

<b>Palabora Asset Management Projects</b>	<b>Technical Specification</b>
---	--------------------------------

Title:	St Patrick Mathibela Male Enviro Loo Construction		
Division:	Asset management Transformation		
Area:	Makhushane Village		
Project No:			
	Name:	Signature:	Date:
Client: Engineer	Otis Mathebula		
Client: Manager	Nozipho Zitha		
Client: Senior Manager	Abby Ledwaba		
Project Lead:	Meshack Maonye		
Projects Supt.:	Rowan Van Rensburg		
Project manager:	Michael Mbele		

**1. GENERAL:**

**Content:**

The bidder, being an expert in his field, will accurately evaluate the needs of the contract by visiting the Site/s, studying the relevant drawings and Technical Specifications for this Contract, and tender accordingly.

Should there be any discrepancies or omissions in the tender information supplied, the bidder will immediately inform the Project Leader accordingly. The Project Leader will then rectify the situation and will inform all other bidders to ensure that comparable bids are received.

Claims for extra work, as a result of tender omissions, will not be entertained.

**Materials:**

Materials shall be first class grade, new and shall conform to the relevant specifications as described on the reference drawings and elsewhere in the Specifications.

**Equipment:**

All related equipment and machinery which is used in the contractual discipline to achieve the scope of work must be available from the awarded contractor being the expert in the field. The equipment, machinery and tools must be of a very high quality and in suitable order to achieve top level work expected in each engineering discipline.

**Queries:**

All queries, as well as any requests for deviation from this Technical Specification, shall be directed to the Project Leader.

Name:	Meshack Maonye	Tel No:	0823619654
-------	----------------	---------	------------

Palabora has appointed the following Project Inspector, who will be responsible for construction supervision and safety on the Contract.

Name:	Meshack Maonye	Tel No:	0823619654
-------	----------------	---------	------------

<b>Palabora Asset Management Projects</b>	<b>Technical Specification</b>
---	--------------------------------

**Contract Clearance Requirements:**

It is a requirement that all contract clearances are obtained prior to commencing work on site. The Project Inspector will assist the Contractor to complete the clearance procedure correctly and without delay.

**2. Scope of work:**

Overview:

**SUPPLY, DELIVERY AND INSTALLATION OF ENVIRO LOO WATERLESS DEHYDRATION SANITATION UNITS**

Detailed scope of work:

**SPECIAL CONDITIONS OF CONTRACT AND TERMS OF REFERENCE**

**1. SCOPE OF WORK**

**MALE TOILETS**

The work entails the supply, delivery and installation of Enviro Loo waterless dehydration sanitation (20 users per toilet per day) units with an acceptable weatherproof structure to inhabitants of the farm at locations determined in collaboration with the beneficiary community and the municipality. Immediately after installation, users are to be educated by the successful bidder on the use and maintenance of the systems and are to be provided with user manuals.

**2. SPECIFICATIONS**

- 2.1 The toilet system should be sealed to prevent leakage and possible infiltration of flood and / or groundwater.
- 2.2 The separation of human liquid and solid waste should occur under gravity within the unit tank.
- 2.3 An extraction point will have to be provided on the domestic type of toilets, to avoid liquid overload, under high usage applications and wet climatic conditions.
- 2.4 The forced extraction ventilation system should be well designed to facilitate continuous air flow through the unit, maximising Aerobic, Waste Separation decomposition and evaporation of liquid waste.
- 2.5 This airflow through the unit should also maintain a negative pressure to prevent the escape of odours through the toilet pan.
- 2.6 All dimensions, levels and positions to be verified on site prior to construction.
- 2.7 All concrete work to be as per Engineer's details and specifications.
- 2.8 All pits to face North
- 2.9 The air flow should be assisted by a ventilation extraction unit positioned on top of the vent pipe, with air being drawn into the container via the inlet vent pipes
  - The design of the system should provide the right environment in terms of sufficient heat, prolonged retention periods in relation to number of users, adequate airflow and oxygen, to dehydrate and decompose the waste efficiently.

