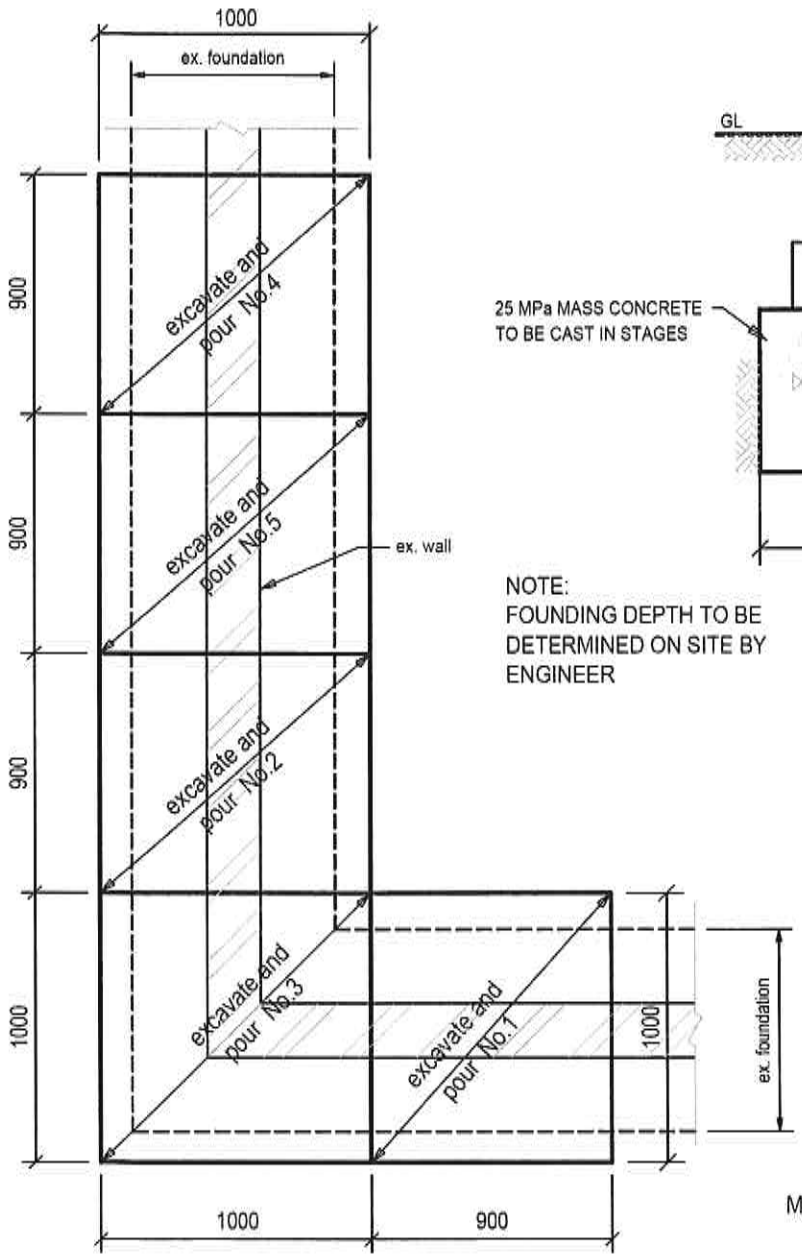
NOTES:

1. SCRAPE OUT AND REMOVE EXISTING MORTAR FILLER AT CONTROL / EXPANSION JOINT TO A MIN DEPTH OF 60mm.
2. INSERT 50mm x 20mm THICK POLYSTYRENE BACKING ALONG LENGTH OF JOINT.
3. APPLY 10mm DEEP x 20mm WIDE POLYSULPHIDE SEALANT TO COVER JOINT AND MAKE GOOD.

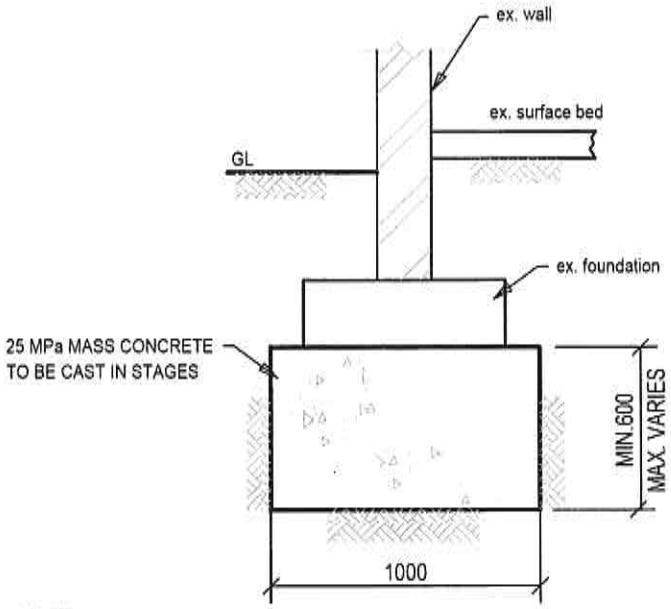


TYPICAL REPAIR DETAILS TO
EXISTING CONTROL / EXPANSION JOINTS
N.T.S

PROJECT:	DETAILS:	DATE	REVISION
WIMS NO. 063634 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	TYPICAL CONTROL JOINT DETAILS	2018.09.06	P1
		PROJ. No. 447	SKETCH No. Sk 319



PLAN



NOTE:
FOUNDING DEPTH TO BE DETERMINED ON SITE BY ENGINEER

TYPICAL FINISHED SECTION

MASS CONCRETE CLASS 25/19

PROJECT:	DETAILS:	DATE	REVISION
WIMS NO. 063634 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	TYPICAL UNDERPINNING DETAILS	2018.09.06	P1
		PROJ. No. 447	SKETCH No. Sk 320

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REPAIRS TO EXISTING CONCRETE SURFACE BED:

SURFACE PREPARATION :

" REMOVE ALL LOOSE, UNSOUND CONCRETE FROM THE AREAS TO BE REPAIRED.
" CUT OUT AROUND THE AREAS TO BE REPAIRED TO A MINIMUM DEPTH OF 10mm TO AVOID FEATHER EDGING.
" HIGH PRESSURE WATER BLAST THE PREPARED AREAS TO REMOVE ANY CONTAMINANTS.
" ENSURE THAT THE SUBSTRATE ONTO WHICH THE REPAIRED CONCRETE IS TO BE APPLIED IS SOUND AND FREE FROM LOOSE MATERIAL.
" IF REINFORCING IS EXPOSED & SHOWS SIGNS OF CORROSION, THE REINFORCING SHALL BE OPENED UP BY BREAKING OUT THE CONCRETE TO A DEPTH OF 20mm BELOW THE REINFORCING AND 50mm BEYOND THE CORRODED LENGTH OF THE REINFORCING.
" ANY EXPOSED STEEL MUST BE MECHANICALLY CLEANED AND COATED WITH 1 COAT OF PRO-STRUCT 688 : ZINC RICH PRIMER @ 4m²/LT.
" REMOVAL OF BADLY CORRODED REINFORCEMENT AND ITS REPLACEMENT- ALL TO ENGINEERS INSTRUCTIONS ON SITE.

TOLERANCES :

" IF LOOSE MATERIAL EXCEEDS MORE THAN 20mm THICK, THE ENTIRE CONCRETE SLAB IS TO BE DEMOLISHED AND RE-CAST AS PER SKETCH 369/SK 304.

PRIMING :

" PRE-DAMPEN PREPARED SURFACE WITH WATER AS DESCRIBED BELOW.

REPAIR MATERIAL:

" THOROUGHLY WET THE SURFACE OF THE CONCRETE WITHIN THE REPAIR AREA WITH WATER.
" DRAIN EXCESS WATER.
" MIX PRO-STRUCT 617 WET TO DRY EPOXY GROUT AS PER DETAILED INSTRUCTIONS AND RE SCREED THE SURFACE BED.
" REPAIRED AREAS MUST BE WET CURED FOR A MINIMUM OF 3 DAYS ONCE SHUTTERS HAVE BEEN STRIPPED.

PROJECT	DETAILS	DATE	REVISION
WIMS NO. 063634 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	REPAIRS TO EXISTING CONCRETE SURFACE BED	2018.09.06	P1
		PROJECT No. 447	SKETCH No. SK 321

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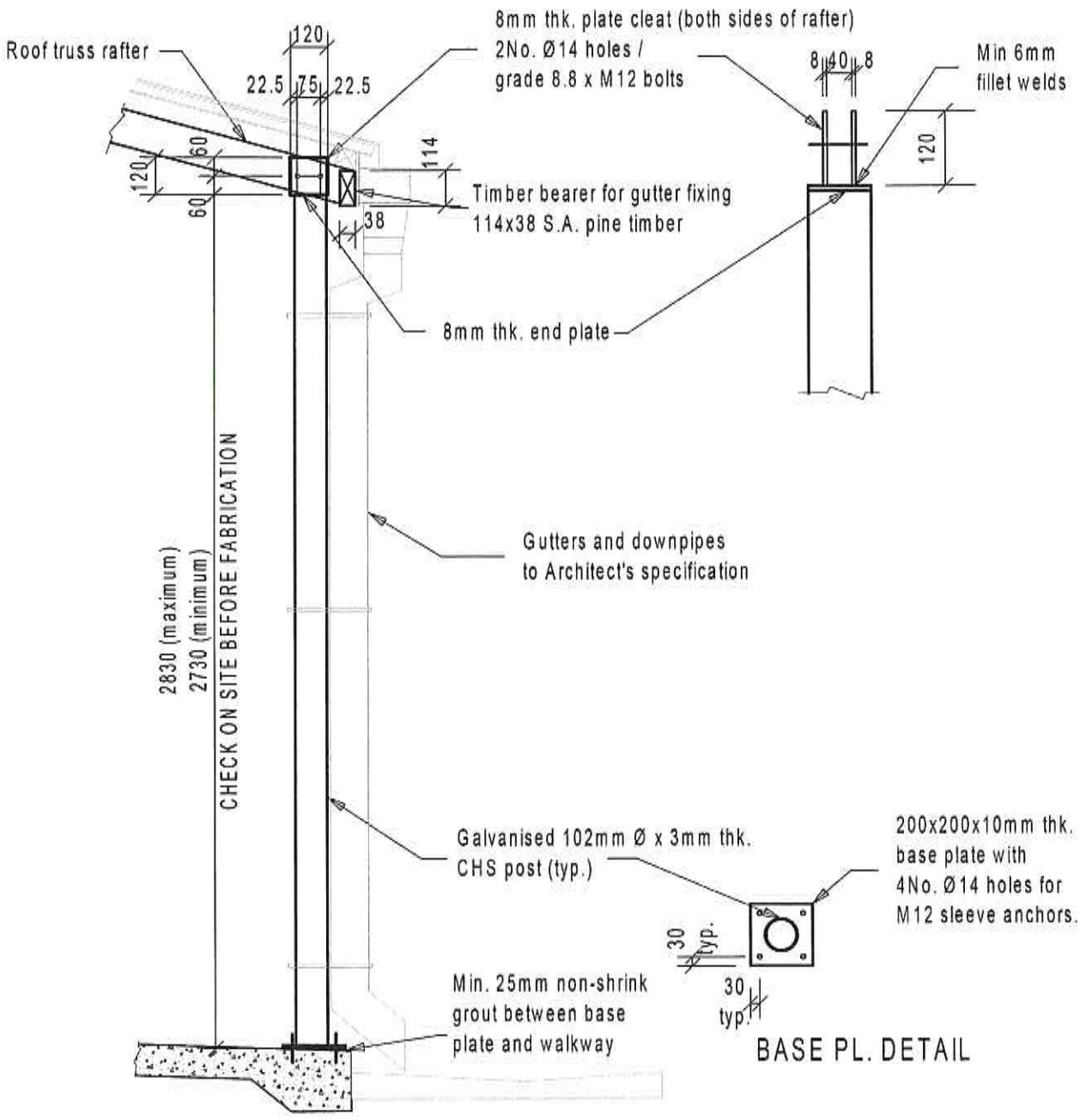

STEEL POST DETAIL

BASE PL. DETAIL

PROJECT	DETAILS	DATE	REVISION
WIMS NO. 063634 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	GUTTER SUPPORT: STEEL POST DETAIL	2018.09.06	P1
		PROJECT No. 447	SKETCH No. SK 322

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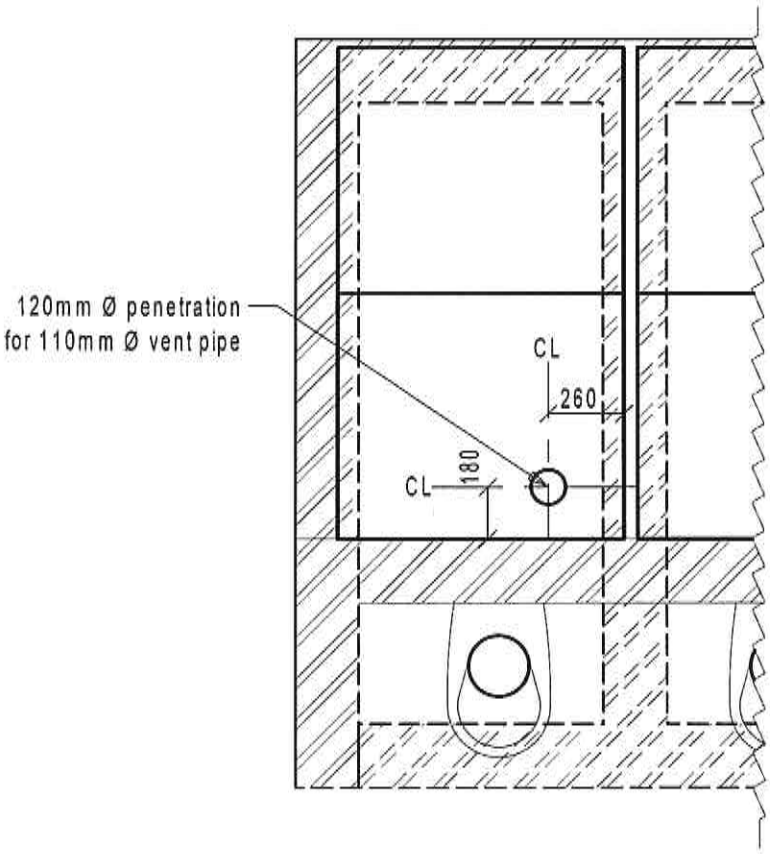
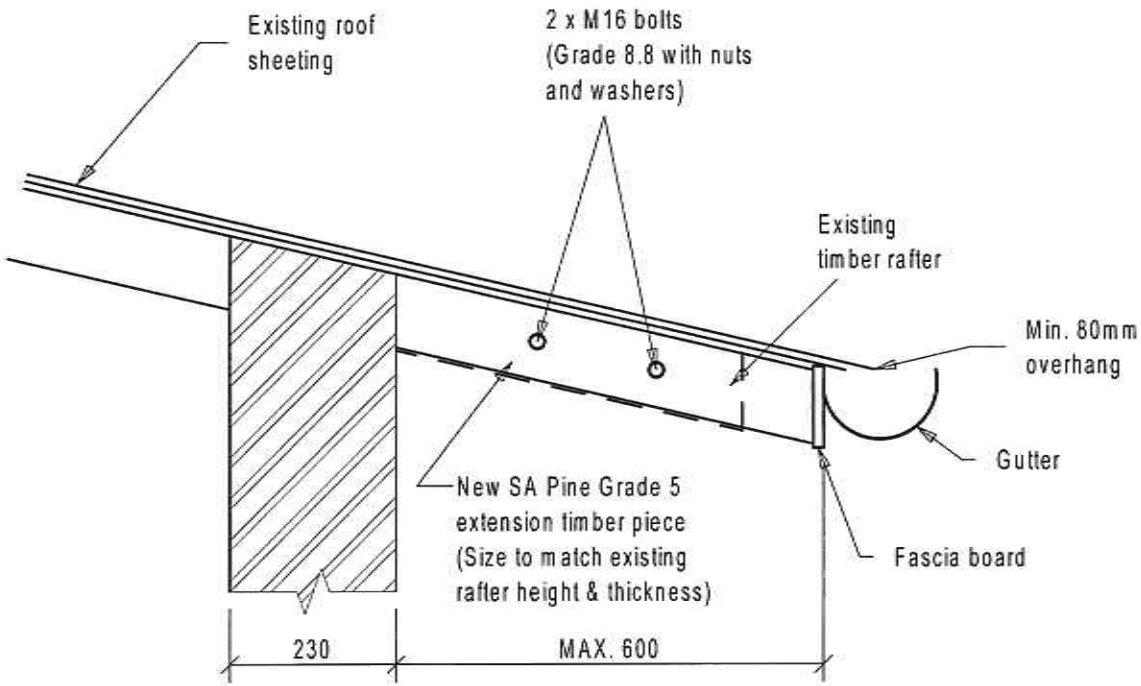


VENT PIPE SETTING OUT ON PRECAST PANEL FOR ABLUTION PITS

PROJECT	DETAILS	DATE	REVISION
WIMS NO. 063634 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	TYPICAL VENT PIPE SETTING OUT ON PRECAST PANEL FOR ABLUTION PITS	2018.09.06	P1
		PROJECT No. 447	SKETCH No. SK 323



SPECIFICATION ON EXTENSION FOR TIMBER RAFTER

SCALE 1:10

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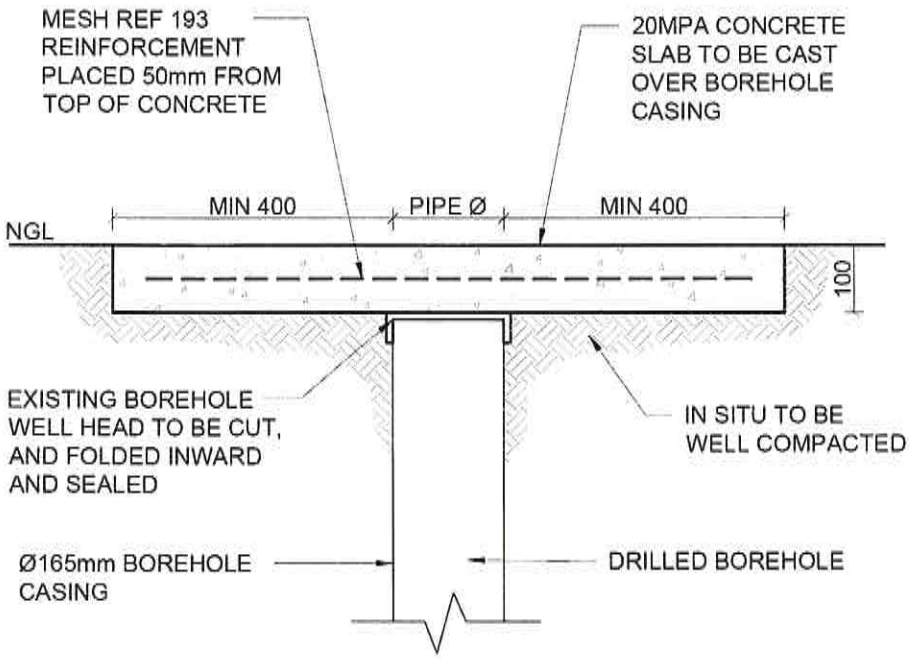
PROJECT
WIMS NO. 063634
DEPARTMENT OF EDUCATION
WATER & SANITATION PROGRAMME

DATE
2018.09.06

REVISION
P1

DETAILS
SPECIFICATION ON EXTENSION FOR TIMBER RAFTER

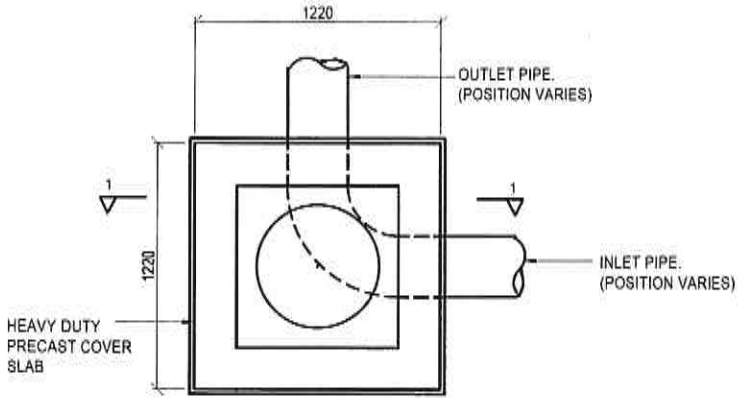
DRG. No.
447 / Sk 324



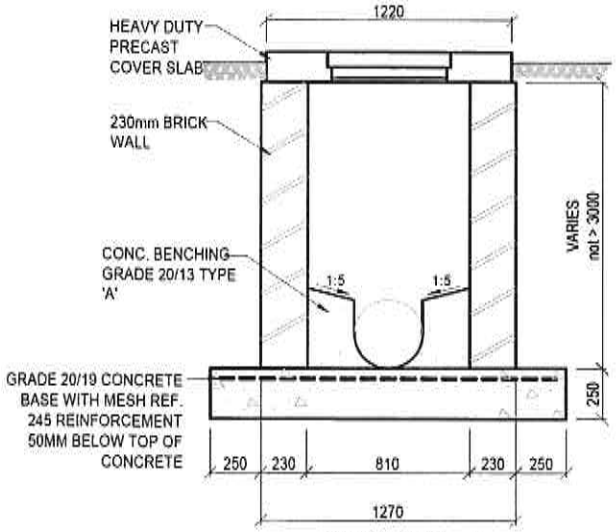
BOREHOLE CAPPING DETAIL

PROJECT:	DETAILS:	DATE	REVISION
WIMS NO. 063634 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	BOREHOLE CAPPING DETAIL	2018.09.06	P1
		PROJ. No. 447	SKETCH No. Sk 325

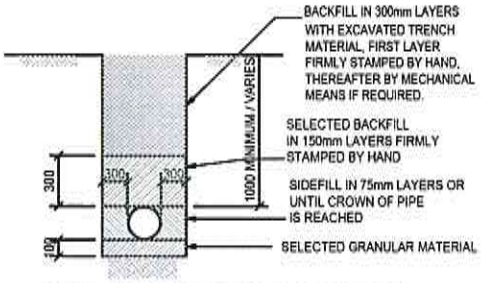
SECTION 3
CIVIL TYPICAL DETAILS AND SPECIFICATIONS



PLAN



SECTION 1 - 1



TYPICAL PIPE BEDDING DETAIL

N.T.S

TYPICAL MANHOLE DETAILS FOR DEPTHS NOT EXCEEDING 3000mm AND FOR PIPES SIZES NOT > 675mm Ø

N.T.S

NOTES

GENERAL

1. SETTING OUT TO ENGINEERS DETAILS.
2. PROVE ALL SERVICES PRIOR TO CONSTRUCTION.
3. ALL WORK AREAS TO BE REINSTATED (PREMIX, CONCRETE, ETC.)
4. SUPPLY AND INSTALLATION TO COMPLY WITH SANS 1200.
5. ALL LEVELS AND DIMENSIONS TO BE VERIFIED ON SITE.
6. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE ARCHITECTURAL AND MECHANICAL ENGINEERS DRAWINGS.

STORMWATER

1. THE INSITU GROUND MUST BE COMPACTED TO 95% MOD. A.A.S.H.T.O. PRIOR TO THE INLET BASE SLAB BEING CAST. IF THIS DENSITY CANNOT BE ATTAINED THE INSITU MATERIAL MUST BE REMOVED TO A DEPTH OF 300mm AND REPLACED WITH A SELECTED BACKFILL.
2. BRICKS TO BE ENGINEERING UNITS (NXFE-14) AS PER SABS 227.
3. TYPE AND CLASS OF PIPE AS SPECIFIED ON SITE.
4. MANHOLE COVER AND FRAME TO BE SPECIFIED ON SITE.

PROJECT:	DETAILS:	DATE	REVISION
WIMS NO. 063634 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	TYPICAL STORMWATER MANHOLE AND PIPE BEDDING DETAILS	2018.09.06	P1
		PROJ. No. 447	SKETCH No. Sk 900

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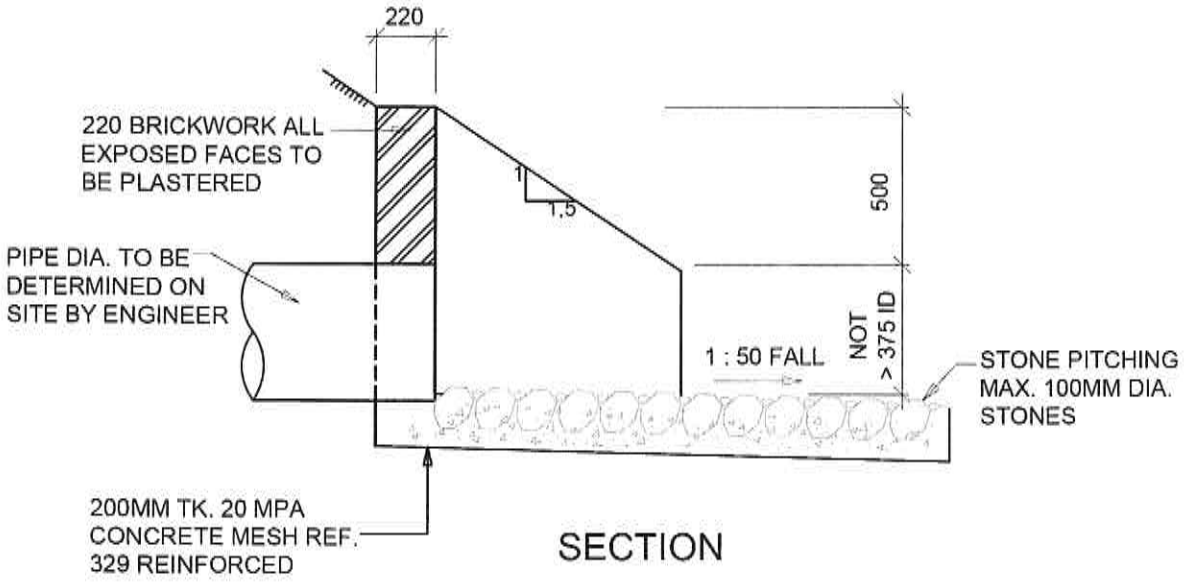
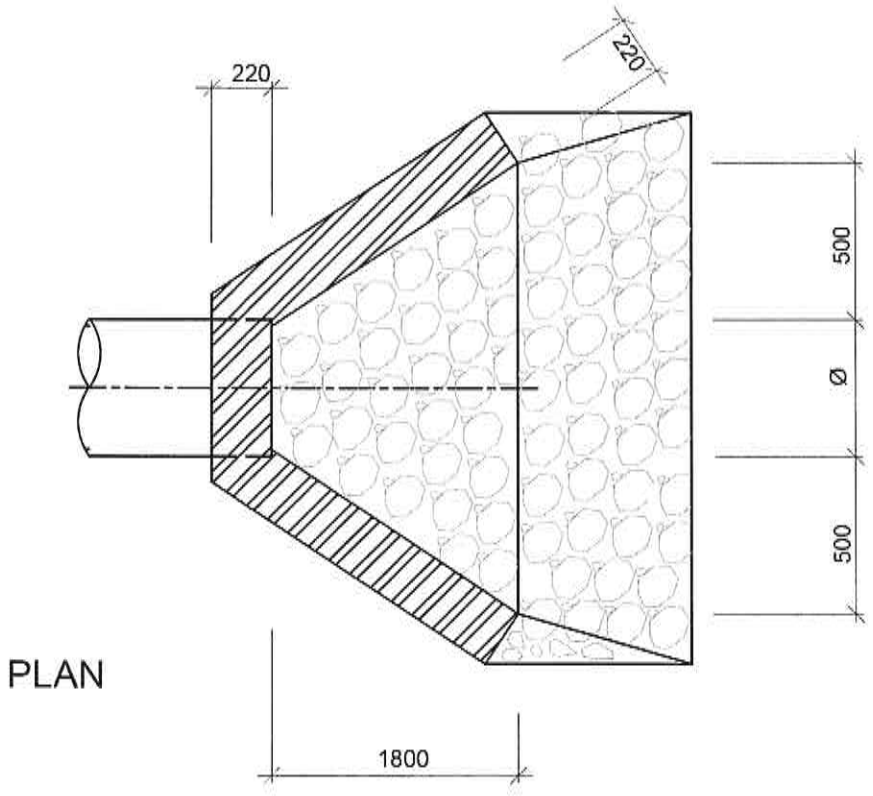


