



CONSTRUCTION OF NEW ECD EDUCATIONAL FACILITIES

AT

COBOSI PRIMARY JUNIOR SCHOOL

FOR

THE DEPARTMENT OF EDUCATION

EMIS No. 200400085

P-No. P9007203

CONTRACT NO: CDC/329/24

BOOK 1 (THE TENDER)

CLOSING DATE: 11 NOVEMBER 2024

CLOSING TIME: 12H00

NAME OF BIDDER:

BOOK 1 – THE TENDER

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BOOK 1 – THE TENDER

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PART T1 – TENDERING PROCEDURES

PART T1.1 – INVITATION TO TENDER



INVITATION TO TENDER NOTICE
CONTRACT NO CDC/329/24
CONSTRUCTION OF NEW ECDC EDUCATIONAL FACILITIES AT COBOSI PRIMARY JUNIOR
SCHOOL (PJS)

The Coega Development Corporation is headquartered in the City of Gqeberha, Nelson Mandela Bay Municipality, South Africa, with a strategic operational footprint in South Africa and beyond the borders on the African continent. Coega's vision is to be the leading catalyst for the championing of socio-economic development. This it seeks to achieve through the development and operation of the 9 003-hectare Coega Special Economic Zone (SEZ), a transshipment hub and a leading investment destination in Africa, providing highly skilled competence and capacity for the execution of complex infrastructure and related projects throughout South Africa and selected markets on the African continent, and advisory on the development of industrialisation and logistics zones. Coega's advanced capabilities are successful enablers in sustainable economic zone development and management, real assets management, infrastructure planning and development, technology integration while realising related socio-economic impact areas such as skills and SMME development. Coega's high-performance ethos is grounded in its commitment to sustainable development, the protection of its people and the planet, and the delivery of infrastructure solutions that support a just social and economic transition to a low-carbon, resource efficient, and climate resilient future. The foundational culture of Coega's approach, backed by its core values, is innovation and continuous improvement.

*The Eastern Cape Provincial Department of Education (DoE) together with the Eastern Cape Department of Public Works & Infrastructure (DPWI) appointed the Coega Development Corporation (CDC) as an Implementing Agent (IA) to assist in rolling out the infrastructure projects within the Eastern Cape Province. A Single Grade R- Early Childhood Centre (ECD Centre) has been identified to be constructed at **Cobosi Junior Primary School**, it is situated in **Engcobo, Chris Hani District Municipality**.*

INVITATION AND SCOPE OF SERVICES

The Coega Development Corporation (CDC) is inviting capable and competent Service Providers with proven experience and track-record to submit their bids for **the Construction of a Single Grade R Facility at Cobosi Junior Primary School (JPS)**.

Bidders must have a CIDB Contractor Grading designation of **5GB or higher**, emerging contractors with a CIDB Contractor grading designation of **4GB PE** are not eligible to make submissions and will not be considered. It is envisaged that the project will take Ten (10) months.

SCOPE OF WORK

The scope of works to be completed entails the following;

- (a) Block 1 Grade R Comprises of 2 x Classrooms, 1 x Kitchen, 2 x Sickroom, 2 x Storeroom, 2 x Offices
- (b) 1 x Learners Ablution block
- (c) Grade R Play area
- (d) Grade R Sandpit
- (e) Electrical Installation
- (f) Mechanical Installation
- (g) Fire Installation
- (h) Associated site works such as Walkways, Parking, Platforms and Landscaping
- (i) Perimeter fencing around Grade R classrooms
- (j) 5000L Classrooms water tanks with stands and 10KI Highrise Water Tank
- (k) Sewerage, Stormwater and Water reticulation
- (l) Drinking Fountain
- (m) Furniture

CONDITIONS OF TENDER

Failure to adhere to the conditions stated hereinunder or to provide evidence where specified, will render the submission non-responsive and the submission will be declared as null and void and will not be considered further.

- (a) Bidders must be registered with the Construction Industry Development Board (CIDB). It is estimated that bidders must have a CIDB Contractor Grading designation of **5GB or higher**. Emerging contractors with a CIDB Contractor grading designation of **4GB PE** are not eligible to make submissions/ to be considered.
- (b) Bidders are required to have a valid and active CIDB registration on the date of closing and required to maintain this registration throughout the Tender Evaluation period. Failure to do so will invalidate the tender.
- (c) Entities who intend submitting a bid as a Joint Venture must ensure that their combined grading meets the required CIDB Grading.
- (d) All bidders with a **CIDB Grading of 7GB or higher** are encouraged to complete and sign Form K, indicating their commitment to subcontracting at least 33% of the contract value to EMEs/QSEs.
- (e) The CDC's Procurement Policy and Procedures shall apply.
- (f) The following legislation shall apply:
 - (i) Public Finance Management Act (PFMA);
 - (ii) Construction Industries Development Board Act, Act 38 of 2000
 - (iii) National Treasury Regulations;
 - (iv) Preferential Procurement Policy Framework Act, 2000;
 - (v) Preferential Procurement Regulations, 2022;

- (vi) National Environmental Act, Act (107 of 1998)
 - (vii) Disaster Management Act, Act (57 of 2002);
 - (viii) Occupational Health and Safety Act and Regulations, Act (85 of 1993);
 - (ix) Compensation for Occupational injuries and disease Act (130 of 1993);
 - (x) BBBEE Act Number 53 of 2003 (as amended by Act number 46 of 2013); and
 - (xi) Any other applicable legislation.
- (g) The 80/20 preference point system, will be used where points will be calculated as follows:
- (i) Price - 80,
 - (ii) Specific Goals - 20.
- (h) As per amended construction codes, companies with less than 51% black shareholding (QSEs & Generics) are to submit a valid SANAS Accredited B-BBEE Verification Certificate (with the full applicable B-BBEE elements) QSE with at least 51% or 100% black shareholding and EMEs with an annual turnover of R 3 million are required to submit a B-BBEE verification certificate from a SANAS accredited verification agency as they have to comply with the 40% sub-minimum requirement on the QSE Skills Scorecard to avoid being discounted a level. EMEs with a turnover of less than R3 million are exempt from complying with the subminimum requirement and may submit an affidavit or a certificate issued by CIPC, confirming their ownership and annual turnover. The consortia/Joint Venture must submit a consolidated B-BBEE Certificate as well as individual B-BBEE Certificates /affidavits of their own entities to confirm the type of enterprise.
- (i) Bidders and all its Consortium/Joint Venture (JV) members, if any, must confirm their company registration with Companies and Intellectual Property Commission (CIPC) (formerly CIPRO) as CDC will not award any bid to any business that appears on the CIPC List of de-registered businesses. The CDC may verify company registration with CIPC through BizPortal.
- (j) All Bidders must be Value Added Tax (VAT) Vendors and the Form of Offer must include VAT. Non-VAT vendors who submit bids for contracts that would, if successful, take their annual turnover above the threshold of R 1 million are obliged to include VAT in the prices quoted and must therefore immediately upon award of the contract register with the South African Revenue Service (SARS) as VAT vendors. The award of contract would be conditional pending the successful bidder submitting proof of registration as a VAT vendor with SARS.
- (k) Bidders (all the members in the Bidding Team in the case of Consortia or Joint Ventures) must provide proof of registration on the National Treasury's Central Supplier Database (CSD) or provide a Treasury CSD registration number e.g. MAAA0.
- (l) The CDC will only award the Tender to a Successful Tenderer who is tax compliant. The tax compliant status of the Bidders (and all the members in the Tendering Team in the case of Consortia or Joint Ventures) will be verified through the CSD and South African Revenue Services (SARS) website. No competitive bids will be awarded to a person or entities who are not Tax Compliant, therefore prospective bidders must ensure that they are Tax Compliant throughout the validity period of the bid in review.
- (m) CDC will not award more than two active Projects to one bidder, unless one Project has reached 80% completion stage and beyond. Capacity assessment may be conducted in an

event that the recommended bidder is the only responsive service provider and has already been awarded two contracts.

- (n) Public servants are prohibited from conducting any form of business with organs of state, whether in their own capacity as individuals or through companies in which they are directors. Verification will be carried out by the CDC and Bidders will be disqualified should they be found to be in contravention with the Regulations.
- (o) In the case of JVs/Consortia, the Bidder must include a Letter of Intent **to Enter into a JV/Consortium Agreement**.
- (p) Entities are not allowed to be a member of more than one (1) JV/Consortium or Bidding Team.
- (q) Bidders must complete and sign the POPI Act Consent Form. In the case of a Joint Venture/ Consortium, a separate form in respect of each party to the JV must be completed.
- (r) Any misrepresentation of information will lead to immediate disqualification of the Bidder's Submission. It is imperative that the duly authorised person conducts quality control on all the documentation to be submitted to the CDC as part of this Tender Document and signs the submission as a correct and sound documentation that the CDC could put its reliance on.
- (s) It is incumbent upon and the responsibility of the Prospective Bidders to submit their full and correct contact details when they collect the tender documents to enable any communication that the CDC might need to issue to all the Prospective Bidders during the bidding process to be realised. The CDC will not be accountable for any such omission or failure by the Prospective Bidders.
- (t) The successful bidder (Principal Contractor) will be required to comply with the Occupational Health and Safety Act and Regulations, Act (85 of 1993); Compensation for Occupational Injuries and Disease Act, Act (130 of 1993), National Environmental Act, Act (107 of 1998) and Disaster Management Act, Act (57 of 2002) and, all relevant and applicable legislations throughout the duration of the contract. Upon appointment of the successful bidder, the service provider will be required to develop Occupational Health, Safety and Environmental Management Systems in compliance with the CDC Norms and Standards.
- (u) Upon award the successful Bidder (Principal Contractor/s) will be required to provide a valid proof of registered Construction Health and Safety Officer (CHSO) or Construction Health and Safety Manager (CHSM) with SACPCMP upon award and must have necessary competencies and resources to execute his/her duties. The CHSO/CHSM must have proven record of a minimum of 2 years of experience or more. No candidate registration will be accepted.
- (v) Incomplete Tender document Submissions will be deemed null and void and shall be considered non-responsive.
- (w) Tender validity shall be twelve (12) weeks from the closing date.
- (x) Bidders must only be submitted on the tender document that is issued.

Bid documents for this Tender Process can be downloaded free of charge from the CDC Website: www.coega.com or National Treasury e-tender portal publication from **12h00 on Friday, 18 October 2024**. The CDC will not take responsibility for any errors that may occur in the downloading of

documents. Bidders are there for required to ensure that they download the full pack with no missing pages.

In case a bidder prefers to purchase a physical bid document, bid documents can be collected from the **CDC's East London Office, Ground Floor, Harraway House, 12 Pearce Street, Berea, East from 12h00 on Friday, 18 October 2024** at a non-refundable bid fee of **R350.00** per set of documents drawn, payable by means of electronic transfers to Account Name: **CDC-DoE; Standard Bank, Account No: 080 396 038, Branch: Pickering Street.**

Bidders are requested to send enquiries related to the bid via tendersDoEec@coega.co.za, between the period of **18 October 2024** to **04 November 2024**. No new queries received after **04 November 2024** will not be responded to.

A **Compulsory briefing** meeting with representatives of the employer and professional team will take place on site, at **Cobosi PJS, Mjanyana A/A, Engcobo, 5050 on Tuesday, 29 October 2024 starting at 11:00**. The GPS coordinates to the site are as follows: **(-31.79543100° South, 28.12755300° East)**.

The closing time for the receipt of tenders is **12h00 on Monday, 11 November 2024**. One original completed bid document shall be placed in a sealed envelope clearly marked:

"CDC/329/24 – Construction of New Educational Facilities at Cobosi Primary Junior School."

Bids are to be placed in the tender box at the **AT THE RECEPTION** at the **CDC's East London Office, Ground Floor, Harraway House, 12 Pearce Road, Berea, East London.**

Bids will be opened in public, and the opening register will be placed on the CDC website within 48 hours of the tender closure and no late submissions will be considered.

Failure to provide any mandatory information required in this Bid will result in the submissions being deemed null and void and shall be considered non-responsive. Telegraphic, telexed, facsimiled or e-mailed submissions will not be accepted.

No telephonic or any other form of communication with any other CDC member of staff, other than the named individual on the tender advert, relating to this request for the tender will be permitted. All enquiries regarding this tender must be in writing only and must be directed to: Zine Mtanda e-mail: tendersDoEec@coega.co.za.

The CDC reserves the right not to accept the lowest proposal in part or in whole or any proposal.

PART T1.2 – TENDER DATA

T1.2 Tender Data

Conditions of Tender

The Conditions of Tender are the Standard Conditions of Tender as contained in Annexure C of the CIDB Standard for Uniformity for Construction Procurement, Department of Public Works Notice 423 of 2019 – Government Gazette – No. 42622 of 08 August 2019 (see www.cidb.org.za) which are reproduced without amendment or alteration for the convenience of Bidders and attached to this Tender Data.

The Standard Conditions of Tender make several references to the Tender Data which specifically applies to the tender. The Tender Data shall have precedence in the interpretation of any ambiguity or inconsistency between it and the Standard Conditions of Tender. Each item of data given below shall be cross-referenced to the Clause in the Standard Conditions of Tender to which it mainly applies.