Palabora Asset Management Projects	Technical Specification
<ul style="list-style-type: none"> <li>• The human waste should convert via stimulated bacterial and biological activity into an inoffensive material. The accumulated dried waste that will be periodically removed should be stabilised and safe to handle.</li> <li>• The periodic removal must be cost effective and as infrequent as possible.</li> <li>• The Waterless Aerobic Enviro Loo toilet systems should be of an effective and efficient design, in order to capitalize on air circulation [wind] and heat from the sun to promote aerobic, Waste Separation of solids and evaporation of liquids.</li> <li>• All work to comply with SANS, PW371 and SABS.</li> </ul>	
<p><b>1 EXECUTION PHASE REQUIREMENTS</b></p>	
<p><b>1.1</b> The order in which the works are to be carried out and the programme of construction shall be subject to the approval of the Project Leader, which approval shall not be unreasonably withheld.</p> <p><b>1.2</b> The Contractor shall deliver to the Project Leader as well as the Project Planner, a realistic programme showing the order of procedure, the duration of activities making up the programme and method which he proposes to use in carrying out the works in order to meet the practical and works Completion dates.</p> <p><b>1.3</b> Programme float belongs to the project, not to the Contractor nor the Employer. Programme to be submitted as a bar chart using a precedence network programme in Microsoft Office Projects.</p> <p><b>1.4</b> When required by the Project Lead, the Contractor shall, within a reasonable time, also deliver to the Project Lead documents in support of the programme and particulars in writing of the Contractors resources planning, including: - the Contractors arrangements for and method of carrying out the works, and - the construction equipment and other resources which the Contractor intends to supply and use for the purpose of the contract, and - rates of progress for the various parts of the works taking account of design, procurement, construction, testing, time risk and float, and - a revised detailed cash flow forecast.</p> <p><b>1.5</b> The Project Lead may if, at any time the rate of progress of the works or any part thereof has fallen behind the programme delivered will, notify the Contractor in writing, with specific reference to the delay, and the Contractor shall there upon, subject to the approval of the Project Lead which approval shall not be unreasonably withheld, take such steps as are necessary to expedite progress so as to complete the works or the said part thereof by the practical and works completion dates.</p> <p><b>1.6</b> The Project Lead may instruct the Contractor to submit a revised programme accommodating the agreed steps to meet the practical and works completion dates.</p> <p><b>1.7</b> <i>In respect of any action arising from the above mentioned, if the work is not being carried out during working hours, but after hours and weekends and the Contractor request permission to work after hours and weekends then, if the Project Lead grants permission, the Contractor shall not be entitled to any additional payment for after hours and weekend work and all such work shall be carried out without unreasonable noise and disturbance.</i></p>	
<p><b>2 PIT EXCAVATION</b></p>	
<p><b>2.1</b> All stages of pit excavation to be inspected and approved by Engineer and signed off.</p> <p><b>2.2</b> All pit lining to be inspected by EnviroLoo Services before slab casting.</p> <p><b>2.3</b> Excavate the pit as per supplied drawing the Length, Width and Depth.</p>	

Palabora Asset Management Projects	Technical Specification
2.4	Foundation recommended is 75mm thick x 400mm wide x 150mm thickening in accordance with the brickwork as per project plan.
3	<b>COMPACTION OF SURFACES</b>
3.1	All ground surfaces receiving concrete floors.
3.2	Slab should be compacted to 150mm <b>layers</b> 93% ModAASHTO density before casting concrete.
4	<b>Internal Brickwork</b>
4.1	<b>Sub-structure</b>
4.1.1	Supply and re-brick the pit wall with 220mm double wall of Mampara clay brick.
4.1.2	All pit lining / foundation brickwork to be solid NFP clay brick.
4.1.3	All internal surface of pit lining to be painted with two coats black epoxy paint installing Enviro-Loo units.
4.1.4	<b>Internal dimension:</b> Length 1830mm x Width 830mm x Depth 1390mm.
4.1.5	<b>External dimension:</b> Length 2270mm x Width 1270mm x 1600mm. These dimension are for Un-plastered wall
4.1.6	Corbel out one half brick out at the height according to the dimension.
4.1.7	The corbelling is along the Width and Length of the interior wall.
4.1.8	Supply and install 110mm pipe for an even distribution of excess liquid in a multiple tank.
4.1.9	Supply and install 50mm pipe for emergency overflow into a grey water system.
4.2	<b>MORTAR</b>
4.2.1	Mixed proportions to be:
4.2.2	1 cement: 3 sand (i.e.1 bag cement: 3 wheelbarrows (37 litres) sand).
4.2.3	Supply and Plaster the interior wall (+-10mm) of the pit completely to ensure a water tight seal.
4.2.4	Supply and paint the epoxy paint over the plastered area.
4.3	<b>Drying Plate</b>
4.3.1	Supply and Install drying plate onto the corbelled brickwork of the pit wall.
4.3.2	Ensure the raised side of the drying plate is on the toilet bowl side of the
4.3.3	Fix the drying plate in place with the mortar around the edge of the brick pit drying plate.
4.4	<b>Top Unit</b>
4.4.1	Supply and Install the top unit and fit the 2 inlet pipes to their respective holes.
4.4.2	Supply and fit the liquid level indicator/inlet pipe to the left hand side of the top unit (viewed from the inspection cover side.)
4.4.3	Supply and bolt 4 bolts and bolts these in position from each side.
4.4.4	Position the top unit above the pit and dry plate.
4.4.5	Lower the top unit above the pit and drying plate and fit the 2 air inlet pipes through the oval holes in the drying plate.