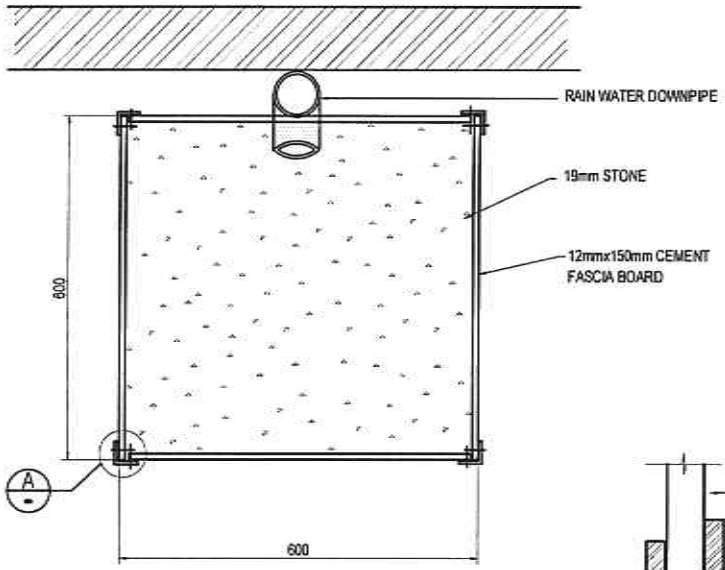
SECTION



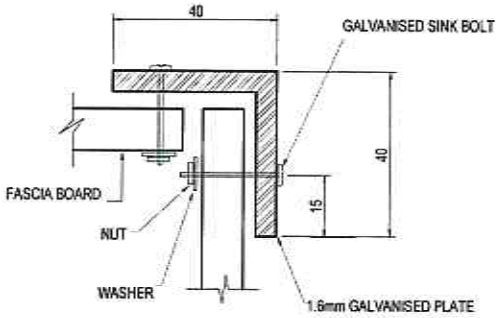
PLAN

STORMWATER HEADWALL DETAILS

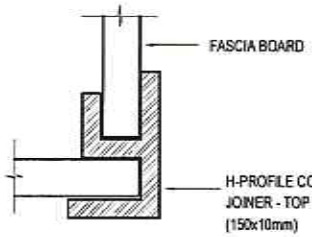
PROJECT:	DETAILS:	DATE	REVISION
WIMS NO. 063634 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	TYPICAL STORMWATER HEADWALL DETAILS ; BRICK AND STONE PITCHED	2018.09.06	P1
		PROJ. No. 447	SKETCH No. Sk 901



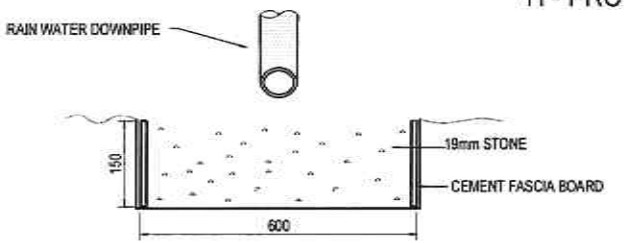
PLAN



DETAIL A
(NB. ALTERNATIVE METHOD)



H - PROFILE CORNER JOINT



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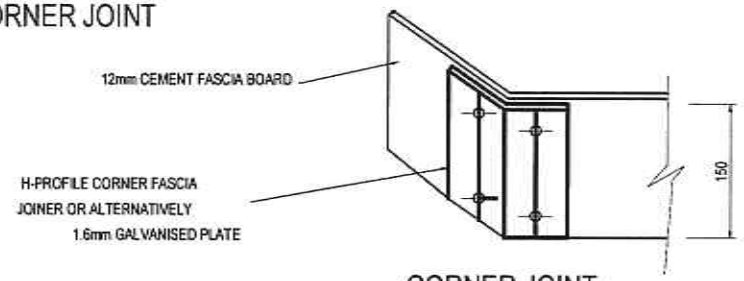

CORNER JOINT

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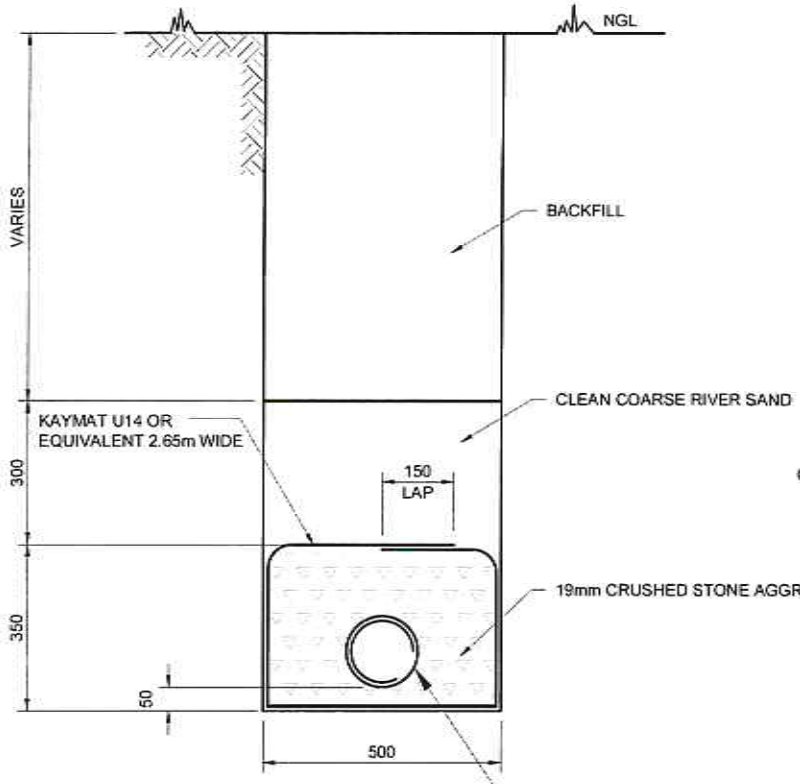
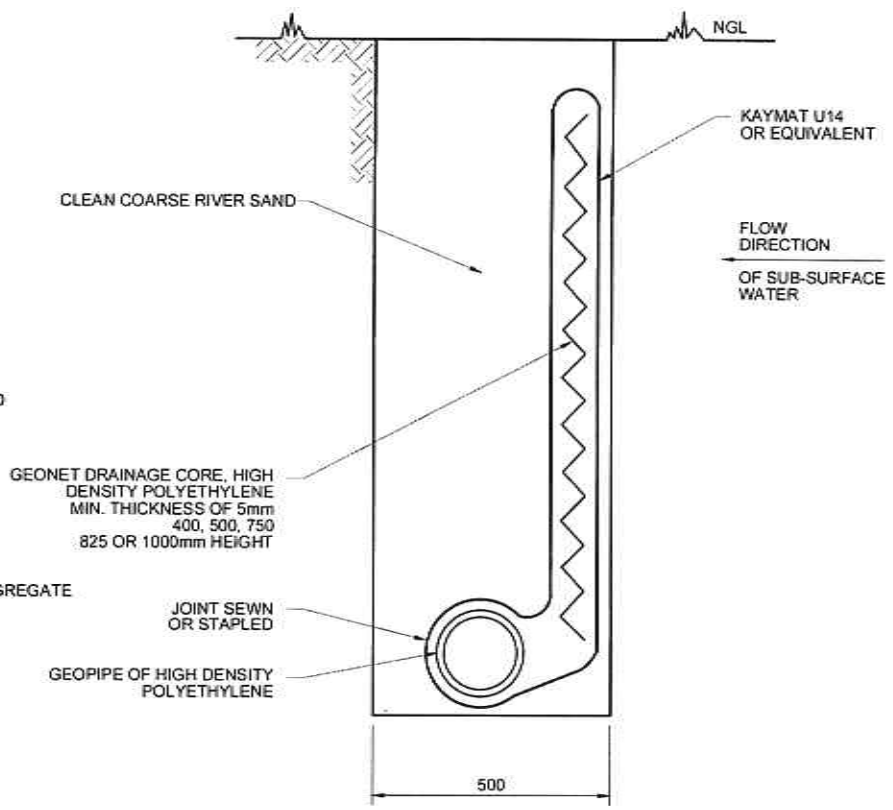
CONSULTING ENGINEERS

PROJECT: WIMS NO. 063634 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	DETAILS: TYPICAL DETAILS: SCOUR PROTECTION AT RWDP OUTLET	DATE 2018.09.06	REVISION P1
		PROJ. No. 447	SKETCH No. Sk 902



AGGREGATE DRAIN



COMPOSITE DRAIN

NOTES :

1. HOLES OR SLOTS TO BE LOCATED TOWARDS 4 & 8 O'CLOCK
2. ENGINEER TO ADVISE ON LEVELS AND POSITION ON SITE

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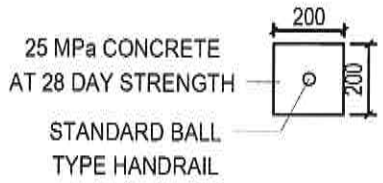
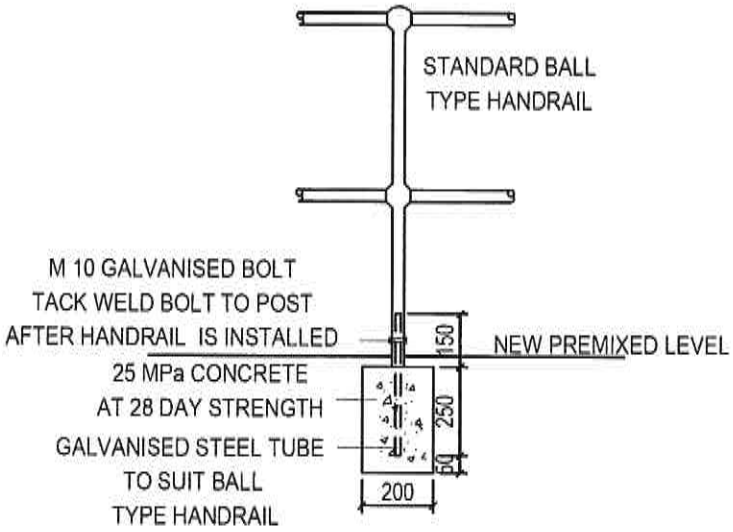
PROJECT: WIMS NO. 063634 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	DETAILS: TYPICAL SUB-SURFACE DRAINAGE DETAILS	DATE 2018.09.05	REVISION P1
		PROJ. No 447	SKETCH No Sk 903

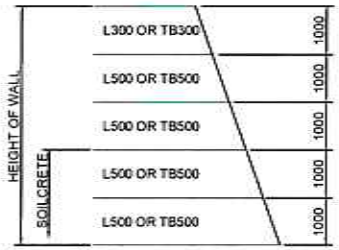


PLAN ON CONCRETE BASE
N.T.S



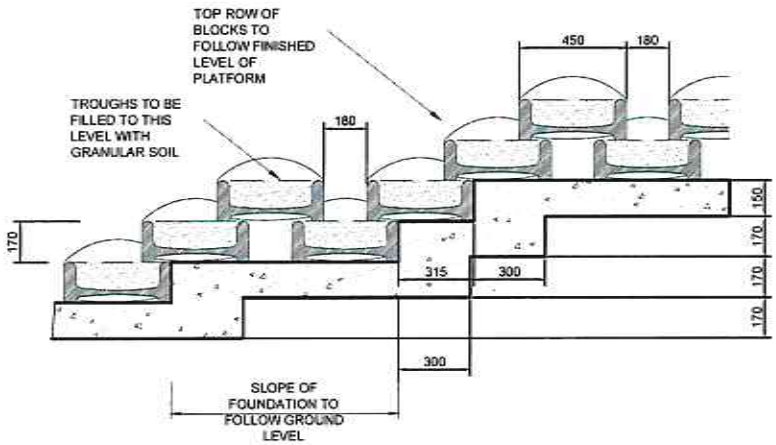
FIXING DETAIL FOR HANDRAIL
N.T.S

PROJECT:	DETAILS:	DATE	REVISION
WIMS NO. 063634 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	TYPICAL HAND RAIL DETAILS	2018.09.06	P1
		PROJ. No. 447	SKETCH No. Sk 904

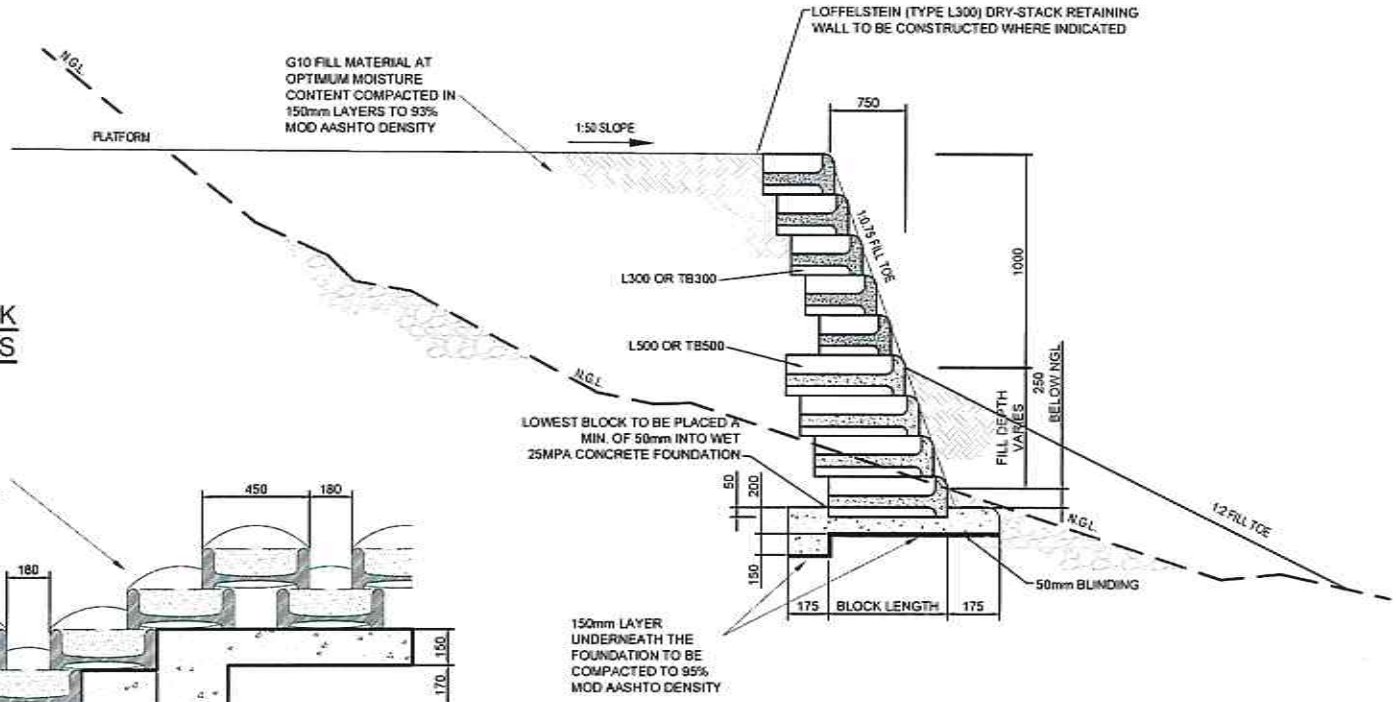


TYPICAL DETAIL SHOWING BLOCK TYPE AND SOILCRETE POSITIONS

N.T.S.



TYPICAL SIDE VIEW



TYPICAL SECTION THROUGH WALL

NOTE:
WHERE FILL DEPTH EXCEEDS 2.0m THEN USE SOILCRETE WITH 3% CEMENT, AT OPTIMUM MOISTURE CONTENT, COMPACTED BY HAND AS FILL MATERIAL BETWEEN AND BEHIND BLOCKS BELOW THIS POINT. (500mm BEHIND BLOCK AND 300mm INTO BLOCK)

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PROJECT: WIMS NO. 063634 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	DETAILS: TYPICAL DRY-STACK RETAINING WALL DETAILS	DATE 2018.09.06	REVISION P1
		PROJ. No. 447	SKETCH No. Sk 905

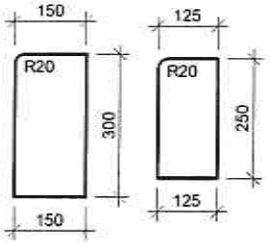


FIG. 1

FIG. 2

RECTANGULAR KERBS

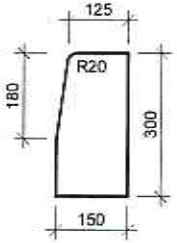


FIG. 3

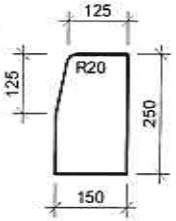


FIG. 4

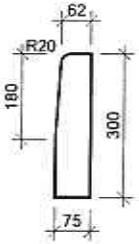


FIG. 5

HALF-BATTERED KERBS

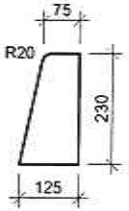


FIG. 6

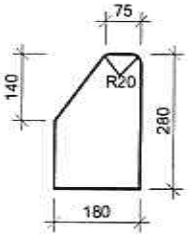


FIG. 7

BATTERED KERBS

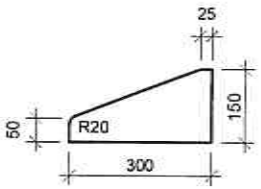


FIG. 8

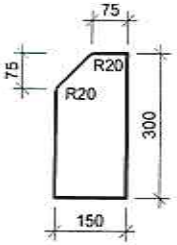


FIG. 9

MOUNTABLE KERBS

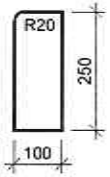


FIG. 10

RECTANGULAR

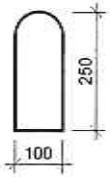


FIG. 11

HALF-ROUND EDGINGS

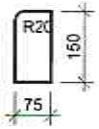


FIG. 12

RECTANGULAR

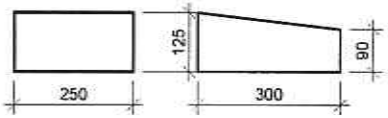


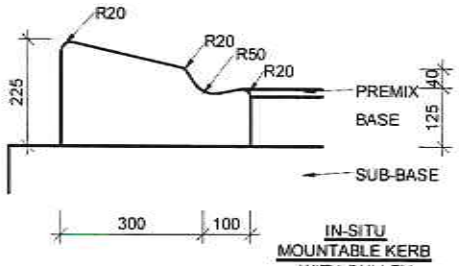
FIG. 13

RECTANGULAR

FIG. 14

TAPERED

CHANNELS



IN-SITU MOUNTABLE KERB WITH GULLEY

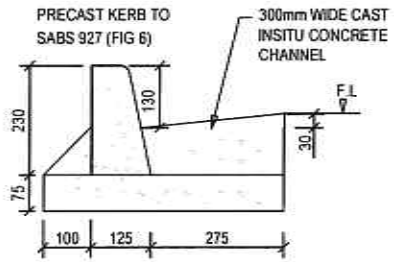


FIG 6 KERB DETAIL - WITH CHANNEL

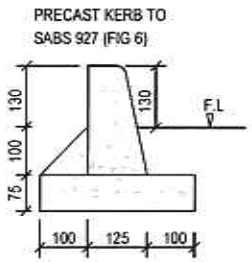


FIG 6 KERB DETAIL -NO CHANNEL

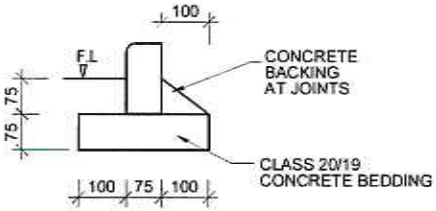


FIG 12 KERB DETAILS

NOTE

EXPANSION JOINTS OF 12mm WIDTH AT 20m INTERVALS AS PER CLAUSE 5.7 OF SABS 1200 M/C

MASS CONCRETE BACKING AT ALL JOINTS

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PROJECT:
WIMS NO. 063634
DEPARTMENT OF EDUCATION
WATER & SANITATION
PROGRAMME

TITLE:
TYPICAL KERBING DETAILS

DATE	REVISION
2018.09.06	P1
PROJ No. 447	SKETCH No. Sk 906

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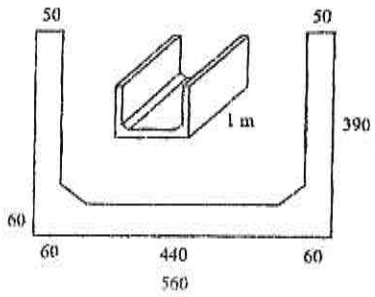
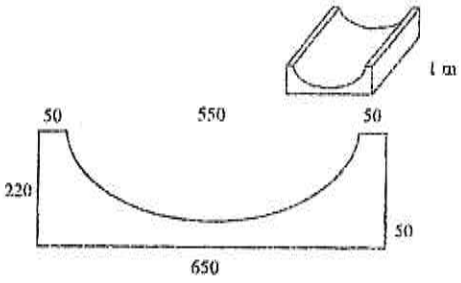
SURFACE WATER CHANNELS

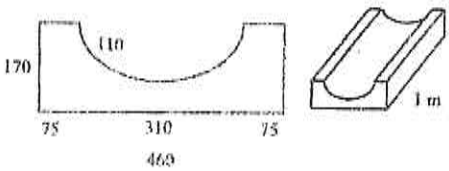
SWC 1



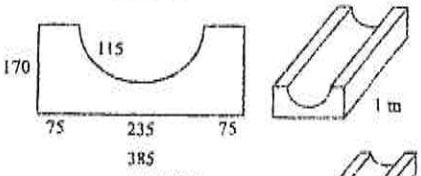
SWC 2



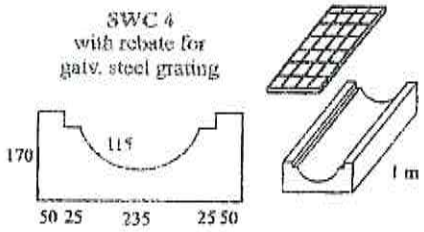
SWC 3



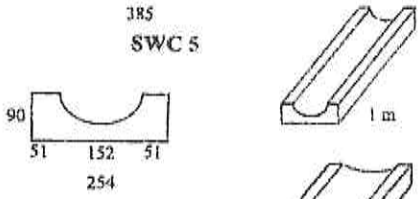
SWC 4



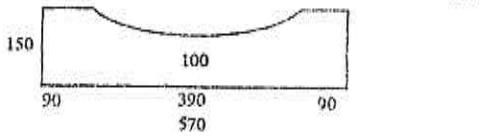
SWC 4
with rebate for
galv. steel grating



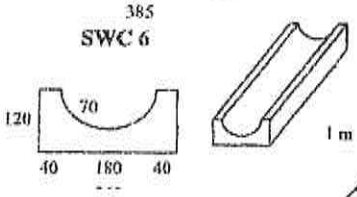
SWC 5



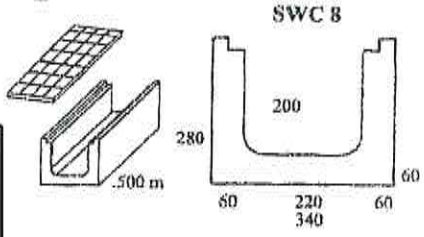
SWC 7



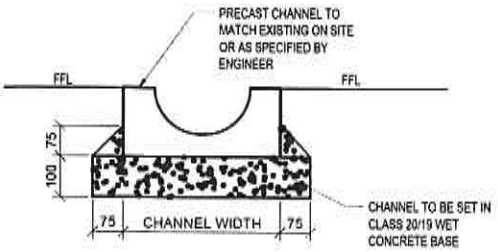
SWC 6



SWC 8

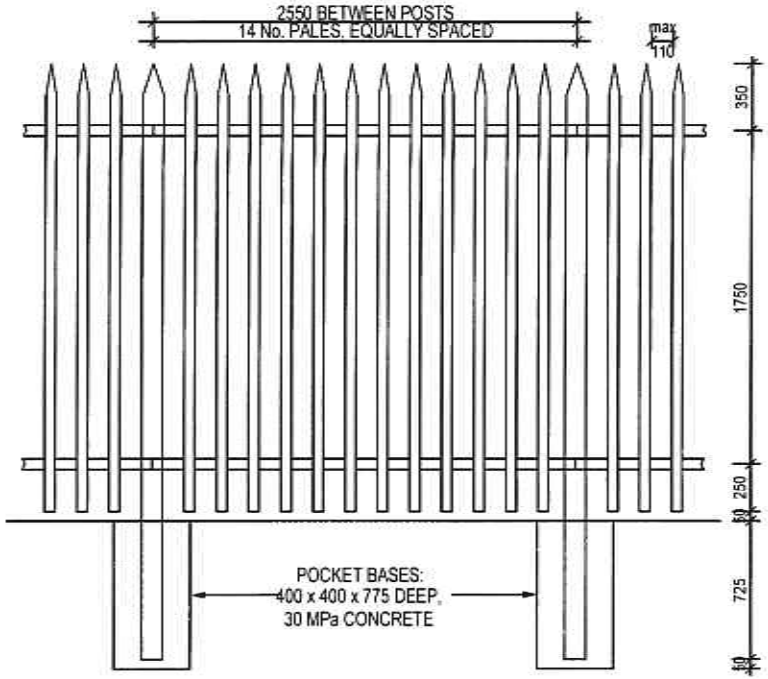


with rebate for
galv. steel grating



TYPICAL INSTALLATION DETAILS FOR PRECAST CONCRETE SURFACE WATER CHANNELS
N.T.S

PROJECT:	DETAILS:	DATE	REVISION
WIMS NO. 063634 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	TYPICAL STORMWATER SURFACE CHANNEL TYPES AND INSTALLATION DETAILS	2018.09.06	P1
		PROJ. No. 447	SKETCH No. Sk 907



STEEL PALISADE FENCE – SPECIFICATION NO. 278/SPF SPECIFICATION FOR THE FABRICATION AND INSTALLATION OF STEEL PALISADE FENCING

1 DIMENSIONS AND GENERAL CHARACTERISTICS

1.1 MAIN POSTS
SHAPED IPE 100 SECTIONS. 100 X 55 X 8.1 kg/m. GRADE 300 W, HOT-ROLLED SECTIONS. SLOTTED TO RECEIVE FISH PLATES TOP AND BOTTOM.

1.2 RAILS
TOP AND BOTTOM RAIL : 60 X 60 X 5 ANGLES. GRADE 300W, HOT-ROLLED SECTIONS.

1.3 PALES
40 X 40 X 5 ANGLES. GRADE 300W, HOT ROLLED SECTIONS.

1.4 FISH PLATES
140 X 50 X 8 mm FLAT BAR

1.5 FIXINGS
PALES TO RAIL : WELDING TO SABS STANDARDS RAILS TO FISH PLATE: M12 'ANT-VANDAL' SHEAR FIXINGS, TOP AND BOTTOM GRADE 8.8

2. CONSTRUCTION

2.1 POSTS SHALL BE PROVIDED AT 2.55m CENTER TO CENTER, SHAPED TO A POINT AT THE TOP. POST TO BE EMBEDDED IN 30 MPa CONCRETE POCKET BASE (MIN. 400 X 400 X 800 DEEP) TO A MINIMUM DEPTH OF 725mm.

2.2 POSTS TO RAILS CONNECTIONS
RAILS SHALL BE SECURED TO POSTS WITH CONNECTOR PLATES OR 'FISH PLATES', BOLTED TO THE VERTICAL LEG OF THE RAIL.

2.3 PROTECTIVE TREATMENT
AFTER THE FABRICATION OF FENCING COMPONENTS, INCLUDING THE PUNCHING OR DRILLING OF ANY HOLES, THE FENCING SHALL BE HOT-DIPPED GALVANIZED TO SANS 763 STANDARDS.

2.4 GENERAL
ALL FOUNDING CONDITIONS TO BE INSPECTED BY THE ENGINEER PRIOR TO CONCRETE BEING CAST. MAP AFRICA CONSULTING ENGINEERS TO APPROVE ALL SHOP DRAWINGS PRIOR TO FABRICATION OF THE STEEL PALISADE FENCE.