The additional conditions of Tender are:

Clause Number	Tender Data																																
C.1.1.1	<p>The Employer is: Coega Development Corporation (Pty) Ltd</p> <p>The address of the Employer is:</p> <p>Address (physical): HARRAWAY HOUSE, 10 & 12 PEARCE STREET, BEREA, EAST LONDON</p> <p>Address (postal): PRIVATE BAG X6009, PORT ELIZABETH</p> <p>VAT registration number: 403 011 9947</p>																																
C.1.1.2	<p>Conflict of Interest: Bidders shall declare any perceived, known and potential conflict of interest under T2.2: Returnable Documents – SBD4 – Bidder's Disclosure.</p>																																
C.1.2	<p><u>Tender Documents</u></p> <p>Documents that relate to the tender:</p> <table border="1"> <tr> <td colspan="2"><u>BOOK 1</u></td></tr> <tr> <td>PART T1:</td><td>TENDERING PROCEDURES</td></tr> <tr> <td>T1.1</td><td>Invitation to Tender</td></tr> <tr> <td>T1.2</td><td>Tender Data</td></tr> <tr> <td>T1.3</td><td>Standard Conditions of Tender</td></tr> <tr> <td>PART C3 :</td><td>SCOPE OF WORKS</td></tr> <tr> <td>C3</td><td>Scope of Works</td></tr> <tr> <td>C3.2</td><td>Drawings & Specifications</td></tr> <tr> <td>C3.3</td><td>Occupational Health & Safety</td></tr> <tr> <td>C3.4</td><td>Baseline Risk Assessment</td></tr> <tr> <td>C3.5</td><td>Social & Economic Deliverables</td></tr> <tr> <td>C3.6</td><td>Wage Rates</td></tr> <tr> <td>C3.7</td><td>SMME Specification</td></tr> <tr> <td>C3.8</td><td>Standard Environmental Specification / Asbestos Report</td></tr> <tr> <td>C3.9</td><td>Contractors Report</td></tr> <tr> <td>C3.10</td><td>Planning Specification for Contractors</td></tr> </table>	<u>BOOK 1</u>		PART T1:	TENDERING PROCEDURES	T1.1	Invitation to Tender	T1.2	Tender Data	T1.3	Standard Conditions of Tender	PART C3 :	SCOPE OF WORKS	C3	Scope of Works	C3.2	Drawings & Specifications	C3.3	Occupational Health & Safety	C3.4	Baseline Risk Assessment	C3.5	Social & Economic Deliverables	C3.6	Wage Rates	C3.7	SMME Specification	C3.8	Standard Environmental Specification / Asbestos Report	C3.9	Contractors Report	C3.10	Planning Specification for Contractors
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AT COBOSI PRIMARY JUNIOR SCHOOL
CONTRACT NO.: CDC/329/24, EMIS Nu.: 200400085, ECDoe P Nu.: P9007203**

Clause Number	Tender Data
	<p>PART C4 : SITE INFORMATION</p> <p>C4 Site Information</p> <p>C4.2 Geotechnical Report</p> <p>BOOK 2</p> <p style="text-align: center;">RESPONSIVENESS CHECKLIST</p> <p>Mandatory Requirements to be submitted Additional Information required to be submitted by Bidders Tender Document Checklist</p> <p>SBD1 Invitation to Bid</p> <p>PART C1: AGREEMENT AND CONTRACT DATA</p> <p>C1.1 Form of Offer and Acceptance</p> <p>C1.2.1 Contract Data: Part 1: Data provided by the Employer</p> <p>C1.2.2 Contract Data: Part 2: Data provided by the Contractor</p> <p>C1.3 Pro-forma forms to be completed after award</p> <p>C1.3.1. Construction Guarantee</p> <p>C1.3.2. Agreement in terms of the Occupational Health and Safety Act</p> <p>PART C2: PRICING DATA</p> <p>C2.1 Pricing Instructions</p> <p>C2.2 Bill of Quantities</p> <p>C2.3 Final Summary</p> <p>PART T2: RETURNABLE DOCUMENTS</p> <p>SBD4 Bidder's Disclosure</p> <p>SBD6.1 Preference Points Claim form</p> <p>T2.1.1 Form A Schedule of Work</p> <p>T2.1.2 Form B Proposed Key Personnel</p> <p>T2.1.3 Form C Schedule of proposed sub-contractors</p> <p>T2.1.4 Form D Particulars of Electrical Contractor</p> <p>T2.1.5 Form E Financial References</p> <p>T2.1.6 Form F Estimated Monthly Expenditure</p> <p>T2.1.7 Form G Details of Amendments and Qualifications</p> <p>T2.1.8 Form H POPIA Consent</p> <p>T2.1.9 Form I Schedule of Construction Plant & Equipment</p> <p>T2.1.10 Form K1 SMME and LEP Target Form</p> <p>T2.1.11 Form K2 Locality Targeting Form</p> <p>T2.1.12 Form L Record of Addenda to Tender Documents</p> <p>T2.1.13 Form M Proposed Construction Work Programme</p> <p>T2.1.14 Form N B-BBEE Validation, CIDB & CSD</p> <p>T2.1.15 Form O Quality Control Systems and Procedures</p>
	<p>The Employer's Agent is:</p> <p>Name: TCN Architects</p>

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CONTRACT NO.: CDC/329/24, EMIS Nu.: 200400085, ECDoE P Nu.: P9007203**

Clause Number	Tender Data
C.2.1.1.	<p>The following Bidders shall be registered with the CIDB, or are capable of being so registered prior to the evaluation of submissions, are eligible to have their tenders evaluated:</p> <ul style="list-style-type: none"> a) Only those respondents who are registered with the Construction Industry Development Board or are capable of being so registered within twenty-one (21) working days from the closing date for submission of tenders, in a contractor grading designation of 5GB, are eligible to have their submissions evaluated. A simple way of establishing whether or not a contractor has a reasonable chance of being registered in the appropriate contractor grading designation is for the bidder to submit a copy of his/her application for CIDB registration with his or her tender submission. b) Contractors who have a contractor grading designation equal to or higher than a contractor grading designation determined in accordance with the sum tendered, or a value determined in accordance with Regulation 25(1B) or 25(7A) of the Construction Industry Development Regulations, for a CIDB Contractor grading of 5GB. 4GB PE will not be eligible to bid for tender. c) Bidders must be able to demonstrate suitable prior experience in construction of school buildings facilities of at least a similar scale and value to those of the tender. Bidders shall complete Returnable Document Form B: Schedule of Work Carried out by the Tender in this regard. d) Joint ventures are eligible to submit tenders provided that: <ul style="list-style-type: none"> (i) Every member of the joint venture is registered with the CIDB. (ii) The lead partner has a contractor grading designation in the 5GB class of construction work; and (iii) The combined contractor grading designation calculated in accordance with the Construction Industry Development Regulations is equal to or higher than a contractor grading designation determined in accordance with the sum tendered for a 5GB class of construction work or a value determined in accordance with Regulation 25 (1B) or 25 (7A) of the Construction Industry Development Regulations; and for alpha-numeric associated with the contractor Grading Designations see Annex G of the Standard Conditions of Tender.
C.2.7	<p>The arrangements and venue for the compulsory clarification meeting areas stated in the Tender Notice and Invitation to tender.</p> <p>Bidders's must sign the attendance register in the name of the tendering entities appearing on the attendance list.</p>
C.2.8	<p>Working days shall be as per a normal working week, Monday to Friday between the hours of 08h00 and 17h00 and shall exclude all gazetted public holidays.</p>

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CONTRACT NO.: CDC/329/24, EMIS Nu.: 200400085, ECDoe P Nu.: P9007203**

Clause Number	Tender Data
	No clarification requests shall be allowed 5 working days before the tender closing date.
C2.12	No alternative offers will only be considered.
C.2.13.2	Bidders to note that the returnable documents are listed in T.2 (Returnable Documents)
C2.13.3	The returnable part of the tender offer communicated on paper shall be submitted as an original only
C.2.13.5 C.2.15.1	<p>The Employer's address for delivery of tender offers and identification details to be shown on each tender offer package are:</p> <p>Location of tender box: Coega Development Corporation (Pty) Ltd</p> <p>Physical address: Harraway House 12 Pearce Street Berea</p> <p>East London Closing date: 11 November 2024</p> <p>Time of the tender closing: 12h00</p> <p>Identification details: "CDC/329/24 – COBOSI PRIMARY JUNIOR SCHOOL</p>
C.2.13 C.3.5	A two-envelope system will not be followed.
C.2.15	The closing time for submission of tender offers is as stated in the Tender Notice and Invitation to Tender.
C.2.16	The tender offer validity period is twelve (12) weeks
C.2.17	The clarification meeting shall also serve as an inspection of the site and Bidders may only obtain further access to the site after written permission has been obtained from the Employer's agent.
C.2.23	The Bidders is required to submit with his tender all documents and/or certificates as listed under Part T2: Returnable Documents
C.3.2	Change "three days" to "seven working days".
C.3.4	Tender Offers will be opened in public. Not more than two representatives of the tendering entity will be allowed to attend the tender opening session.
C.3.5	A two-envelope system will not be followed

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Clause Number	Tender Data																				
C.3.11.2	<p>The procedure for the evaluation of responsive tenders is Method (Price and Specific Goals). The financial offer will be scored using the formulas:</p> <table><tr><th>SCORING CRITERIA</th><th>WEIGHTING</th><th>COMMENTS</th></tr><tr><td>Price</td><td>80</td><td></td></tr><tr><td>Specific Goals (B-BBEE Status Level of Contributor)</td><td>20</td><td>B-BBEE Certificate is required</td></tr><tr><td>Total points</td><td>100</td><td></td></tr></table> <p>Formula of Scoring for Price</p> $Ps = 80 \left(1 - \frac{Pt - Pmin}{Pmin} \right)$ <p>Where</p> <p>Ps = Points scored for price of tender under consideration</p> <p>Pt = Price of tender under consideration</p> <p>The allocation of tender adjudication points for Contracts shall be as follows:</p> <table><tr><th>Area of Adjudication</th><th>Maximum Points</th></tr><tr><td>Tendered Price (Sp)</td><td>80</td></tr><tr><td>Specific Goals (B-BBEE Status Level of Contributor) (Se)</td><td>20</td></tr><tr><td>Total Points (s)</td><td>100</td></tr></table> <p>In addition to price evaluation, CDC will evaluate contractors, services providers and professionals based on their B-BBEE status achieved in accordance with the DTI.</p> <p>As per amended construction codes, companies with less than 51% black shareholding (QSEs & Generics) are to submit a valid SANAS Accredited B-BBEE Verification Certificate (with the full applicable B-BBEE elements) QSE with at least 51% or 100% black shareholding and EMEs with an annual turnover of R 3 million are required to submit a B-BBEE verification certificate from a SANAS accredited verification agency as they have to comply with the 33% sub-minimum requirement on the QSE Skills Scorecard to avoid being discounted a level. EMEs with a turnover of less than R 3 million are exempt from complying with the subminimum requirement and may submit an affidavit or a certificate issued by CIPC, confirming their ownership and annual turnover.</p> <p>Points for Specific Goals (B-BBEE Status Level of Contributor) points shall be awarded to a Bidders for attaining the B-BBEE status level of contributor in accordance with the table below.</p>	SCORING CRITERIA	WEIGHTING	COMMENTS	Price	80		Specific Goals (B-BBEE Status Level of Contributor)	20	B-BBEE Certificate is required	Total points	100		Area of Adjudication	Maximum Points	Tendered Price (Sp)	80	Specific Goals (B-BBEE Status Level of Contributor) (Se)	20	Total Points (s)	100
SCORING CRITERIA	WEIGHTING	COMMENTS																			
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	<table><tr><th>B-BBEE Status Level of Contributor</th><th>Number of points (80/20 system)</th></tr><tr><td>1</td><td>20</td></tr><tr><td>2</td><td>18</td></tr><tr><td>3</td><td>16</td></tr><tr><td>4</td><td>12</td></tr><tr><td>5</td><td>8</td></tr><tr><td>6</td><td>6</td></tr><tr><td>7</td><td>4</td></tr><tr><td>8</td><td>2</td></tr><tr><td>Non-compliant</td><td>0</td></tr></table>	B-BBEE Status Level of Contributor	Number of points (80/20 system)	1	20	2	18	3	16	4	12	5	8	6	6	7	4	8	2	Non-compliant	0	
B-BBEE Status Level of Contributor	Number of points (80/20 system)																					
1	20																					
2	18																					
3	16																					
4	12																					
5	8																					
6	6																					
7	4																					
8	2																					
Non-compliant	0																					
	<p>The points scored by a Bidders in respect of Price (S_P) will be added to the points scored for the Specific Goals (B-BBEE Status Level of Contributor) (S_e). Only the Bidders with the highest number of points may be selected, except in those instances identified in the Annexure.</p>																					
C.3.13	<p>A Tender offer will only be accepted if the Bidders:</p> <ul style="list-style-type: none">(a) Is registered with the Construction Industry Development Board in an appropriate contractor grading designation, refer F.2.1.(b) or any of its directors is not listed on the Register of Tender Defaulters in terms of the Prevention and Combating of Corrupt Activities Act of 2004 as a person prohibited from doing business with the public sector; and(c) has not abused the Employer's Supply Chain Management System(d) Tax compliance(e) Has met all the requirements in terms of the mandatory requirements,(f) Has passed the procurement integrity in every respect																					