Palabora Asset Management Projects	Technical Specification
	<p><b>4.4.6</b> Supply concrete nails and fix the top unit in position in each corner.</p> <p><b>4.5 Slap &amp; Concrete work</b></p> <p><b>4.5.1</b> Supply and cast 25MPa strength concrete floor slab over the top unit not exceeding 150mm thick.</p> <p><b>4.5.2</b> NB 25MPa strength concrete to be used throughout construction:</p> <p><b>4.5.3</b> Supply and Install 85mm THICK CONCRETE APRON SLAB</p> <p><b>4.5.4</b></p> <p><b>4.5.5</b> Trial Concrete Mixes: Proportions Concrete Strength at 28 Days 25Mpa:</p> <p><b>4.5.6</b> 1: 2: 2 (mix proportion by volume)</p> <p><b>4.5.7</b> 1 bag cement: 0.08m<sup>3</sup> Sand: 0.09m<sup>3</sup> Stone (Volume/Bag)</p> <p><b>4.5.8</b> 385 kg cement: 820 kg sand: 960 kg stone (Mass/m<sup>3</sup>).</p> <p><b>4.5.9</b> Supply and position the concrete lintels accordingly.</p> <p><b>4.5.10</b> Pre-cast concrete lintels to be used as support under top slab of pit.</p> <p><b>4.5.11</b> NB the concrete lintels span the width of the brick-pit to support the rear external wall of the building. The interior face of the rear wall must be built 385mm from the centre of the toilet flange protruding from the floor slab.</p> <p><b>4.5.12</b> Supply and cast 1000mm concrete apron slab wide placed with construction joints at every 1500mm interval.</p> <p><b>4.5.13</b> Supply and Install 100mm concrete surface bed with REF: 395 mesh wire in bottom of slab with 30mm cover</p> <p><b>4.5.14</b> Supply and Install standard pre-cast lintels across width of each brick.</p> <p><b>4.5.15</b> Supply and cast tank concrete base to Engineering details.</p> <p><b>4.5.16</b> Supply and cast 600 x 300mm concrete strip foundation as per supplied drawing.</p> <p><b>4.5.17</b> Throw the concrete shoulder/apron around the whole unit sloping the apron to the outside (manhole) end.</p> <p><b>4.5.18</b> Supply and Install 30mm toilet flange and it must protrude from the floor slab for fixing the bowl.</p> <p><b>4.5.19</b> All concrete to be as per Engineer's details and specifications.</p> <p><b>4.6 Super-structure</b></p> <p><b>4.6.1</b> Supply and Install external walls / partitions to be of clay face brick to SABS quality.</p> <p><b>4.6.2</b> Supply and Install cubicle partition walls to be 3 courses above door height.</p> <p><b>4.6.3</b> Supply and Install brickwork above door openings should have brick force on every course at least 3 courses.</p> <p><b>4.6.4</b> Supply and Install Air bricks: Standard 230X152mm terra-colls' vermin proofed louvre air grating to be used above all window openings.</p> <p><b>4.6.5</b> Supply and Install All brickwork brick force at every 2nd course in pit lining and 3rd course in Superstructure.</p> <p><b>4.6.6</b> Supply and Install wall plate as per supplied drawing.</p> <p><b>5 ROOF SHEETING</b></p> <p><b>5.1</b> Supply and Install 0.6mm kliplock chromadek roof sheeting at 12 degree on sanitation on 76mm x 60mm.</p>

Palabora Asset Management Projects	Technical Specification
<p><b>5.2</b> Supply and Install Nutec Fascia Board</p> <p><b>6 ROOF TIMBER / CEILING</b></p> <p><b>6.1</b> All roof timbers to be machined SABS treated wood with three coats of approved wood preservative.</p> <p><b>6.2</b> Supply and Install S.A purlin at 900mm c/cs on prefabricated timber trusses.</p> <p><b>6.3</b> Supply and Install 114 x 38mm S.A pine rafter at 900mm c/c.</p> <p><b>6.4</b> Supply and Install Timber connections (Hurricane Clips) are required all intercessions between timber rafters and purlins.</p> <p><b>6.5</b> Sisalation is to be applied interval under all roof surfaces.</p> <p><b>6.6</b> Supply and Install wind master extractor cowl.</p> <p><b>6.7</b> Supply and Install steel brackets fixed to trusses.</p> <p><b>6.8</b> Supply and Install steel vent brackets fixed to wall.</p> <p><b>7 METALWORK</b></p> <p><b>7.1</b> All metalwork should be primed before installation.</p> <p><b>7.2</b> All steel window should have 6x20mm flat bar burglar proofing.</p> <p><b>8 PLUMBING</b></p> <p><b>8.1</b> Supply and Install Double concrete wash trough to be used.</p> <p><b>8.2</b> All wash troughs should be connected to the school's water supply system and the waste water should be piped to a soakaway.</p> <p><b>8.3</b> The soakaway should be as per Engineer's detail and position to be determined on site.</p> <p><b>8.4</b> Supply and Install 20mm galvanised pipes. Pipework should be used as connection from wall to the Discharge points.</p> <p><b>8.5</b> Supply and Install bag of mounting screws.</p> <p><b>8.6</b> Supply and Install the ventilation extractor unit onto the outlet vent duct, secure with self – taper screw.</p> <p><b>8.7</b> Position the outlet vent pipe over the flange above the manhole cover area.</p> <p><b>8.8</b> Supply and position steel brackets for the outlet vent pipe as high as possible to the top of the rear wall for maximum support.</p> <p><b>8.9 NB the ventilation extraction unit must be position above the pitch of the roof to ensure adequate and consistence ventilation.</b></p> <p><b>8.10</b> Supply and Install the vent pipe standard length is 2300mm.</p> <p><b>8.11</b> Supply and Install extension vent pipe 1200mm long (if required).</p> <p><b>8.12</b> Supply and Install air intake vent.</p> <p><b>8.13</b> Supply and Install 110mm Pipes</p> <p><b>8.14</b> Supply and position/secure toilet bowls, seats and lids with dry mix onto the toilet flange protruding from the floor slab. The base of the toilet bowl must rest on the floor slab.</p> <p><b>8.15</b> Supply and assemble toilet seats and lids</p> <p><b>8.16</b> Supply and secure the toilet seat and lids with the plastic bolts and nuts.</p> <p><b>8.17</b> Supply and Install Two Urinal bowl each evaporative tank</p> <p><b>8.18</b> Supply and Install 50mm inlet pipe for urinal.</p> <p><b>8.19</b> Supply and Install drying plate.</p>	