NOTES:

1. POSTS : IPE 100 x 55 (8.1 kg/m), RAILS: 60 x 60 x 5 ANGLES AND PALES: 40 x 40 x 5mm
2. PALES TO BE WELDED TO RAILS AND ALL WELDS TO BE 5mm CFW
3. ALL STEELWORK TO BE HOT-DIPPED GALVANISED TO SANS 763 STANDARDS
4. LOCATION OF FENCE TO BE CONFIRMED ON SITE PRIOR TO FABRICATION
5. ENGINEER TO INSPECT FOUNDING CONDITIONS PRIOR TO CONCRETE BEING CAST

TYPICAL SECTION ON STEEL PALISADE FENCE

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PROJECT: WIMS NO. 063634 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	DETAILS: TYPICAL GALVANISED STEEL PALISADE FENCING DETAILS	DATE 2018.09.06	REVISION P1
		PROJ No. 447	SKETCH No. Sk 908

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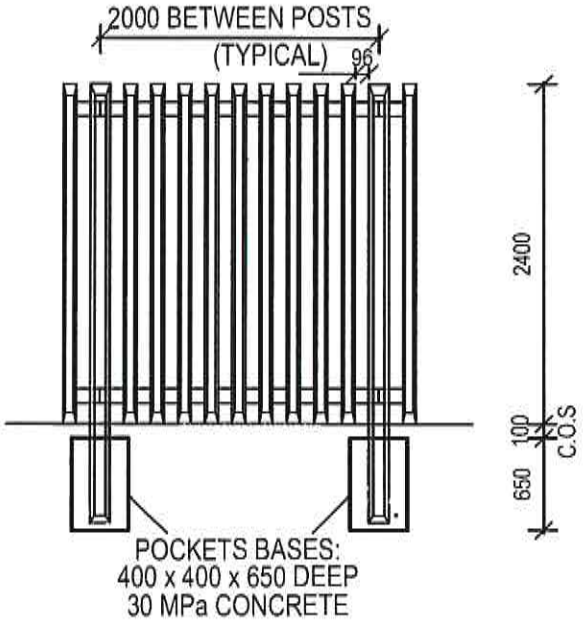
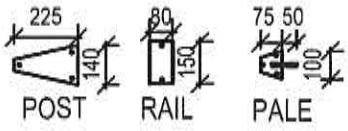
1. LOCATION OF FENCE TO BE CONFIRMED ON SITE PRIOR TO FABRICATION AND/ OR CONSTRUCTION.
3. ENGINEER TO INSPECT FOUNDING CONDITIONS PRIOR TO CONCRETE.



TYPICAL ELEVATION ON CONCRETE PALISADE FENCE
SCALE 1 : 50

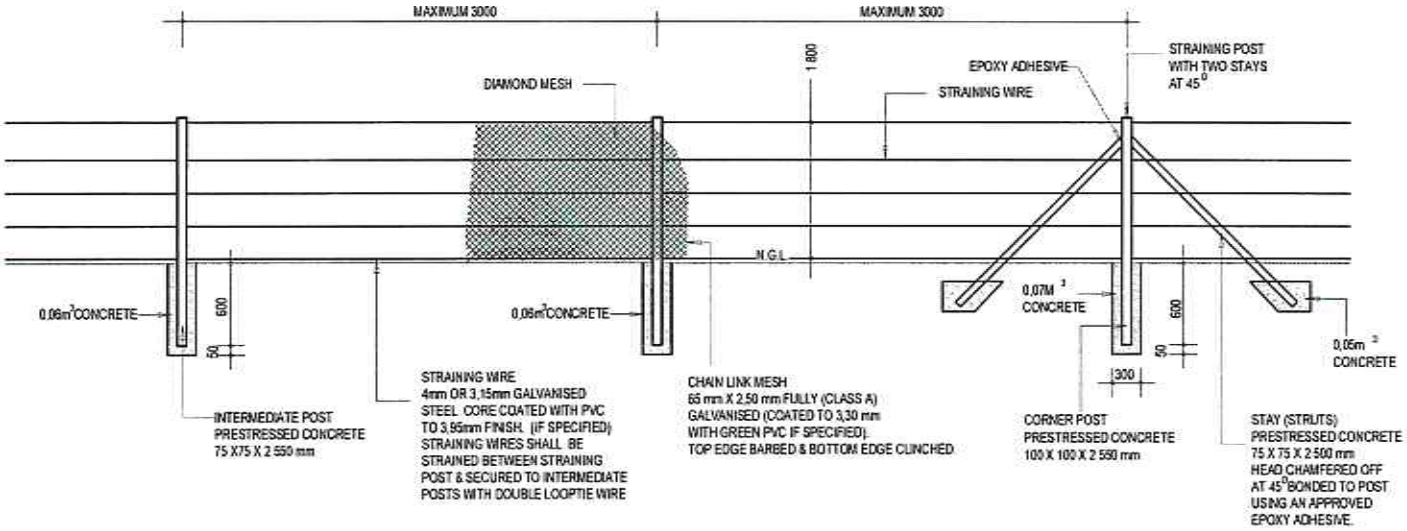


SECTIONAL DETAILS
SCALE 1 : 50

PROJECT:	DETAILS:	DATE	REVISION
WIMS NO. 063634 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	TYPICAL PRECAST CONCRETE PALISADE FENCING DETAILS	2018.09.06	P1
		PROJ. No. 447	SKETCH No. Sk 909

NOTES :

1. ALL POSTS, DROPPERS AND STANDARDS TO BE ON THE INSIDE OF FENCE.
2. STRAINING POSTS TO BE USED AT EVERY CHANGE OF VERTICAL AND HORIZONTAL DIRECTION WITH A MAXIMUM SPACING OF 30 METRES.
3. INTERMEDIATE POSTS TO BE USED AT A MAXIMUM SPACING OF 3 METERS
4. CONCERTINA GATES TO BE USED WHERE SPECIFIED.
5. SPECIFICATION FOR CORROSION PROTECTION FOR GATE TO BE SPECIFIED WHEN ORDERING.
6. SPECIFICATION FOR GATE HINGES TO BE SPECIFIED WHEN ORDERING. (EG. HOLE TYPE OR BRACKET TYPE).



CONCRETE FENCE SUPPORTS WITH CHAIN LINK MESH

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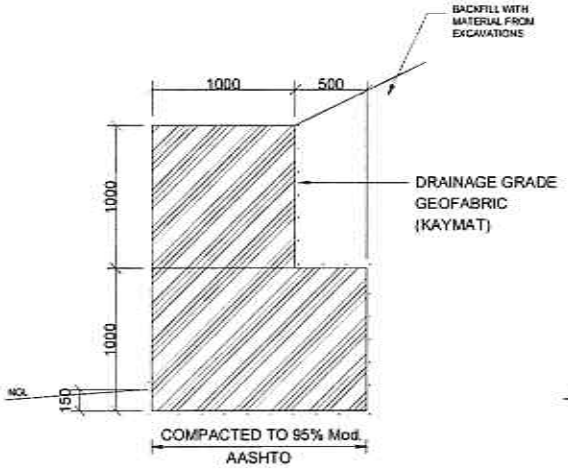
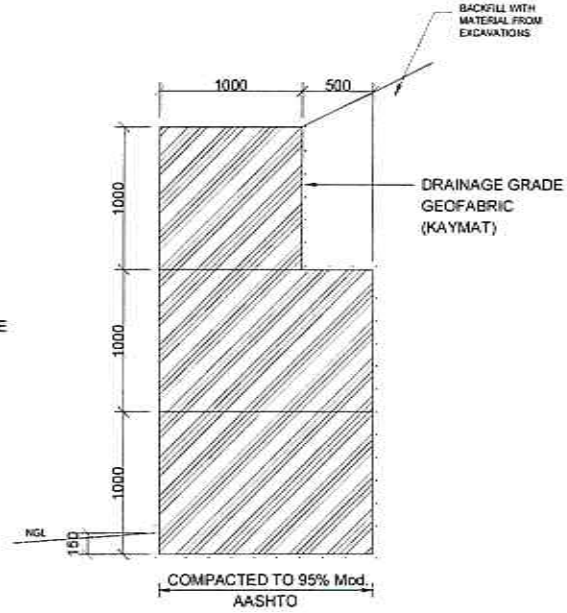
PROJECT: WIMS NO. 063634 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	DETAILS: TYPICAL WIRE MESH FENCING DETAILS	DATE 2018.09.06	REVISION P1
		PROJ. No 447	SKETCH No Sk 910

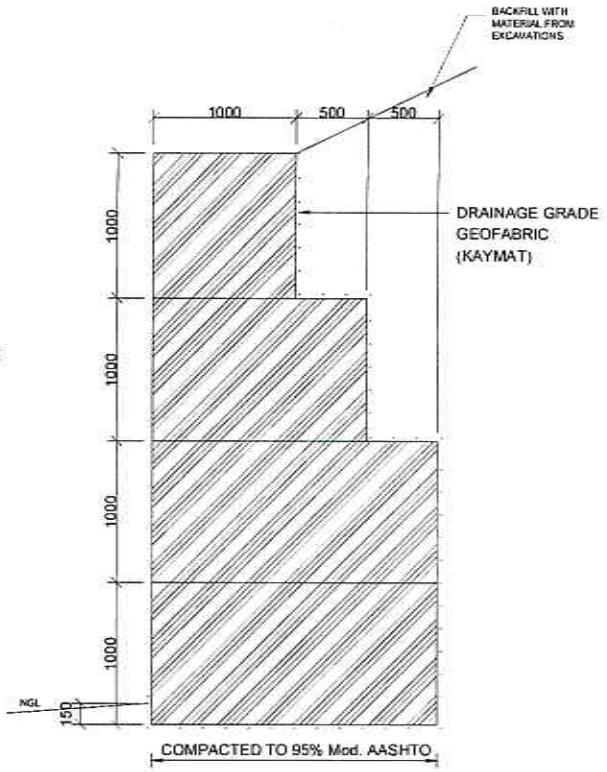
NOTES:
1. FOUNDATIONS TO BE STEPPED AND PREPARED AS INSTRUCTED BY THE ENGINEER.
2. GEOTEXTILE FABRIC TO BE GRADE C OR SIMILAR AS INSTRUCTED BY THE ENGINEER.
3. ALL WIRE USED IN THE MAKING OF GABIONS SHALL BE GALVANISED IN ACCORDANCE WITH THE PROVISIONS S.A.B.S 1580:1993 FOR CLASS A HEAVY GALVANISED MILD-STEEL WIRE.
4. THE STANDARD SIZES OF GABIONS ARE AS FOLLOWS:
   LENGTH : 1.0m , 2.0m , 3.0m & 4.0m
   WIDTH : 1.0m 1.5m DEPTH : 0.5m & 1.0m
   DIAPHRAGM SPACING : 1.0m
5. LACING AND BRACING TO BE DONE IN ACCORDANCE WITH MANUFACTURES RECOMMENDATIONS.



TYPICAL 2,0m HIGH WALL



TYPICAL 3,0m HIGH WALL



TYPICAL 4,0m HIGH WALL

TYPICAL DETAILS OF GABION RETAINING WALLS OF VARIOUS HEIGHTS

N.T.S

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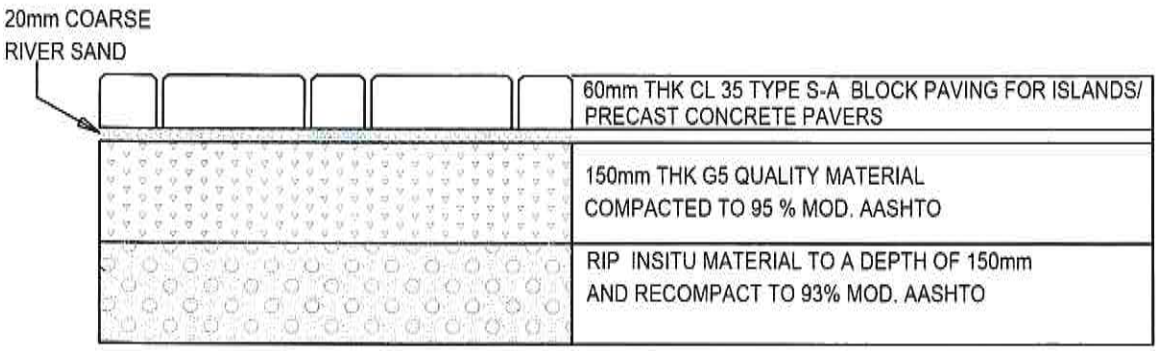
MAP AFRICA CONSULTING ENGINEERS

PROJECT: WIMS NO. 063634 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	DETAILS: TYPICAL GABION RETAINING WALL DETAILS	DATE: 2018.09.05	REVISION: P1
		PROJ. No.: 447	SKETCH No.: Sk 911



TYPICAL BRICK PAVING/ PRECAST CONCTETE PAVING
LAYERWORK DETAILS
N.T.S

PROJECT:	DETAILS:	DATE	REVISION
WIMS NO. 063634 DEPARTMENT OF EDUCATION SANITATION PROGRAMME	TYPICAL BLOCK PAVING/ PRECAST CONCRETE PAVING LAYERWORK DETAILS	2018.09.06	P1
		PROJ. No. 447	SKETCH No. Sk 912

PROPERTY	G1	G2	G3	G4	G5	G6	G7
MAX DIAMETER (mm)	37.5	37.5	37.5	53.0	63.0	63.0	100.0
GRADING MODULUS	GRADING ENVELOPE	GRADING ENVELOPE	GRADING ENVELOPE	GRADING ENVELOPE	>= 1.50	>= 1.20	>= 0.75
LIQUID LIMIT (MAX) (%)	25	25	25	25	30	-	-
PLASTICITY INDEX (MAX) (%)	4	6	6	6	10	12	12
10% FACT (MIN) (kN)	110	110	N.A.	N.A.	N.A.	N.A.	N.A.
LINEAR SHRINKAGE (%) (MAX)	2	3	3	3	5	6	6
ACV (MAX) (%)	29	29	N.A.	N.A.	N.A.	N.A.	N.A.
FLAKINESS INDEX (%)	<= 35.0	<= 35.0	N.A.	N.A.	N.A.	N.A.	N.A.
MIN. CBR %	N.A.	80 @ 98% MOD AASHTO	80 @ 98% MOD AASHTO	80 @ 98% MOD AASHTO	45 @ 95% MOD AASHTO	25 @ 93% MOD AASHTO	15 @ 93% MOD AASHTO
SWELL (MAX) % AT 100% MOD	N.A.	0.2	0.2	0.2	0.5	1.0	1.5
SOLUBLE SALTS (%)	< 0.2%	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
MgS_4O + $Na\ S_2O_4$ (%)	< 0.05%	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.

MATERIAL PROPERTIES FOR :
CRUSHED STONE (G1,G2,G3)
NATURAL GRAVEL (G4,G5,G6)
GRAVEL SOIL (G7)

PROPERTY	G8	G9	G10	SELECTED FILL
GRADING MODULUS	NO REQUIREMENTS	NO REQUIREMENTS	NO REQUIREMENTS	0.75
MIN CBR% AT IN-SITU DENSITY	10	7	3	10
SWELL (MAX) % AT 100% MOD AASHTO	1.5	1.5	1.5	1.5
LIQUID LIMIT (MAX) (%)	N.A.	N.A.	N.A.	40
PLASTICITY INDEX (MAX) (%)	N.A.	N.A.	N.A.	18

MATERIAL PROPERTIES FOR
GRAVEL - SOIL AND SELECTED FILL

NOTES:

1. TYPE AND PERCENTAGE OF STABILIZATION TO BE DETERMINED BY LABORATORY
2. MATERIAL PROPERTIES DERIVED FROM TRH 14 & SABS. 1200

PROPERTY	C1	C2	C3	C4
MAX DIAMETER (mm)	37.5	37.5	63.0	63.0
GRADING MODULUS BEFORE TREATMENT	>= 1.50	>= 1.50	>= 1.50	>=1.50
LIQUID LIMIT (MAX) BEFORE (%)	25	25	30	45
PLASTICITY INDEX (MAX) BEFORE (%)	6	6	10	10
PLASTICITY INDEX (MAX) AFTER (%)	N.A.	N.A.	6	6
10% FACT (MIN) kN	110	110	N.A.	N.A.
ACV (MAX) (%)	29.0	29.0	N.A.	N.A.
FLAKINESS INDEX (%)	<= 35.0	<= 35.0	N.A.	N.A.
SAND ADDED EQUIVALENT (%)	>= 30.0	>= 30.0	N.A.	N.A.
UCS 100% MOD AASHTO (MPa)	> 6.0 < 12.0	> 3.0 < 6.0	> 1.5 < 3.0	> 0.75 < 1.5

MATERIAL PROPERTIES FOR
CEMENTED CRUSHED STONE OR NATURAL GRAVEL

SIEVE SIZE	% PASSING		
	G1,C1,C2	G2,G3,C1,C2	G4
53.0mm	100	100	100
37.5mm	100	100	85-100
26.5mm	84-94	100	-
19.0mm	71-84	85-95	60-90
13.2mm	59-75	71-84	-
4.75mm	36-53	42-60	30-65
2.00mm	23-40	27-45	20-50
0.425mm	11-24	13-27	10-30
0.075mm	4-12	5-12	5-15

GRADING ENVELOPE

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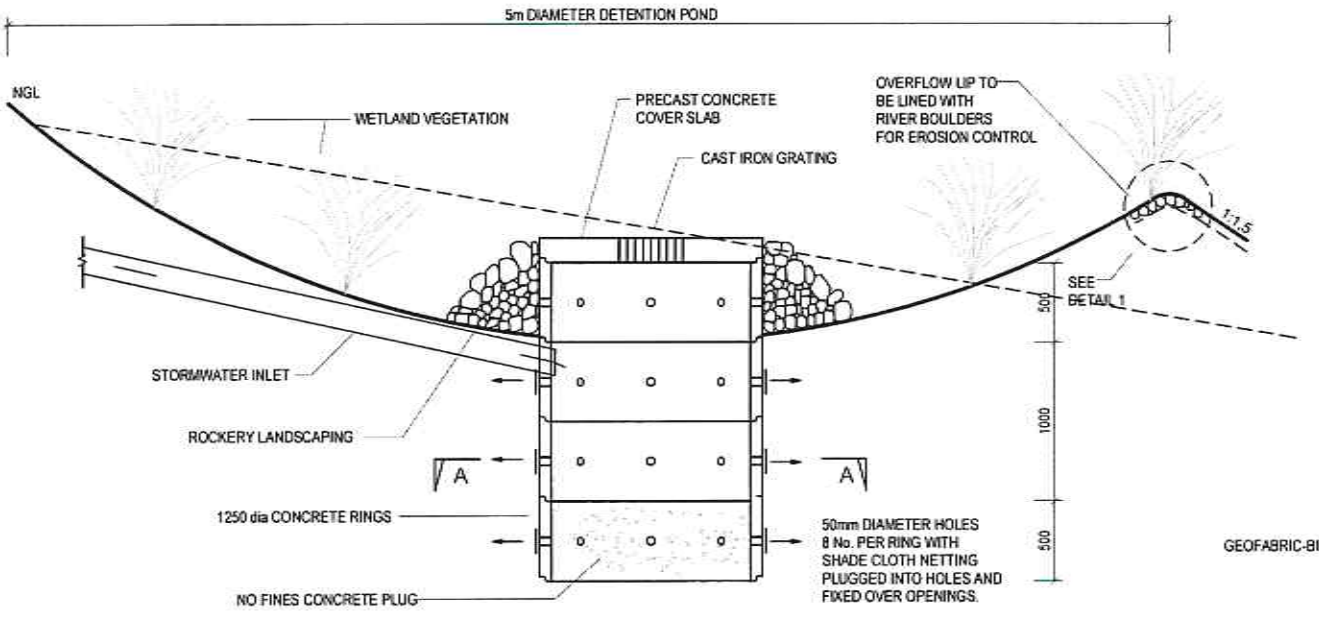
MAP AFRICA CONSULTING ENGINEERS

PROJECT:
WIMS NO. 063634
DEPARTMENT OF EDUCATION
WATER & SANITATION
PROGRAMME

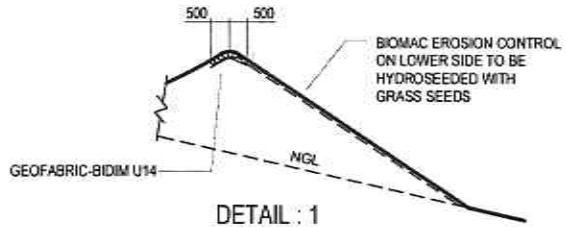
DETAILS:
MATERIAL PROPERTIES
FOR LAYERWORKS

DATE	REVISION
2018.09.06	P1
PROJ. No. 447	SKETCH No. Sk 913

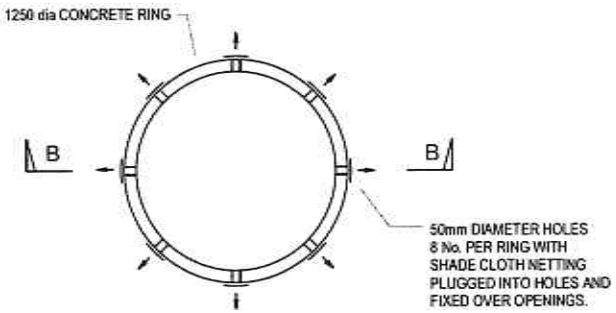


SECTION B-B
N.T.S

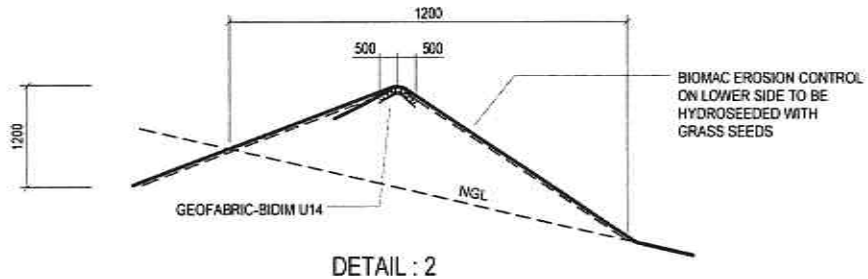
NOTE:
PIPE DIAMETER AND POSITION OF POND TO BE DETERMINED ON SITE BY ENGINEER



DETAIL : 1
N.T.S



SECTION A-A
N.T.S



DETAIL : 2
EARTH BERM AT THE SOUTH EASTERN BOUNDARY
N.T.S

TYPICAL DETAILS FOR SOAK AWAY

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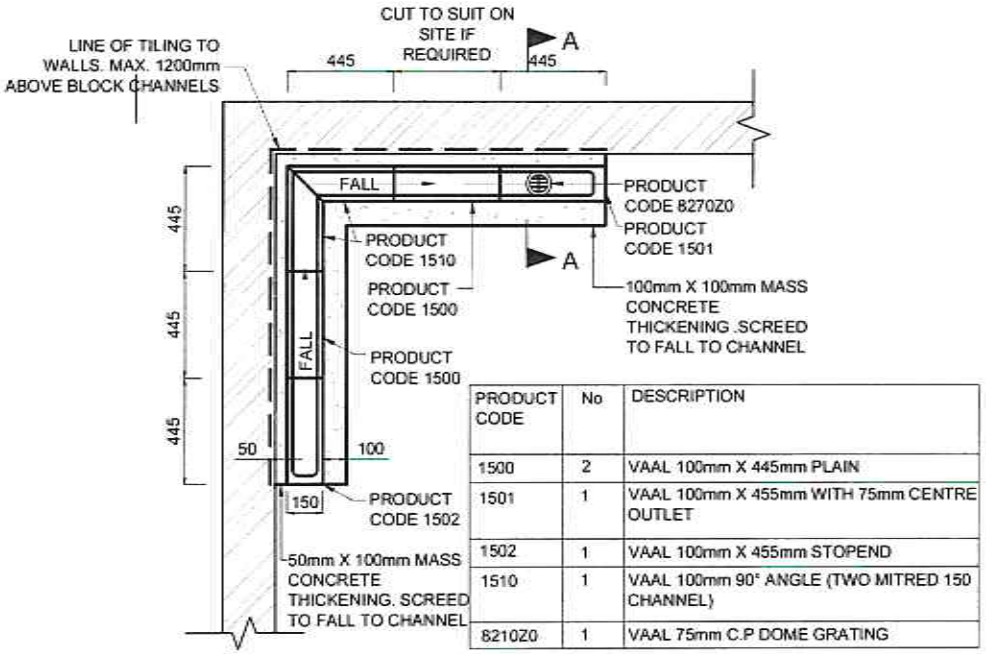
CONSULTING ENGINEERS

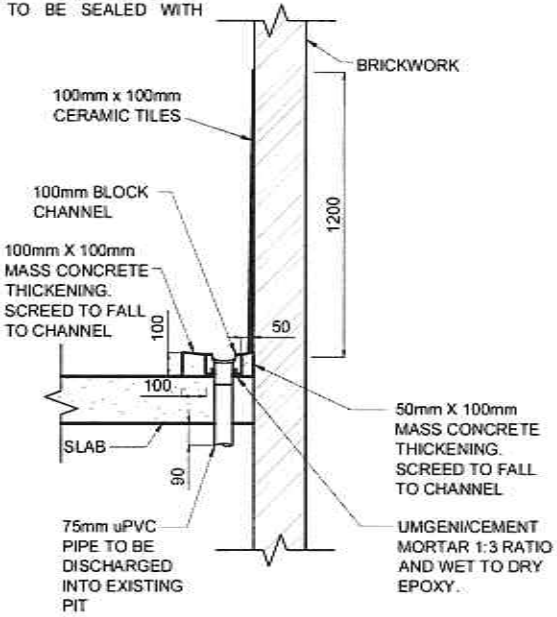
PROJECT: WIMS NO. 063634 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	DETAILS: TYPICAL STORMWATER SOAK AWAY DETAILS	DATE 2018.09.06	REVISION P1
		PROJ. No. 447	SKETCH No. Sk 914



PRODUCT CODE	No	DESCRIPTION
1500	2	VAAL 100mm X 445mm PLAIN
1501	1	VAAL 100mm X 455mm WITH 75mm CENTRE OUTLET
1502	1	VAAL 100mm X 455mm STOPEND
1510	1	VAAL 100mm 90° ANGLE (TWO MITRED 150 CHANNEL)
8210Z0	1	VAAL 75mm C.P DOME GRATING

PLAN
SCALE 1:20

NOTE:
THE CHANNELS ARE TO BE FIXED TO THE SURFACE BED WITH UMGENI/CEMENT MORTAR 1:3 RATIO AND WET TO DRY EPOXY.THE SURFACE BED IS TO BE SCABBLED PRIOR TO APPLICATION OF MORTAR.THE CHANNEL IS TO BE LAID AS PER PLAN FALL. ALL JOINTS BETWEEN CHANNELS TO BE SEALED WITH WATERPROOF GROUT.