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MANDATORY REQUIREMENTS

No.	DESCRIPTION
1	Completed and signed Invitation to Bid (SBD 1) (in case of a Joint Venture/Consortium, the information of all the entities should be reflected on the SBD1 form.
2	Completed and signed Bidder's Disclosure (SBD 4) . (in case of a Joint Venture/Consortium, a separate SBD 4 form in respect of each party to the JV must be completed and submitted).
3	Bidders must be registered with the Construction Industry Development Board (CIDB) and must submit proof of an active CIDB grading of 5GB or higher. Emerging contractors with CIDB grading designation of 4GB PE are not eligible to make submission and will not be considered.
4	Bidders must complete and sign the attendance register for the mandatory briefing meeting. The attendance register must be completed in the name of the bidding entity. One delegate may not represent more than one bidding entity.
5	A Signed letter of intent to enter into a Joint Venture/Consortium. To be signed by all parties to the Joint Venture/ Consortium (Where applicable)
6	Completed and Signed Certificate of Authority of Signatory to be signed by all bidders. In case of a Joint Venture/ Consortium, the Authority of Lead Partner to sign JV/Consortium documents must ALSO be provided and signed by all parties in the JV. Proof of authority to sign may be submitted in a form of company resolution
7	<p>An original fully completed, priced and handwritten Bill of Quantities (including Mechanical, Electrical BoQ & SHE BoQ (where applicable),) must be filled in clearly legible with permanent black ink.</p> <p>In cases where the P&G's is not priced but included within the tendered rates, the bidder must explicitly indicate as such. Failure to provide the total amount for P&G's or to state if the amount is covered elsewhere will result in immediate disqualification. The bidder must expressly state "Included or elsewhere covered" for line items that are considered to be covered elsewhere in the Measured Works Items. Non-compliance will lead to immediate disqualification.</p>

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	Copies of the priced BoQ, alternatively scanned copies of priced Bills of Quantities are not acceptable and may result in disqualification.
8	A Fully Completed and Signed Form of Offer , handwritten with permanent ink.
9	Bidders MUST provide appointment letters, completion certificates and performance reports from the previous employer or consultants that they have worked with in projects completed in last 7 years. Only in comparable projects within the built environment – Construction of school buildings, Libraries etc. Details of two (2)contactable reference for each project listed are to be included. All the documents stated above must be for projects completed in the last 7 years.
10	The bidders are to provide information that covers the level of experience, and the positions held of the key staff /personnel (specific to the Contracts Manager, Site Agent and Foreman) that will be available to manage the execution of the project (refer to returnable sheet C3.11). Please provide copies of CV's and Qualifications. Failure to provide CV's will suggest the absence of such experience.

ADDITIONAL REQUIREMENTS

ITEM #.	DESCRIPTION
1	As per amended construction codes, companies with less than 51% black shareholding (QSEs & Generics) are to submit a valid SANAS Accredited B-BBEE Verification Certificate (with the full applicable B-BBEE elements) QSE with at least 51% or 100% black shareholding and EMEs with an annual turnover of R 3 million are required to submit a B-BBEE verification certificate from a SANAS accredited verification agency as they have to comply with the 40% sub-minimum requirement on the QSE Skills Scorecard to avoid being discounted a level. EMEs with a turnover of less than R 3 million are exempt from complying with the subminimum requirement and may submit an affidavit or a certificate issued by CIPC, confirming their ownership and annual turnover. The consortia/Joint Venture must submit a consolidated B-BBEE Certificate as well as individual B-BBEE Certificates/affidavits of their own entities to confirm the type of enterprise.
2	Proposed methodology covering and demonstrating coherence of the: (i) Work organization programme,

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	(ii) Resource plan, and (iii) Methodology for executing the works.
3	Supporting documents on project's imperative: (i) Plans for promoting and managing safety, health and environmental issues during execution of the project; (ii) Plans for monitoring and applying quality assurance principles in the execution of the project; (iii) Plans for addressing socio-economic issues with specifics on numbers to be achieved, which include: i. Maximisation of job opportunities (labour histograms), ii. Use of local material /local suppliers, iii. Training of labour (non-accredited and accredited training).
4	Completed and signed Form SBD 6.1 preference points claim form in terms of the Preferential Procurement Regulations, 2022.
5	Bidders must complete and sign the POPI Act Consent Form . In the case of a JV / Consortium, a separate form in respect of each party to the JV must be completed.
6	The Bidders are to provide Form K2 – completed and signed –indicating their percentage commitment to the Contract Participation (in %) and rand value for sub-contracting to EMEs/QSEs.

ELIMINATION CRITERIA

The Qualitative / Risk Assessment will be conducted on the responsive Bidders who passed the quantitative assessment. The main aim of this assessment is to undertake a risk analysis to ascertain that there are no adverse risks in making an award to a particular Bidders.

The following criteria constitute "objective criteria" in terms of 2(f) of the Preferential Procurement Policy Framework Act, Act 5 of 2000, and will be used to pass over a Bidders for consideration for award of a contract:

- **Performance reports for previous projects:**

Performance reports for projects previously undertaken by the contractor will be reviewed and those Bidders with negative performance reports may be passed over. Where the Bidders has previously undertaken work for CDC, internal reports will be obtained. Where these are inconclusive, external reports will be requested.

- **Listing on the National Treasury Register of Tender Defaulters and/ or the National Treasury Register of Restricted Bidders:**

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Clause Number	Tender Data
	<p>Where a Bidders, or a director/ member of the Bidders appears on either one of the National Treasury Registers, the Bidders will be passed over.</p> <ul style="list-style-type: none"> Previous Contract terminated by an Organ of State in the last 5 years: Where a Bidders has had a contract terminated by an organ of state in the last five years on account of failure to perform or non- compliance with the contract, the Bidders will be passed over. Conviction for Fraud or Corruption: Where a Bidders or director/ member of the Tender has been convicted by a court of law for fraud and/ or corruption, the Tender will be passed over. Inability to prove working capital: Where a Bidders's Annual Financial Statements do not show the ability to provide the working capital necessary for the project and/ or the Bidders is insolvent, technically or otherwise.

PART T1.3 – STANDARD CONDITION OF TENDER

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T1.4 STANDARD CONDITIONS OF TENDER

As published in Annexure C of the CIDB Standard for Uniformity in Engineering and Construction Works Contracts, Department of Public Works Notice 423 of 2019 – Government Gazette – No. 42622 of 08 August 2019.

C.1 General

C.1.1 Actions

C.1.1.1 The employer and each Bidder submitting a tender offer shall comply with these conditions of tender. In their dealings with each other, they shall discharge their duties and obligations as set out in C.2 and C.3, timeously and with integrity, and behave equitably, honestly and transparently, comply with all legal obligations and not engage in anticompetitive practices.

C.1.1.2 The employer and the Bidder and all their agents and employees involved in the tender process shall avoid conflicts of interest and where a conflict of interest is perceived or known, declare any such conflict of interest, indicating the nature of such conflict. Bidders shall declare any potential conflict of interest in their tender submissions. Employees, agents and advisors of the employer shall declare any conflict of interest to whoever is responsible for overseeing the procurement process at the start of any deliberations relating to the procurement process or as soon as they become aware of such conflict and abstain from any decisions where such conflict exists or recuse themselves from the procurement process, as appropriate.

Note: 1) A conflict of interest may arise due to a conflict of roles which might provide an incentive for improper acts in some circumstances. A conflict of interest can create an appearance of impropriety that can undermine confidence in the ability of that person to act properly in his or her position even if no improper acts result.

2) Conflicts of interest in respect of those engaged in the procurement process include direct, indirect or family interests in the tender or outcome of the procurement process and any personal bias, inclination, obligation, allegiance or loyalty which would in any way affect any decisions taken.

C.1.1.3 The employer shall not seek and a Bidder shall not submit a tender without having a firm intention and the capacity to proceed with the contract.

C.1.2 Tender Documents

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

C.1.3 Interpretation

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

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conditions of tender.

C.1.3.2 These conditions of tender, the tender data and tender schedules which are required for tender evaluation purposes, shall form part of any contract arising from the invitation to tender.

C.1.3.3 For the purposes of these conditions of tender, the following definitions apply:

- a) **conflict of interest** means any situation in which:
 - i) someone in a position of trust has competing professional or personal interests which make it difficult to fulfill his or her duties impartially;
 - ii) an individual or Bidder is in a position to exploit a professional or official capacity in some way for their personal or corporate benefit; or
 - iii) incompatibility or contradictory interests exist between an employee and the Bidder who employs that employee.
- b) **comparative offer** means the price after the factors of a non-firm price and all unconditional discounts it can be utilised to have been taken into consideration;
- c) **corrupt practice** means the offering, giving, receiving or soliciting of anything of value to influence the action of the employer or his staff or agents in the tender process;
- d) **fraudulent practice** means the misrepresentation of the facts in order to influence the tender process or the award of a contract arising from a tender offer to the detriment of the employer, including collusive practices intended to establish prices at artificial levels;

C.1.4 Communication and employer's agent

Each communication between the employer and a Bidder shall be to or from the employer's agent only, and in a form that can be readily read, copied and recorded. Communications shall be in the English language. The employer shall not take any responsibility for non-receipt of communications from or by a Bidder. The name and contact details of the employer's agent are stated in the tender data.

C.1.5 Cancellation and Re-Invitation of Tenders

C.1.5.1 An employer may, prior to the award of the tender, cancel a tender if-

- a) due to changed circumstances, there is no longer a need for the engineering and construction works specified in the invitation;
- b) funds are no longer available to cover the total envisaged expenditure; or
- c) no acceptable tenders are received.
- d) there is a material irregularity in the tender process.

C.1.5.2 The decision to cancel a tender invitation must be published in the same manner in which the original tender invitation was advertised

C.1.5.3 An employer may only with the prior approval of the relevant treasury cancel

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a tender invitation for the second time.

C.1.6 Procurement procedures

C.1.6.1 General

Unless otherwise stated in the tender data, a contract will, subject to C.3.13, be concluded with the Bidder who in terms of C.3.11 is the highest ranked or the Bidder scoring the highest number of tender evaluation points, as relevant, based on the tender submissions that are received at the closing time for tenders.

C.1.6.2 Competitive negotiation procedure

C.1.6.2.1 Where the tender data require that the competitive negotiation procedure is to be followed, Bidders shall submit tender offers in response to the proposed contract in the first round of submissions. Notwithstanding the requirements of C.3.4, the employer shall announce only the names of the Bidders who make a submission. The requirements of C.8 relating to the material deviations or qualifications which affect the competitive position of Bidders shall not apply.

C.1.6.2.2 All responsive Bidders or at least a minimum of not less than three responsive Bidders that are highest ranked in terms of the evaluation criteria stated in the tender data shall be invited to enter into competitive negotiations based on the principle of equal treatment, keeping confidential the proposed solutions and associated information.

Notwithstanding the provisions of C.2.17, the employer may request that tenders be clarified, specified and fine-tuned in order to improve a Bidder's competitive position provided that such clarification, specification, fine-tuning or additional information does not alter any fundamental aspects of the offers or impose substantial new requirements which restrict or distort competition or have a discriminatory effect.

C.1.6.2.3 At the conclusion of each round of negotiations, Bidders shall be invited by the employer to revise their tender offer based on the same evaluation criteria, with or without adjusted weightings. Bidders shall be advised when they are to submit their best and final offer.

C.1.6.2.4 The contract shall be awarded in accordance with the provisions of C.3.11 and C.3.13 after Bidders have been requested to submit their best and final offer.

C.1.6.3 Proposal procedure using the two stage-system

C.1.6.3.1 Option 1

Bidders shall in the first stage submit technical proposals and, if required, cost parameters around which a contract may be negotiated. The employer shall evaluate each responsive submission in terms of the method of evaluation stated in the tender data, and in the second stage negotiate a contract with the Bidder scoring the highest number of evaluation points and award the contract in terms of these conditions of tender.

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C.1.6.3.2 Option 2

C.1.6.3.2.1 Bidders shall submit in the first stage only technical proposals. The employer shall invite all responsive Bidders to submit tender offers in the second stage, following the issuing of procurement documents.

C.1.6.3.2.2 The employer shall evaluate tenders received during the second stage in terms of the method of evaluation stated in the tender data, and award the contract in terms of these conditions of tender.

C.2 Tenderer's obligations

C.2.1 Eligibility

C.2.1.1 Submit a tender offer only if the Bidder satisfies the criteria stated in the tender data and the Bidder, or any of his principals, is not under any restriction to do business with employer.

C.2.1.2 Notify the employer of any proposed material change in the capabilities or formation of the tendering entity (or both) or any other criteria which formed part of the qualifying requirements used by the employer as the basis in a prior process to invite the Bidder to submit a tender offer and obtain the employer's written approval to do so prior to the closing time for tenders.

C.2.2 Cost of tendering

C.2.2.1 Accept that, unless otherwise stated in the tender data, the employer will not compensate the Bidder for any costs incurred in the preparation and submission of a tender offer, including the costs of any testing necessary to demonstrate that aspects of the offer complies with requirements.

C.2.2.2 The cost of the tender documents charged by the employer shall be limited to the actual cost incurred by the employer for printing the documents. Employers must attempt to make available the tender documents on its website so as not to incur any costs pertaining to the printing of the tender documents.