Palabora Asset Management Projects	Technical Specification
8.20	Supply and Install Moulded Polyurethane tank cover with a manhole access on the evaporative tank so that it will receive maximum possible sunlight on the sun facing aspect of the building.
8.21	Supply and Install Organic starter and Enzymes through the toilet bowl.
9	<b>GLAZING</b>
9.1	Supply and Install 6.28mm obscure safety glass.
9.2	Supply and Install Stainless steel mirrors size 350x450mm high.
10	<b>PAINTING</b>
10.1	All paintwork to comply with SABS and PW371 specification.
10.2	All steel window and door frames including doors and fascia / barge boards to be discharge points.
10.3	Supply and paint the interior wall of the pit with epoxy coat over the plastered area using a black epoxy coat.
11	<b>SOAKWAY</b>
11.1	Supply and Install 375mm Micron waterproof sheeting.
11.2	Supply and Install BIDIM OR SIMILAR MATERIAL.
11.3	Supply and Install Granular Material.
11.4	Supply and Install End Cap.
11.5	Supply and Install 20mm PVC Pipe for wash troughs.
12	<b>DISABLE TOILET</b>
12.1	Supply and Erect Wheel Chair Ramp with a min fall of 1:12
12.2	Supply and Install stainless steel mirror 360 x460mm high.
12.3	Supply and Install Grab rail as per SANS: "S".
12.4	Supply and Install wash hand basin.
12.5	Supply and Install s
13	<b>CUBICLE DOOR</b>
13.1	Supply and Install cubicle door with SINGLE REBATE STEEL DOOR FRAME -SIZE 83x53mm (FRAME UNDERCUT TO 150mm).
13.2	<b>FRAME FINISH:</b> PRIME AND PAINT UNDERCOAT AND 2 COATSGLOSS ENAMEL - COLOUR TBC.
13.3	<b>DOOR LEAF:</b> 44mm FRAMED LEDGED EMBRACED DOOR SIZE 813x2032mm (DOOR RAISE BY 150mm TO TOP OF FRAME
13.4	<b>LEAF FINISH:</b> UNDER COAT AND MINIMUM 2 COATS GLOSS ENAMEL - COLOUR TBC.
13.5	<b>LOCK:</b> TOILET INDICATOR LOCK.
13.6	<b>IRONMONGERY:</b> 100mm CHROME PLATED "D" TYPE HANDLE 3 BY SOLID BRACE HINGES
14	<b>WINDOWS</b>
14.1	Supply and Install 2 off 1022 x 054mm HIGH STANDARD STEEL NE7 WINDOW FRAME.
14.2	<b>WINDOW:</b> Supply and Install 0.28mm obscure safety glass.
14.3	<b>Frame Finish:</b> WITH ZINC CHROMATE PRIMER & APPLY ONE UNIVERSAL UNDER COAT & TWO COATS EPWP GOLDEN BROWN GLOSS ENAMEL PAINT ON STEEL TOILET INDICATOR LOCK PRIME AND PAINT UNDERCOAT.
14.4	Supply and Install 5 off 533 x 054mm HIGH STANDARD STEEL NE1 WINDOW FRAME.
14.5	<b>WINDOW:</b> Supply and Install 0.28mm obscure safety glass

Palabora Asset Management Projects	Technical Specification
<p><b>14.6 Frame Finish:</b> WITH ZINC CHROMATE PRIMER &amp; APPLY ONE UNIVERSAL UNDER COAT &amp; TWO COATS EPWP GOLDEN BROWN GLOSS ENAMEL PAINT ON STEEL TOILET INDICATOR LOCK PRIME AND PAINT UNDERCOAT.</p>	
<p><b>15 ENTRANCE DOORS</b></p> <p>15.1 Supply and Install single rebate steel frame to fit 220mm wall.            15.2 Supply and Frame Finish with prime and paint undercoat and finishing coat in gloss enamel. Colour TBC.            15.3 Supply and Install door leaf 44mm framed ledged and braced door size 813 x 2032mm including external weather bar.            15.4 Supply and Install leaf finish with UNDER COAT AND MINIMUM 2 COATS GLOSS ENAMEL - COLOUR TBC.            15.5 Supply and Install 3 LEVER MORTICE LOCK SET.            15.6 Supply and Install 100mm BRACE CABIN HOOK</p>	
<p><b>16 BUGLAR DOOR</b></p> <p>16.1 Supply and Install burglar door at an external toilet block.            16.2 Supply and Install the mild steel security gate which is made of square hollow section.            16.3 <b>DOOR FINISH:</b> 1xCOAT ZINC CHROMATE PRIMER MINIMUM 2 x COATS GLOSS ENAMEL (EXTERNAL QUALITY)            16.4 Supply and Install 50x38x1.6mm M.S. RECTANGULAR HOLLOW SECTION FRAME 38x28x1.6mm RECTANGULAR HOLLOW SECTION            16.5 Supply and Install FRAME WITH 25x25x1.6 INTERMEDIATES AT 100mm CENTERS AT A 45° ANGLE COLOUR TBC            16.6 Supply and Install SECURITY DOUBLE THROW DEAD LOCK (NO LATCH)</p>	