SECTION A-A
SCALE 1:20

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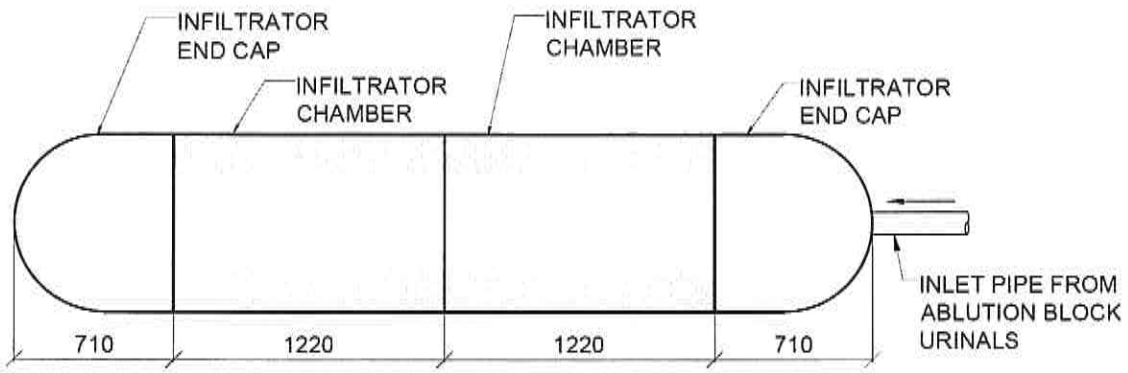
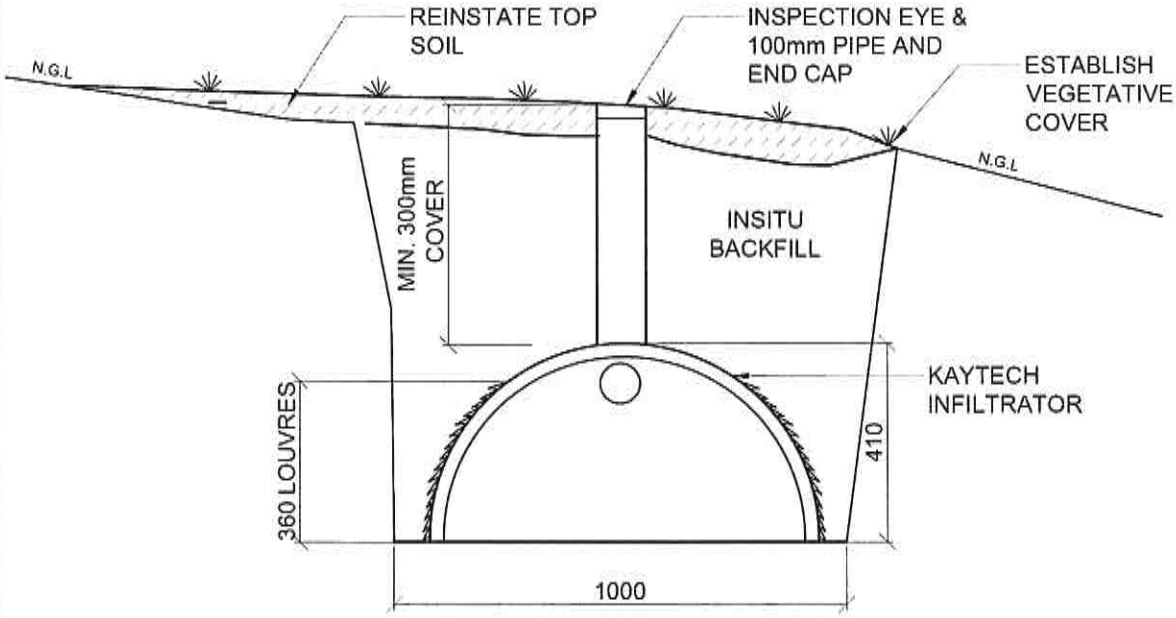
MAP AFRICA

PROJECT: WIMS NO. 063634 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	DETAILS: PLAN AND SECTION SHOWING URINAL TO BOYS ABLUTION	DATE 2018.09.06	REVISION P1
		PROJ. No. 447	SKETCH No. Sk 915



PLAN

SCALE 1:30



SECTION

SCALE 1:15

TYPICAL SECTION THROUGH INFILTRATOR SOAKAWAY

PROJECT:	DETAILS:	DATE	REVISION
WIMS NO. 063634 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	TYPICAL INFILTRATOR SOAKAWAY DETAIL FOR URINALS	2018.09.06	P1
		PROJ. No. 447	SKETCH No. Sk 916

KWAZULU-NATAL PROVINCE
PUBLIC WORKS
REPUBLIC OF SOUTH AFRICA

DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3: ETHEKWINI REGION: DUMANE COMMERCIAL HS

ANNEXURE 11

BOREHOLE INSTALLATION SPECIFICATION

DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME

WIMS NO.: 063634

DUMANE S COMMERCIAL HIGH SCHOOL-DRILLING OF NEW BOREHOLE, TEST PUMPING, EQUIPPING OF BOREHOLE AND INSTALLATION OF ELEVATED TANK

SCHOOL NAME :	**DUMANE S COMMERCIAL HIGH SCHOOL**
CLUSTER NO. :	**N/A**
WIMS NO. :	**063634**

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1 INTRODUCTION AND BACKGROUND

The Department of Education is in the process of upgrading the existing water and sanitation facilities at 362 schools in the KwaZulu-Natal Province. These schools have been prioritised for the construction of a borehole to supplement their water demands.

Dumane S Commercial High School requires one such borehole. The scope of work and detailed BOQ with the applicable options follows. Site specifications depend on recent site assessments, old and available hydrogeological reports and needs to be confirmed per school.

The following supplies a general overview of the Drilling/Rehabilitation, Test Pumping and Equipping of the Borehole as well as the ancillary works required for the installation of an Elevated Tank to serve the Dumane S Commercial High School. A schedule of the anticipated Bill of Quantities and Appendices is supplied at the back of this document.

1.1 Other General Information

1.1.1 Terrain

1.1.1.1	Topography.	
	Flat surface, plain	Yes
	Gently rolling	Yes
	Moderately rolling	Yes
	Hilly	Yes
	Mountainous	Yes - limited
1.1.1.2	Vehicle accessibility	
	Dry weather conditions	Fair
	Wet weather conditions	Poor
	Four- or six-wheel drive required in wet conditions	Yes
1.1.1.3	Access to be established Nature of access:	Yes
	Light bush clearing	Yes
	Heavy bush clearing	Yes
	Rudimentary road building	Yes
	Dismantling of bore head superstructure for rehabilitation of existing boreholes	yes

1.1.2 Facilities Available

1.1.2.1	Camping site / depot.	no
1.1.2.2	Water supply	limited
1.1.2.3	Power supply	no
1.1.2.3	Ablution facilities	no
1.1.2.4	Housing / accommodation	no

2 DRILLING SCOPE OF WORK

1.2 General

2.1.1	Drilling of a new borehole(s) for exploration, monitoring, production assessment and management purposes.	yes
	Estimated number	Unspecified
2.1.1.1	Type of drilling method considered suitable (depending on site geology to be confirmed)	
	Rotary air percussion with foam	Yes
	Odex/ Symetrix	Yes
	Mud Flush	yes
2.1.2	Rehabilitation of existing boreholes:	
	Estimated number (as per desktop survey)	Unspecified
2.1.2.1	Type of drilling method considered suitable for rehab:	
	Rotary air percussion with foam	Yes
	Cable tool (jumper) percussion	yes

1.3 Drilling Conditions

2.2.1 Geology

Unconsolidated sediments (e.g. loose sand, gravel and/or boulders)

Consolidated sediments (e.g. sandstone, mudstone, siltstone, shale, tillite)

Igneous rocks (e.g. granite, diabase, dolerite) Metamorphic rocks (e.g. gneiss, gabbro, norite, marble, schist)

Highly abrasive rocks (e.g. quartzite)

Carbonate rocks (e.g. dolomite, limestone, chert)

2.2.2 Expected rock conditions

Hard

Moderately hard

Soft

Weathered

Fractured

Weathered and fractured

Cavities

2.2.3 Expected drilling conditions

Good to excellent

Fair to poor

Difficult to very difficult

1.4 Standard Specifications for Borehole Drilling

1.4.1 Purpose and Scope

Simply stated, the purpose of this activity is to establish a means to access and tap groundwater resources. This is most often provided by the drilling of a borehole. It is not sufficient for this facility to represent just another hole in the ground. It is vital that the borehole be constructed and completed to certain minimum standards in order to secure the long-term viability and serviceability of the installation. This component of the project is served jointly by the Hydrogeological Consultant and the Drilling Contractor. It is therefore expected of these parties to function as a team within the framework of their individual briefs as set out in their respective contract agreements with the Implementing Authority.

1.4.2 Approach and Responsibility

In general, it is required that the drilling of any borehole be approached with due diligence and care on the part of the appointed drilling contractor(s). Specifically, it is required that the drilling of each borehole be approached in a cost effective manner to establish a water supply.

In some instances boreholes may be drilled for exploration and/or resource monitoring purposes. Under normal circumstances, the pre-drilling of a 165 mm diameter exploration borehole is drilled and the borehole is reamed to larger diameters for construction purposes where find necessary. In leached/cavernous carbonate rock areas drilling normally commences with larger diameters, to limit reaming of boreholes and allow for telescope borehole construction.

The Drilling Contractor(s) will function under the direct supervision of the Hydrogeological Consultant. This by no means implies that the Drilling Contractor(s) is absolved from any responsibility. All drilling activities will, therefore, be approached through communication and discussion between the Hydrogeological Consultant and the contractor(s) with a view to developing the most suitable and mutually acceptable finished product serving the best interests of the project. The fact that the Drilling Contractor is also appointed for the skills which he can offer the project and is often able to provide, from experience, practical approaches and solutions to specific problems must be recognised and accepted by the Hydrogeological Consultant.

Failure by the contractor(s) to timeously render advice and input where required will be regarded as a dereliction of duty. This responsibility extends to informing the Hydrogeological Consultant of serious reservations regarding any aspect of the work. The contractor(s) will also be required to maintain the aesthetic appearance of the site during drilling operations, including keeping the site neat, tidy and free of litter. More importantly, the contractor must ensure that safety standards are met and that the work site is kept free, as far as is possible, from vehicular and pedestrian traffic and from interested bystanders and onlookers not involved with the project.

In essence, the final responsibility for the finished water supply borehole and all actions and activities leading up thereto must be carried jointly by the Hydrogeological Consultant of the Executive Agency and the appointed Drilling Contractor(s).

1.4.3 Techniques

The most common method employed for the sinking of a water supply borehole is that of rotary air percussion drilling employing a down-the-hole (DTH) hammer. This drilling technique is ideally suited to hard rock formations and therefore finds wide application in most of the geological environments encountered in South Africa.

Other techniques which will be applied depending on site-specific circumstances include: (1) Odex drilling (2) cable tool percussion drilling and (3) Mud flush drilling. Method (1) represent technically more sophisticated techniques, which find specific application in loose and unconsolidated materials. Method (2) employs the familiar jumper rig, its most useful application being the cleaning and rehabilitation of existing boreholes. Method (3) is specific to primary unconsolidated type aquifers.

In light of the above, the preferred drilling technique to be employed on community water supply projects is that of rotary air percussion unless otherwise required as per the site specific conditions.

1.4.4 Equipment and Materials

The equipment made available by the Drilling Contractor must be in good working order. It must also be maintained in good condition for the duration of the project. In order to achieve this, time should be set aside each week for the routine service and preventative maintenance of all equipment. The drilling equipment must include a full air/foam pumping system. At the start of the project, the gauge diameter of the button drill bits to be employed with the rotary air percussion drilling technique must conform closely to their manufactured gauge and must also possess all of their tungsten carbide buttons.

The Hydrogeological Consultant will discuss with the Drilling Contractor the retirement of a bit due to excessive wear or damage incurred during the course of the project. Further, it is imperative that the equipment be of a suitable size and capacity to deal, on occasion, with: (1) deep boreholes (up to 300 m), (2) larger than average borehole diameters (up to 305 mm), (3) large quantities of groundwater and (4) potentially onerous drilling conditions. Since this capability is provided in large measure by the air compressor, it is considered that a compressor having a capacity of at least 2400 kPa (24 bar) and a volume of at least 750 cfm is appropriate for most water borehole drilling applications and conditions using the rotary air percussion technique. In order to maintain the straightness of a borehole, the Hydrogeological Consultant may insist that the Drilling Contractor employ at least an overshot sleeve (drill collar) fitted to the pneumatic DTH hammer.

Further precautions to ensure this aspect might include the use of a stabiliser rod immediately behind the bit/hammer/overshot combination. All materials to be used on the project should be new and meet project specifications. This applies particularly to steel casing, which shall be: (1) of the seam-welded type, (2) round, (3) straight, (4) of uniform wall thickness and (5) have bevelled edges. Second-hand material such as steel casing recovered from an earlier borehole can be used provided that it has been refurbished to an acceptable condition (refer to subsection 5.6f). The Hydrogeological Consultant will have the right to reject, with motivation, any material (including casing) which is deemed inappropriate, substandard or otherwise unsuitable for the project.

1.4.5 Workmanship and Performance

The standard of workmanship of the Drilling Contractor will be subject to close scrutiny by the Hydrogeological Consultant. Many aspects thereof are of a subjective nature and not readily quantifiable. Every attempt must, therefore, be made to render this beyond possible criticism.

Judgment of the performance of the Drilling Contractor in the execution of assigned work is similarly of a subjective nature. Although it cannot be expected of the contractor to complete a specified number of boreholes in a given time period, it is reasonable to expect that "favourable progress" be made under normal circumstances and drilling conditions. An indication of what might be regarded as "favourable progress" is considered to fall in the range of 50 to 100 m of drilling advancement per day taking into consideration inter-hole moves and set-up time. Performance being related to efficiency and efficiency in turn being a function of, amongst other factors, the number of mechanical equipment breakdowns suffered by the contractor, it will be in the best interests of the contractor to set aside time for the routine preventative maintenance of equipment. If the contractor is inclined to work a 6 or 7-day week, it is preferred that maintenance activities be scheduled for the weekends. Such schedule must be communicated to the Hydrogeological Consultant. This party may insist that the Drilling Contractor does not start with the drilling of a borehole over a weekend. Although work-in-progress may be completed, the contractor shall under no circumstances vacate a site before the Hydrogeological Consultant has inspected the completed works and sanctioned the move to the next borehole.

1.4.6 Borehole Construction

The extremely diverse nature of subsurface conditions, sometimes over very short distances, renders it virtually impossible to address this aspect in great or specific detail. This factor also rules out standardisation in this regard. It is possible, however, to address certain basic borehole construction practices which will contribute to final acceptance of the successfully finished product.

1.4.6.1 Drilling Diameter

Drilling diameters will be 152 mm (6"), 165 mm (6,5"), 203 mm (8"), 254 mm (10") and 305 mm (12") for rotary air percussion drilling. Odex drilling diameters will be 194 mm, 219 mm or 273 mm OD. Any variations must be acceptable to the Engineer.

The minimum final cased diameter of a successful community water supply borehole shall not be less than 152 mm ID nominal.

The contractor will be remunerated for drilling per linear metre of depth at the rate bidded for each relevant drilling diameter employed as set out in the Schedule of Rates.

1.4.6.2 Steel Casing

Note: All steel casing supplied must conforms to SABS 719 and SABS 62.

Steel casing may either be used in a temporary manner or form a permanent part of the borehole infrastructure. Its temporary use is indicated in instances where, for example, the borehole is unsuccessful or the need for it to remain in place becomes redundant. Under these circumstances it is also referred to as a pre-collar, surface casing, starter casing, outer casing or soil casing generally to be removed (recovered) on completion of drilling. The removal of temporary/starter casing to a depth of 5 m will not be a payable item under recovery of steel casing. It will be left in place where the Hydrogeological Consultant is of the opinion that the unsuccessful borehole should be secured to serve a long-term groundwater monitoring purpose. In such instances, additional provision must be made to protect the borehole against actions, which may compromise this function.

More commonly, however, this casing constitutes the final casing with which a successful borehole is equipped/constructed. Its proper installation, therefore, is mandatory. It is installed from surface through unstable, unconsolidated or fractured materials usually occurring in the near surface. Under these circumstances, the function of steel casing includes one or more of: (1) supporting unstable materials against collapse into the borehole during drilling, (2) facilitating the installation or removal of other casing, (3) minimizing the erosion and widening of the unstable upper portions of the borehole sidewall caused by the return flow established during drilling and/or the passage of drilling equipment/tools and (4) facilitating the placement of a sanitary seal and/or gravel pack or formation stabilizer. The casing must conform to the required specifications.

In order to ensure as far as is possible that the annular space between this casing and the borehole sidewall remains open for the later emplacement of a sanitary seal, the circumferential entrance to this space must be temporarily plugged. Hessian sacking packed around and lightly tamped into the surface entrance to this annular space can be used for this purpose. In instances where steel casing needs to be driven through unstable horizons (generally at greater depths in a borehole), it will also be required that such casing be fitted with a casing shoe to protect the "mouth" of the casing from damage (subsection 5-6.c). Irrespective of the casing used to facilitate the drilling of the borehole, the final cased diameter of the finished product must be sufficient for the borehole to easily accept a borehole pump. Since the outside diameter of the latter is generally in the order of 1 00 mm, it is required that the final cased diameter of the borehole be not less than 152 mm (6 in.) nominal where steel casing is used.

The Drilling Contractor will be remunerated for steel casing per linear metre thereof supplied, delivered and installed at the rate bidded for each relevant casing diameter as set out in the Schedule of Rates.

1.4.6.3 Casing Shoe

This item is fitted (welded) to the bottom end (foot) of a casing string in order to protect the "mouth" of the casing from damage due to forcing the casing through unstable horizons. Its use is therefore only warranted (indeed mandatory) in instances where such conditions reveal themselves to require securement through the emplacement of casing.

The Drilling Contractor will be remunerated for each casing shoe supplied and used at the rate bidded for each relevant shoe diameter as set out in the Schedule of Rates.

1.4.6.4 uPVC Casing

Also referred to as thermoplastic casing, the material generally comprises PVC (polyvinyl chloride) which, when treated to withstand ultraviolet radiation, is known as uPVC casing. Its application in the construction of community water supply boreholes is rather specific, being used mainly in instances where security against the collapse of a borehole sidewall is required and where steel casing does not already offer such security. In such instances, the casing is inserted the entire length of the borehole and will certainly be perforated for some portion of its length.

The diameter of this casing will also necessarily be smaller than that of the steel casing used which, in most instances, will have a nominal diameter of 165 mm. In order not to compromise too severely on the minimum nominal diameter requirement of 152 mm for successfully completed community water supply boreholes (subsection 5-6.b), the inside diameter of the uPVC casing shall not be less than 127 mm with a wall thickness of 6 mm. It is also common practice to leave the steel casing in place in order to provide protection for the uPVC casing. The decision to use uPVC casing in the final construction of a borehole shall be made by the Hydrogeological Consultant.

The Drilling Contractor will be remunerated for uPVC casing per linear metre thereof supplied and installed at the rate bidded for each relevant casing diameter as set out in the Schedule of Rates.

1.4.6.5 Perforated Casing

Also referred to as slotted casing, this is used in instances where a casing string inserted into a borehole will extend across a water-bearing horizon. The perforations or slots will allow the groundwater to enter the borehole. Perforations can be made in a number of ways ranging from prefabricated machine- or plasma-cut slots to hacksaw, angle grinder or oxyacetylene torch-cut slots made in the field. The latter type of slots are seldom satisfactory since it is difficult to produce perforations which are: (1) of uniform size, (2) clean, open and free of restrictions and (3) small enough to control the ingress of finer material into the borehole. It is therefore preferred that perforated casing used in the construction of community water supply boreholes be of a prefabricated type. As a general guideline, slots should be: (1) 300 mm in length, (2) 3 to 4 mm wide, (3) positioned in bands around the circumference of the casing, (4) spaced equally in each band, (5) each circumferential band of slots separated by 100 mm of plain pipe, (6) every second band of slots aligned with one another, and (7) a 300 mm section of plain pipe left at both ends of the casing. This slot pattern is illustrated in Drawing 4 (Section 6). Bearing in mind that the number of slots forming each circumferential band depends not only on the casing diameter but also impact on the strength of the casing, it is suggested that the guidelines presented in Table 5-1 be adhered to in this regard.

Table 0-1: Recommended number of slots per circumferential band for various steel casing diameters and associated percentage open area provided

NORMAL CASING DIAMETER	NUMBER OF SLOTS PER CIRCUMFERENTIAL BAND	PERCENTAGE OPEN AREA
152mm	6	3,0%
165 mm	8	3,7%
203 mm	10	3,7%

Also presented in this table is the approximate open area provided by the above slot pattern applied to each of the given casing diameters. In certain instances, however, it may be required to use more sophisticated and expensive slotted casing. Also known as screens, these include: (1) continuously wound wedge wire screens, (2) louvered screens or bridge-slotted screens and (3) screens pre-coated with gravel. The decision to use such screens shall again be made by the Hydrogeological Consultant after providing motivation to and gaining acceptance from the Implementing Authority.

The Drilling Contractor will be remunerated for perforated casing per linear metre thereof supplied and installed at the rate bidded for each relevant casing diameter as set out in the Schedule of Rates.

1.4.6.6 Recovery of Steel Casing

The contractor shall make every effort to recover, only on instruction of the Hydrogeological Consultant, steel casing from unsuccessful or abandoned boreholes. This casing can also be refurbished to an acceptable condition for re-use.

The Drilling Contractor will be remunerated for the recovery of steel casing per linear metre thereof salvaged from a borehole as per the rate bidded in the Schedule of Rates. The removal of temporary/ starter casing to a depth of 5 m will not be a payable item to the contractors.

Payment for the proper refurbishment of such casing shall be made on a time basis against bidded standing time rates subject to verification and certification of the amount/duration of this work by the Hydrogeological Consultant.

1.4.6.7 Borehole Straightness

The straightness (alignment) of a borehole is defined by the degree to which it deviates along its length from an imaginary centre line drawn through the borehole. This is readily determined by passing a "dummy" or "dolly" through the borehole. The equipment comprises a rigid hollow steel pipe having an outside diameter which is smaller by not more than 20 mm than the inside diameter of the final casing. Caution should be exercised when conducting a straightness test in an uncased or partially cased borehole since irregularities in the borehole sidewall may cause the "dummy" to become jammed. Since the casing string is normally constructed from six-metre lengths, it is required that the "dummy" itself have a length of at least six metres in order to adequately "straddle" casing joints. This equipment must form part of the standard equipment supplied by the Drilling Contractor. It must also be readily available since the Hydrogeological Consultant may request a straightness test at any stage during drilling. The "dummy", suspended from a flexible steel rope (normally the hoist line with which most drilling rigs are equipped), is slowly lowered down the borehole.

The borehole will be considered straight if the "dummy" passes down the entire length of the borehole and can be withdrawn without it binding or becoming stuck in the borehole. The straightness test must be performed by the Drilling Contractor in the presence of the Hydrogeological Consultant and its success (or failure) recorded by this party.

A borehole which fails a straightness test will be deemed lost (subsection 5-6.1) and it will be required of the Drilling Contractor to drill a replacement borehole at own expense. In the event that a straightness test is made before completion of the borehole, then the contractor will be required to cease operations and facilitate access to the borehole for the duration of such activity.

The contractor will recover the cost of production loss (incurred for the duration that drilling activities are interrupted) against the rate bidded for standing time in the Schedule of Rates. It will be the responsibility of the Hydrogeological Consultant to verify and certify any claim by the Drilling Contractor in this regard.

1.4.6.8 Borehole Verticality

This represents the plumb ness of the borehole as measured by the deviation of the centre of the borehole from the vertical at any depth within the bore. The deviation must not exceed two thirds of the borehole diameter (casing inside diameter) per 30 m of depth. Although the SABS 045-1974 standard code of practice for testing water boreholes (including for verticality) has been withdrawn, the nature and form of the apparatus to be used for this purpose remains valid. Drawing 5 in Section 6 of this document illustrates the equipment.

The equipment comprises a tripod (shear legs), a plumb-bob and a flexible wire line. The plumb-bob must be fitted with a centre-mounted spindle at one end and a centralising device on its circumference. The tripod is erected over the borehole such that its apex is above the centre of the borehole. The wire line is passed through a small pulley mounted at the apex. The plumb-bob, suspended from the wire line, must hang vertically from the pulley such that the wire line passes exactly through the centre of the borehole when the plumb-bob is centrally positioned within the mouth of the casing (tolerance 3 mm). The vertical distance from the pulley to the top of the casing must be measured accurately (tolerance 0,01 m). This distance must not be less than 2,4 m. The plumb-bob is then lowered in equal increments (generally 3 m) down the borehole. The deviation of the wire line measured in millimetres from the centre of the casing must be determined at each depth increment and the measurements recorded on a data sheet. This procedure must be continued for the entire length of the borehole. The measured deviation of the wire line from the centre of the mouth of the casing at each depth increment indicates the drift (Ø) of the plumb-bob. The measured deviation is used together with a deflection factor (Df) to calculate the actual deflection (Da) of the borehole from the vertical at each depth increment according to the equation:

$$Da = Ø\ (d + h)/h$$

where Ø = the measured drift (in millimetres) of the wire line at a given plumb-bob depth,

d = depth of plumb-bob below casing collar (in metres) for each drift (Ø) measurement,

h = vertical distance between the casing collar and the pulley (at the tripod apex) over which the wire line passes (in metres), and

(d + h)/h represents the deflection factor (Df).

The wire line deviation measurement is most accurately performed if a revolving template with a graduated radial slot is mounted directly over the collar of the casing. The slot is graduated in millimetres outwards from the centre of the template. The template is revolved until the wire line passing through the slot hangs free and straight in the slot and its deviation from the centre read off on the graduated slot.

The verticality test must be performed by the Hydrogeological Consultant in the presence of the Drilling Contractor. The consultant will therefore be required to provide the necessary equipment for conducting a verticality test. A borehole which fails a verticality test will be deemed lost (subsection 5-6.ℓ) and it will be required of the contractor to drill a replacement borehole at own expense. In the event that a verticality test is made before completion of the borehole, then the Drilling Contractor will be required to cease operations and facilitate access to the borehole for the duration of such activity.

The contractor will recover the cost of production loss (incurred for the duration that drilling activities are interrupted) against the rate bidded for standing time in the Schedule of Rates. It will be the responsibility of the Hydrogeological Consultant to verify and certify any claim by the Drilling Contractor in this regard.

1.4.6.9 Backfilling

This entails filling the annular space between the borehole sidewall and the outside of the casing with suitable material. The purpose of annular backfilling includes: (1) the provision of a base on which to found a sanitary seal and (2) the provision of support for the sidewalls of the borehole and the casing. In instances where casing has been seated at a comparatively shallow depth in fresh material below a weathered near-surface horizon, all of the drill cuttings removed from the borehole whilst drilling represents suitable material for this purpose. Annular backfilling with this material is not advisable in instances where this is not the case, such as for example where the casing extends to a substantial depth and comprises slotted/perforated sections or where the water-bearing horizon is shallow and open to the borehole via slotted/perforated casing. In these instances, it will be required to insert a formation stabiliser into the annulus. The backfilling must extend to within approximately 5 m of the ground surface.

The Drilling Contractor will be remunerated for backfilling against the standing time rate (which shall include the supply and insertion of material required therefore) bidded for in the Schedule of Rates.

1.4.6.10 Formation Stabiliser

This comprises material which is placed in the annulus between the borehole sidewall and perforated/slotted sections of casing to stabilise the formation against collapse and ingress into the borehole. The drill cuttings and spoils removed from the borehole is not suitable material for this purpose. The stabiliser must comprise material which is: (1) well sorted, (2) well rounded, (3) low in calcareous content, and (4) graded such that the smallest grain size is larger than the casing perforations/slots. The stabiliser material can either be placed by hand or through a tremie pipe. Excessive bridging of stabiliser material in the annulus can be prevented: (1) through the use of centralisers on the casing or (2) by washing it in with clean water. The formation stabiliser should extend some 10 m above the top of the uppermost perforated/slotted section of casing before the borehole is developed.

The Drilling Contractor will be remunerated for formation stabiliser per 20 litre container supplied and installed at the rate bidded for in the Schedule of Rates.

1.4.6.11 Concrete Collar

The Drilling Contractor will construct a shallow circular concrete collar around each successfully completed borehole. This collar shall have the dimensions set out in Drawing 6 (Section 6) yielding a volume approaching 0,08 m3. The concrete mixture shall consist of water, Portland cement, stone aggregate (10 mm) and river sand. Quantities of these materials sufficient to make 0,1 m3 of concrete with the required strength of some 30 MPa after 28 days are: (1) 20 litre of water, (2) 42 kg (0,8 bag) of Portland cement, (3) 0,07 m3 of stone aggregate, and (4) 0,07 m3 of river sand. A similar collar may need to be constructed, on request off the Hydrogeological Consultant, over unsuccessful or abandoned boreholes.

The contractor will be remunerated for a concrete collar per unit constructed at the rate provided in the Schedule of Rates, which rate shall include for the transport, supply, mixing and placement of all the materials required.

1.4.6.12 Unsuccessful and Abandoned Boreholes

A borehole will be declared unsuccessful at the discretion of the Hydrogeological Consultant. The latter may also, at any time during the course of the work, order the abandonment of a borehole in progress.

In such instances, the Hydrogeological Consultant must instruct the Drilling Contractor on further actions to be taken. These may include either: (1) the salvage of any casing from the borehole and (2) the plugging of the borehole or (3) the securement of the borehole for long-term monitoring purposes, in which case it will be provided with a sanitary seal (subsection 5-6.n), concrete collar (5-6.k), protection (5-6.q) and marking (5-6.r).

Plugging (or finishing) of an unsuccessful or abandoned borehole is aimed at removing any danger or hazard such boreholes may present to the environment, e.g. as a conduit for the inflow or surface water into the groundwater regime or as a danger to traffic (whether human, stock or vehicular) in the immediate vicinity thereof. This is achieved by shovelling the drill cuttings and other suitable natural material back into the unsuccessful borehole. In order to prevent this material from "hanging" in the borehole, it might be required to periodically wash it in with clean water during the infilling process. Once the infill material extends to the ground surface, it must be compacted by tamping it down manually and any subsidence topped up with fresh backfill material. The compacting and topping up activities should be repeated until assurance can be had that all reasonable precaution has been taken to prevent future subsidence. It will also be required to cast a concrete collar over the infilled borehole (subsection 5-6.m).