C.2.3 Check documents

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

C.2.4 Confidentiality and copyright of documents

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

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C.2.5 Reference documents

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

C.2.6 Acknowledge addenda

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

C.2.7 Clarification meeting

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

C.2.8 Seek clarification

Request clarification of the tender documents, if necessary, by notifying the employer at least five (5) working days before the closing time stated in the tender data.

C.2.9 Insurance

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

C.2.10 Pricing the tender offer

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

C.2.10.2 Show VAT payable by the employer separately as an addition to the tendered total of the prices.

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

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

C.2.11 Alterations to documents

Do not make any alterations or additions to the tender documents, except to comply with instructions issued by the employer, or necessary to correct errors made by the Bidder. All signatories to the tender offer shall initial all such alterations.

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C.2.12 Alternative tender offers

C.2.12.1 Unless otherwise stated in the tender data, submit alternative tender offers only if a main tender offer, strictly in accordance with all the requirements of the tender documents, is also submitted as well as a schedule that compares the requirements of the tender documents with the alternative requirements that are proposed.

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

C.2.12.3 An alternative tender offer must only be considered if the main tender offer is the winning tender.

C.2.13 Submitting a tender offer

C.2.13.1 Submit one tender offer only, either as a single tendering entity or as a member in a joint venture to provide the whole of the works identified in the contract data and described in the scope of works, unless stated otherwise in the tender data.

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

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

C.2.13.4 Sign the original and all copies of the tender offer where required in terms of the tender data. The employer will hold all authorized signatories liable on behalf of the Bidder. Signatories for Bidders proposing to contract as joint ventures shall state which of the signatories is the lead partner whom the employer shall hold liable for the purpose of the tender offer.

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

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

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

C.2.13.8 Accept that the employer will not assume any responsibility for the

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misplacement or premature opening of the tender offer if the outer package is not sealed and marked as stated.

C.2.13.9 Accept that tender offers submitted by facsimile or e-mail will be rejected by the employer, unless stated otherwise in the tender data.

C.2.14 Information and data to be completed in all respects

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

C.2.15 Closing time

C.2.15.1 Ensure that the employer receives the tender offer at the address specified in the tender data not later than the closing time stated in the tender data. Accept that proof of posting shall not be accepted as proof of delivery.

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

C.2.16 Tender offer validity

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

C.2.16.2 If requested by the employer, consider extending the validity period stated in the tender data for an agreed additional period with or without any conditions attached to such extension.

C.2.16.3 Accept that a tender submission that has been submitted to the employer may only be withdrawn or substituted by giving the employer's agent written notice before the closing time for tenders that a tender is to be withdrawn or substituted. If the validity period stated in C.2.16 lapses before the employer evaluating tender, the contractor reserves the right to review the price based on Consumer Price Index (CPI).

C.2.16.4 Where a tender submission is to be substituted, a Bidder must submit a substitute tender in accordance with the requirements of C.2.13 with the packages clearly marked as "SUBSTITUTE".

C.2.17 Clarification of tender offer after submission

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

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

C.2.18 Provide other material

C.2.18.1 Provide, on request by the employer, any other material that has a bearing on the tender offer, the tenderer's commercial position (including notarized joint venture agreements), preferencing arrangements, or samples of materials, considered necessary by the employer for the purpose of a full and fair risk assessment.

Should the Bidder not provide the material, or a satisfactory reason as to why it cannot be provided, by the time for submission stated in the employer's request, the employer may regard the tender offer as non-responsive.

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

C.2.19 Inspections, tests and analysis

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

C.2.20 Submit securities, bonds and policies

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

C.2.21 Check final draft

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

C.2.22 Return of other tender documents

If so instructed by the employer, return all retained tender documents within twenty-eight (28) days after the expiry of the validity period stated in the tender data.

C.2.23 Certificates

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

C.3 The employer's undertakings

C.3.1 Respond to requests from the Bidder

C.3.1.1 Unless otherwise stated in the tender Data, respond to a request for clarification received up to five (5) working days before the tender closing time stated in the Tender

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Data and notify all Bidders who collected tender documents.

C.3.1.2 Consider any request to make a material change in the capabilities or formation of the tendering entity (or both) or any other criteria which formed part of the qualifying requirements used to prequalify a Bidder to submit a tender offer in terms of a previous procurement process and deny any such request if as a consequence:

- a) an individual firm, or a joint venture as a whole, or any individual member of the joint venture fails to meet any of the collective or individual qualifying requirements;
- b) the new partners to a joint venture were not prequalified in the first instance, either as individual firms or as another joint venture; or
- c) in the opinion of the Employer, acceptance of the material change would compromise the outcome of the prequalification process.

C.3.2 Issue Addenda

If necessary, issue addenda that may amend or amplify the tender documents to each Bidder during the period from the date that tender documents are available until three (3) working days before the tender closing time stated in the Tender Data. If, as a result a Bidder applies for an extension to the closing time stated in the Tender Data, the Employer may grant such extension and, shall then notify all Bidders who collected tender documents.

C.3.3 Return late tender offers

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

C.3.4 Opening of tender submissions

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

C.3.4.2 Announce at the meeting held immediately after the opening of tender submissions, at a venue indicated in the tender data, the name of each Bidder whose tender offer is opened and, where

applicable, the total of his prices, number of points claimed for its BBBEE status level and time for completion for the main tender offer only.

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

C.3.5 Two-envelope system

C.3.5.1 Where stated in the tender data that a two-envelope system is to be followed, open only the technical proposal of valid tenders in the presence of Bidders' agents who choose to attend at the time and place stated in the tender data and announce

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the name of each Bidder whose technical proposal is opened.

C.3.5.2 Evaluate functionality of the technical proposals offered by Bidders, then advise Bidders who remain in contention for the award of the contract of the time and place when the financial proposals will be opened. Open only the financial proposals of Bidders, who score in the functionality evaluation more than the minimum number of points for functionality stated in the tender data, and announce the score obtained for the technical proposals and the total price and any points claimed on BBBEE status level. Return unopened financial proposals to Bidders whose technical proposals failed to achieve the minimum number of points for functionality.

C.3.6 Non-disclosure

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

C.3.7 Grounds for rejection and disqualification

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

C.3.8 Test for responsiveness

C.3.8.1 Determine, after opening and before detailed evaluation, whether each tender offer properly received:

- a) complies with the requirements of these Conditions of Tender,
- b) has been properly and fully completed and signed, and
- c) is responsive to the other requirements of the tender documents.

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

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

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

C.3.9 Arithmetical errors, omissions and discrepancies

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C.3.9.1 Check responsive Bidders for discrepancies between amounts in words and amounts in figures. Where there is a discrepancy between the amounts in figures and the amount in words, the amount in words shall govern.

C.3.9.2 Check the highest ranked tender or Bidder with the highest number of tender evaluation points after the evaluation of tender offers in accordance with C.3.11 for:

- a) the gross misplacement of the decimal point in any unit rate;
- b) omissions made in completing the pricing schedule or bills of quantities; or
- c) arithmetic errors in:
 - (i) line item totals resulting from the product of a unit rate and a quantity in bills of quantities or schedules of prices; or
 - (ii) the summation of the prices.

C.3.9.3 Notify the Bidder of all errors or omissions that are identified in the tender offer and either confirm the tender offer as tendered or accept the corrected total of prices.

C.3.9.4 Where the Bidder elects to confirm the tender offer as tendered, correct the errors as follows:

- a) If bills of quantities or pricing schedules apply and there is an error in the line item total resulting from the product of the unit rate and the quantity, the line item total shall govern and the rate shall be corrected. Where there is an obviously gross misplacement of the decimal point in the unit rate, the line item total as quoted shall govern, and the unit rate shall be corrected.
- b) Where there is an error in the total of the prices either as a result of other corrections required by this checking process or in the tenderer's addition of prices, the total of the prices shall govern and the Bidder will be asked to revise selected item prices (and their rates if bills of quantities apply) to achieve the tendered total of the prices.

C.3.10 Clarification of a tender offer

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

C.3.11 Evaluation of tender offers

The Standard Conditions of Tender standardize the procurement processes, methods and procedures from the time that tenders are invited to the time that a contract is awarded. They are generic in nature and are made project specific through choices that are made in developing the Tender Data associated with a specific project.

Conditions of tender are by definition the document that establishes a Bidder's obligations in submitting a tender and the employer's undertakings in soliciting and evaluating tender offers. Such conditions establish the rules from the time a tender is advertised to the time that a contract is awarded and require employers to conduct the process of offer and acceptance in terms of a set of standard procedures.

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The CIDB Standard Conditions of Tender are based on a procurement system that satisfies the following system requirements:	
Requirement	Qualitative interpretation of goal
Fair	The process of offer and acceptance is conducted impartially without bias, providing simultaneous and timely access to participating parties to the same information.
Equitable	Terms and conditions for performing the work do not unfairly prejudice the interests of the parties.
Transparent	The only grounds for not awarding a contract to a Bidder who satisfies all requirements are restrictions from doing business with the employer, lack of capability or capacity, legal impediments and conflicts of interest.
Competitive	The system provides for appropriate levels of competition to ensure cost effective and best value outcomes.
Cost effective	The processes, procedures and methods are standardized with sufficient flexibility to attain best value outcomes in respect of quality, timing and price, and least resources to effectively manage and control procurement processes.

The activities associated with evaluating tender offers are as follows:

- a) Open and record tender offers received
- b) Determine whether or not tender offers are complete
- c) Determine whether or not tender offers are responsive
- d) Evaluate tender offers
- e) Determine if there are any grounds for disqualification
- f) Determine acceptability of preferred Bidder
- g) Prepare a tender evaluation report
- h) Confirm the recommendation contained in the tender evaluation report

C.3.11.1 General

The employer must appoint an evaluation panel of not less than three persons conversant with the proposed scope of works to evaluate each responsive tender offer using the tender evaluation methods and associated evaluation criteria and weightings that are specified in the tender data.

C.3.12 Insurance provided by the employer

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

C.3.13 Acceptance of tender offer

Accept the tender offer; if in the opinion of the employer, it does not present any risk and only if the Bidder:

- a) is not under restrictions, or has principals who are under restrictions, preventing participating in the employer's procurement;
- b) can, as necessary and in relation to the proposed contract, demonstrate

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that he or she possesses the professional and technical qualifications, professional and technical competence, financial resources, equipment and other physical facilities, managerial capability, reliability, experience and reputation, expertise and the personnel, to perform the contract;

- c) has the legal capacity to enter into the contract;
- d) is not; insolvent, in receivership, under Business Rescue as provided for in chapter 6 of the Companies Act No. 2008, bankrupt or being wound up, has his/her affairs administered by a court or a judicial officer, has suspended his/her business activities or is subject to legal proceedings in respect of any of the foregoing;
- e) complies with the legal requirements, if any, stated in the tender data; and
- f) is able, in the opinion of the employer, to perform the contract free of conflict of interest.

C.3.14 Prepare contract documents

C.3.14.1 If necessary, revise documents that shall form part of the contract and that were issued by the employer as part of the tender documents to take account of:

- a) addenda issued during the tender period,
- b) inclusion of some of the returnable documents and
- c) other revisions agreed between the employer and the successful Bidder. Complete if any. the schedule of deviations attached to the form of offer and acceptance,

C.3.15 Complete adjudicator's contract

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

C.3.16 Registration of the award

An employer must, within twenty-one (21) working days from the date on which a contractor's offer to perform a construction works contract is accepted in writing by the employer, register and publish the award on the cidb Register of Projects.

C.3.17 Provide copies of the contracts

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

C.3.18 Provide written reasons for actions taken

Provide upon request written reasons to Bidders for any action that is taken in applying these conditions of tender but withhold information which is not in the public interest to

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be divulged, which is considered to prejudice the legitimate commercial interests of Bidders or might prejudice fair competition between Bidders.

C.1.6.4 The employer and each Bidder submitting a tender offer shall comply with these conditions of tender. In their dealings with each other, they shall discharge their duties and obligations as set out in C.2 and C.3, timeously and with integrity, and behave equitably, honestly and transparently, comply with all legal obligations and not engage in anticompetitive practices.

C.1.6.5 The employer and the Bidder and all their agents and employees involved in the tender process shall avoid conflicts of interest and where a conflict of interest is perceived or known, declare any such conflict of interest, indicating the nature of such conflict. Bidders shall declare any potential conflict of interest in their tender submissions. Employees, agents and advisors of the employer shall declare any conflict of interest to whoever is responsible for overseeing the procurement process at the start of any deliberations relating to the procurement process or as soon as they become aware of such conflict and abstain from any decisions where such conflict exists or recuse themselves from the procurement process, as appropriate.

Note: 1) A conflict of interest may arise due to a conflict of roles which might provide an incentive for improper acts in some circumstances. A conflict of interest can create an appearance of impropriety that can undermine confidence in the ability of that person to act properly in his or her position even if no improper acts result.

2) Conflicts of interest in respect of those engaged in the procurement process include direct, indirect or family interests in the tender or outcome of the procurement process and any personal bias, inclination, obligation, allegiance or loyalty which would in any way affect any decisions taken.

C.1.6.6 The employer shall not seek and a Bidder shall not submit a tender without having a firm intention and the capacity to proceed with the contract.