**3. Drawings:**

No	Description	Drg No	Rev:

**4. Inclusions/Exclusions:**

Palabora

Contractor  
Own Power Supply

**5. Project Schedule:**

**Venue: Edu Centre**

**Time: 09h45**

**Date: 30 April 2021 (Friday)**

Palabora wishes to complete the work by: Project Completion Date: **30 October 2021**

A detailed schedule must be compiled with PMC personnel within **7 days** of receipt of order.

**6. Quality:**

Quality parameters will be applicable but not limited to this project as per PROJ...Quality Management [PROJ-OP-009]



<b>Palabora Asset Management Projects</b>	<b>Technical Specification</b>
---	--------------------------------

## 7. Tender Price Submission

The pricing will be done as per the attached Pricing Schedule (Appendix 1 – Schedule of Quantities) and payments will be subjected to re-measurement of all quantities if applicable, otherwise a realistic progress agreed to by the Project Leader and the Project Inspector.

## 8. Safety, Health and Environment Regulations

- **NB Occupational health and Safety Act and Construction Regulations 2003:**
- **The tenderers attention is specifically brought to the abovementioned Construction Regulations.**
- **In terms of these regulations the Employer is required to prepare a Health and Safety Specification for the construction work. All tenderers are to submit a OHS Plan prior to the commencement of the works and a full consolidated copy of such plan at the completion of construction work inclusive of a record of all drawings, designs, material used and other similar information concerning the completed structure. Audits of such safety plan will be carried out by the Employers agents during the construction period. The Contractor must register this project with the Compensation Fund or FEM before the commencement of the works. The Contractor must include in his OHS Plan a Provision of Risk Assessment of the works. The Contractor must appoint a fulltime competent employee of the contractor as his construction safety supervisor for the duration of the works. The Contractor must provide the Representatives/Agent with minutes of all Safety Meetings as requested by the OHS Safety Act and all incident investigations. The Contractor must allow in his tender for all costs which he deems he will incur as a result of having to conform to the requirements of Regulation No. 1010 of the Construction Regulations of the Department of Labour’s Occupational Health and Safety Act (Act No 85 of 1993), as promulgated on 18 July 2003 in Government Regulation Gazette No 7721 (Vol 456 - No 25207). The bidder is requested to familiarise himself with Palabora regulations, as laid out in the Palabora Standards, which is available on CD, from Contractor Management Centre.**

### Housekeeping and Site Management

The contractor will maintain a demarcated and tidy site at all times.

All construction rubble, waste and redundant equipment will be removed to appropriate dumping areas within the Palabora property on a daily basis.

### Environment:

Palabora Mining Company is a certified ISO 14001 Company. The contractor is required at all times to observe the environmental requirements of the specific area in which the work is to be carried out and the property as a whole.

In particular, any chemicals that will be brought onto the property during the course of the contract execution should be brought to the attention of the Environmental Department

## 9. PPE (Personal Protective Clothing)

Standard Palabora PPE (minimum)  
Area specific (specify which items apply)

## 10. Training And Qualifications

See Appendix 2 – SHEQ plan, training and qualification matrix

<b>Palabora Asset Management Projects</b>	<b>Technical Specification</b>
---	--------------------------------

**11. Site Supervision**

Minimum supervision required will be as specified in the latest revision of the Mines Health and Safety Act.

If more stringent supervision is required, it is to be specified here:

**12. Tender deliverables**


Appendix 1					
Schedule of Quantities					
Project Title:		St Patrick Mathibela Enviro Loo Construction			
Project No:					
	Description:	Unit	Qty	Rate	Amount
<b>1.</b>	<b>Preliminary and Generals</b>				
1.1	Fixed Related Items	Sum	1		
1.2	Time Related Items	Sum	1		
	<b>MALE TOILET</b>				
<b>2</b>	<b>Pit Excavation</b>				
2.1	Excavate the pit as per supplied drawing the Length, Width and Depth. <b>For two blocks</b>	M <sup>3</sup>	41,2		