The Drilling Contractor will be remunerated for an unsuccessful or abandoned borehole on the basis of bidded rates in the Schedule of Rates for such of the following items as are relevant: (1) drilling per linear metre of depth for each relevant drilling diameter employed, (2) steel casing per linear metre thereof recovered excluding starter casing to a depth of 5 metres, (3) backfilling, (4) a sanitary seal, (5) borehole protection, and (6) borehole marking. Payment for any casing left behind in an unsuccessful or abandoned borehole will only be made, on the same basis as described in (2) above, on written certification by the Hydrogeological Consultant that the contractor has made every reasonable recovery attempt in this regard.

1.4.6.13 Lost Boreholes

A borehole will be declared lost by the Hydrogeological Consultant in the event that it can not be completed satisfactorily due to factors such as: (1) the irrecoverable loss of drilling equipment, materials or tools therein, (2) accident to plant or heavy machinery, (3) failure to pass a straightness test, and (4) failure to pass a verticality test. A decision in this regard must be made after consultation with the Drilling Contractor, who will have the considered option to either attempt remediation of the situation to the satisfaction of the Hydrogeological Consultant or, alternatively, declare the situation irretrievable. No payment shall be made for any work done, materials used or time spent by the Drilling Contractor on a lost borehole. The cost of any materials recovered in a damaged state from a lost borehole will be borne by the contractor.

A borehole which is declared lost shall be replaced with a new borehole to be constructed by the Drilling Contractor in the vicinity of the lost borehole and at a position indicated by the Hydrogeological Consultant. Payment for a new borehole constructed under these circumstances shall be made on the same basis as for any other successfully completed borehole. Materials recovered in good condition may, however, be re-used by the contractor.

Dry Boreholes - The Drilling Contractor will be reimbursed for the cost of drilling an additional borehole in the event of the first drilled borehole position being declared a dry borehole. This additional borehole will only be drilled on instruction from the Hydrogeological Consultant. The Drilling Contractor is to make allowance in his rates for any possible standing time when awaiting for this instruction from the Hydrogeological Consultant.

1.4.6.14 Sanitary Seal

The purpose of a sanitary seal is to prevent the ingress of potentially contaminated surface water into the borehole via the annular space between the borehole sidewall and the outside of the casing. It is required, therefore, that every successful community water supply borehole be provided with a sanitary seal. The seal must consist of Portland cement mixed to slurry with bentonite and water, which is free of oil and other organic matter. The bentonite and water should be thoroughly mixed in the ratio of 2 kg bentonite to 25 litre water prior to adding and mixing in 50 kg (one bag) cement. The final grout seal must extend to a depth of at least 5 m below ground surface. The seal is preferably placed at the beginning of the drilling process after a 5 m deep 305 mm hole has been drilled and cased with 254 mm ID steel casing (type 1 sanitary seal) or with a 215 mm ID steel casing (type 2 sanitary seal. After placing the casing and centring the hole, an amount of bentonite, cement and water grout, adequate to fill the entire annulus between the casing and the wall of the borehole, is tremied into the casing. The slurry can be gravity-fed into the annulus through a small diameter tube (tremie pipe) extending to the depth of emplacement. The tremie pipe should be withdrawn slowly as the slurry fills up the annulus.

Care should be taken not to leave voids in the sanitary seal. These may result from: (1) channelling caused by casing which is not centred in the borehole, (2) an improperly mixed slurry which contains lumps and (3) an annular space which is too small to assure a uniform thickness of seal.

The Drilling Contractor will be remunerated for a sanitary seal per linear metre thereof against the rate bidded in the Schedule of Rates. This rate will include for the supply, delivery, mixing and installation of all material for type 1 and type 2 sanitary seals.

1.4.6.15 Borehole Development

This activity entails flushing all loose material from the borehole upon the completion of drilling. This material might comprise one or more of: (1) drill cuttings resting on the bottom, (2) loose material forming insecure portions of the borehole sidewall, (3) clayey material "plastered" to the borehole sidewall during the drilling process, and (4) fine material which has collected behind screened portions of the borehole. The removal of this potentially "clogging" material often leads to an improvement in the yield of the borehole. The most common borehole development technique used simply entails repeatedly running the drill bit up and down in sequential passes across portions of the borehole with the compressed air turned open. The length of each pass will be dictated by the length of the drill rods used by the contractor. The process is normally performed from the bottom up, one drill rod being removed from the drill string upon development of the preceding (lower) section.

The borehole will be deemed sufficiently developed when very little or no material is brought to the surface in the return flow from the borehole as evidenced by collecting a portion of this flow in a bucket placed at the bore head during development. Other methods, which may be employed, for borehole development includes: (1) surge plunging using a surge block and (2) jetting using a purpose-built jetting tool. This activity must be concluded with the collection of a one-litre representative water sample obtained from the return flow during development.

The Drilling Contractor will be remunerated for borehole development on a time basis against the work time rate bidded in the Schedule of Rates. It will be the responsibility of the Hydrogeological Consultant to verify and certify any claim by the contractor in this regard.

1.4.6.16 Borehole Disinfection

Also known as sterilisation, the purpose hereof is to disinfect the borehole and its contents of any bacteria, and particularly coliform bacteria, introduced into the borehole during drilling operations. Sterilisation is most readily accomplished by introducing chlorine (or chlorine-yielding compounds) into the borehole. On completion of development the borehole shall be disinfected with a solution of 0.5 kg of HTH mixed in 250 litres of water.

The Drilling Contractor will be remunerated for borehole disinfection per single application at the cost (which shall include for all materials supplied and used and the time spent) bidded for one such application as set out in the Schedule of Rates.

1.4.6.17 Borehole Protection

This entails sealing the borehole from the introduction of foreign material directly through the casing. It is often achieved by means of a lockable cap fitted to the borehole collar. Experience suggests, however, that a 3 to 4 mm thick steel plate (lid) welded onto the borehole collar ensures better security. Of course, it will later be required of the Testing Contractor to remove this plate in order to gain access to the borehole for testing purposes. In order to provide the Hydrogeological Consultant with ready access to the borehole for water level measuring purposes, it is required that a small hole be drilled in the lid. This hole must be furnished with a tamper-proof plug such as a "dead-end" threaded into a water pipe connector welded on the hole. The final diameter of the hole providing access to the borehole must be sufficient to allow a "normal" diameter probe to pass through it. It is considered that a diameter of at least 10 mm and not more than 20 mm is suitable for this purpose.

The Drilling Contractor will be remunerated for borehole protection per single installation at the cost (which shall include for all materials supplied and used and the time spent) bidded for one such installation as set out in the Schedule of Rates.

1.4.6.18 Borehole Marking (in the field)

For all Community Water Supply and Sanitation projects, the borehole identifying number will be provided by the Directorate Water Regulation and Use, sub-directorate Geohydrology of the regional KwaZulu-Natal DWS, or else by the Implementing Authority. It is the responsibility of the Hydrogeological Consultant to ensure that the correct number is provided to the contractor for this purpose. The consultant will be responsible for securing a batch of numbers and pass these on to the Contractor as is deemed fit and appropriate.

The activity itself represents marking the borehole by: (1) script-welding its assigned and unique identifying number onto the lid of the borehole and (2) planting a concrete block with dimensions of 200 mm x 200 mm x 200 mm in the ground with a pole (see specifications in drawing) bearing the number of the borehole at a distance of five metres to the north of the borehole.

The Drilling Contractor will be remunerated for borehole marking per single application at the cost (which shall include for all materials supplied and used and the time spent) bidded for one such application as set out in the Schedule of Rates.

1.4.6.19 Site Finishing

The activities associated with this task must include the repair of construction scars on the work site resulting from drilling activities, as well as the general clean-up of the site of waste materials, debris and oil spills.

The latter must be suitably disposed of in an environmentally friendly manner. The Drilling Contractor will be remunerated for site finishing per single application at the cost (which shall include for the time spent) bidded for one such application as set out in the Schedule of Rates.

1.4.7 Data Recording and Reporting

It is imperative that a detailed and accurate record of all information arising from the borehole drilling activity be recorded with care and diligence. Much of this information can be collected by the Drilling Contractor. It must be recorded on a driller's log such as is provided in Section 6. This must be kept current and available for inspection at request of the Hydrogeological Consultant. The contractor will include the cost of these activities as a single sum per borehole in the Schedule of Rates. It will be the responsibility of the Hydrogeological Consultant to verify receipt of this information prior to certifying a claim by the Drilling Contractor in this regard. The following items of information represent the minimum number of parameters, which must be monitored and recorded by the contractor.

1.4.7.1 Penetration Rate

This represents the time taken, as measured with a stopwatch, to advance the borehole a specific depth (generally one metre). In broad terms, the harder the rock formation the slower the penetration rate and vice versa. Since the hardness (or softness) of a rock formation is a characteristic which can be associated with specific rock types, an accurate record of penetration rates serves as an additional means of identifying changes in rock type with depth. Although a slow penetration rate may be of hydrogeological significance, it can also be caused by worn equipment or difficult drilling conditions such as are presented by loose, unstable material. The measured penetration rate must, therefore, not include time spent overcoming technical problems or remedying mechanical breakdowns encountered during drilling.

1.4.7.2 Formation Sampling and Description

This entails a brief description of the visual appearance of the rock formation being drilled. It is performed by inspection of the rock chips (also known as drill cuttings) brought to the surface during drilling. A spadeful of chips should be collected at the mouth of the borehole for each metre drilled.

The "samples" should be placed as sequential piles in ordered rows at a cleared and visible location away from the immediate area of activity and traffic around the borehole being drilled. If instructed by the Hydrogeologist a fist full of each sample should be bagged in individual plastic bags labelled with the borehole number and sample depth. These samples should be kept at a pre-arranged location for description at a later stage. The samples should be described by a suitably qualified geotechnician/earth scientist according to the guidelines set out by the South African Institute for Engineering Geologists (SAIEG, 1995). The driller's description must include, as a minimum, a note on the colour of the formation, the relative size of the drill cuttings and, if possible, an identification of the possible rock type.

1.4.7.3 Water Strike Depth

This information relates to the depth at which any water, including seepage, is encountered in a borehole during drilling. It is possible for water to be encountered at more than one depth as drilling advances. The depth(s) at which water is encountered must be determined to an accuracy of one metre and recorded. It is also necessary to record the nature of the formation associated with the water strike(s). This may, for example, be represented by a single fracture of fissure, a system of such features or a noticeably softer or more weathered horizon.

1.4.7.4 Blow Yield

Water which is encountered in a borehole being drilled by the rotary air percussion method is blown out of the borehole during drilling. The amount of water being blown from the borehole provides an indication of the possible yield of the borehole. The blow yield must not be guesstimated, even though a fair visual estimate based on experience can often be provided by the Drilling Contractor. Also, since water may be encountered at more than depth, it is necessary to measure and record the blow yield immediately following each water strike. These measurements should be repeated as drilling continues until constancy is revealed by at least four consecutive measurements each representing a further metre of drilling.

The accurate measurement of the blow yield does not require the use of sophisticated equipment. The most acceptable and preferred means of measurement is provided by the use of a 90° V-notch weir, details of which are provided in Drawing 8, Section 6. The use of a 90° V-notch weir entails channelling all of the water being blown from the borehole through such a weir, which has been placed level in the channel (or ditch) leading the return water flow away from the borehole being drilled. The height of water flowing over the notch is translated into a flow rate or yield as indicated in Table 5-2. It is imperative that the height of water flowing over the weir is not measured within the notch itself but at and from a position in the weir upstream and to the side of the notch and which corresponds exactly in height to the inverted apex of the notch.

Table 0-2: Tabulation of height vs flow rate data for a 90° V-notch weir

HEIGHT (mm)	FLOW RATE (l/s)	FLOW RATE (l/s) FOR				
		HEIGHT + 2 mm	HEIGHT + 4 mm	HEIGHT + 5 mm	HEIGHT + 6 mm	HEIGHT + 8 mm
10	0,01			0,04		
20	0,08			0,15		
30	0,23			0,04		
40	0,47	0,53	0,60		0,67	0,74
50	0,80	0,88	0,97		1,06	1,16
60	1,26	1,36	1,47		1,59	1,71
70	1,84	1,97	2,11		2,25	2,40
80	2,55	2,71	2,88		3,05	3,23
90	3,41	3,60	3,80		4,00	4,21
100	4,42	4,64	4,87		5,10	5,34
110	5,59	5,85	6,11		6,38	6,65
120	6,94	7,22	7,,52		7,83	8,14
130	8,46	8,79	9,12		9,46	9,81
140	10,17	10,53	10,90		11,28	11,67
150	12,07	12,47	12,88		13,30	13,73
160	14,17	14,61	15,07		15,53	16,00
170	16,48	16,96	17,46		17,96	18,48
180	19,00	19,53	20,07		20,62	21,18
190	21,75	22,32	22,91		23,50	24,11
200	24,72	25,34	25,97		26,61	27,26
210	27,92	28,59	29,26		29,95	30,65
220	31,36	32,08	32,80		33,54	34,28
230	35,04	35,81	36,58		37,37	38,17
240	38,97	39,79	40,62		41,45	42,30

Another common but less preferred method in use is the "drum-and-stopwatch" technique. This requires only that all of the water blown from the borehole be channelled to a point where the concentrated flow can be collected in an open-ended drum of known volume (generally 20 litres) and the time taken to fill the container measured with a stopwatch for accuracy. Dividing the full volume of the drum (in litres) by the time taken (in seconds) to fill the drum gives the blow yield in litres per second *(l/s)*. It is cautioned, however, that this method is only effective and reliable for yields of less than approximately 2 l/s.

1.4.7.5 Groundwater Rest Level

This parameter represents the depth, as measured from surface, to the level of standing water in the borehole. This measurement can be made with the use of any liquid level indicating device, the most common of which is an electrical contact meter (dipmeter). The groundwater level measurement must be accurate to the nearest 0,01 metre (one centimetre). The measurement reference point, which may either be the ground level or the collar of the borehole, should be identified against the measured depth value. The latter reference point will generally be represented by the top of the casing with which the borehole has been equipped. In these instances, it will also be necessary to measure the height by which the casing extends above ground level. If the borehole is drilled and completed on the same day, then a groundwater level measurement must be taken immediately before leaving the site.

If drilling and borehole construction extends over two or more days, then such measurements must also be taken before daily drilling activities commence, provided that water, including seepage water, has been encountered in the borehole. A groundwater level measurement must be referenced to the date on which it is made and, if more than one such measurement is made per day, then also the time of each such measurement must be recorded.

1.4.8 Down-the-hole Loss of Equipment

Drilling equipment, materials or tools may be lost down a borehole during drilling operations. Since this can often result in the irretrievable loss of a borehole, substantial efforts are generally employed by the Drilling Contractor to recover such material. This activity is also referred to as fishing. The Hydrogeological Consultant will afford the contractor every opportunity and reasonable time to fish for lost equipment. The Drilling Contractor must, in turn, keep the Hydrogeological Consultant informed of progress and the likelihood of success in this regard. The contractor will have no claim against any other party for any losses incurred in this regard. Further, the fate of a borehole which cannot be continued or completed due to the presence of lost equipment, materials or tools therein will finally be decided by the Hydrogeological Consultant. It may either be declared successful or lost.

1.4.8.1 Borehole declared Successful

Circumstances under which a borehole may be declared successful include: (1) the borehole has encountered significant water or is drilled for resource monitoring purposes, (2) pumping equipment can be installed to an acceptable depth in the borehole and (3) the lost equipment does not pose a threat to the present and future quality of the groundwater. In the event that a borehole is declared successful despite the irrecoverable loss of drilling equipment, materials or tools therein, then the exact nature and position of the equipment lost in the borehole must be recorded and appear in relevant project documentation. The Drilling Contractor will be remunerated for a borehole declared successful under these circumstances on the same basis as for any other successfully completed borehole.

1.4.8.2 Borehole declared Lost

Although the circumstances under which a borehole will be declared lost are varied and diverse, the criteria which should apply include: (1) the borehole has not yet encountered water irrespective of the depth reached, (2) the borehole has not yet encountered water even though the geological and hydrogeological indications are positive, (3) the borehole has encountered water but in too small a quantity to warrant the installation of pumping equipment, yet the geological and hydrogeological indications are positive that more water can be obtained, and (4) the borehole has encountered a significant quantity of water but the lost equipment prevents the installation of pumping equipment to an acceptable depth. In the event that a borehole is declared lost under these circumstances, then the criteria set out in subsection 5-6.1 for further actions, payment, etc, shall apply.

1.4.9 Down-the-hole Borehole Measurements

This activity is more commonly referred to as borehole logging. The measurements are carried out by manually or mechanically lowering tools or instruments of various technical sophistication down a borehole. Borehole logging is useful in instances where:

(1) surface geophysical data need to be calibrated against subsurface information,

(2) geological information for a borehole is absent or suspect,

(3) borehole construction information is absent or suspect, and

(4) information is required for the proper and effective stimulation by various means of borehole yields.

Although down-the-hole borehole measurements may be made at any time during the construction of a borehole, they are generally performed on completion thereof. In the event that such measurements need to be made before completion of the borehole, then the Drilling Contractor will be required to cease operations and facilitate access to the borehole for the duration of such activity. The contractor will be able to recover the cost of production loss (incurred for the duration that drilling activities are interrupted) against the rate specified for standing time in the Schedule of Rates, any claim in this regard to be verified and certified by the Hydrogeological Consultant.

The nature of the information to be gathered dictates the technique(s) to be used and the time required to complete these measurements. Basic information such as the depth of the borehole and the amount of steel casing installed therein is readily and cheaply determined by means of straightforward and uncomplicated instruments. Geophysical and geological information, on the other hand, requires the more costly application of specialized borehole logging instrumentation including the use of video cameras. It is required that the more sophisticated of these investigations: (1) be motivated to and authorised by the Implementing Authority prior to their execution and (2) be applied judiciously at the discretion of the Hydrogeological Consultant.

1.4.9.1 Borehole Construction Information

This includes information such as: (1) the depth and diameter(s) of the borehole, (2) the depth and diameter(s) of casing installed in the borehole and (3) the integrity of the casing. This information can be used to verify/check the documented construction details of a borehole. The depth of a borehole can be determined simply by plumbing with a weighted line. A calliper tool can be used to determine borehole and casing diameters and the length and integrity of the casing string. The length of steel casing can also be determined more simply with a sensor operating on electromagnetic principles.

1.4.9.2 Geological Information

This covers aspects such as identifying: (1) the nature of different rock formations occurring at various depths within a borehole on the basis of their geophysical (geo-electrical) properties and (2) the presence and size of fractures and/or fissures intersected by a borehole. This information can be used to: (1) calibrate surface geophysical data obtained from similar geological environments, (2) determine the optimum depth at which a borehole pump should be installed in a borehole and (3) direct the application of borehole yield stimulation activities such as hydro fracturing.

1.4.9.3 Hydrogeological Information

This includes information such as (1) the porosity of rock formations and (2) the rate of groundwater movement. These measurements generally require the use of more sophisticated and costly instrumentation.

1.4.9.4 Hydrochemical Information

This covers aspects such as the variation of groundwater quality with depth in a borehole. These measurements again require the use of generally more sophisticated instrumentation. Not quite in the same vein as these measurements, yet of probably greater importance, is the representative water sample obtained from a borehole during its development.

The water sample must be submitted to a laboratory as soon as is reasonably possible for chemical analysis of: (1) the electrical conductivity, (2) the nitrate concentration and (3) the fluoride concentration. These results will provide an early indication of whether the groundwater quality is acceptable or not and, if not, whether test pumping is warranted.

1.4.10 Rehabilitation of Existing Boreholes

The scope of this work may vary from the basic cleaning out and redevelopment of an existing borehole to the recovery of casing, the reaming and subsequent reinstallation of casing. As far as it is possible, the nature of the rehabilitation required in each individual instance should be identified prior to undertaking this activity since this will indicate which equipment will most suitably complete the task. This is illustrated in the following examples. The straight-forward cleaning out and redevelopment of an existing borehole can readily be accomplished using a rotary air percussion drilling rig. On the other hand, the recovery of casing and the removal of unnatural material from a borehole are more readily accomplished using a cable tool (jumper) drilling rig.

It is particularly helpful to both the Hydrogeological Consultant and the Drilling Contractor undertaking the rehabilitation to know as much about the original construction (e.g. depth, diameter, length and type of casing, geology, etc.) of the borehole as possible. This is impossible in instances where original records are lost, deficient, vague or poorly documented/archived. It will be required in such cases to obtain as much information as can reasonably be gleaned from an in situ inspection of the borehole. This might include such basic measurements as plumbing the current depth of the borehole and establishing, by means of a casing detector, the length of casing (steel) installed, to carrying out several of the more sophisticated down-the-hole borehole measurements and observations.

The rehabilitation of an existing borehole should preferably be carried out under the supervision of the Hydrogeological Consultant. In any event, the execution of such work will be subject to the same degree of data collection and record keeping as is required of a new borehole.

The Drilling Contractor will be remunerated for this service on the basis of the rates bidded in the Schedule of Rates. It will be expected of the contractor to have assessed the potential technical risks involved with such work and, as a consequence, the contractor shall have no claim against any other party for the loss of equipment, materials or tools incurred in the course of such work.

1.4.11 Final Acceptance

The Hydrogeological Consultant shall accept a successfully finished community water supply or monitoring borehole by certifying the Drilling Contractor's invoice for such borehole as true and correct for payment by the Implementing Authority. At this stage, the Hydrogeological Consultant will have established that all aspects pertaining to the work and the final product meet, at least, those of the various criteria and requirements set out above which have been imposed.

3 TEST PUMPING SCOPE OF WORK

1.5 General

3.1.1	Testing of new boreholes for community water supply, resource and assessment, resource monitoring and management purposes.	yes
	Estimated Number of Boreholes	To confirm
3.1.2	Type of testing method to be applied	
	Calibration testing	Yes
	Stepped discharge testing	Yes
	Constant discharge testing	Yes
	Recovery testing	Yes
	Slug Testing	No
3.1.3	Type of pump considered appropriate	
	Positive displacement	Yes
	Line-shaft turbine	Yes
	Submersible	No
3.1.4	Testing of existing boreholes	
	Estimated total number	TBC (30)
	Estimated number equipped	Unspecified
	Removal of existing equipment required	Yes
	Re-installation of existing equipment required	Yes
3.1.5	Salient Information	
	Smallest borehole inside diameter (mm)	165
	Smallest cased inside diameter (mm)	152
	Estimated maximum pump setting installation depth (m)	120
	Estimated maximum depth to water level (m)	90
	Estimated maximum discharge line length (m)	500

Estimated yield range (l/s)	0.2 to 20
Estimated specialised testing yield range	20 to 40
Estimated maximum duration of constant discharge test (hr)	72
Tests with observation boreholes	yes

1.6 Test Pumping Specification

1.6.1 Application and Status

These Project Specifications describe the Works to be executed by the Contractor under the Contract and set out the requirements for the Works as well as the minimum standards to be achieved by the Contractor.

These Project Specifications are supplementary to the Standard Specifications for Test Pumping of Boreholes (hereinafter referred to as the "Standard Specifications") and set out variations, additions and omissions to the Standard Specifications and as such, shall be construed and interpreted in conjunction with such Standard Specifications.

These Project Specifications set out the variations, additions and omissions which shall be applicable in the Contract to the Standard Specifications and should there be any discrepancy, conflict or inconsistency between any part of the Standard Specifications and any part of these Project Specifications, the provisions of these Project Specifications shall take precedence and prevail in the Contract.

1.6.2 Interpretation

Wherever reference is made within the Standard Specifications and/or these Project Specifications to the "Geohydrological Consultant" and/or the "geohydrologist" and/or the "Consultant", it shall be deemed to mean the "Engineer" as defined in the Conditions of Contract.

Wherever reference (if any) is made within the Standard Specifications and/or these Project Specifications to the "Implementing Agent", the "Department of Water and Sanitation", "DWS" or any party not being the "Employer", the Contractor, the Engineer, the Geohydrological Consultant or the Consultant, it shall be deemed to mean the Employer.

1.6.3 Purpose and Scope

The Contract is for the test pumping of water supply boreholes for Department of Education purposes and all Works associated therewith in accordance with:

(1) the Information Provided to Bidder as per Section 1 of this document,

(2) any further detailed instructions as may be ordered by the Employer or the Hydrogeological Consultant.

The borehole test pumping services are required from the date of award and no specific quantity of work has been identified. The Contract is based on a Schedule of Rates with payment to be made on the basis of measured quantities and the Bidded rates.

The Scope of Work to be actually executed by the Contractor will be as decided by the Engineer in consultation with the Employer, as provided for in the Conditions of Contract. The work to be carried out during the currency of the contract may be given as separate batches (referred to in the Conditions of Contract as "Works Segments"). Each Works Segment to be executed by the Contractor will, from time to time during the currency of the Contract, be detailed in a written instruction by the Consulting Hydrogeologist as provided for in the Conditions of Contract.

1.6.4 Test Pumping Equipment and Materials

The Contractor shall provide all labour, transport, plant, tools, materials and appurtenances, and shall perform all work necessary to satisfactorily complete the Works in accordance with the Standard Specifications.

The Contractor shall furnish all the particulars requested in this document. The capacity shall be sufficient to cope with the work as specified for the project. It shall be kept at all times in full working order and good repair. The Hydrogeological Consultant and or the Client will have the right to inspect the equipment to be used prior to the commencement of the Works. If the Hydrogeological Consultant and / or Employer considers that the plant in use on the site of the Works is in any way inefficient or inadequate in capacity, he shall have the right to instruct the Contractor to put such equipment in order within seven days or, alternatively, to remove such plant and replace it with other plant or equipment which he considers necessary to meet the requirements of the Contract.

In the event of breach by the Contractor of this requirement, the Hydrogeological Consultant reserves the right to recommend to the Client to terminate the Contract in accordance with the Conditions of Contract.

Equipment brought onto the site may not be removed there from without the written permission of the Hydrogeological Consultant. It will be the responsibility of the Contractor to arrive on site with all staff, equipment, materials and chemicals required to complete the work without interruption.

Where existing equipped boreholes are to be tested, the Contractor must provide suitable plant to enable the installed pumping equipment to be removed and reinstalled. This includes the removal and reinstallation of hand pumps, wind pumps and motorised pumps and may also include the recovery of existing pumping equipment that was previously dropped into a borehole.

1.6.5 Data Recording and Reporting

In addition to a site diary stating daily activities, borehole and pump test data as well as installed borehole equipment is to be recorded on the relevant forms included in Section 6 of the Contract Documents.

1.6.6 Measurement and Payment

The Contractor appointed under this contract is considered to be an expert in his field and is expected to organise and carry out the required duties in an expert manner. Problems encountered during test pumping will be overcome entirely within the framework of these Specifications and the Schedule of Rates, and no claims for extra payments will be entertained for problems foreshadowed in the Specification or due to limitations imposed by this Specification.

The measurement of and payment for all materials and work provided by the Contractor in the course of the project will be according to the criteria as set out and are applicable in respect of such as are variously specified in the Standard Specifications and hereunder:

1.6.6.1 Standing Time

This will cover periods when the test pumping rig and crew or, if more than one rig and crew are fielded, when all rigs and crews are idle waiting for decisions by the Consultant where those decisions or whose presence is required before the commencement or continuation of the work. Under no circumstances will standing time be payable for any delays other than those incurred by the Hydrogeological Consultant's decisions.

Except only for abnormal weather conditions as provided for in Sub-Clause 47.(2) of the Conditions of Contract, no standing time will be payable due to inclement weather or prevention of access to a site by the Contractor or Hydrogeological Consultant due to inclement weather. Further, no standing time will be payable to the Contractor in respect of any periods where the Contractor is not engaged in the execution of the Works as a result of the Consultant having failed to issue an instruction to commence with the works of any Works Segment and there being no other Contract Works on which the Contractor is required to carry out work.

1.6.6.2 Inter-hole Moves

Payment for inter-hole moves up to a distance of ten kilometres shall be made at the unit rate Bidded for in the Schedule of Rates. Inter-hole moves in excess of ten kilometres shall be remunerated for the first ten kilometres at the Bidded unit rate and, for each full kilometre thereafter, at the rate per kilometre Bidded in the Schedule of Rates.

1.6.6.3 6-6-3. Removal of Existing Pumping Equipment

This rate shall cover the removal of existing pumping equipment in a borehole to be tested. Payment for removal up to an installed depth of 50 m shall be made at the unit rate Bidded for in the Schedule of Rates. Installed depths in excess of 50 m shall be remunerated for the first 50 m at the Bidded unit rate and, for each full metre thereafter, at the rate per metre Bidded in the Schedule of Rates.