C.1.7 Tender Documents

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

C.1.8 Interpretation

C.1.8.1 The tender data and additional requirements contained in the tender schedules that are included in the returnable documents are deemed to be part of these conditions of tender.

C.1.8.2 These conditions of tender, the tender data and tender schedules which are required for tender evaluation purposes, shall form part of any contract arising from the invitation to tender.

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C.1.8.3 For the purposes of these conditions of tender, the following definitions apply:

PART C3 – SCOPE OF WORKS

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AT COBOSI PRIMARY JUNIOR SCHOOL
CONTRACT NO.: CDC/329/24, EMIS Nu.: 200400085, ECDoe P Nu.: P9007203**

PART C3: SCOPE OF WORK

C3.1 DESCRIPTION OF WORKS

SCOPE OF WORKS

- a) Block 1 Grade R Comprises of 2 x Classrooms, 1 x Kitchen, 2 x Sickroom, 2 x Storeroom, 2 x Offices
- b) 1 x Learners Ablution block
- c) Grade R Play area
- d) Grade R Sandpit
- e) Electrical Installation
- f) Mechanical Installation
- g) Fire Installation
- h) Associated site works such as Walkways, Parking, Platforms and Landscaping
- i) Perimeter fencing around Grade R classrooms
- j) 5000L Classrooms water tanks with stands and 10KI Highrise Water Tank
- k) Sewerage, Stormwater and Water reticulation
- l) Drinking Fountain
- m) Furniture

ORDER OF THE WORKS

The Bidder will be expected to make or present a proposed programme for the works (as outlined in C1.2 Contract Data) and the order of the works will then be finalized in conjunction with the principal agent.

BUILDING OCCUPIED

Although the building is being used, it is expected that it will be occupied during the construction period. It is important that the contractor liaises closely with the building users whenever this is required and to adhere to H&S Regulations at all times.

EXISTING PREMISES ON SITE

The existing site is sloping, with various building structures.

CONTRACT PERIOD

The contract period shall be 10 (ten) calendar months from date of handover of site. (Including annual builders' holidays). Work to be completed as a whole as outlined in C1.2 Contract Data

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CONTRACT NO.: CDC/329/24, EMIS Nu.: 200400085, ECDuE P Nu.: P9007203**

SOCIO ECONOMIC DELIVERABLES

The Socio-economic objectives of the project are:

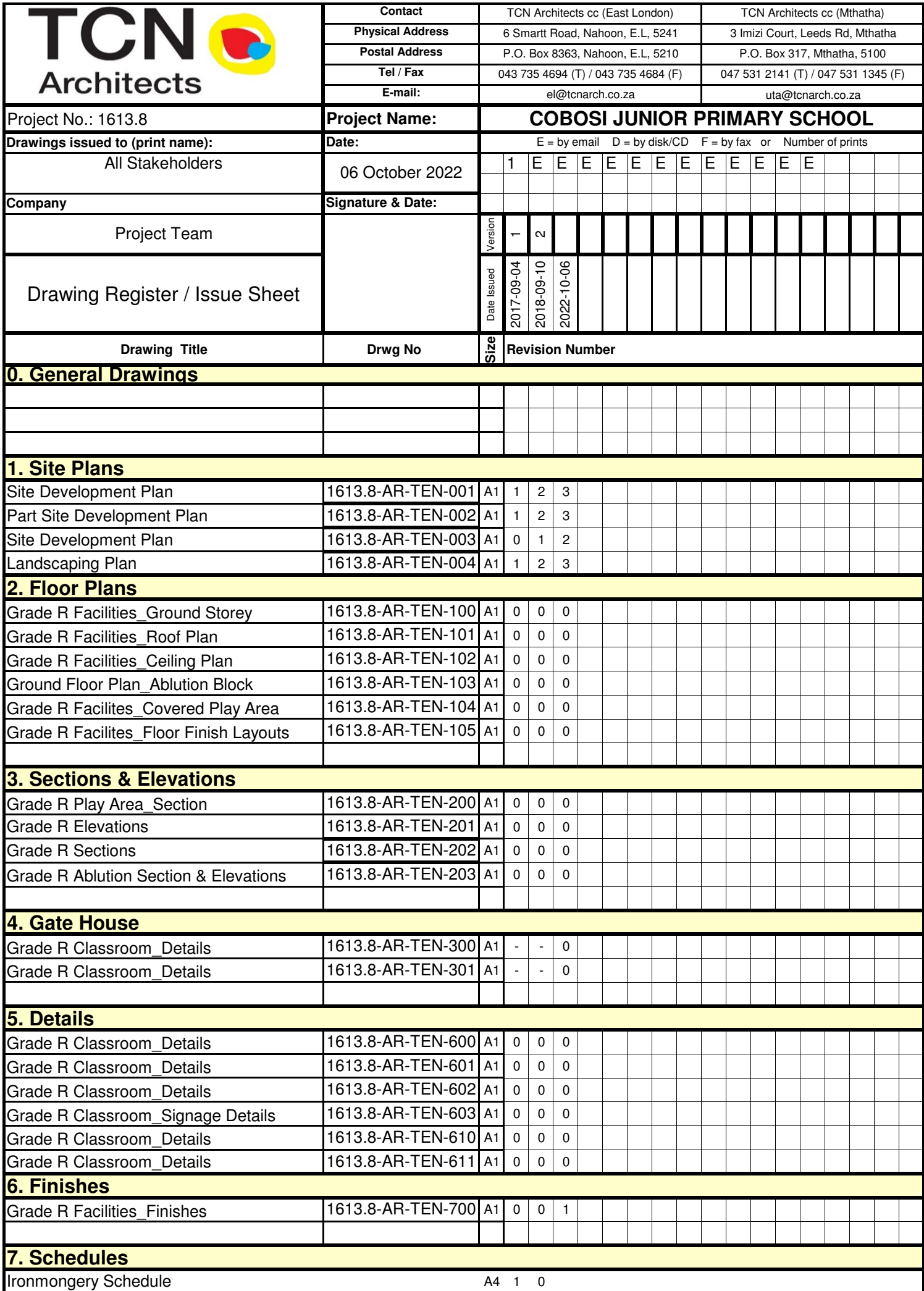
- To train occupational qualifications, trade qualifications, work integrated learners - P1 and P2 learners, professional candidates.
- To develop targeted enterprises who are either JV partners to the successful bidder or sub-contractors. Development will be undertaken in identified areas following a Needs Analysis.

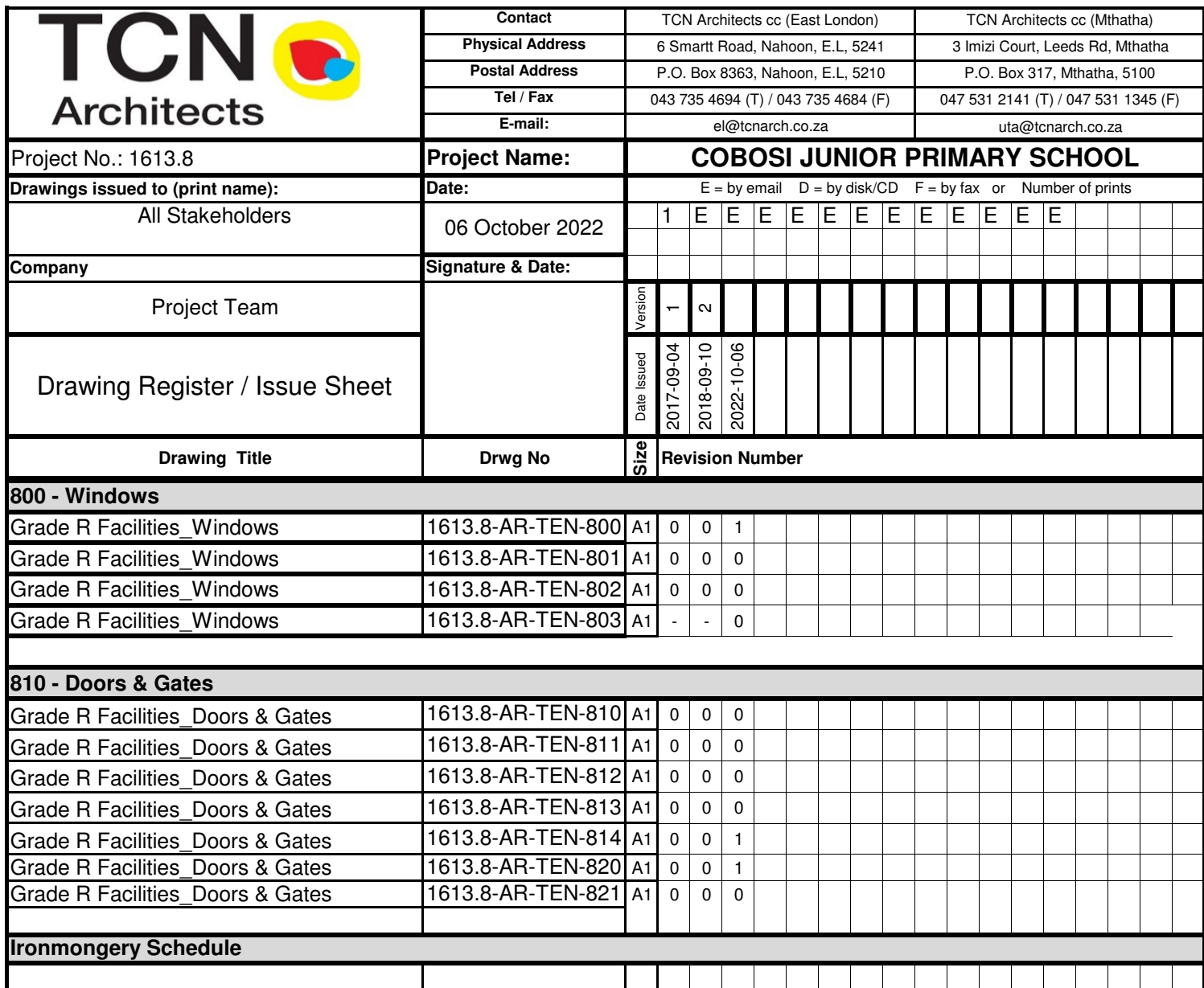
PART C3.2 – DRAWINGS AND SPECIFICATIONS

**CONSTRUCTION OF NEW EECDC EDUCATIONAL FACILITIES
AT COBOSI PRIMARY JUNIOR SCHOOL
CONTRACT NO.: CDC/329/24, EMIS Nu.: 200400085, ECDoE P Nu.: P9007203**

C3.2 DRAWINGS & SPECIFICATIONS

A flash stick containing a full set of Architectural, Civil/Structural and Electrical Drawings is attached to the tender documents.







BUSINESS MANAGEMENT SYSTEM

BOSCH PROJECTS DRAWING REGISTER

BOSCH PROJECTS DRAWING REGISTER						
		FILING		5100		
Project Title	CDC EC Schools – Cluster 9		Project Number		6068-006	
Client	Coega Development Corporation					
School	COBOSI PJS		Date		13-Oct-22	
	Project Drawing No.	Drawing Description	Latest Rev			
	6068-006		Rev No.	Revised Date	Issue Slip No.	Previous Issue
Civil Drawings						
	6068/006/041	COBOSI PJS – WATER LAYOUT PLAN	T1	Oct-22		
	6068/006/042	COBOSI PJS – SEWER LAYOUT PLAN	T1	Oct-22		
	6068/006/043	COBOSI PJS – STORMWATER LAYOUT	T1	Oct-22		
General Standard Drawings						
	6068/006/005	10kl ELEVATED TANK SECTIONS AND DETAILS	T1	Oct-22		
	6068/006/007	RAINWATER STORAGE	T1	Oct-22		
	6068/006/008	STANDPIPE DETAILS	T1	Oct-22		
	6068/006/009	STORMWATER DETAILS	T1	Oct-22		
	6068/006/010	PIPE BEDDING, ROAD CROSSING AND CONCRETE ENCASEMENT DETAILS	T1	Oct-22		
	6068/006/011	DRINKING FOUNTAIN DETAIL	T1	Oct-22		
	6068/006/012	TYPICAL WATER MAIN THRUST BLOCK DETAILS	T1	Oct-22		
	6068/006/014	FOUNDATION FENCING DETAILS	T1	Oct-22		
	6068/006/015	WALKWAYS LAYERWORKS DETAIL	T1	Oct-22		
	6068/006/017	GENERAL SEWER DETAILS	T1	Oct-22		



Bosch Projects

Consulting Engineers, Project Managers
57 Western Avenue Vincent East London, 5247
P.O. Box 13530, Vincent, East London, 5217
Tel (043) 721 1717 Fax (043) 721 1719

DRAWING ISSUE SLIP		NUMBER		DATE	2022-08-24
PROJECT DESCRIPTION	CDC EC Schools – Cluster 9	PROJECT NUMBER	6068-006		
CLIENT	Coega Development Corporation	ISSUED TO	Amahle Quantity Surveyors		
<u>DRAWING NUMBER</u>	<u>DESCRIPTION</u>	<u>REVISION</u>	<u>PAGE SIZE</u>	<u>QTY</u>	
Structural Layout Drawings	COBOSI PJS				
6068/006/2/100	GRADE R FACILITIES – FOUNDATION LAYOUT	3	A1	1	
6068/006/2/101	GRADE R FACILITIES – SURFACE BED LAYOUT	3	A1	1	
6068/006/2/102	GRADE R FACILITIES – RING BEAM LAYOUT	3	A1	1	
6068/006/2/103	GRADE R FACILITIES – SAND PIT AND WATER TANK PLINTH	2	A1	1	
6068/006/2/104	GRADE R TOILET BLOCK – PLAN, SECTION AND DETAILS	2	A1	1	
6068/006/2/105	GRADE R FACILITIES – STANDARD DETAILS AND NOTES	2	A1	1	
ISSUED BY:		RECEIVED BY:			
Name	T. MABUSELA	Name			
Signature		Signature			
Date	2022-08-24	Date			

PART C3.3 – OCCUPATIONAL HEALTH & SAFETY



Specification:

**HEALTH AND SAFETY SPECIFICATION FOR
CONSTRUCTION OF A NEW EARLY CHILDHOOD
DEVELOPMENT CENTRE- COBOSI PJS**

CDC-329-24

Specification N^o
CDC-SBU-SPC-128-23

Classification: Public

30 January 2023

DOCUMENT INFORMATION SHEET

Title of Document : Health and Safety Specification for Construction of a New Early Childhood Development Centre Cobosi PJS.