Palabora Asset Management Projects		Technical Specification			
2.2	Dig Foundation recommended is 75mm thick x 400mm wide x 150mm thickening in accordance with the brickwork as per project plan. <b>For two blocks</b>	M <sup>3</sup>	0.01		
3	<b>Compaction</b>				
3.1	Compact to 150mm layers 93% ModAASHTO density before casting concrete.	Sum	2		
4	<b>Internal Brickwork</b>				
4.1	<b>Sub-structure</b>				
4.1.1	Supply and re-brick the pit wall with 220mm double wall of Mampara clay brick. <b>For two blocks</b>	M <sup>2</sup>	29,6		
4.1.2	Supply and paint All internal surface of pit lining with two coats black epoxy paint installing Enviro-Loo units.	M <sup>2</sup>	29,6		
4.1.3	<b>Internal dimension:</b> Length 1830mm x Width 830mm x Depth 1390mm.	M <sup>3</sup>	15		
4.1.4	<b>External dimension:</b> Length 2270mm x Width 1270mm x 1600mm. These dimension are for unplastered wall	M <sup>3</sup>	44		
4.1.5	Corbel out one half brick out at the height according to the dimension.	Sum	2		
4.1.6	The corbelling is along the Width and Length of the interior wall.	Sum	2		
4.1.7	Supply and install 110mm pipe for an even distribution of excess liquid in a multiple tank.	Sum	2		
4.1.8	Supply and install 50mm pipe for emergency overflow into a grey water system.	Sum	2		
5	<b>MORTAR</b>				
5.1	Supply and Plaster the interior wall (+- 10mm) of the pit completely to ensure a water tight seal.Reref to mix proportion	M <sup>2</sup>	63		
5.2	Supply and paint the epoxy paint over the plastered area.	M <sup>2</sup>	63		
6	<b>Drying Plate</b>				

Palabora Asset Management Projects		Technical Specification			
6.1	Supply and Install drying plate onto the corbelled brickwork of the pit wall.	Sum	2		
6.2	Fix the drying plate in place with the mortar around the edge of the brick pit drying plate.	Sum	2		
7	<b>TOP UNIT</b>				
7.1	Supply and Install the top unit and fit the 2 inlet pipes to their respective holes.	Sum	2		
7.2	Supply and fit the liquid level indicator/inlet pipe to the left hand side of the top unit (viewed from the inspection cover side.)	Sum	2		
7.3	Supply and bolt 4 bolts and bolts these in position from each side.	Sum	2		
7.4	Position the top unit above the pit and dry plate.	Sum	2		
7.5	Lower the top unit above the pit and drying plate and fit the 2 air inlet pipes through the oval holes in the drying plate.	Sum	2		
7.6	Supply concrete nails and fix the top unit in position in each corner.	Sum	2		
8	<b>Slap &amp; Concrete work</b>				
8.1	Supply and cast 25MPa strength concrete floor slab over the top unit not exceeding 150mm thick.	M <sup>3</sup>	23,24		
8.2	Supply and position the concrete lintels accordingly.	Sum	2		
8.3	Pre-cast concrete lintels to be used as support under top slab of pit.	Sum	2		
8.4	The interior face of the rear wall must be built 385mm from the centre of the toilet flange protruding from the floor slab.	Sum	2		
8.5	Supply and cast 1000mm concrete apron slab wide placed with construction joints at every 1500mm interval.	M <sup>3</sup>	145,2		
8.6	Supply and Install 100mm concrete surface bed with REF: 395 mesh wire in bottom of slab with 30mm cover	M <sup>3</sup>	154,88		
8.7	Supply and Install standard pre-cast lintels across width of each brick.	Sum	2		
8.9	Supply and cast 600 x 300mm concrete strip foundation as per supplied drawing.	M <sup>2</sup>	0,18		
8.10	Throw the concrete shoulder/apron around the whole unit sloping the apron to the outside (manhole) end.	Sum	2		

Palabora Asset Management Projects		Technical Specification			
8.11	Supply and Install 30mm toilet flange and it must protrude from the floor slab for fixing the bowl.	Sum	2		
8.12	Supply and Install REF: 395 mesh wire	M <sup>2</sup>	40		
<b>9</b>	<b>Super-structure</b>				
9.1	Supply and Install external walls / partitions to be of clay face brick to SABS quality.	Sum	2		
9.2	Supply and Install cubicle partition walls to be 3 courses above door height.	Sum	2		
9.3	Supply and Install brickwork above door openings should have brick force on every course at least 3 courses.	Sum	2		
9.4	Supply and Install Air bricks: Standard 230X152mm terra-colts' vermin proofed louvre air grating to be used above all window openings.	Sum	2		
9.5	Supply and Install All brickwork brick force at every 2nd course in pit lining and 3rd course in Superstructure.	Sum	2		
9.6	Supply and Install wall plate as per supplied drawing.	Sum	2		
9.7	Supply and Install external pre-manufacture concrete wash through.	Each	4		
<b>10</b>	<b>ROOF SHEETING</b>				
10.1	Supply and Install 0.6mm kliplock chromadek roof sheeting at 12 degree on sanitation on 76mm x 60mm.	Sum	2		
10.2	Supply and Install Nutec Fascia Board	Sum	2		
<b>11</b>	<b>ROOF TIMBER / CEILING</b>				
11.1	Supply and Install treated roof timbers	Sum	2		
11.2	Supply and Install S.A purlin at 900mm c/cs on prefabricated timber trusses.	Sum	2		
11.3	Supply and Install 114 x 38mm S.A pine rafter at 900mm c/c.	Sum	2		
11.4	Supply and Install Timber connections (Hurricane Clips) are required all	Sum	2		