1.6.6.4 Re-installation of Existing Pumping Equipment

This rate shall cover the re-installation of existing pumping equipment in a borehole following test pumping of the borehole. Payment for installation up to a depth of 50 m shall be made at the unit rate Bidded for in the Schedule of Rates. Re-installation depths in excess of 50 m shall be remunerated for the first 50 m at the Bidded unit rate and, for each full metre thereafter, at the rate per metre Bidded in the Schedule of Rates. The existing pumping equipment shall be reinstalled and left in working condition as it was found before removal unless the Contractor is instructed otherwise by the Hydrogeological Consultant.

1.7 Standard Specifications for the Test Pumping of Boreholes

1.7.1 Purpose and Scope

The efficient operation and utilisation of a borehole requires insight into and an awareness of its productivity and that of the groundwater resource from which it draws water. Such insight and awareness is provided by borehole testing.

This activity, which is also known as test pumping, provides a means of identifying potential constraints on the performance of a borehole and on the exploitation of the groundwater resource. The recognition and understanding of these constraints promotes the proper, judicious and optimum exploitation of the groundwater resource. Ignorance and disregard of these constraints can lead, at best, to the uneconomical operation of the borehole and, at worst, to over-exploitation of the resource.

The Test Pumping Contractor (Test pumping Contractor) may be required to test either:

(1) newly drilled boreholes which have not yet been equipped, (2) existing "older" boreholes which may or may not already be equipped with pumping installations, or (3) a mixture of the aforementioned.

Test pumping serves two primary objectives. The first of these is an assessment of the productive capacity (yield potential) of the borehole. The second objective addresses the productivity of the groundwater resource. These objectives are met by various types of borehole tests performed separately and often sequentially. These are identified as:

(1) the calibration test, (2) the stepped discharge test, (3) the constant discharge test and (4) the recovery test. Factors determining which of these tests must be performed include: (1) the potential yield of the borehole and (2) the amount of water which it will be required to supply.

In instances where a slug is introduced, the water level will recede to its original level. The sudden removal of a quantity of water from the borehole will cause the water level to rise to its original level. The rate of recession or rise provides an indication of the yield of the borehole. In qualitative terms the more rapid this is, the higher the potential yield of the borehole.

(a) The Calibration Test

A calibration test requires that water be pumped from the borehole at three or more different rates over short (15 minutes), sequential periods of time. The response of the water level to each known pumping rate is measured and recorded. The calibration test provides a means of assessing the yield potential of borehole according to the magnitude of the water level decline associated with each pumping rate. This information is used to select appropriate pumping rates at which to perform a stepped discharge test or a pumping rate at which to perform a constant discharge test.

(b) The Stepped Discharge Test

Also known as a step drawdown test, it is performed to assess the productivity of a borehole. It also serves to more clearly define the optimum yield at which the borehole can be subjected to constant discharge testing if required.

The test involves pumping the borehole at three or more sequentially higher pumping rates each maintained for an equal length of time, generally not less than 60 minutes and seldom longer than 120 minutes. The magnitude of the water level drawdown in the borehole in response to each of these pumping rates must be measured and recorded in accordance with a prescribed time schedule. The actual pumping rate maintained during each "step" must also be measured and recorded. As a rule, the rate of water level recovery for a period of time immediately following the period of pumping should also be monitored according to the same time schedule as during pumping.

(c) The Constant Discharge Test

A constant discharge test is performed to assess the productivity of the aquifer according to its response to the abstraction of water. This response can be analysed to provide information in regard to the hydraulic properties of the groundwater system and arrive at an optimum yield for the medium to long-term utilisation of the borehole. This test entails pumping the borehole at a single pumping rate, which is kept constant for an extended period of time. The test duration shall not be less than 12 hours and, in some instances, might last up to 72 hours or more. The duration is generally determined by the importance, which is attached to the borehole and groundwater resource not only in terms of its yield potential but also in terms of its intended application.

The pumping rate is set at a yield, which it is considered the borehole and groundwater system will be able to maintain for the entire planned duration of the test and, in the process, utilising better than 70 per cent but not exhausting the available drawdown. It is critical that the pumping rate during the entire duration of the test be kept as constant as possible. The drawdown in water level in the borehole during the course of the test is again measured and recorded according to a prescribed time schedule. In the case of this type of test, it is imperative that water level measurements be made during the recovery period following the end of pumping.

(d) The Recovery Test

This test provides an indication of the ability of a borehole and groundwater system to recover from the stress of abstraction. This ability can again be analysed to provide information with regard to the hydraulic properties of the groundwater system and arrive at an optimum yield for the medium to long-term utilisation of the borehole.

Although referred to as a test, it rather represents a period of monitoring activity following a period of pumping. The rate at which the water level in the tested borehole (or any other borehole affected by the abstraction) recovers towards its starting level (the groundwater rest level before pumping started) is monitored in this period. The duration of this monitoring is generally equal to that of the preceding period of pumping unless the rate of recovery is sufficiently rapid so that the starting water level is reached in a shorter period of time.

1.7.2 General Approach and Methodology

As mentioned in subsection 3.3.1, various factors determine which type of pumping test (or tests) might need to be performed. It is the responsibility of the Hydrogeological Consultant to formulate a test pumping schedule for each successful borehole.

All project-related test pumping activities will also be carried out under the direct supervision of the Hydrogeological Consultant. The execution of a pumping test in accordance with established scientific protocols must be undertaken by a suitably experienced and equipped Test pumping Contractor. It will be the task of the Hydrogeological Consultant to evaluate and analyse the data, draw conclusions with regard to the productivity of the borehole and the aquifer, and make recommendations with regard to a suitable operating schedule for the borehole and the optimum exploitation of the groundwater resource.

Both the practical and analytical aspects of test pumping benefit greatly from prior information regarding the borehole and the aquifer which it taps into. This information is gleaned during the drilling and the construction of the borehole. It includes knowledge of: (1) the amount of water blown out of the borehole during drilling operations, (2) the depth(s) at which water was struck in the borehole, (3) the construction of the borehole in terms of the setting of especially perforated (slotted) casing and (4) the nature of the rock formation at the depth(s) where water was struck. This information should be communicated to the Test pumping Contractor by the Hydrogeological Consultant. If not, the contractor has the right to request and expect to receive this information from the Hydrogeological Consultant prior to the testing of any borehole.

The Test pumping Contractor must keep a full record of the test pumping which was undertaken and provide this on completion of the test. This record must include the following basic information: (1) the depth to water level before the start of testing, (2) the depth at which the test pump was installed, (3) the type, make and model of the test pump used, (4) the pumping rate as measured at regular intervals during the test and (5) the water level in the borehole as measured according to a prescribed time schedule both during and after pumping, (6) the depth to which steel casing was installed in the borehole. The contractor must be sufficiently well equipped to gather this information with acceptable accuracy.

1.7.3 Equipment and Materials

These represent the test unit and all ancillary equipment and materials needed to accurately and efficiently perform borehole testing. Details are provided as follows.

(a) Test Unit

The test unit must comprise a positive displacement (PD) type pump element and a pump head driven by a motor fitted with an accelerator, gearbox and clutch. The unit must be in good working order and capable of maintaining a minimum of 72 hours of continuous operation.

The unit must be capable of delivering water at a rate in excess of the expected maximum yield of the borehole to be tested.

(b) Discharge Piping

This comprises both the pipe (rising main or pump column) which brings the water to surface and the pipe (discharge hose) used to lead the pumped water away from the borehole being tested. The Test pumping Contractor must supply sufficient rising main to set the test pump at a depth of at least 100 m below the surface. It may, however, be required under certain circumstances to set the test pump at a greater depth in the borehole. The pump column must be of uniform diameter throughout. The contractor must also provide discharge piping in the amount of at least 50 m. This must be free of leaks for its entire length. It may again, under certain circumstances, be required to discharge the pumped water at a point further away than 50 m (possibly in excess of 300 m) from the borehole being tested. In such instances, a similar procedure to that discussed above in regard to the rising main must be followed.

(c) Discharge Measuring Equipment/Instrumentation

This must be adequate to accurately measure the pumping rate within the range of yields expected from successful project boreholes. If volumetric methods are used, a stopwatch for measuring time to an accuracy of at least one-tenth of a second is required. The full capacity of each container must be determined accurately. The contractor must also ensure that a container stands level when it is being used for discharge measurements. Guidelines regarding the use of different size containers for volumetric discharge rate measurements in specific yield ranges are given below:

YIELD RANGE	CONTAINER SIZE
Less than 2 ℓ/s	20 ℓ
2 ℓ/s to 5 ℓ/s	50 ℓ
5 ℓ/s to 20 ℓ/s	210 ℓ
20 ℓ/s 30 ℓ/s	500 ℓ

It is recognized that some water leakage will generally occur especially at the borehead during pumping. This is acceptable provided that: (1) such leakage does not interfere with any water level monitoring and (2) the total amount of leakage to the end of the discharge pipeline does not exceed one per cent of the pumping rate as measured at the end of this pipeline.

(d) Water Level Measuring Equipment/Instrumentation

The contractor must provide at least three water level measuring devices which are each capable of providing an accuracy of at least 0,01 m (10 mm) and are of sufficient length to match the pump installation depth. If ungraduated electrical contact meters (dipmeters) are used for this purpose, each such instrument must be equipped with a measuring tape of an acceptable length and approved standard and which is graduated to an accuracy of at least 0,01 m (10 mm). These instruments must be in good working order and number at least one spare for each two on site

The contractor must further provide conduit tubing of sufficient length to match the pump installation depth. The diameter of this tube must be large enough (minimum 15 mm) to allow free movement of the dipmeter probe and cable therein. The tubing must be made of material strong enough to withstand reasonable pressure on its sidewall which might cause a constriction. The tube must be open at its lower end to allow the free entrance of water into the tube. This is facilitated by perforating the bottom section of the conduit tube sidewall. Precautions should also be taken to prevent the dipmeter probe from passing beyond the bottom end of the conduit tube and, as a result of entanglement, not able to be withdrawn.

(e) Other Materials

No pumping test should commence without field data sheets on which to record all data and information relevant to the test pumping activities in an acceptable format. The examples provided in Section 6 of the Contract Documents indicate the format and level of detail which is required of these data sheets. The contractor must also provide backup measuring equipment and instrumentation which is immediately available to replace any similar item which may become damaged or broken during the course of the test such that measurements are no longer accurate or reliable.

1.7.4 Arrival-on-site Actions

The contractor must firstly establish whether the borehole is equipped or not. If so, the contractor will be required to: (1) remove the equipment taking care not to damage either it or the installation, (2) inspect the equipment for defects and (3) note down all particulars regarding the equipment and the installation.

The latter includes but should not be limited to the manufacture and type of pump (and motor if motorised), the depth to which the pump was installed, the power rating of the motor and the diameter, length and quantity of pump column sections. The contractor must next establish whether there are any other boreholes in the vicinity of that to be tested. If so, then the following information must be gathered and recorded for each: (1) the straight-line distance (in metres) between each such borehole and that to be tested, (2) whether the borehole is equipped, open or sealed and, if equipped (3) whether the installation is operational or not. Depending on the degree of access allowed by such a borehole, the contractor must establish whether there is water in the borehole and if so, measure and record: (1) the depth to the groundwater rest level, (2) the height of the borehole collar above ground level and where possible also (3) the depth of the borehole.

The final activities to be carried out prior to the actual installation of the test pump into the borehole to be tested must involve measuring and recording: (1) the diameter of the borehole, (2) the depth of the borehole as determined by means of a weighted line or plumb bob and (3) the depth to the groundwater rest level in the borehole, again referenced to a date.

An example of a field data sheet for recording the above information is presented in Section 6 of the Contract Documents. Payment for this work shall be incorporated into that for data recording.

1.7.5 Test Pump Installation

The conduit tube should be attached and secured to the first section of pump column behind the pump element and the test pump installed to the required depth, attaching and securing the conduit tube to the riser main every 2 to 3 m.

The Test pumping Contractor will be remunerated for the installation of a test pump per linear metre of depth installed at the rate Bidded as set out in the Schedule of Rates. The rate Bidded for this activity shall also apply to the withdrawal of the test pump from the borehole on completion of all testing activities.

1.7.6 Equipment Set-up and pre-test Actions

Where possible, the discharge pipe must be laid out in a downhill direction from the borehole to be tested unless this will take it in the direction of or past another borehole located in the vicinity of that to be tested. In such instances, lay the discharge pipe out in a downhill direction which will take its furthest end as far as possible away from any other borehole in the vicinity.

In field situations where the terrain is extremely flat, the length of the discharge pipe must be extended from 50 m to at least 300 m if any possibility exists that the discharged water may infiltrate to the groundwater resource within the radius of influence of the test.

A final decision in this regard must be made by the Hydrogeological Consultant and communicated to the contractor. The dipmeter should be inserted into the installed conduit tube and run down this tube to the bottom to make sure that it passes freely along the full length of the tube. If the dipmeter used is not graduated to an accuracy of 0,01 m, mark the position on the dipmeter cable where it indicates the depth to the groundwater rest level and attach the end of the graduated tape at this position on the cable ensuring that the zero mark of the graduated tape corresponds exactly to this mark. Slowly lower the dipmeter and graduated tape down the conduit tube, in the process securing the tape to the dipmeter cable every 2 to 3 m. Ensure that there is no slack between each point where the tape is secured to the dipmeter cable. Also make sure that the dipmeter cable and graduated tape combination passes freely along the full length of the conduit tube.

The Test pumping Contractor shall be remunerated for this work per set-up at the rate Bidded for one such activity as set out in the Schedule of Rates.

1.7.7 Final pre-test Measurements

The Contractor shall ensure that all the basic information required on the field data sheet has been collected and recorded as completely as possible. The basic information data entry fields can be used as a checklist for information to be measured/collected and recorded. The Contractor shall not guess at any information which has not been measured.

Payment for this work shall be incorporated into that for data recording and reporting.

1.7.8 Data Recording

(a) Discharge Measurements

The measurement of discharge (yield or pumping rate) must be consistently accurate and reliable. The method of measurement must be appropriate to meet this requirement. Where volumetric calculation methods are applied, time will be measured using a stopwatch and the container volume must be accurately known. The volumetrically measured yields recorded on the field data sheets must be based on the average obtained from a set of three sequential measurements.

(b) Water Level Measurements

The periodicity of water level measurements for each type of test are given in the data recording forms in Section 6 of this document. This information must be filled in as a record of all data collection activities carried out for a pumping test.

The type of water level measurement values required to be recorded on the field data sheet are the actual (or true) drawdown values. These represent measurements which reflect the depth of the water level below the groundwater rest level depth, i.e. which already take into account the groundwater rest level depth below the reference measuring point. It should be noted that the more basic type of measurement which reports the depth of the dynamic water level as a distance below the reference measuring point, ie which combines the depth of the water level below the groundwater rest level depth and the depth of the groundwater rest level below the reference measuring point, gives only an apparent (or false) drawdown value. All water level measurements must be measured to an accuracy of at least 0,01 m (10 mm). The water level data must be plotted on the semi-logarithmic graph paper provided with each set of field data sheets. The plotting of these data must take place as the test proceeds, i.e. each water level measurement must be plotted on the graph as soon as possible after it was measured. The field data sheets and accompanying water level graphs must be shown to any authorised supervisory personnel at request and will be up-to-date at the time of such request.

(c) Other Information

The Test pumping Contractor must also record any extraordinary observations made during the test. These may include: (1) changes in the colour of the discharged water, (2) changes in the turbidity of the discharged water, (3) the presence of air in the discharged water, and (4) rainfall events which occur during a test. Remuneration for all data collection and recording activities by the Contractor in the course of a pumping test shall be incorporated into an hourly rate as set out in the Schedule of Rates.

1.7.9 Groundwater Sampling

Sampling for Macro-element Analysis

A water sample should be collected from the end of the discharge pipeline no sooner than 15 minutes before the scheduled end of a pumping test whether this be of a calibration, stepped discharge or constant discharge nature. This will ensure that a water sample is collected in case testing does not proceed to include either one or both of the latter two types of test. The standard amount of sample normally collected is in a clean, sterilised plastic bottle of capacity 240 millilitre or greater and equipped with a watertight screw-on cap. This is the standard issue sample bottle provided by the DWS. Depending on the analysing laboratory's requirements, however, a sample of up to two litres in volume may have to be collected. The Hydrogeological Consultant will advise on this matter in instances where the contractor is required to collect samples, in which case the consultant will provide ampoules containing preservative chemicals if required. All other materials such as sample bottles, tie-on labels and sample custody are to be provided by the contractor.

(a) Sampling Procedure

Wash hands thoroughly and rinse the sample bottle three times with the water to be sampled, i.e. that being pumped from the borehole. Fill the bottle so that a space of five to ten millimetres is left at the top. Add the preservative as instructed in (b).

(b) Sample Preservation

Gently tap the bottom of an ampoule of preservative on a firm surface so that all the chemical flows to below the constriction. Hold the ampoule firmly upright with thumbs placed either side of the constriction, flex off the neck, turn the ampoule upside down and place it in the bottle together with the broken-off neckpiece. Firmly screw on the cap of the sample bottle after rinsing it well with water from the borehole. Shake the capped sampled bottle well. Caution should be exercised when handling the preservative since this chemical is poisonous.

(c) Sample Custody

Place the sample bottle in a cooler or icebox and keep it stored under chilled conditions. The water sample will be collected by the Hydrogeological Consultant.

1.7.10 Aborted Tests and Breakdowns

The Hydrogeological Consultant may at any stage during the execution of a pumping test request the Test pumping Contractor to abort a test if, in the opinion of the consultant, continuation of the test is not in the interests of the project. Factors which might contribute to such a decision by the Hydrogeological Consultant are: (1) sufficient data having been collected for an adequate scientific evaluation thereof, (2) the execution of the test not meeting project criteria and requirements (such as for constancy of yield, accuracy of yield measurements or accuracy of water level measurements, sufficiency of discharge line length, etc.) or (3) a mechanical breakdown occurring during pumping which causes a test to be interrupted or aborted.

(a) Tests aborted due to sufficiency off data

In such instances, the Test pumping Contractor will be remunerated for the actual duration of testing (including recovery testing) at the hourly rates set out in the Schedule of Rates.

(b) Tests aborted due to incorrect execution

The Test pumping Contractor will be required to remedy the cause(s) for an abort decision by the Hydrogeological Consultant. The test shall be restarted, as if it were the first attempt, after the water level has recovered to within five per cent of the pre-test rest water level or the contractor is instructed thereto by the Hydrogeological Consultant. The Test pumping Contractor shall not be entitled to remuneration for any test which is aborted under these circumstances irrespective of the time elapsed up to receipt of the instruction to abort.

(c) Tests aborted due to breakdowns

The following procedures are recommended when a mechanical breakdown occurs during pumping which causes a test to be interrupted or aborted.

Calibration Test:

Start immediately with the measurement and recording of the water level recovery rate according to the periodicity given in reporting forms. Irrespective of how long after the start of pumping the breakdown occurs or how rapidly the breakdown can be fixed, continue with water level recovery measurements until the water level is within five per cent of the pre-test rest water level or, at the discretion of the Hydrogeological Consultant, may be discontinued. Restart the calibration test as if it is the first attempt. The Test pumping Contractor shall not be entitled to remuneration for a calibration test which is aborted under such circumstances.

Stepped discharge test:

Record the time of the breakdown and start immediately with the measurement and recording of the water level recovery according to the periodicity given in reporting forms. If the breakdown occurs during the first or second steps of the test, continue with water level recovery measurements until the water level is within five per cent of the start rest water level and then restart the stepped discharge test as if it is the first attempt. If the breakdown occurs during the third step of the test, can be fixed and the pump restarted to produce the same yield (as before the breakdown) within five minutes of the breakdown occurring, continue with the test at this yield after measuring and recording the water level immediately before restarting the pump. Only one such breakdown event is allowed.

If a second breakdown occurs, proceed as described for a first step breakdown. If the breakdown occurs during the fourth or later step of the test, can be fixed and the pump restarted to produce the same yield (as before the breakdown) within five minutes of the breakdown occurring, continue with the test and complete it at this yield after measuring and recording the water level immediately before restarting the pump. If a breakdown at this stage cannot be fixed within five minutes, continue with water level recovery measurements as if the test has been fully completed. The Contractor shall not be entitled to remuneration for a stepped discharge test, which is aborted: (1) within the first or second step, or (2) within the third step and cannot be restarted within the time allowed for repair.

Constant discharge test:

Note the time of the breakdown and start immediately with the measurement and recording of the water level recovery according to the periodicity given in reporting forms.

If the breakdown occurs within the first two hours after the start of pumping, continue with water level recovery measurements until the water level is within five per cent of the pre-test (start) rest water level and then restart the test. If the breakdown occurs later than two hours into the test, can be fixed and the pump restarted to produce the

same yield as before the breakdown within the time periods (after the breakdown occurring) given in

Table 0-1, continue with the test at this yield after measuring and recording the water level immediately before restarting the pump.

If the breakdown cannot be fixed and the pump started within one hour of the breakdown occurring, continue with water level recovery measurements until the water level is within five per cent of the pre-test rest water level and then restart the constant discharge test as if it is the first attempt unless the following condition has been met. If the breakdown occurs after approximately 80 per cent of the planned duration of the constant discharge test has been successfully completed, continue with water level recovery measurements as if the test has been fully completed. The allowable elapsed time (in hours) in regard to selected constant discharge test total durations in order for this specification to be acceptable is given in

Table 0-2.

Table 0-1: Period allowed for breakdown repair and continuation of testing

TIME BREAKDOWN AFTER START	PERIOD ALLOWED FOR REPAIR OF TEST
2 hours to 4 hours	6 minutes
4 hours to 6 hours	12 minutes
6 hours to 8 hrs hours	18 minutes
8 hours to 10 hours	24 minutes
10 hours to 12 hours	30 minutes
12 hours to 14 hours	36 minutes
14 hours to 16 hours	42 minutes
16 hours to 18 hours	48 minutes
18 hours to 20 hours	60 minutes
Longer than 20hrs	60 minutes

Table 0-2: Period after which a constant discharge test may be considered completed in the event of a breakdown

CONSTANT DISCHARGE TEST	ALLOWABLE TIME ELAPSED TO BREAKDOWN
24 hours	20 hours (equivalent to 80% of total time
36 hours	30 hours (equivalent to 83% of total time
48 hours	38 hours (equivalent to 79% of total time
72 hours	60 hours (equivalent to 77% of total time

The Test pumping Contractor shall not be entitled to remuneration for a constant discharge test, which is aborted under circumstances, which preclude its restart within the time allowable for repair and continuation. The contractor will, however, be entitled to remuneration for a constant discharge test which is aborted after approximately 80 per cent of the planned duration of the constant discharge test (refer to Table 5-10-1) has been successfully completed, payment being made for the actual duration of the test (including the recovery test) at the hourly rates set out in the Schedule of Rates.

4 APPENDIX 1: LAYOUT SHOWING PROPOSED NEW WATER SERVICES

VIP ABLUTION BLOCKS

TYPE	DESCRIPTION
B(T)	2 SEATER FEMALES 2 SEATER MALES 1 TEACHERS & PARA
B(L)	2 SEATER GIRLS 2 SEATER BOYS 1 TEACHERS & PARA

EXISTING BUILDINGS

BLOCK	BUILDING TYPE
A	EXISTING BOYS ABLUTION BLOCK
B	EXISTING GIRLS ABLUTION BLOCK
C1-C2	EXISTING ABLUTION BLOCKS FOR DEMOLITION
D1-D3	EXISTING ADMIN OFFICE & CLASSROOM BLOCKS
E	EXISTING GAURDHOUSE

KEY

- EXISTING BUILDINGS
- EXISTING ABLUTION TO BE DEMOLISHED
- PROPOSED NEW TOILETS
- PROPOSED WALKWAY 2.2M WIDE
- PROPOSED COVERED WALKWAY 2.2M WIDE
- 50M PARAPLEGIC RADIUS
- 20M BOREHOLE CLEARANCE RADIUS
- APPROX. PERCOLATION TEST PIT POINT

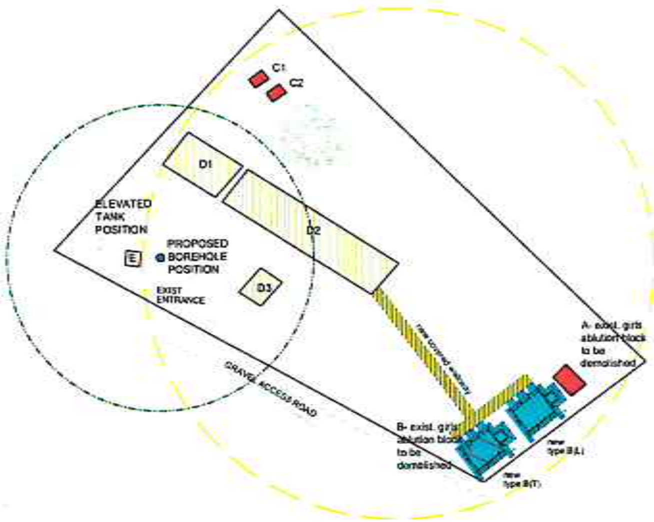
EARTHWORKS

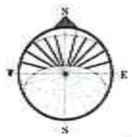
MINOR EARTHWORKS

RETAINING WALLS

NO RETAINING WALLS

PRE-CONSTRUCTION SITE AERIAL PHOTOGRAPH
NOT TO SCALE





SITE PLAN

SCALE 1:500
29°38'40"S 30°42'30"E

1. Please note that the site boundaries do not depict ownership boundaries in the 'notional site plan'. These 'notional' boundaries represent nearest fence lines and the layouts is solely for reference information purposes only.
2. For accurate and true ownership boundaries, cadastral survey diagrams must be obtained.