Type of Document : Health and Safety Specification

Document Number : CDC-SBU-SPC-128-23

Prepared by : P. Zikizela

Typed by : P. Zikizela

Business Unit : Operations

Prepared for : Bidders/Service Providers

Date of Issue : 30 January 2023

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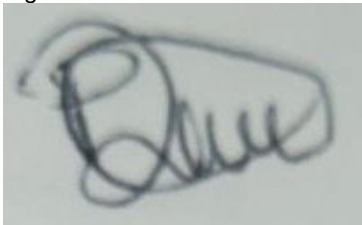

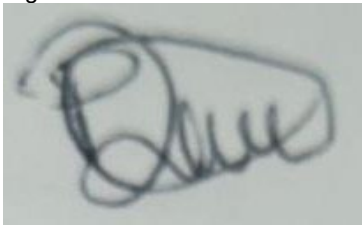
DOCUMENT CONTROL SHEET

The purpose of this form is to ensure that documents are reviewed and approved prior to issue. The form is to be bound into the front of all documents released by the Coega.

PROJECT NAME : CONSTRUCTION OF NEW EARLY CHILDHOOD DEVELOPMENT CENTRE AT COBOSI PJS.
DOCUMENT TITLE : HEALTH AND SAFETY SPECIFICATION
DOCUMENT No. : CDC-SBU-SPC-128-23

SIGNING OF THE ORIGINAL DOCUMENT

We, the undersigned, accept this document as a stable work product to be placed under formal change control as described by the Procedure for Control of Documented Information.

ORIGINAL	Prepared by	Reviewed by	Approved by
Date: 30.01.2023	Name: P. Zikizela Signature: 	Name: N.Mdikane Signature: 	Name: P. Zikizela Signature: 

Distribution:	Coega
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REVISION CHART

REVISION 1	Name:	Name:	Name:
Date:	Signature:	Signature:	Signature:

This document, and the information or advice which it contains, is provided by the SHEQ Business Unit solely for the use by the Board of Directors of the Coega Development Corporation (Pty) Ltd and Coega and for reliance by its Executive Management and the Board in performance of that Business Unit's duties.

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INTRODUCTION AND BACKGROUND

Background to the Occupational H&S Specification

Historically, the Building or Construction Industry has had poor health and safety record. Due to the complex and potentially dangerous operations being undertaken, there is a high risk of incidents and injuries. In many instances poor adherence to the Occupational Health and Safety Act (OHS ACT) has resulted in severe consequences for Health and Safety performance. The Coega Development Corporation (CDC) together with its client the Provincial Department of Education Eastern Cape is determined that the highest health and safety standards are implemented and full commitment from all parties to achieving best practices recognised internationally.

To achieve this goal the CDC has prepared and published a Project-Specific Occupational Health and Safety Specification for the **Construction of a New Early Childhood Development Centre-Cobosi PJS**.

The OHSS-P sets out guidelines and minimum levels of awareness and guidance for health and safety requirements for the specific project. Contractual responsibility for adhering to these requirements rests with the Principal Contractor. In particular all employees are encouraged to be pro-active in compliance. The CDC is committed in ensuring the highest health and safety standards for all work undertaken on construction sites.

Purpose of the Occupational Health and Safety Specification

The purpose of the OHSS-P is to assist the Principal Contractor in achieving compliance with the OHS Act, Construction Regulations of 2014 and all relevant regulations and Standards revolving the Contractor's scope of works and to reduce injuries in the work environment.

The OHSS-P is a performance measurement to ensure all stake holders such as the Client, Consultants, Principal Contractors and Contractors achieve an acceptable level of OHS performance. This health and safety specification should be included in all tender documents for construction works and/or be provided the successful bidder and this will assist Principal Contractor with guidelines as to what the Client requires during construction.

Therefore, the Principal Contractor is at all times required to and will remain responsible to address all requirements of the OHS Act, Construction Regulations and all relevant Regulations and Standards in the project health and safety plan and implementation thereof.

The OHSS-P is a performance specification to ensure that the CDC and any bodies that enter into formal agreements with the CDC such as Consultants, Principal Contractors, and Principal Contractors achieve an acceptable level of OHS performance. No advice, approval of any document required by the OHSS-P such as hazard identification and risk assessment action plan or any other form of communication from the CDC shall be construed as an acceptance by the CDC of any obligation that absolves the Principal Contractor from achieving the required level of performance and compliance with legal requirements. Further, there is no acceptance of liability by the CDC/its client which may result from the Principal Contractor failing to comply with the OHSS-P unless the CDC has issued an instruction to any requirement, i.e. the Principal Contractor remains responsible for achieving the required performance levels.

Implementation of the Occupational Health and Safety Specification Programmes (OHSS-P)

This OHSS-P forms an integral part of the Contract, and Principal Contractors are required to make it an integral part of their Contracts with Sub-Principal Contractors and Suppliers. It will be disseminated by the CDC persons responsible for the design of the construction works, who will ensure that it is included in the Tender Document(s) issued to prospective Principal Contractors. The prospective Principal Contractors shall incorporate the requirements of the OHSS-P in their submission of tenders to the CDC.

The Principal Contractor shall sign a CDC acknowledgement in Annexure A that he / she has familiarised him / herself with the content of the OHSS-P and he /she shall comply with all his / her obligations in respect thereof. The successful Principal Contractor will be required to compile H&S Plan and file based on the requirements of the OHS Act and these Specifications, which will need to be approved by the appointed H&S Agent prior commencement with construction work.

OCCUPATIONAL HEALTH AND SAFETY SPECIFICATION

Scope

The scope is as per clearly specified in detail in the Scope of Works of the Tender Document.
(Refer to Scope of Works in the Tender Document)

Health and Safety is everyone's responsibility, report Unsafe Acts and Unsafe Conditions to your superior immediately.

Interpretation

The OHSS-P contains clauses that are generally applicable to building / construction and to impose pro-active controls associated with activities that impact on human health and safety as it relates to plant and machinery.

Compliance to the requirements of the OHS ACT is in addition to the requirements of the OHSS-P and is part of the Principal Contractor's responsibility. The CDC will monitor that the Principal Contractors comply with the requirements of the OHS ACT and will not prescribe to the Principal Contractor how such compliance is achieved.

Definitions

For the purpose of the OHSS-P the definitions, acronyms given hereunder shall apply:

- 1.1.1 **Construction Work (as defined in the Construction Regulations, 2014)** means any work in connection with –
- a) The construction, erection, alteration, renovation, repair, demolition or dismantling of or an 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.

2.3.2 Hazard Identification and Risk Assessment and Risk Control

Means a documented plan, which identifies hazards, assesses the risks and detailing

2.3.3 Site

Means the area in the possession of the Principal Contractor for construction of works. Where there is no demarcated boundary it will include all adjacent areas, which are reasonably required for the activities for the Principal Contractor and approved for such use by the Principal Agent.

2.3.4 The Act

Means, unless the context indicates otherwise, the Occupational Health and Safety Act, 1993 (ACT NO. 85 of 1993) and Regulations promulgated there under.

2.3.5 CDC

Coega Development Corporation (Pty) Ltd.

2.3.6 Hazard

Means a source of or exposure to danger (source which may cause injury or damage to persons, or property)

2.3.7 Risk

Means the probability or likelihood that a hazard can result in injury or damage

2.3.8 Principal Contractor's Responsible Person

Means any person appointed in writing by the Principal Contractor to supervise construction or building work. The appointment shall be as required by the OHS ACT which shall stipulate health and safety responsibilities, area of responsibility and the proposed duration of the project.

2.3.9 Employer's Personnel

As defined in the relevant contract Documents

2.3.10 OHSS-P

Occupational Health and Safety Specification

General Health and Safety Provisions

2.4.1 Notification of Intention to Commence Construction Work

The Principal Contractor shall notify the Provincial Director of the Department of Employment and Labour of intention to commence with construction work (as is required by CR4). Notification shall be sent to the **Provincial Office of the Department of Employment and Labour – Eastern Cape (Ngcobo)**. A Notification shall be sent for every specific construction site where construction work shall be undertaken by the Principal Contractor, or on behalf of the Principal Contractor. A copy of the signed and completed notification is to be included in the H&S Plan and File which is submitted to CDC for consideration, with proof of submission to the DOEL.

2.4.2 *Assignment of Principal Contractor's Responsible Persons to Supervise Health and Safety on Site*

The Contractor shall submit the following supervisory appointments as well as any relevant appointments in writing (as stipulated by the OHSAct), prior to commencement of work:

- CEO Assignee OH&S Act sect. 16(2)
- **Full-time Construction Manager CR 8.1**

The Principal Contractor shall appoint in writing and submit full-time construction manager appointments prior to commencement of work. The construction manager has the duty of managing all the construction work and the duty of ensuring the H&S compliance full-time on a single site. The appointed construction manager may not manage any construction site other than the site in respect to which he/she has been appointed for. The Principal Contractor shall submit CV's of the responsible persons for approval by the CDC/Appointed H&S Agent prior the commencement of work on site. Proof of competency is to be included with all appointments, in the form of C.V. and Certificates.

- **Full-Time Construction Health and Safety Officer CR 8.5**

The Principal Contractor shall appoint a Full-Time Competent Construction Health & Safety Officer/CHSM registered with SACPCMP (who has 2 or more years working experience) to assist in the control of all health and safety related aspects on site as per [CR 8(5)]

This competent Full-Time H&S Officer must at least have practical experience in the type of construction work associated with the Project with specific reference to work at heights, mechanical works & and excavations who shall be responsible for overseeing overall compliance of H&S issues on the project. Such appointed Safety Officer shall be at all times available and be on site during execution of all Risk Activities such as highlighted in the project programme & Risk Assessments.

- **Construction work supervisor CR 8.7**

Principal Contractor must appoint construction supervisors in writing responsible for construction activities and ensuring H&S compliance on a single construction site he/she is appointed for.

- **Risk Assessment coordinator CR 9**

Principal Contractor must, before the commencement of any construction work and during such construction work, have risk assessments performed by a competent person appointed in writing.

2.4.3 *Compensation of Occupational Injuries and Diseases Act 130 of 1993 (COIDAAct)*

The Principal Contractor shall submit a copy of their valid Letter of Good Standing with the Compensation Insurer to the CDC by including it in the Project H&S Files which will include the following:

- Occupational Health and Safety Policy
- Environmental Policy
- Substance Abuse Policy
- HIV Policy
- Disciplinary Code

2.4.4 Health and Safety Organogram

The Principal Contractor shall submit a Project Specific organogram in each project H&S File, outlining the Health and Safety Site Team as required and as related to the relevant appointments by the OHS ACT. In cases where appointments have not been made, the organogram shall reflect the position. The organogram shall be updated, when there is a change in the site team.

2.4.5 Risk Assessments

2.4.5.1 Baseline Risk Assessment

The Principal Contractor shall submit a baseline risk assessment, which shall form part of the health and safety plan and file. The Risk Methodology applied should follow the hierarchy of controls mitigation and must form part of the Risk Assessment and be included in the H&S File.

Should the Principal Contractor commence work without approval of the risk assessment, or should the risk assessment not reflect the activities being undertaken, the CDC may instruct the work to be immediately halted, and the Principal Contractor will have no claim against the CDC in such a case for lost time or costs, irrespective of whether it can be demonstrated that the work was being safely undertaken.

The risk assessment should include the following:

- a) the identification of the risks and hazards to the health and safety to which persons may be exposed.
- b) the analysis and evaluation of the hazards identified.
- c) a documented plan and safe working procedures to mitigate, reduce or control the risks identified; and
- d) The monitoring and review plan of the risks and hazards.
- e) The relevant personal protective equipment or clothing.

The Principal Contractor shall ensure that all persons entering the site are informed of all hazards on site; record of this is to be kept on the H&S File.