Palabora Asset Management Projects		Technical Specification			
	intercessions between timber rafters and purlins.				
11.5	Sisalation is to be applied interval under all roof surfaces.	Sum	2		
11.6	Supply and Install wind master extractor cowl.	Each	10		
11.7	Supply and Install steel brackets fixed to trusses and wall	Each	20		
12	<b>PLUMBING</b>				
12.1	Supply and Install 20mm galvanised pipes. Pipework should be used as connection from wall to the Discharge points.	Sum	2		
12.2	Supply and Install the ventilation extractor unit onto the outlet vent duct, secure with self –tapper screw.	Each	10		
12.3	Position the outlet vent pipe over the flange above the manhole cover area.	Each	10		
12.4	Supply and Install polyurethane tank cover with a manhole.	Each	10		
12.5	Supply and Install 110mm Pipes	Sum	2		
12.6	Supply and position/secure toilet bowls, seats and lids with dry mix onto the toilet flange protruding from the floor slab. The base of the toilet bowl must rest on the floor slab.	Each	8		
12.7	Supply and assemble toilet seats and lids	Each	8		
12.8	Supply and secure the toilet seat and lids with the plastic bolts and nuts.	Sum	2		
12.9	Supply and Install Organic starter and Enzymes through the toilet bowl.	Sum	2		
12.10	Supply and Install the vent pipe standard length is 2300mm.	Each	10		
12.11	Supply and Install extension vent pipe 1200mm long (if required).	Each	10		
12.12	Supply and Install air intake vent.	Each	10		
12.13	Supply and Install Two Urinal bowl each evaporative tank	Each	8		
12.14	Supply and Install 50mm inlet pipe for urinal.	Sum	2		
12.15	Supply and Install drying plate.	Sum	2		
12.16	Supply and Install Organic starter and Enzymes through the toilet bowl.	Sum	2		

Palabora Asset Management Projects		Technical Specification			
13	<b>Glazing</b>				
13.1	Supply and Install 6.28mm obscure safety glass.	Each	12		
13.2	Supply and Install Stainless steel mirrors size 350x450mm high.	Each	4		
14	<b>PAINTING</b>				
14.1	All paintwork to comply with SABS and PW371 specification.				
41.2	All steel window and door frames including doors and fascia / barge boards to be discharge points.	Sum	2		
14.3	Supply and paint the interior wall of the pit with epoxy coat over the plastered area using a black epoxy coat.	M <sup>2</sup>	29,6		
15	<b>SOAKWAY</b>				
15.1	Supply and Install 375mm Micron waterproof sheeting.	Sum	2		
15.2	Supply and Install BIDIM OR SIMILAR MATERIAL	Sum	2		
15.3	Supply and Install Granular Material.	Sum	2		
15.4	Supply and Install End Cap.	Sum	2		
15.5	Supply and Install 20mm PVC Pipe for wash troughs.	Sum	2		
16	<b>DISABLE TOILET</b>				
16.1	Supply and Erect Wheel Chair Ramp with a min fall of 1:12 (2 Off)	Each	2		
16.2	Supply and Install stainless steel mirror 360 x460mm high.	Each	2		
16.3	Supply and Install Grab rail as per SANS: "S".	Each	2		
16.4	Supply and Install wash hand basin.	Each	2		

Palabora Asset Management Projects		Technical Specification			
<b>17</b>	<b>CUBICLE DOOR</b>				
<b>17.1</b>	Supply and Install cubicle door with SINGLE REBATE STEEL DOOR FRAME -SIZE 83x53mm (FRAME UNDERCUT TO 150mm).	Each	8		
<b>17.2</b>	PRIME AND PAINT UNDERCOAT AND 2 COATSGLOSS ENAMEL - COLOUR TBC.	M <sup>2</sup>	1,76		
<b>17.3</b>	<b>SUPPLY AND</b> UNDER COAT AND MINIMUM 2 COATS GLOSS ENAMEL - COLOUR TBC	M <sup>2</sup>	1,76		
<b>17.4</b>	<b>SUPPLY</b> TOILET INDICATOR LOCK	Each	2		
<b>17.5</b>	<b>SUPPLY</b> 100mm CHROME PLATED "D" TYPE HANDLE 3 BY SOLID BRACE HINGES	Each	2		
<b>18</b>	<b>BURGLAR DOOR</b>				
<b>18.1</b>	Supply and Install PURPOSE MADE SQUARE HOLLOW SECTION MILD STEEL SECURITY GATE	Each	2		
<b>18.2</b>	Supply and Paint Door 1xCOAT ZINC CHROMATE PRIMER MINIMUM	M <sup>2</sup>	3.3		
<b>18.3</b>	Supply and Paint Door 2 x COATS GLOSS ENAMEL (EXTERNAL QUALITY)	M <sup>2</sup>	6.6		
<b>18.4</b>	Supply and Install 50x38x1.6mm M.S. RECTANGULAR HOLLOW SECTION FRAME	Each	2		
<b>18.5</b>	Supply and Paint Frame 1xCOAT ZINC CHROMATE PRIMER MINIMUM	M <sup>2</sup>	3.3		
<b>18.6</b>	Supply and Paint Frame 2 x COATS GLOSS ENAMEL (EXTERIOR QUALITY)	M <sup>2</sup>	6.6		
<b>18.7</b>	Supply and Install Door 38x28x1.6mm RECTANGULAR HOLLOW SECTION FRAME WITH 25x25x1.6 INTERMEDIATES AT 100m CENTERS AT A 45° ANGLE COLOUR TBC	Each	2		
<b>19</b>	<b>ENTRANCE DOORS</b>				
<b>19.1</b>	Supply and Install single rebate steel frame to fit 220mm wall.	Each	2		
<b>19.2</b>	Supply and Frame Finish with prime and paint undercoat and finishing coat in gloss enamel. Colour TBC	M <sup>2</sup>	3.3		
<b>19.3</b>	Supply and Install door leaf 44mm framed ledged and braced door size 813 x 2032mm including external weather bar.	Each	2		
<b>19.4</b>	Supply and Install burglar door at an external toilet block	Each	2		
<b>19.5</b>	Supply and Install the mild steel security gate which is made of square hollow section.	Each	2		