FOR TENDER

N. FRANCIS

LDM

francisarchitects
architecture + restoration + urban design
think architecture

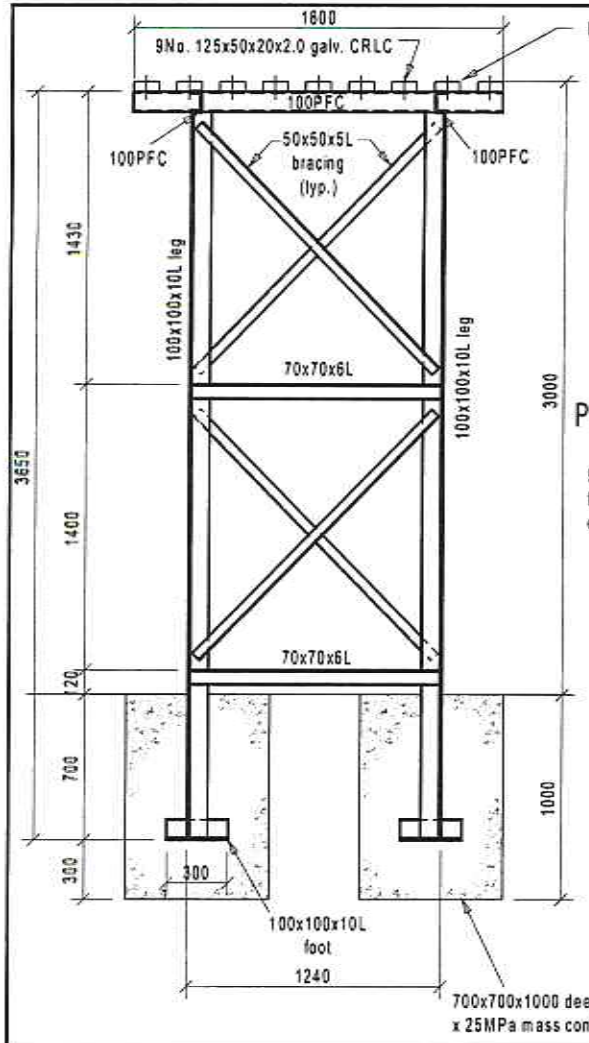
PROVINCE OF KWAZULU-NATAL
DEPARTMENT OF PUBLIC WORKS

DEPARTMENT OF EDUCATION
SANITATION PROGRAMME
eThekwini Metro Municipality (iLembe)
Dumane S. Comprehensive High School
1603 D Section Hlomantethe, Ndwedwe

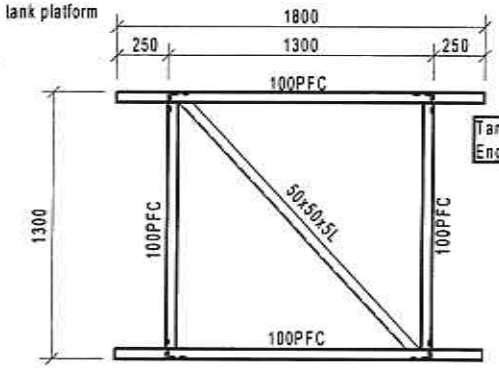
SITE PLAN LAYOUT
TYPE B(T), B(L)

n. mokoena	n. francis		
04-07-23	AS SHOWN		
E62-DumaCHS	1	T	A1	1/2
063834	500334981	1	

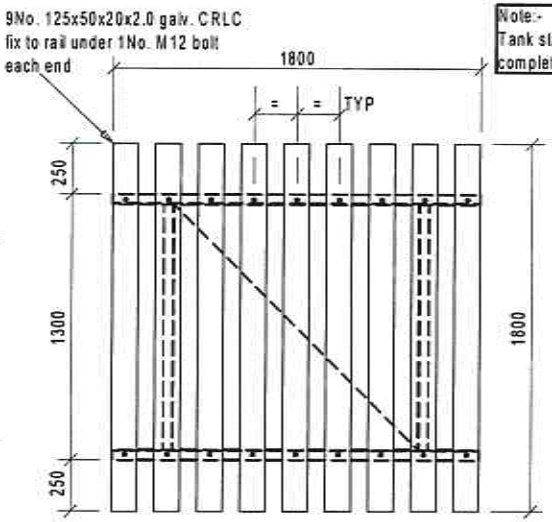
5 APPENDIX 2: TYPICAL ELEVATED TANK STAND DETAIL



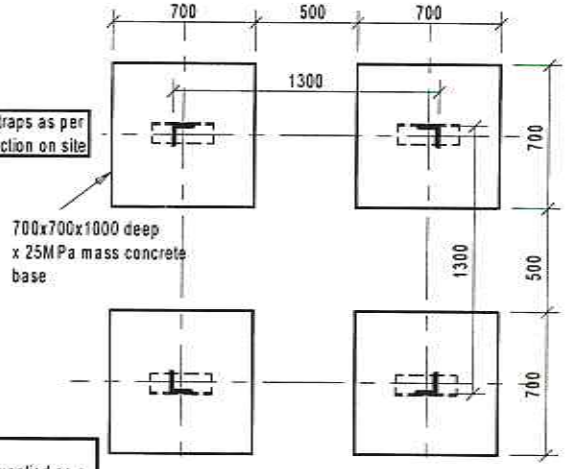
PLAN ON TANK PLATFORM



PLAN ON TANK PLATFORM SUPPORT FRAME



PLAN ON TANK PLATFORM



PLAN ON FOUNDATION

Note:-
Tank stand supplied as a complete welded structure

Structural steel notes:-

1. All work in accordance with sans 1200H.
2. All welds to be min. 6mm continuous fillet welds.
3. All steelwork to be grade S355JR.
4. All purlins to be commercial grade purlins.
5. All bolts to be grade 8.8 bolts.
6. All commercial quality H.D. Bolts and steelwork to have a min. grade stress of 200MPa.
7. All steelwork to be hot dipped galvanised to ISO 1461 or EN 10240 (unless otherwise noted). Galvanising cerilicate for all steelwork is to be submitted to the engineer on completion.
8. 2 sets of fabrication drawings to be provided to engineer for approval before commencing fabrication.
9. Certificates confirming the grade stress of all steelwork and bolts specified is to be submitted to the engineer on completion.
10. The structural steelwork contractor is to verify all setting out dimensions on site prior to fabrication.

professional person registration

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Solutions For The Built Environment
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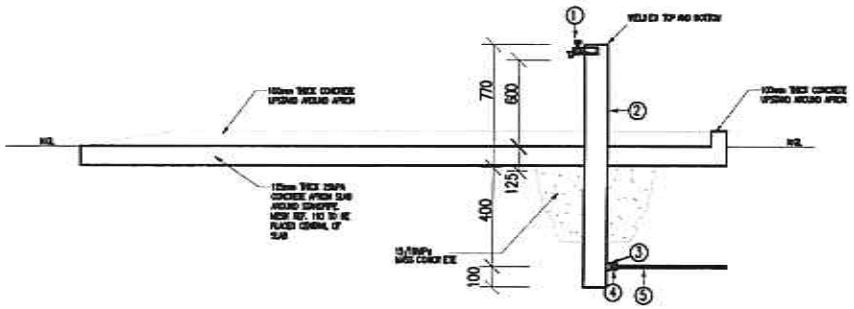
MAP AFRICA
CONSULTING ENGINEERS

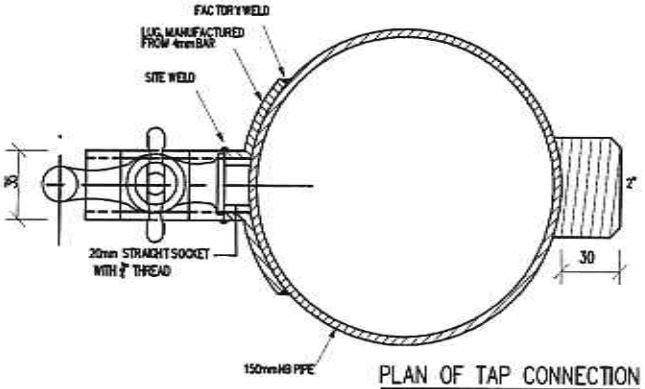
PRELIMINARY

PROJECT WIMS NO. 053895 DEPARTMENT OF EDUCATION SANITATION PROGRAMME	DATE 01/07/2016 REVISION P1
DETAILS TYPICAL ELEVATED WATER TANK SUPPORT STRUCTURAL STEEL LAYOUT & DETAILS	DRG. No. 447 / Sk100

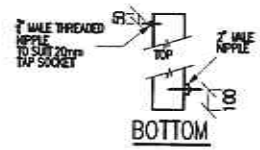
6 APPENDIX 3: TYPICAL STANDPIPE AND APRON DETAIL

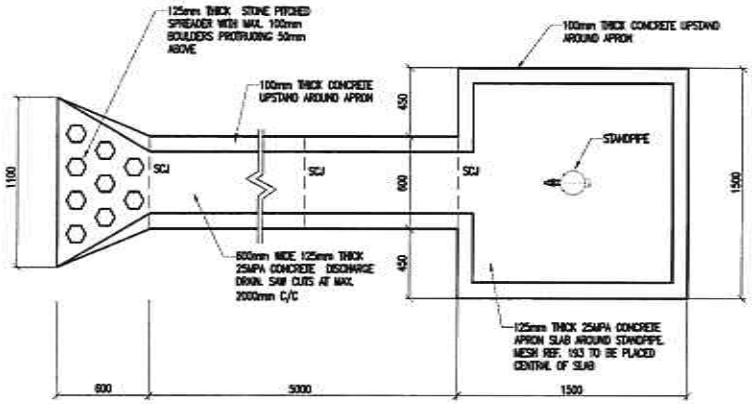


SECTION A–A

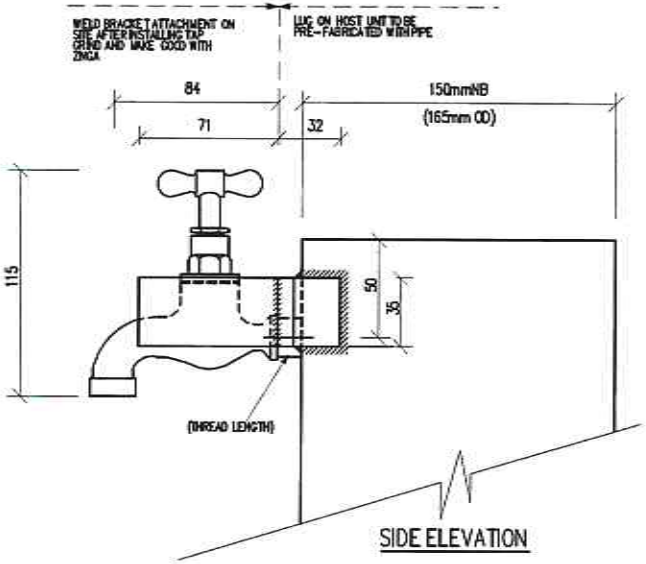


PLAN OF TAP CONNECTION

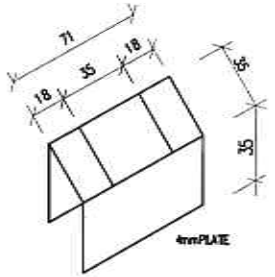




APRON SLAB DETAIL



SIDE ELEVATION



BRACKET ATTACHMENT

FITTINGS SCHEDULE			
ITEM	DESCRIPTION	UNIT	QTY
1	"TAP 105-20 WITH ¾" WAVE UNION	No.	1
2	150mm NB x 4mm GALVANISED MILD STEEL PIPE, 1620mm LONG, WELDED CLOSED TOP AND BOTTOM, WITH ¾" MALE NIPPLE WELDED TO TOP AND 2" MALE NIPPLE WELDED TO BOTTOM	No.	1
3	2" x ¾" REDUCING SOCKET	No.	1
4	¾"x20 MALE ADAPTOR COMPRESSION FITTING	No.	1
5	20mm HDPE PIPE CLASS 10	m	2

PRELIMINARY

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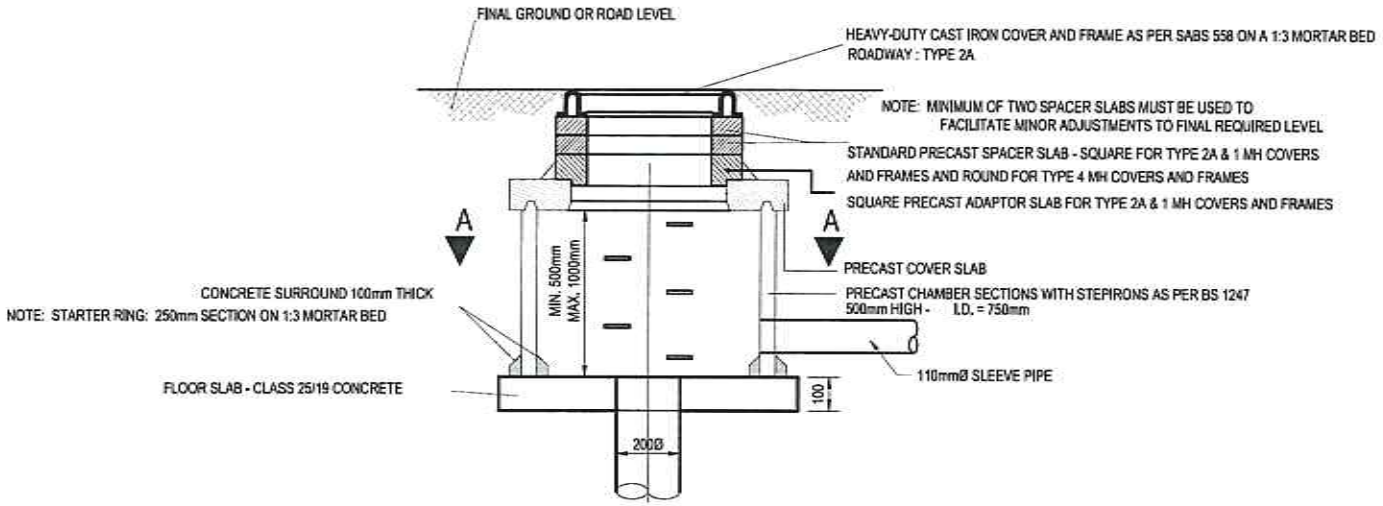
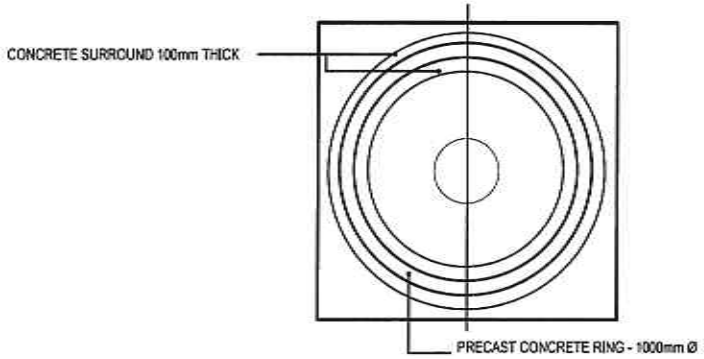
MAP AFRICA
CONSULTING ENGINEERS

PROJECT: WIMS NO. 053895 DEPARTMENT OF EDUCATION WATER AND SANITATION PROGRAMME	DETAILS: TYPICAL STANDPIPE AND APRON DETAIL	DATE 2017.03.03	REVISION P1
		PROJ. No 447	SKETCH No Sk 101

7 APPENDIX 4: TYPICAL BOREHOLE MANHOLE DETAIL



SECTION



SECTION A - A

PRELIMINARY

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CONSULTING ENGINEERS

PROJECT: WIMS NO. 053895 DEPARTMENT OF EDUCATION WATER AND SANITATION PROGRAMME	DETAILS: TYPICAL BOREHOLE MANHOLE DETAIL	DATE 2017.03.03	REVISION P1
		PROJ. No 447	SKETCH No Sk 102

8 APPENDIX 5: STANDARD CONTROL BOX DETAIL

a. Manufacturers approved control box (or equally approved)
b. Control box to be weather proof and lockable
c. Control box kiosk to be mounted on a concrete base allowing for bottom entry cable duct into control box

9 APPENDIX 6: COMPLIANCE REQUIREMENTS

SECTION TWO

DATA CAPTURE AND RECORDING FORMS

Form 1

2 MAP CODE

DW 71

10 ENTRY - BASIC SITE INFORMATION

NATIONAL GROUND WATER DATA BASE

Company

Address

Signature
Name &
Position
Date

Date

Postal Address

Map No

Farm Name

INFORMATION FOR DATA BASE

These forms are designed specifically to have information entered into the Dept of Water Affairs data base. The more information and the speed with which the information is entered into this database will determine it's usefulness. It is imperative for end-users, contractors, local authorities and government to have this information at their finger tips.

The BOREHOLE OWNER will receive a set of 6 forms completed by the responsible person as listed below and copies of these forms MUST be sent by the borehole owner to:

Directorate: Geohydrology
DEPT of WATER AFFAIRS
P B X313
PRETORIA 0001

and or the local regional authority.

ONLY A COMPLETE SET OF 6 FORMS MUST BE SENT. DO NOT SEND ONE FORM AT A TIME

The 6 forms must be completed by the following:

The DRILLER is responsible for forms 1-4 which include:

* BOREHOLE LOGS consisting of 2 parts. These contain: Basic Info - Penetration - Aquifer - Geology
* BOREHOLE CONSTRUCTION CERTIFICATE which contains: Basic Information - Hole Construction - Casing - Water Level

The PUMP INSTALLER is responsible for forms 5 & 6:

* YIELD TEST CERTIFICATE (Pumping test data) which contains: Pumping Test data - Discharge Rate - Water Level
* PUMP INSTALLATION CERTIFICATE which contains: Basic Information - Pumping Equipment Data

4 DISTRICT and FARM NUMBER
Code numerical

For more information contact the BOREHOLE WATER ASSOCIATION
Tel (011) 942-1120 ... BOX ... SOUTHDALE 2135

5 SITE NAME

6 TOPOGRAPHIC SETTING	
Alluvial fan	A
Dunes	D
Flat surface plain	F
In or along river bed	H
Along dam, lake or swamp	L
On mountain or hill	M
In or along pan	P
In or along river	R
Hillside (slope)	S
Valley	V
Terrace	T
Other (Specify)	Z

MAP COORDINATES IN SA

5 X	
5 Y	

OR

COORDINATES IN DEGREES

7 Lat	
8 Long	

9 COORDINATE ACCURACY	
Within 1 metres	0
Within 10 metres	1
Within 100 metres	2
Within 500 metres	3
Within 1000 metres	4

11 ALTITUDE (Above sea level)

12 ALT MEASUREMENT METHOD	
Altimeter	A
Levelled or surveyed	L
Interpolated from map	M
Other (Specify)	Z

13 SITE TYPE	
Borehole	B
Dug well	D
Inclined/horizontal well	I
Well point	W
Other (Specify)	Z

14 SITE SELECTED BY	
Engineering Geologist	EG
Water finder	DIV
Driller	DRL
Dept Water Affairs	DWA
Geologist / Geophysicist	GEO
Geological survey	GSO
Owner	OWN

15 DEPTH DRILLED (m)

16 COMPLETED DEPTH (m)

17 COMPLETION DATE

18 STATUS	
Destroyed	D
In use	U
Unused	E

20 SITE PURPOSE	
Exploration hole	E
Mine drainage	M
Observation	O
Production (water supply)	P
Recharge	R
Standby	S
Waste disposal	W
Other (Specify)	Z

21 WATER USE - CONSUMER	
Private	P
...	C

22 WATER USE - APPLICATION	
Agricultural and domestic	AD
Agricultural - irrigation	AI
Agricultural - stock watering	AS
Domestic - all purposes	DA
Domestic - garden only	DG
Nature conservation	N
Public	P
Industrial - commercial	IC
Industrial - industrial	II
Industrial - mining	IM
Industrial - power generation	IP
Other (Specify)	Z

23 REPORTING INSTITUTE
For office use only

24 EQUIPMENT	
Air lift	A
Centrifugal pump	C
Hand pump	H
Jet	J
Screw type pump	M
No equipment	N
Piston pump	P
Powerhead	Q
Submersible pump	S
Turbine	T
Windpump	W
Windpump and powerhead	X
Other (Specify)	Z

25 POTABILITY	
From chemistry	
Acceptable for all consumption	
For animals only	
Marginal human consumption	
Good for human consumption	
Very good	
Taste	
Fair	
Good	
Nil	

COMMENT

INSTRUCTIONS

1. ALL forms must contain all the information ... [illegible]
2. ... [illegible]
3. ... X & Y ... [illegible]
4. ... CIRCLE the code ... [illegible]
5. ... [illegible]
6. ... [illegible]
7. ALL ... COMPLETED [illegible]

IMPORTANT : BOREHOLE OWNER

Only a complete set of 6 forms must be sent to:

Directorate : GEOHYDROLOGY
Dept Water Affairs
P.B X313 PRETORIA 0001

DO NOT SEND ONE FORM AT A TIME.

Form 2a

2 MAP CODE

DW 71

20 LOGS; 21 PENETRATION RATE; 22 AQUIFER

NATIONAL GROUNDWATER DATA BASE

102 Landowner Name	Street Address
Postal Address	Plot/Erf No. 113 Borehole No.
	Farm Name

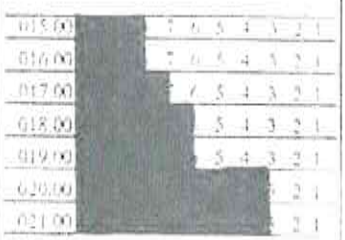
Circle one of the following:	
FOR DEPTH	0 - 50m
OR DEPTH	101 - 150m

MAP CO-ORDINATES IN X&Y	
7 X	
8 Y	

OR

CO-ORDINATES IN DEGREES						
7 Lat						
8 Long						

INSTRUCTIONS
PENETRATION RATE
You will be recording penetration rate in minutes taken to drill a metre. Mark the penetration rate by drawing a vertical line over the appropriate number of minutes taken to drill that metre. The scale above the column heading is in metres drilled per hour. This is for computer use only.
eg:



STRIKE
Mark water strike with S in the block headed 'S'

YIELD
Actual yield should be recorded to litres per second.

METHOD Mark method used to determine yield while drilling	
Current meter	C
Dammited	D
Flume	F
Totalling meter	M
Notch (V- or U-notch)	N
Submerged orifice	S
Volumetric measurement	V
Venturi meter	U
Weir	W
Other(Specify	Z

IMPORTANT:
BOREHOLE OWNER

Only a complete set of 6 forms must be sent to:

Directorate:
GEOHYDROLOGY
Dept Water Affairs
P.B.X313
PRETORIA 0001

DO NOT SEND ONE FORM AT A TIME.

[mm] Diam	Depth	6 6.5 7 7.5 8 8.5 10 12 15 20 30 60 Penetration rate (min/m)	[See tables] Aquifer code	S	[dddd dd] Yield (l/s)	Comment
	1.00	10 9 8 7 6 5 4 3 2 1				
	2.00	10 9 8 7 6 5 4 3 2 1				
	3.00	10 9 8 7 6 5 4 3 2 1				
	4.00	10 9 8 7 6 5 4 3 2 1				
	5.00	10 9 8 7 6 5 4 3 2 1				
	6.00	10 9 8 7 6 5 4 3 2 1				
	7.00	10 9 8 7 6 5 4 3 2 1				
	8.00	10 9 8 7 6 5 4 3 2 1				
	9.00	10 9 8 7 6 5 4 3 2 1				
	10.00	10 9 8 7 6 5 4 3 2 1				
	11.00	10 9 8 7 6 5 4 3 2 1				
	12.00	10 9 8 7 6 5 4 3 2 1				
	13.00	10 9 8 7 6 5 4 3 2 1				
	14.00	10 9 8 7 6 5 4 3 2 1				
	15.00	10 9 8 7 6 5 4 3 2 1				
	16.00	10 9 8 7 6 5 4 3 2 1				
	17.00	10 9 8 7 6 5 4 3 2 1				
	18.00	10 9 8 7 6 5 4 3 2 1				
	19.00	10 9 8 7 6 5 4 3 2 1				
	20.00	10 9 8 7 6 5 4 3 2 1				
	21.00	10 9 8 7 6 5 4 3 2 1				
	22.00	10 9 8 7 6 5 4 3 2 1				
	23.00	10 9 8 7 6 5 4 3 2 1				
	24.00	10 9 8 7 6 5 4 3 2 1				
	25.00	10 9 8 7 6 5 4 3 2 1				
	26.00	10 9 8 7 6 5 4 3 2 1				
	27.00	10 9 8 7 6 5 4 3 2 1				
	28.00	10 9 8 7 6 5 4 3 2 1				
	29.00	10 9 8 7 6 5 4 3 2 1				
	30.00	10 9 8 7 6 5 4 3 2 1				
	31.00	10 9 8 7 6 5 4 3 2 1				
	32.00	10 9 8 7 6 5 4 3 2 1				
	33.00	10 9 8 7 6 5 4 3 2 1				
	34.00	10 9 8 7 6 5 4 3 2 1				
	35.00	10 9 8 7 6 5 4 3 2 1				
	36.00	10 9 8 7 6 5 4 3 2 1				
	37.00	10 9 8 7 6 5 4 3 2 1				
	38.00	10 9 8 7 6 5 4 3 2 1				
	39.00	10 9 8 7 6 5 4 3 2 1				
	40.00	10 9 8 7 6 5 4 3 2 1				
	41.00	10 9 8 7 6 5 4 3 2 1				
	42.00	10 9 8 7 6 5 4 3 2 1				
	43.00	10 9 8 7 6 5 4 3 2 1				
	44.00	10 9 8 7 6 5 4 3 2 1				
	45.00	10 9 8 7 6 5 4 3 2 1				
	46.00	10 9 8 7 6 5 4 3 2 1				
	47.00	10 9 8 7 6 5 4 3 2 1				
	48.00	10 9 8 7 6 5 4 3 2 1				
	49.00	10 9 8 7 6 5 4 3 2 1				
	50.00	10 9 8 7 6 5 4 3 2 1				

6 6.5 7 7.5 8 8.5 10 12 15 20 30 60
Penetration rate (min/m)

Form 2b

2 MAP CODE

DW 71

20 LOGS; 21 PENETRATION RATE; 22 AQUIFER

NATIONAL GROUND WATER DATA BASE

1. Samples must be laid out after every metre drilled in order to complete the Geology Information Sheet.
2. On reaching final drilling depth, rule off penetration table column and record the final blow yield in appropriate column.
3. This information will be required to complete your Casing and Hole Construction Data Sheet.
4. Use the notes section at the bottom to record casing details, development and work time.

Circle one of the following:	
FOR DEPTH	51 - 100m
OR DEPTH	151 - 200m

ON COMPLETION OF DRILLING COMPLETE THE FOLLOWING SUMMARY:
TOTAL DEPTH OF HOLE
NOMINAL DIAMETER
STATIC WATER LEVEL
FINAL BLOW YIELD

NOTES

[mm] Diam	Depth	6 6.5 7.5 8.5 10 12 15 20 30 60 Penetration rate (min/m)	[See tables] Aquifer code	S	[dddddd] Yield (l/s)	Comments
	51.00	10 9 8 7 6 5 4 3 2 1				
	52.00					
	53.00					
	54.00					
	55.00					
	56.00					
	57.00					
	58.00					
	59.00					
	60.00					
	61.00					
	62.00					
	63.00					
	64.00					
	65.00					
	66.00					
	67.00					
	68.00					
	69.00					
	70.00					
	71.00					
	72.00					
	73.00					
	74.00					
	75.00					
	76.00					
	77.00					
	78.00					
	79.00					
	80.00					
	81.00					
	82.00					
	83.00					
	84.00					
	85.00					
	86.00					
	87.00					
	88.00					
	89.00					
	90.00					
	91.00					
	92.00					
	93.00					
	94.00					
	95.00					
	96.00					
	97.00					
	98.00					
	99.00					
	100.00					

6 6.5 7.5 8.5 10 12 15 20 30 60
Penetration rate (min/m)

Company

Address Code

Signature

Name & Position (print)

Form 3a

2 MAP CODE

DW 71

23 UNCONSOLIDATED, 24 CONSOLIDATED

NATIONAL GROUND WATER DATA BASE

112 Customer Name	Street Address
Postal Address	Plot/Erf No. 113 Borehole No.
	Farm Name

Fill in for ALL Boreholes				CONS ONLY	UNCONSOLIDATED FORMATIONS ONLY				
Depth	1 Lithology code	Colour 2P	3S	4Texture	Feature 5	6 Feature P	S	7A	8S	9R
1.00										
2.00										
3.00										
4.00										
5.00										
6.00										
7.00										
8.00										
9.00										
10.00										
11.00										
12.00										
13.00										
14.00										
15.00										
16.00										
17.00										
18.00										
19.00										
20.00										
21.00										
22.00										
23.00										
24.00										
25.00										
26.00										
27.00										
28.00										
29.00										
30.00										
31.00										
32.00										
33.00										
34.00										
35.00										
36.00										
37.00										
38.00										
39.00										
40.00										
41.00										
42.00										
43.00										
44.00										
45.00										
46.00										
47.00										
48.00										
49.00										
50.00										

Circle one of the following

FOR DEPTH	1 - 50m
OR DEPTH	101 - 150m

1 LITHOLOGY CODE

Overburden	OBDN
Clay	CLAY
Clay and sand	CLSD
Coal	COAL
Boulders	BLDR
Boulderclay	BLCL
Alluvium	ALVM
Chert	CHRT
Calcrete	CLCR
Conglomerate	CLGM
Diabase	DIBS
Dolerite	DLRT
Dolomite	DLMT
Granite	GRNT
Gravel	GRVL
Lava	LAVA
Quartzite	QRTZ
Sand	SAND
Shale	SHLE
Sandstone	SNDS

2 PRIMARY COLOURS

Black	S
Blue	B
Brown	C
Green	G
Grey	H
Purple	N
Orange	O
Pink	P
Red	R
White	W
Yellow	Y
No information	

3 SECONDARY COLOURS

Bluish	B
Brownish	C
Dark	D
Greenish	G
Greyish	H
Light	I
Purple	M
Orange	O
Pinkish	P
Reddish	R
Olive	V
Yellowish	Y
No information	

4 TEXTURE

Cryptic	CR
Very fine	VF
Fine	FN
Fine/medium	FM
Medium	MD
Medium/Coarse	MC
Coarse	CO
Very coarse	VC

5 FEATURE (Consolidated only)

Cemented	CE
Consolidated	CS
Fractured	FC
Hard	D
Soft	SF
Undressed	UC
Weathered	WT

Form 3b

2 MAP CODE

DW 71

23 UNCONSOLIDATED; 24 CONSOLIDATED

NATIONAL GROUNDWATER DATA BASE

Fill in for ALL Boreholes					CONS ONLY	UNCONSOLIDATED FORMATIONS ONLY				
Depth	1 Lithology code	Colour 2P	3S	4 Texture	Feature 5	6 Feature P	S	7A	8S	9R
51.00										
52.00										
53.00										
54.00										
55.00										
56.00										
57.00										
58.00										
59.00										
60.00										
61.00										
62.00										
63.00										
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68.00										
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72.00										
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89.00										
90.00										
91.00										
92.00										
93.00										
94.00										
95.00										
96.00										
97.00										
98.00										
99.00										
100.00										

Circle one of the following	
FOR DEPTH	51 - 100m
OR DEPTH	151 - 200m

CODES FOR UNCONSOLIDATED ONLY

6 PRIMARY AND SECONDARY FEATURES	
Argillaceous	AG
Arenaceous	AR
Baked	BK
Calcareous	CA
Carbonaceous	CB
Cemented	CE
Chloritic	CL
Consolidated	CS
Clayey	CY
Dark	DK
Fractured	FC
Ferruginous	FE
Fresh	FR
Feldspathic	FS
Glauconitic	GL
Gravel bearing	GV
Hard	HD
Heavy minerals	HM
Jointed	JT
Loose	LS
Light	LT
Micaceous	MC
Mineralised	MN
Massive	MS
Oolitic	OO
Phosphate bearing	PO
Primary	PR
Peaty	PT
Siliceous	SC
Sandy	SD
Soft	SF
Shaly	SH
Stratified	ST
Silty	SL
Seams	SN
Secondary	SR
Unconsolidated	UC
Weathered	WT
No information	

7 FEATURE ATTRIBUTE	
Slightly	-
Very	+
No information	

8 SORTING	
Unsorted	11
Poorly sorted	22
Poorly to mod. sorted	23
Mod. to poorly sorted	32
Moderately sorted	33
Mod. to well sorted	34
Well to mod. sorted	43
Well sorted	44
No information	

9 ROUNDNESS	
Angular	11
Angular to sub-angular	12
Angular to sub-rounded	13
Angular to rounded	14
Sub-angular	22
Sub-angular to sub-rounded	23
Sub-angular to rounded	24
Sub-rounded	33
Sub-rounded to rounded	34
Rounded	44
No information	

Company

Address Code

Signature

Name & Position (Print)

IMPORTANT : BOREHOLE OWNER

Only a complete set of 6 forms must be sent to :

Directorate : GEOHYDROLOGY
Dept Water Affairs
P/B X313 PRETORIA 0001

DO NOT SEND ONE FORM AT A TIME.