The risk assessment should take into consideration the following key processes, but not limited to:

- Site Establishment.
- Identification of existing services, exposure and protection thereof.
- Clearing of vegetation along the existing fence-line.
- Work at heights.
- Scaffolding.
- Movement of Construction Vehicles (Inclusive of Bakkies) in the school premises and public roads.
- Accommodation of traffic in the school premises during delivery of equipment and materials.
- Control of access of public to site and access of employees into the work area.
- Concrete batching if ready-mix concrete will not be used.
- All health hazards that can be present during any of the above activities and should include individual dusts, gases, noise, extreme temperatures, illumination, vibration and ergonomic hazards.

Preventative measures must first address the elimination of the hazard or risk. Should PPE be required to reduce risk, the equipment or clothing must be used and be SABS approved?

2.4.6.2 Issue Based Risk Assessment

As circumstances and needs arise, separate risk assessment studies will need to be conducted. These will be associated with a system for the management of change. An additional risk assessment will need to be conducted and submitted to the CDC/SHE Agent for verification when for example:

- a) A new machine is introduced onto site.
- b) A system for work is changed or operations altered.
- c) After an accident or a 'near miss' has occurred
- d) New knowledge comes to light and information is received which may influence the level of risk to employees on site.

2.4.6.3 Continuous Risk Assessment

This is the most important form of risk assessment which should take place continually, as an integral part of day-to-day management.

This should be conducted by frontline construction managers on site and it is essential that formal training be provided to enable this process to be efficient.

The Principal Contractor shall be responsible for making sure that all employees under his / her control are conversant with the content of the Risk Assessment and what appropriate measures have been put in place to either eliminate or reduce the identified risks. The Principal Contractor shall outline to employees what role they are expected to play in the Risk Assessment and control measure process. Records are to be kept of this communication on the construction site H&S File.

2.3.7 Health and Safety Representative(s)

The Principal Contractor shall ensure that at least One (1) Health and Safety Representative is elected and trained to carry out his / her functions on a single construction site. The appointment must be in writing. The Health and Safety Representative shall carry out regular inspection, keep records and report to the construction manager and construction supervisor to take appropriate action. He/she shall attend Health and Safety Meetings when required.

The H&S Representative shall be part of the team that will investigate incidents, accidents & non-conformances.

The Principal Contractor is required to elect and appoint a health and safety representative regardless of the number of employees on site. Such representative shall at all times be on site and report to the full-time Safety Officer, Construction Supervisor and Construction Management Representative.

2.3.8 Health and Safety Committee

Based on the magnitude and duration of this project, no Health & Safety Committee will be formed. However, should the need arise such H&S meetings shall be held as directed by the Client or its representative.

2.3.9 Health and Safety Training

The Principal Contractor shall at project start-up conduct a training needs analysis to ascertain what health and safety training is required. A plan of action should be drafted and included in the H&S file. Once the identified people have attended the training, the Principal Contractor must ensure copies of the certificates are kept on the relevant construction site H&S Files.

2.3.9.1 Induction

The Principal Contractor shall conduct Project Specific inductions to all new employees and visitors on site. Proof of inductions in a form of attendance registers must be kept in the relevant construction site H&S Files.

2.3.9.2 Awareness

The Principal Contractor shall conduct, on site, periodic toolbox talks, preferably weekly or before any hazardous work takes place. The talks shall cover the relevant activity and an attendance register must be kept and signed by all attendees. A record of who attended and the content of the topic will be kept on the site health and safety file as evidence of training.

2.3.9.3 Competency

The Principal Contractor shall ensure that all workers utilised on this project are competent in their various trades and all certification of such individuals are kept in the Safety File on site at all times.

2.3.9.4 General Record Keeping

The Principal Contractor shall keep and maintain Health and Safety records to demonstrate compliance with the OHSS and the OHS Act. The Principal Contractor shall ensure that all records of incidents, spot fines, training etc. are kept on site. All documents shall be available for inspection by the CDC, or the Department of Labour's Inspectors. Each construction site will keep and maintain a site-specific H&S File on site at all times during construction.

2.3.9.5 General Inspection, Monitoring and Reporting

A table of intended inspections is to be included in the H&S plan, including inspection register, the responsible person and frequency. Inspection registers must be kept in each relevant construction site H&S File.

2.3.9.6 *Internal Audits*

The Principal Contractor shall conduct H&S audits of the site Health and Safety Management System, including the sub-Contractor records, to ensure compliance with the OHS Act and OHSS. All sub-contractors on site must be audited at least once within a period of not exceeding one (1) month on site. Records of audits must be kept, and non-conformance reported, investigated and corrective action must be taken to prevent re-occurrence.

2.3.9.7 *External Audits*

The CDC, or its relevant Representative, shall conduct monthly Audits on each site. All documentation held by the Principal Contractor shall be available for inspection. The Principal Contractor shall provide any additional information required. The Principal Contractor is required to participate in the Audit.

2.3.9.8 *Emergency Procedures*

The Principal Contractor shall submit a detailed Emergency Procedure for approval by in the H&S File.

The procedure shall detail the response plan including the following key personnel for each construction site:

- a) List of key personnel,
- b) Details of emergency services,
- c) Actions or steps to be taken in the event of the emergency; and
- d) Information on hazardous material / situation, including each material's / hazardous potential impact or risk on the environment or human and measures to be taken in the event of an accident.

Emergency procedure(s) shall include, but not be limited to, fire, spills, accidents to employees, use of hazardous substances, damage of vital municipal services such as water and electricity etc.

NB: a separate Risk Assessment and Safework Procedure for the Identification, location, exposure and protection of Existing Services is required for submission, review and approval by the CDC H&S Project Manager or the H&S Agent Client in with the relevant members of the Technical Team.

A contact list of all service providers (Fire department, Ambulance, Police, Medical and Clinic, etc) must be maintained and available to site personnel. Furthermore, the Principal Contractor shall consult with the school Management and ensure that his Emergency Preparedness and Response Plan is in line with the existing school's one.

2.3.9.9 First Aid Box and First Aid Equipment

The Principal Contractor shall ensure that it appoints a trained **Level 2 First Aider(s)** on site regardless of number of employees on site. The appointed First Aider(s) are to be sent for accredited first aid training **before** starting on site. Valid certificates are to be kept on site. The Principal Contractor shall provide on-site a First Aid Box, adequately stocked at all times, and ensure that the First Aid Box is accessible and fully controlled by a qualified First Aider. The Principal Contractor shall ensure that there is a qualified First Aider at all times on site.

2.3.9.10 Accident / Incident Reporting and Investigation

The Principal Contractor shall investigate record and report all reportable incidents as per the OHS Act. The Investigations shall be conducted by a competent person appointed in writing. The Principal Contractor shall advise the CDC, H&S Agent and H&S PM and any relevant party immediately, followed up with a written notification, of any medical treatment cases, lost time, disabling incident or fatality. Incident Investigation Report is to be submitted to the CDC H&S PM via the H&S Agent within 7 working days, unless requested otherwise.

2.3.9.11 Unanticipated Hazards

The Principal Contractor shall immediately notify Project Management & Relevant School's Representative of any hazardous or potentially hazardous situations arising during the performance of activities.

2.3.9.12 Personal Protective Equipment (PPE)

A PPE needs analysis is to be conducted in accordance with the HIRA. PPE is to be issued free of charge. The Principal Contractor is to indicate procedure for Lost or Stolen and Worn Out or Damaged PPE. The following PPE shall be used on site as minimum required for everyone on site:

- Steel-Toe Safety Shoes/Boots.
- Hi-Viz Vest in cases where visibility is impaired

2.3.9.13 Occupational Health and Safety Signage

The Principal Contractor shall ascertain and provide adequate on-site Warning, Prohibition, Mandatory and General Signage. The Principal Contractor shall be responsible to maintain the quality and replacement of signage.

2.3.9.14 Permits

The Principal Contractor shall implement a Permit to Work System. The System shall cover the following works:

- Excavations deeper than 1 metre.
- Use of a Hazardous Chemical Substance.

2.3.9.15 Contractors

The Principal Contractor shall implement a Contractor Management System to ensure compliance to the OHS Act and OHSS. The Contractor Management System procedures are to be stipulated in the H&S Plan. The Principal Contractor is to appoint all contractors in terms of the OHS Act and OHSS.

The Principal Contractor shall provide contractors who are proposing to perform construction work for the principal contractor, with the client's health and safety specifications and must ensure that such a contractor has made sufficient provision for health and safety measures during the construction process.

The Principal Contractor shall ensure that no contractor is appointed to perform construction work unless the principal contractor is reasonably satisfied that the contractor that he/she intends to appoint, has the necessary competencies and resources to perform the construction work safely.

Occupational Safety

2.5.1 Excavations, Shoring, Dewatering or Drainage

It is not envisaged that excavations deeper than 150mm will be present on this project. However, should deeper excavations be required, the Principal Contractor shall ensure that barriers and/or safety netting are erected on unattended excavations.

2.5.2 Stacking of Materials

The Principal Contractor shall ensure that there is an appointed stacking supervisor and all materials, all equipment is stacked and stored in accordance with legislation. All materials shall be stocked in the designated area as directed by the Principal Agent/Project Manager. No materials shall be stacked in the school's unauthorised areas and anywhere where it could cause a tripping hazard to workers, school staff and members of the public.

2.5.3 *Speed Restrictions and Protection*

The Principal Contractor shall ensure that all persons in their employ and all those that are visiting the site are aware and comply with the site speed restriction(s). The speed limit is set to not exceed 20km/h when approaching the school premises.

2.5.4 Hazardous Chemical Substances (HCS)

In addition to the requirements in the HCS Regulations, the Principal Contractor must provide proof in the H&S Plan that:

- Safety Data Sheets (SDS's) of the relevant materials/hazardous chemical substances are available prior to use by the Principal Contractor. Mention should be made how the Principal Contractor is going to act according to special/unique requirements made in the relevant SDS's. All SDS's shall be available for inspection by the agent at all times.
- Risk assessments are to be done when new HCS are introduced on site.
- How the relevant HCS's are being/going to be controlled by referring to:
 - Limiting the amount of HCS
 - Limiting the number of employees
 - Limiting the period of exposure
 - Substituting the HCS
 - Using engineering controls
 - Using appropriate written work procedures
- The correct PPE is being used.
- HCS are stored and transported according to SABS 072 and 0228.
- Training with regards to these regulations is conducted.

The H&S plan should make reference to the disposal of hazardous waste on classified sites and the location thereof (where applicable).

The First Aider must be made aware of the SDS and how to treat HCS incidents appropriately.

2.5.5 *Asbestos*

No asbestos work will be required on this project.

2.5.6 *Noise Induced Hearing Loss*

Minimal noise is envisaged on this project, however where noise is identified as a hazard, the requirements of the NIHL regulations must be complied with and means of compliance is to be stipulated in the H&S Plan.

The Principal Contractor is to ensure that noise is minimised to acceptable levels and try to conduct noisy activities at times where it would not make any nuisance to members of the public and

neighbours. Proper planning and finding means of reducing noise levels with regards to these activities is highly encouraged.

Plant and Machinery

2.6.1 Construction Plant

“Construction Plant” encompasses all types of plant including but not limiting to, boring machines, rollers, compactors, generators, compressors, excavators, TLB, front loaders, draglines, and road vehicles with or without lifting equipment etc.

The Principal Contractor shall ensure that all such plant complies with the requirements of the OHS ACT.

The Principal Contractor shall inspect and keep records of inspections of the tools and equipment used on site. Only authorised persons are to use machinery under proper supervision. Appropriate PPE and clothing and as specified by the HIRA, shall be provided and maintained in good condition at all times.

2.6.2 Pressure Equipment or Gas Bottles Including Operations

Not applicable in this project.

2.6.3 Fire Extinguishers and Fire Fighting Equipment

The Principal Contractor shall provide adequate regularly serviced fire extinguishers located at strategic points on site. The Principal Contractor shall keep spare serviced portable fire extinguishers. Safety signage shall be posted up in all areas where fire extinguishers are located. The Principal Contractor shall have adequate persons trained or competent to use the Fire Fighting Equipment. The Principal Contractor shall have its own Fire-fighting equipment at all times.

2.6.4 Hired Plant and Machinery

The Principal Contractor shall ensure that any hired plant and machinery brought to site is safe for use. The necessary requirements as stipulated by the OHS ACT as well as those that are stipulated by this OHSS, shall apply. The Principal Contractor shall ensure that operators hired with machinery have proof of competency to operate the machinery, proof of medical certificate of fitness and undergo a health and safety induction, appropriate toolbox talks and be issued with the necessary PPE.

2.6.5 Work at elevated positions

The Principal Contractor shall ensure that a reasonably detailed Fall Protection & Rescue Plan and HIRA has been undertaken and submitted for approval to the CDC before commencement on site.

Where scaffolding is to be used, the Principal Contractor shall appoint and train scaffold inspectors and erectors to ensure all scaffolding is erected according to SANS 10085.

2.6.6 Form and Support Work for Structures

It is not envisaged that this type of work will be in this project.

2.6.7 Lifting Machine and Tackle

The Principal Contractor shall ensure that lifting machinery and tackle is inspected before use and/or on a monthly basis. The Principal Contractor shall have lifting machinery and tackle inspector who will inspect the equipment daily or before use, taking into account that:

- All lifting machinery and tackle have a safe working load clearly indicated.
- Records of inspections and load testing certificates are kept on site.
- There is proper supervision in terms of guiding the loads which includes a trained banks man to direct and check lifting tackle if it is safe for use.