Palabora Asset Management Projects		Technical Specification			
<b>20</b>	<b>DOOR FINISH:</b>				
<b>20.1</b>	Supply and Paint 1xCOAT ZINC CHROMATE PRIMER MINIMUM	M <sup>2</sup>	3.3		
<b>20.2</b>	Supply and Paint 2 x COATS GLOSS ENAMEL (EXTERNAL QUALITY)	M <sup>2</sup>	6.6		
<b>20.3</b>	Supply and Install 50x38x1.6mm M.S. RECTANGULAR HOLLOW SECTION FRAME 38x28x1.6mm RECTANGULAR HOLLOW SECTION	Each	12		
<b>20.4</b>	Supply and Install FRAME WITH 25x25x1.6 INTERMEDIATES AT 100m CENTERS AT A 45° ANGLE COLOUR TBC	Each	12		
<b>20.5</b>	Supply and Install SECURITY DOUBLE THROW DEAD LOCK (NO LATCH)	Each	12		
<b>21</b>	<b>WINDOWS NE7</b>				
<b>21.1</b>	Supply and Install 6 off 1022 x 654mm HIGH STANDARD STEEL NE7 WINDOW FRAME.	Each	8		
<b>21.2</b>	Supply and Install 6.28mm obscure safety glass	Each	8		
<b>21.3</b>	Frame Finish: Supply and Spot Pin defects In Pre-Prime surface with zinc chromate primer	M <sup>2</sup>	1,34		
<b>21.4</b>	Supply and apply one universal Under Coat	M <sup>2</sup>	1,34		
<b>21.5</b>	Supply and Apply two coats EPWP Golden Brown Gloss Enamel Paint on steel	M <sup>2</sup>	2.68		
<b>22</b>	<b>WINDOWS NE1</b>				
<b>22.1</b>	Supply and Install 533 x 654mm HIGH STANDARD STEEL WINDOW FRAME	Each	16		
<b>22.2</b>	Supply and Install 6.28mm obscure safety glass	Each	16		
<b>22.3</b>	Frame Finish: Supply and Spot Pin defects In Pre-Prime surface with zinc chromate primer	M <sup>2</sup>	0.7		
<b>22.4</b>	Supply and apply one universal Under Coat	M <sup>2</sup>	0.7		
<b>22.5</b>	Supply and Apply two coats EPWP Golden Brown Gloss Enamel Paint on steel	M <sup>2</sup>	1.4		
		<b>Total</b>			

<b>Palabora Asset Management Projects</b>	<b>Technical Specification</b>
---	--------------------------------

<b>Appendix 2 TRAINING AND QUALIFICATION MATRIX</b>				
Contract description:		Construction of male Enviro-Loo		
Project No:				
Description	Team/member	Vehicle/equipment Operator	Supervisor	Manager
2.6.1 Appointment				
2.9.2 Appointment				
Medical examination				
Generic safety induction				
General isolation				
Working at heights				
Basic rigging				
Gas cutting & welding				
Electrical grinding				
Crane driver's license				
Truck & hydraulic hoist license (Hiab)				
HIRA Training				
Supervisor legal course				
Provincial license				
<b>Access and driving license:</b>				
PP&V mining				
VO plant				
Mining surface				

Palabora Asset Management Projects		Technical Specification		
Mining pit				
Concentrator dams				
<b>Trade certificates:</b>				
Fitter				
Boilermaker				
Electrician				
Instrument Technician				
Rigger				

<b>After receiving an official order:</b>	
Attend scope clarification meeting with project personnel.	
Submit method statement to Project Inspector	
Submit HIRA for job	
Participate in developing the project schedule	
Obtain contract clearance from Projects	
HIRA approval from Project Lead	
<b>Before starting work:</b>	
Report to CMC for tool, equipment, personnel and competency and certification checks	
Attend site specific induction by client supervisor	
Obtain daily permit to work from client operations supervisor and sign off at end of shift.	
Obtain hot work permit from client supervisor if required	
Obtain confined space permit if required.	
Obtain excavation permit if required.	
Attach personal locks to equipment locked out by client isolation officer and supervisor if required, and remove when job is complete.	