Form 4

2 MAP CODE

DW 71

3a CONSTRUCTION; 31 HOLE; 32 CASING; 33 OPENINGS; 34 FILL

NATIONAL GROUND WATER DATA BASE

Company

Address

Signature

Name & Position [print]

112 Contractor Name

Postal Address

Street Address

Project No

113 Borehole No

Farm Name

6 DATA SOURCE	
Driller/Boring Inspector	D
Geologist/technician	G
Other[Specify]	Z

INSTRUCTIONS
1. Begin with largest diameter on first column. The last column used will indicate open hole diameter (ie. no casing installed).

2. Where fill was used section 34 of the appropriate column only must be completed
3. FINAL FIGURE IN LAST COLUMN USED MUST INDICATE FINAL DEPTH OF HOLE

7 METHOD OF CONSTRUCTION	
Air-rotary [Drag bit/tricone]	A
Cable-tool	C
Dug	D
Hydraulic rotary [Mud rotary]	H
Jetted	J
Air-percussion [Down-the-hole-hammer]	P
Reverse rotary	R
Other[Specify]	Z

10 TYPE OF FINISH	
Dug/work	B
Porous concrete	C
Gravel pack with perforations	I
Gravel pack with screen	G
Horizontal gallery	H
Open bottom (partially cased)	O
Perforated or slotted casing	P
Screen	S
Well point	W
Open hole	X
Other[Specify]	Z

11 METHOD OF DEVELOPMENT	
Pumped with air lift	A
Bailed	B
Compressed air	C
Air lifted with inductor	I
Jetted or washed	J
None	N
Pumped	P
Surged	S
Other[Specify]	Z

12 DEVELOPMENT-Duration[hrs]	

13 SPECIAL DEVELOPMENT TREATMENT	
Brushing	B
Chemical (acid, calgon etc)	C
Dynamite	D
Explosives	E
Hydrofracturing	H
Other[Specify]	Z

35 TOTAL COST OF BOREHOLE	

37 COMMENT	

IMPORTANT :
BOREHOLE OWNER

Only a complete set of 6 forms must be Sent to :

Directorate : GEOHYDROLOGY
Dept Water Affairs
P/B X313
PRETORIA 0001

DO NOT SEND ONE FORM AT A TIME.

BEGIN by filling in the LARGEST DIAMETER CASING used in COLUMN 1

31,33 CASING DEPTH	Col 1	Col 2	Col 3	Col 4	Col 5	Col 6
From top [m]						
To bottom [m]						
31,35 CASING INTERNAL DIAMETER						
35 CASING MATERIAL						
Brass	B	B	B	B	B	B
Concrete	C	C	C	C	C	C
Copper	D	D	D	D	D	D
PVC or other plastic	P	P	P	P	P	P
Plastic	O	O	O	O	O	O
Steel	S	S	S	S	S	S
Stainless Steel	X	X	X	X	X	X
Other[Specify]	Z	Z	Z	Z	Z	Z
32 MATERIAL/WALL THICKNESS [mm]						

33 FOR SLOTTED CASING [Additional info - Use only the column/s related to casing depth above]

TYPE OF OPENINGS						
Perforated or slotted with fibre mesh	F	F	F	F	F	F
Mesh screen	M	M	M	M	M	M
Perforated or slotted	P	P	P	P	P	P
Screen	S	S	S	S	S	S
Well point	W	W	W	W	W	W
Open hole	X	X	X	X	X	X
Other[Specify]	Z	Z	Z	Z	Z	Z
33 LENGTH OF OPENINGS mm						
33 WIDTH OF OPENINGS mm						
33 DISTANCE BETWEEN OPENINGS						
Horizontal mm						
Vertical mm						
33 METHOD OF SLOTS MADE						
Sawn	A	A	A	A	A	A
Drilled	D	D	D	D	D	D
Electric cut	E	E	E	E	E	E
Gas cut	G	G	G	G	G	G
Machine cut	M	M	M	M	M	M
Punched	P	P	P	P	P	P
Screen	S	S	S	S	S	S
Well point	W	W	W	W	W	W
Wire wound	X	X	X	X	X	X
Other[Specify]	Z	Z	Z	Z	Z	Z

34 FILL/GRAVEL PACK [Complete this column/s where fill was used with the casing described above]

Depth to top[m]						
Depth to bottom[m]						
34 TYPE OF FILL						
Formation or clay	F	F	F	F	F	F
Cement	C	C	C	C	C	C
Gravel [> 2mm]	G	G	G	G	G	G
Sand [< 2mm]	S	S	S	S	S	S
Soil or subsoil	X	X	X	X	X	X

Form 5a

1 MAP CODE

DW 71

100 PUMPING TEST; 60,61 WATER LEVEL

NATIONAL GROUND WATER DATA BASE

Company

Address/Code

Signature

Name & Position [print]

112 Customer Name

Postal Address

Street Address

Plot/Erf No. 113 Borehole No.

Farm Name

PUMPING TEST DATA SHEET

2? REPORTING INSTITUTION
For office use only

3 TEST STARTED

Date

Time

6 METHOD TESTED		Duration/hrs
Air (blow out) test	A	
Bailer test	B	
Free flow test	F	
Owner test	O	
Controlled pumping test	P	
Controlled recovery test	R	
Slug test	S	

7 DEPTH TO PUMP INTAKE (m)
[Only if P is chosen above]

INSTRUCTIONS : 8, 9 & 10 only to be filled in once CONTROLLED PUMPING TEST is completed
See Discharge Rate Sheet overleaf

8 RECOMMENDED ABSTRACTION (l/s)

9 TRANSMISSIVITY (m^2/day)

10 STORATIVITY

11 COMMENT

IMPORTANT : BOREHOLE OWNER
Only a complete set of 6 forms must be sent to :
Directorate : GEOHYDROLOGY
Dept Water Affairs
P/B X313
PRETORIA 0001
DO NOT SEND ONE FORM AT A TIME.

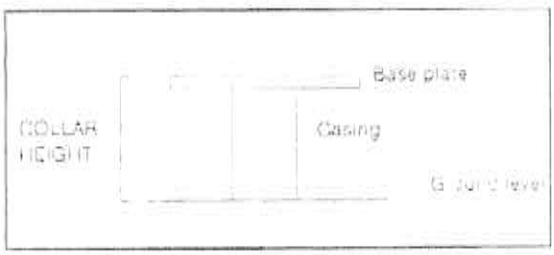
WATER LEVEL DATA SHEET

DO NOT FILL IN IF CONTROLLED PUMPING TEST IS PERFORMED
Use for any other water level measurements taken. Use one column for each measurement

6 MEASUREMT METHOD	1	2	3	4	5	6	7
Airline	A	A	A	A	A	A	A
Electrical contact meter	E	E	E	E	E	E	E
Pressure gauge	P	P	P	P	P	P	P
Recorder	R	R	R	R	R	R	R
Steel tape	S	S	S	S	S	S	S
Reported, unknown	U	U	U	U	U	U	U
Estimate	X	X	X	X	X	X	X

7 WATER LEVEL STATUS							
Water level affected by nearby pumping/drilling	A	A	A	A	A	A	A
Dry	D	D	D	D	D	D	D
Flowing	F	F	F	F	F	F	F
Obstruction, no water level measured	O	O	O	O	O	O	O
Pumping water level	P	P	P	P	P	P	P
Recovering water level	R	R	R	R	R	R	R
Static water level	S	S	S	S	S	S	S

8 COLLAR HEIGHT [m]



9 DATA SOURCE							
Driller	D	D	D	D	D	D	D
Geologist	G	G	G	G	G	G	G
Pump operator	P	P	P	P	P	P	P
Other[Specify]	Z	Z	Z	Z	Z	Z	Z

61 DATE

Month

Day

61 TIME

hrs

mins

61 WATER LEVEL
(m.b.s.l.=below casing top)

61 COMMENT

Form 5b

2 MAP CODE

DW 71

50,51 DISCHARGE RATE

NATIONAL GROUND WATER DATA BASE

Company	
Address/Code	
Signature	
Name & Position [print]	

112 Customer Name	
Postal Address	
Street Address	
Plot/Erf No	113 Borehole No
Farm Name	

5 TYPE OF DISCHARGE		Circle one below		
Pump	P	Blow	Bail	Pump
Flow - Artesian	F			

6 METHOD DISCHARGE MEASURED	
Current meter	C
Estimated	E
Flume	F
Totalling meter	M
Notch (V- or U-notch)	N
Submerged orifice	S
Volumetric measurement	V
Venturi meter	U
Weir	W
Other[Specify]	Z

STATUS Use to complete column below for contractor's reference purpose only	
Step test pump test	S
Recovering water level	R
Constant rate pumping test	C
Other[Specify]	Z

WATER LEVEL MEASUREMENT METHOD	
Airline	A
Electrical contact meter	E
Pressure gauge	P
Recorder	R
Steel tape	S
Reported, unknown	U
Estimate	N

This form must be completed in conjunction with Pumping Test Data Sheet overleaf

Date yyyymmdd	Time ddHdd	Discharge ddd ddl/s	Water level (m below casing top)	Status	Date yyyymmdd	Time ddHdd	Discharge ddd ddl/s	Water Level (m below casing top)	Status	Date yyyymmdd	Time ddHdd	Discharge ddd ddl/s	Water level (m below casing top)	Status

Form 5c

1:50 MAP CODE									

BOREHOLE TEST RECORD SHEET

REQUEST NO	MAP REFERENCE		PROVINCE
BOREHOLE NO	COORDINATES (DD:MM:SS)	Lo	DISTRICT
ALT. BH. NO	LATITUDE	X	FARM NAME
ALT. BH. NO.	LONGITUDE	Y	SITE NAME

BOREHOLE DEPTH (m)	DATUM LEVEL ABOVE CASING (m)	EXISTING PUMP
WATER LEVEL (mbgl)	CASING HEIGHT (magl)	
	BH DIAM. (PUMP INLET) (mm)	CONT

SLUG TEST

TEST STARTED		DURATION (min):
DATE: TIME:		

SLUG IN			COMMENTS	SLUG OUT			COMMENTS
Time (Guide) (sec)	Time (Actual) (sec)	Displacement (mm)		Time (Guide) (sec)	Time (Actual) (sec)	Displacement (mm)	
5				5			
10				10			
15				15			
20				20			
30				30			
40				40			
60				60			
80				80			
100				100			
120				120			
150				150			
300				300			
400				400			
500				500			
600				600			
800				800			
1000				1000			
1200				1200			
1500				1500			
1800				1800			
2500				2500			

COMMENTS: 1)

Form 5d

2.MAP CODE								

BOREHOLE TEST RECORD SHEET

REQ / PROJ. NO.	MAP REFERENCE		PROVINCE
BOREHOLE NO.	COORDINATES (DDMMSS)	Lo	DISTRICT
ALT. BH. NO.	LATITUDE	X	FARM NAME
ALT. BH. NO.	LONGITUDE	Y	SITE NAME

BOREHOLE DEPTH (m)	DATUM LEVEL ABOVE CASING (m)	EXISTING PUMP
WATER LEVEL (mbgl)	CASING HEIGHT (magl)	CONTRACTOR
DEPTH OF PUMP (m)	BH DIAM. (PUMP INLET) (mm)	PUMP TYPE

CALIBRATION TEST AND RECOVERY

DISCHARGE RATE 1					DISCHARGE RATE 2					DISCHARGE RATE 3				
DATE		TIME			DATE		TIME			DATE		TIME		
Time (min)	Draw-down (m)	Yield (l/s)	Time (min)	Recovery (m)	Time (min)	Draw-down (m)	Yield (l/s)	Time (min)	Recovery (m)	Time (min)	Draw-down (m)	Yield (l/s)	Time (min)	Recovery (m)
1			1		1			1		1			1	
2			2		2			2		2			2	
3			3		3			3		3			3	
5			5		5			5		5			5	
7			7		7			7		7			7	
10			10		10			10		10			10	
15			15		15			15		15			15	
			20					20					20	
			30					30					30	
			40					40					40	
			50					50					50	
			60					60					60	
			70					70					70	
			80					80					80	
			90					90					90	
			100					100					100	
			110					110					110	
			120					120					120	
			150					150					150	

DISCHARGE RATE 4					DISCHARGE RATE 5					DISCHARGE RATE 6				
DATE		TIME			DATE		TIME			DATE		TIME		
Time (min)	Draw-down (m)	Yield (l/s)	Time (min)	Recovery (m)	Time (min)	Draw-down (m)	Yield (l/s)	Time (min)	Recovery (m)	Time (min)	Draw-down (m)	Yield (l/s)	Time (min)	Recovery (m)
1			1		1			1		1			1	
2			2		2			2		2			2	
3			3		3			3		3			3	
5			5		5			5		5			5	
7			7		7			7		7			7	
10			10		10			10		10			10	
15			15		15			15		15			15	
			20					20					20	
			30					30					30	
			40					40					40	
			50					50					50	
			60					60					60	
			70					70					70	
			80					80					80	
			90					90					90	
			100					100					100	
			110					110					110	
			120					120					120	
			150					150					150	
			180					180					180	
			210					210					210	
			240					240					240	

COMMENTS

Form 5e

2:MAP CODE								

BOREHOLE TEST RECORD SHEET

REG / PROJ. NO	MAP REFERENCE		PROVINCE
BOREHOLE NO	COORDINATES (DD:MM:SS)	Lo	DISTRICT
ALT. BH. NO	LATITUDE	X	FARM NAME
ALT. BH. NO	LONGITUDE	Y	SITE NAME

BOREHOLE DEPTH (m)	DATUM LEVEL ABOVE CASING (m)	EXISTING PUMP
WATER LEVEL (mbgl)	CASING HEIGHT (magl)	CONTRACTOR
DEPTH OF PUMP (m)	BH DIAM (PUMP INLET) (mm)	PUMP TYPE

STEPPED DISCHARGE TEST AND RECOVERY

DISCHARGE RATE 1					DISCHARGE RATE 2					DISCHARGE RATE 3				
DATE		TIME			DATE		TIME			DATE		TIME		
Time (min)	Draw down (m)	Yield (l/s)	Time (min)	Recovery (m)	Time (min)	Draw down (m)	Yield (l/s)	Time (min)	Recovery (m)	Time (min)	Draw down (m)	Yield (l/s)	Time (min)	Recovery (m)
1			1		1			1		1			1	
2			2		2			2		2			2	
3			3		3			3		3			3	
5			5		5			5		5			5	
7			7		7			7		7			7	
10			10		10			10		10			10	
15			15		15			15		15			15	
20			20		20			20		20			20	
30			30		30			30		30			30	
40			40		40			40		40			40	
50			50		50			50		50			50	
60			60		60			60		60			60	
70			70		70			70		70			70	
80			80		80			80		80			80	
90			90		90			90		90			90	
100			100		100			100		100			100	
110			110		110			110		110			110	
120			120		120			120		120			120	
			150					150					150	

DISCHARGE RATE 4					DISCHARGE RATE 5					DISCHARGE RATE 6				
DATE		TIME			DATE		TIME			DATE		TIME		
Time (min)	Draw down (m)	Yield (l/s)	Time (min)	Recovery (m)	Time (min)	Draw down (m)	Yield (l/s)	Time (min)	Recovery (m)	Time (min)	Draw down (m)	Yield (l/s)	Time (min)	Recovery (m)
1			1		1			1		1			1	
2			2		2			2		2			2	
3			3		3			3		3			3	
5			5		5			5		5			5	
7			7		7			7		7			7	
10			10		10			10		10			10	
15			15		15			15		15			15	
20			20		20			20		20			20	
30			30		30			30		30			30	
40			40		40			40		40			40	
50			50		50			50		50			50	
60			60		60			60		60			60	
70			70		70			70		70			70	
80			80		80			80		80			80	
90			90		90			90		90			90	
100			100		100			100		100			100	
110			110		110			110		110			110	
120			120		120			120		120			120	
			150					150					150	
			180					180					180	
			210					210					210	
			240					240					240	

COMMENTS

Form 5f

2 MAP CODE								

BOREHOLE TEST RECORD SHEET

REQUEST NO	MAP REFERENCE		PROVINCE
BOREHOLE NO	COORDINATES (DD-MM-SS)	Lo	DISTRICT
ALT BH NO	LATITUDE	X	FARM NAME
ALT BH NO	LONGITUDE	Y	SITE NAME

BOREHOLE DEPTH (m)	DATUM LEVEL ABOVE CASING (m)	EXISTING PUMP
WATER LEVEL (mbgl)	CASING HEIGHT (magl)	
DEPTH OF PUMP (m)	BH DIAM (PUMP INLET) (mm)	CONT

CONSTANT DISCHARGE TEST AND RECOVERY

TEST STARTED		TEST COMPLETED		DURATION (min)
DATE	TIME	DATE	TIME	TYPE OF PUMP

* NOTE * Distance between discharge and observation holes in m

DISCHARGE BOREHOLE					OBSERVATION HOLE 1		OBSERVATION HOLE 2		OBSERVATION HOLE 3	
					Nr		Nr		Nr	
					Distance		Distance		Distance	
Time	Drawdown	Yield	Time	Recovery	Time	Drawdown	Time	Drawdown	Time	Drawdown
(min)	s(m)	(l/s)	(min)	s' (m)	(min)	(m)	(min)	(m)	(min)	(m)
1			1		1		1		1	
2			2		2		2		2	
3			3		3		3		3	
5			5		5		5		5	
7			7		7		7		7	
10			10		10		10		10	
15			15		15		15		15	
20			20		20		20		20	
30			30		30		30		30	
40			40		40		40		40	
60			60		60		60		60	
90			90		90		90		90	
120			120		120		120		120	
150			150		150		150		150	
180			180		180		180		180	
210			210		210		210		210	
240			240		240		240		240	
300			300		300		300		300	
360			360		360		360		360	
420			420		420		420		420	
480			480		480		480		480	
540			540		540		540		540	
600			600		600		600		600	
720			720		720		720		720	
840			840		840		840		840	
960			960		960		960		960	
1080			1080		1080		1080		1080	
1200			1200		1200		1200		1200	
1320			1320		1320		1320		1320	
1440			1440		1440		1440		1440	

TOTAL TIME PUMPED (min)	
AVERAGE YIELD (l/s)	

COMMENTS 1)

Form 6

1 MAP CODE

DW 71

40 INSTALLATION

NATIONAL GROUND WATER DATA BASE

Company

Address/Code

Signature

Name &
Position
[print]

112 Customer Name

Postal Address

Street Address

Plot/Erf No. 113 Farm/Holding No.

Farm Name

5 INSTALLATION DATE

6 INSTALLATION TYPE

Airlift	A
Centrifugal pump	C
Gravity station	G
Hand pump	H
Jet	J
Screw-type pump	M
No equipment	N
Observation tube	O
Piston pump	P
Powerhead	Q
Recorder	R
Submersible pump	S
Turbine	T
Windpump	W
Windpump and powerhead	X
Other[Specify]	Z

7 DEPTH TO PUMP INTAKE (m)

8 TYPE OF POWER

Diesel engine	D
Electric engine	E
Hand	H
Wind pump	W
Other[Specify]	Z

9 PUMP POWER RATING [kW]

10 MANUFACTURER OF PUMP

11 SERIAL No OF PUMP

12 POWER METER No (electrical)

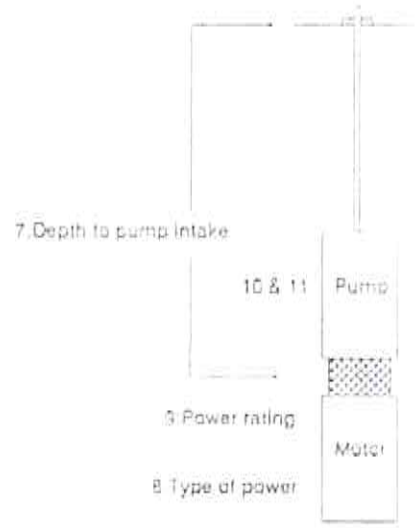
13 MONITORING FACILITY

Airline	A
Piezometer inside casing	I
Piezometer outside casing	O
Pressure transducer	T
Other[Specify]	Z

14 DATA SOURCE

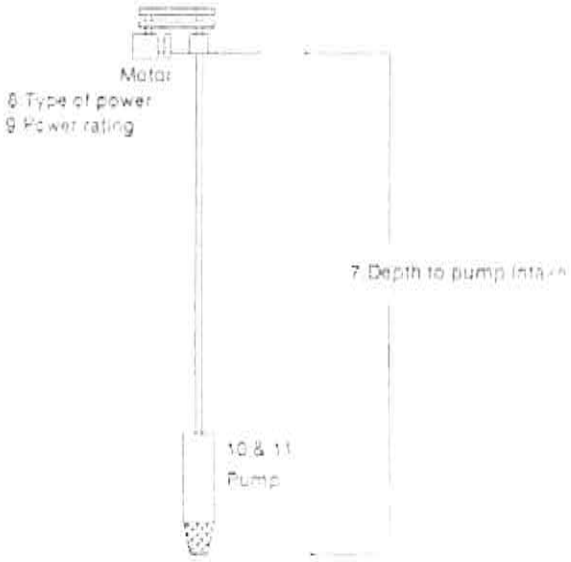
Driller's log	D
Geologist, technician, operator's report	G
Owner's record	O
Pump operator's record	C
Other[Specify]	Z

IMPORTANT : BOREHOLE OWNER
Only a complete set of 6 forms must be sent to:
Directorate : GEOHYDROLOGY
Dept Water Affairs
P.B. X313
PRETORIA 0001
DO NOT SEND ONE FORM AT A TIME.



Rising main
Steel S
Plastic P
Diameter
. . . . . .

Submersible pump



Lineshaft pump

Form 6a

1-MAP CODE								

RECORD OF EXISTING EQUIPMENT AT BOREHOLE	
Borehole No	Date
District	Contractor
Village/Farm	
Locality	

ITEM(S) PARAMETER(S)	DESCRIPTION (furnish particulars as are relevant to the specific installation)
TYPE OF INSTALLATION	(State type of pump, eg. reciprocal cylinder, mono-type, submersible, hand, wind solar, etc)
Type Name & model Depth installed (m) Element diameter (mm) Element stroke (mm)	
PIPE COLUMNS & SHAFTS	
Diameter (mm) Length / section (m) No. of sections Pipe material Shaft diameter (mm),	
MOTORIZED PUMP (State type of motor, eg. electric or diesel)	
Type Name/model of motor Motor power rating (kW) Motor pulley diam (mm) Pump pulley diam (mm)	
HANDPUMP	
Name/model	
WINDPUMP	
Wheel diameter (m) Mast height (m)	
SOLAR PUMP	
No. of panels Rating per panel (Watts)	
ANCILLARY EQUIPMENT	
Storage tank volume (m^3) Stand height (m) Water meter name/model Water meter reading	

Form 7

? MAP CODE								

VERTICALITY TEST

Company	Customer Name
Address/Code	Postal Address
Signature	Street Address
Name & Position (print)	Plot/Erf No. / Borehole No
	Farm Name

DEPTH (m)	DEFLECTION (m)	DEFLECTION CALCULATION FACTOR	ACTUAL DRIFT (mm)	COMPASS DIRECTION

Deflection calculation factor = (depth + tripod height) tripod height
Actual drift = deflection x deflection calculation factor

Form 8

DW 45

GROUNDWATER SAMPLE CUSTODY

3 MAP CODE

INSTRUCTIONS

1 SAMPLING POINT TYPE CODE

NON STATION		STATION
NO1 - BOREHOLE	=	S01
NO2 - ARTESIAN BOREHOLE	=	S02
NO5 = MINE	=	S05
N20 = FOUNTAIN / SPRING	=	S20
N21 = RIVER / SPRUIT / CREEK	=	S21
N51 = PAN	=	S51
N79 = OTHER	=	S79

2 DRAINAGE REGION

Ie.
A21 = G121
J12 = G912

3 SAMPLING METHOD CODE

I = IRREGULAR INTV. GRAB
M = PUMPED
U = UNKNOWN
O = FLOWING

4 WATER USE CODE

AD = AGRICULTURAL AND DOMESTIC
AI = IRRIGATION
AS = STOCK WATERING
DA = DOMESTIC
DG = GARDENING
E = NATURE CONSERVATION
P = PUBLIC
TC = COMMERCIAL
TM = MINING
TP = POWER GENERATION

5 EQUIPMENT CODE

A = AIRLIFT
C = CENTRIFUGAL PUMP
H = HAND PUMP
J = JET PUMP
M = MONO PUMP
N = NONE
P = PISTON PUMP
O = POWER HEAD PUMP
R = WATER LEVEL RECORDER
S = SUBMERSIBLE PUMP
T = TURBINE PUMP
W = WIND PUMP
Z = OTHER

6 DEPT CODE

1 = EASTERN CAPE
2 = HIGHVELD
3 = NATAL
4 = OVS
5 = TVL
6 = WESTERN CAPE

7 PRESERVE CODE

UNKNOWN
0 = UNPRESERVED
1 = $HgCl_2$
2 = HNO_3
3 = H_2SO_4
4 = NaOH
5 = COOLING

8 ANALYSE FOR

MACRO1	MACRO
MACRO2	MACRO + E
MACRO3	MACRO + TURB
PHOS01	MACRO + KN + TP
PHOS02	MACRO + E + KN + TP
TRMEO1	TRACE ELEMENTS
TRMEO2	HG
TRMEO3	AL + FE
CO	UNKNOWN

9 PROJECT NUMBER

= NONE
GH = GEOHYDROLOGY
HN = HYDRO RESEARCH INST
TH = APPLIED HYDROLOGY

H NO

BATCH NO

SAMPLING POINT TYPE CODE: 1

BOTTLE NO.

DRAINAGE REGION (EG. D41): 2

1:50 000 MAP NO.

LAT (DMS)

LONG(DMS)

LLACC: 0 (5m) 1 (10m) 2 (100m) 3 (1000m) 4 (10000m)

DECIMAL

DECIMAL

Non-sta. No.:

W.No.

Geohydrology No.: G

FARM / PLACE

Province District Farm No.

FARM NO

PROJECT No: 9

SAMPLING METHOD CODE: 3

Hole depth (m)

DATE sampled: 1 9

TIME

Altitude (m)

Site ID

Water use code: 4

Equipment code: 5

Dept Region: 6

Temperature (°C)

PRESERVE WITH: 7

Water level (m)

Depth (m) or Pump rate (L/s)

ANALYSE FOR: 8

SAMPLER

Remarks