2.6.8 Ladders and Ladder work

The Principal Contractor shall ensure that all ladders are numbered and inspected regularly keeping record of inspections. It should be noted that Aluminium ladders are preferred to wooden ladders.

2.6.9 General Machinery

The Principal Contractor shall comply with the Driven Machinery Regulations, which include inspecting machinery regularly, appointing a competent person to inspect and ensure maintenance, issuing PPE or clothing and training those that use machinery and enforce compliance.

2.6.10 Portable Electrical Tools / Explosive Power Tools

The Principal Contractor shall ensure that use and storage of all explosive powered tools and portable electrical tools are in compliance with relevant legislation. The Principal Contractor shall consider that:

- A competent person undertakes routine inspections.
- Only authorised persons use the tools.
- There are safe working procedures applied.
- Awareness training is carried out and compliance is enforced at all times; and
- PPE and clothing are provided and maintained.

2.6.11 High Voltage Electrical Equipment and any electrical works

All electric work should be carried out by a competent person. All CoC's must be produced and filed in the OHS File before commencement of work.

2.6.12 Public Health and Safety

Having being aware that the project is taking place in a fully functional Government school, the Principal Contractor shall ensure that each person working on or visiting the work areas, shall be made aware of the dangers likely to arise from on site activities and the precautions to be observed to avoid or minimise those dangers. Appropriate health and safety signage shall be posted at all times.

The Principal Contractor have a duty in terms of the OHS ACT to do all that is reasonably practicable to prevent members of the public and others from being affected by the construction processes to be aware and put preventative measures in place.

The visitors to site shall go through a visitor's 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 Principal Contractor shall ensure that there is no part of the school's perimeter fencing which will not adequately closed at the end of each working day and during weekends. Temporary perimeter fencing must be maintained at all times to prevent unlawful and uncontrolled access into the school.

2.6.13 *Night Work*

The Principal Contractor shall not undertake any night work.

2.6.14 *Facilities for Safekeeping and Eating Area (Mess Room) for workers*

The Principal Contractor shall provide facilities for safekeeping. Where possible, there shall be a temporary shaded structure that will serve as a mess room or eating area.

The structure should be suitable for use during adverse weather such as rain or should this not be possible an alternative must be sought and an approval from, SHE Project Manager will be required.

The weather conditions might be unsuitable for workers to be exposed to, e.g. in rainy season. In terms of the OHS ACT, employers have to provide employees with facilities for safekeeping.

2.6.15 *Transport of Workers*

The Principal Contractor shall refer and comply with the requirements set in the National Road Transport Regulations, 2000. The Principal Contractor shall, and not be limited to:

- Not transporting persons together with goods or tools unless there is an appropriate area or section to store them.

- Not transport persons in a non-enclosed (top) vehicle, e.g. truck, there must be a proper canopy (properly covering the back and top) with suitable sitting area. Workers shall not be permitted to stand or sit at the edge of the transporting vehicle.
- Not transporting workers on the back of open bakkies.
- Provision of a serviced portable fire extinguisher in vehicles at all times.

It is vital that all those exposed to the hazards or risks are made aware of the risk and what control measures have been put in place to prevent the occurrence of incidents.

Occupational Health

Exposure of workers to occupational health hazards and risks are very common in any work environment, especially in construction. Occupational health hazards and risks exposure is a major problem, and all Contractors are to ensure that proper health and hygiene measures are put in place to prevent exposure to these hazards and risks. The occupational hazards and risks may enter the body in three ways:

- Inhalation through breathing e.g. cement dust.
- Ingestion through swallowing maybe through food intake.
- Absorption through the skin e.g. painting or use of thinners.

The Principal Contractor should ensure that Occupational Hygiene surveys are conducted as per the Occupational Health and Safety Act to ensure employees is not exposed to hazards. Risk Assessments should identify areas where surveys are to be conducted.

2.7.1 Medical Service

The Principal Contractor shall ensure that all employees undergo Pre-Employment medical examination and certified fit for duty and conduct Exit- medicals upon demobilization. These medical examinations must be conducted by an Occupational Health Practitioner and fitness certificates must be kept in the H&S File.

Any person normally working on the site and subsequently away from site for more than one month shall be required to undergo another medical upon return.

2.7.2 HIV/Aids Programme

CDC commits itself to providing guidance and leadership in the implementation of HIV and AIDS, TB and Sexually Transmitted Infections (STI) programmes by all stakeholder organisations. It is a requirement that Principal Contractors shall provide HIV/Aids awareness training and roll out an HIV/Aids Programme for all employees.

It is required that Principal Contractor provide an HIV/Aids Coordinator who speaks and understands all the local languages spoken by the Workers and who shall be on site during all stages of the construction period.

The Principal Contractor shall ensure that the HIV/AIDS Coordinator has been trained on the basic HIV/AIDS information, the support services available and the necessary skill to handle questions regarding the HIV/AIDS programme in a sensitive and confidential manner.

The HIV/Aids Awareness Programme Requirements:

- HIV Programme Coordinator appointed
- Appoint and train Peer Educator/s
- Male condom dispensers, sufficient male condom available and is it placed in high trafficked areas.
- Female condom dispenser, sufficient female condoms available and is it in high trafficked area
- All types of HIV/Aids related posters displayed in a high trafficked area and in a good condition.
- HIV/Aids Awareness workshops/toolbox talk
- HIV/Aids Prevention Measures
- HIV/Aids Care and Support
- Free voluntary HIV testing

Principal Contractor must liaise with the Hospital's HIV/AIDS Champion. No Principal Contractor shall require an employee, or an applicant for employment, to undertake an HIV test in order to ascertain that employee's HIV status. As provided for in the Employment Equity Act, employers may approach the Labour Court to obtain authorisation for testing.

All Personnel must be encouraged to undertake voluntary testing. Voluntary Testing and Counselling (VCT) must be encouraged by all Principal Contractors.

Penalties

Should, at any time, the works, or part of the works, be stopped due to unsafe acts or non-compliance with the Clients or PCs OHS Plan; neither the PC nor any other Contractor shall have a claim for extension of time or any other compensation.

In cases of any **repetitive non-conformances**, the non-conforming party shall be penalised as per the table below:

The following constitute examples of the types of non-conformances that will attract penalties:

Minor:	Medium:	Severe
Fine: R50/count		

	Fine: R500/count and a non-conformance	Fine: R5000/count, a non-conformance and/or activity stoppage
Non-use of basic PPE supplied (e.g. Overalls, Safety Shoes, Hardhats) per person	Toilets not supplied or regularly serviced; lack of drinking water	Principal Contractors working without OHS Plan approval
Non completion of registers for plant and equipment on site	Principal Contractors not audited	Workers transported in contravention of the OHS Plan or legal requirements
Lack of OHS signage at work areas	Working without training or the appropriate OHS Method Statements / SWP / HIRA	Invalid/expired Letters of Good Standing with licensed Compensation Insurer
Tools and equipment identified in poor condition during inspections	Non-conformances identified during the previous audit and not addressed within the agreed time frame	Allow people to work at heights without proper training and PPE
	No internal monthly Audit Report on file.	Fall Arrest Harness not tied off / worn when a risk of falling exists
	No Medical Certificates of Fitness for relevant workers	Threat to the OHS of persons
	Unsafe work at heights	3 rd Offence on Unsafe Work at Heights
	Poor Housekeeping	Failure to submit consolidated H&S report and relevant document.

All penalties shall be communicated to the Principal Contractor and the relevant Professional Team Members on a monthly basis. The Principal Contractor will be expected to confirm receipt of such penalty/ies. The total deductible amount as per penalties issued shall be tabled in the Monthly Progress Meeting for noting purposes. All monthly penalties shall be deducted from the Certified Certificates submitted by the Principal Contractor.

Close - Out Requirements

Upon completion of the project, the Principal Contractor shall submit a well-documented consolidated H&S file (to be in electronic form) to the appointed H&S Agent, confirming the H & S history of the project.

The following **summary** of information is required, filed in a disc format, but not limited to:

- Monthly H&S Agents H&S audit reports
- Minutes of the Health and Safety meetings
- Incidents & IOD
- WCA Claims
- Total Man-hours and DIFR
- Monthly H&S audit reports (Internal)
- Environmental rehabilitation status
- H&S Non-conformances (current/outstanding)
- Principal Contractor's project SHE File

Handover of the consolidated H&S file can only commence once all personnel has been demobilized and nil man-hours are recorded. Electronic submission must be provided to the CDC H&S Project manager.

The H&S Agent will evaluate the H&S performance of the Principal Contractor i.e. compliance, performance, quality and refer in a cover letter which will be added to the Principal Contractors consolidated file.

Annexure

Acknowledgement:

I, _____ representing

_____ Principal Contractor have
satisfied myself with the content of the Occupational Health and Safety Specification (OHSS)
and shall ensure that the Principal Contractor and his / her personnel comply with all relevant
obligations in respect thereof.

Signature of Principal Contractor

Date

Signature of Agent

Date

Comments:

BILL OF QUANTITIES FOR HEALTH AND SAFETY

	Description	Unit	Qty	Rate	Total
1.	Notify the provincial director in writing of the commencement of construction work with and including submission of a letter of receipt and acknowledgement of the aforementioned notice by the director of his/her representative	item	01		
2.	Allow for the necessary Workman's Compensation Fund or FEM contributions for the duration of the project with and including renewals	item	01		
3.	Allow for the preparation and approval of project-specific H&S Plan & File [CR 7(1)(a)]	item	01		
4.	Allow for the implementation and maintenance of project-specific H&S Plan & File. [CR 7]	Months	10		
5.	Allow for the appointment of a Full-Time Competent Construction Health & Safety Officer/ CHSO registered with SACPCMP (who has 2 or more years working experience) to assist in the control of all health and safety related aspects on site as per [CR 8(5)]	Months	10		
6.	Provide for appointment of responsible and competent person/s to manage and supervise the works and administer and enforce health and safety on site as per [CR 8(1), (2), & (7)]	Months	10		
7.	Allow for provision of telecommunication facilities for the appointed Construction Health & Safety Officer	Months	10		
8.	Allow for provision of Basic Emergency Preparedness and Response equipment & at least Level 2 First Aider/s	Months	10		
	Provide, supply and maintenance for each worker the following SANS approved personal protective equipment & clothing as per the site-specific risk assessments:	Months	10		

	(Including but not limited to the following).				
9.	Hard Hats (High Density polyethylene, & 6-point lining)	As per required number			
10.	Overall/work suit (100% Cotton)	As per required number			
11.	Safety boots/shoes (Steel-Toe)	As per required number			
12.	Gumboots Boots (Steel-toe)	As per required number			
13.	Safety gloves	As per required number			
14.	Ear Plugs/Muffs	As per required number			
15.	Dust Mask (at least FF2 type)	As per required number			
16.	Respirators	As per required number			
17.	Safety goggles	As per required number			
18.	Personal Fall arrest and rescue equipment with and including lifelines and associated equipment	As per required number			
19.	High visibility reflective vests and/or bibs	As per required number			
20.	Temporary handrails, toe boards other than for access scaffolding	As per required number			
21.	SANS approved safety netting (orange color with minimum of 1,2 meters high)	As per required meters			
22.	Allow for Pre-employment medical examinations	All employees	All employees		
23.	Allow for exit medical examinations	All employees	All employees		
24.	Mobile toilets and waste removal	As per need			
25.	First Aid Box	As per need			
26.	Fire Extinguisher Equipment	As per need			
27.	1200mm surveyor poles for Barricading net	As per need			

28.	Drip trays	As per need			
29.	Waste bins	As per need			
30.	Site Signage				
31.	Provision for drinkable water				
	HEALTH AND SAFETY EDUCATION				
32.	Allow for HIV/AIDS awareness and Implementation programmes, including STI and TB	Months	01		
33.	Allow for all compulsory health and safety awareness programme (e.g. Inductions, toolbox Talks, Safety Promotions, H&S related training, etc.)	Months	01		
	ENVIRONMENTAL				
34.	Provide for adequate handling and storage of materials so as to minimize contamination of ground, air or water.	Item	1		
35.	Provide for the adequate and safe collection and disposal of waste material from site by an approved method.	Item	1		
	Provide Facilities and Eating Area for workers.	Item	1		
36.	Provide for rehabilitation on completion of site areas and temporary access routes not covered by construction or landscaping specifications.	Item	1		
	COMPULSORY BREAKDOWN FOR THE ADJUSTMENT OF PRELIMINARIES				
37.	Value Related	Item			
38.	Fixed Value Related	Item			
39.	Time Related	Item			
40.	TOTAL				

PART C3.4 – BASELINE RISK ASSESSMENT



Baseline Risk Assessment:

**FOR CONSTRUCTION OF A NEW EARLY
CHILDHOOD DEVELOPMENT CENTRE COBOSI PJS
CDC/329/24**

Risk Assessment Nº
CDC-SBU- BRA-070-23

Classification: Public

30 January 2023



DOCUMENT INFORMATION SHEET

Title of Document : Baseline Risk Assessment for the Construction of
New Early Childhood Development Centre-
Cobosi PJS

Type of Document : Baseline Risk Assessment

Document Number : CDC-SBU-BRA-070-23

Prepared by : P. Zikizela

Typed by : P. Zikizela

Business Unit : Operations

Prepared for : Bidders/Service Providers

Date of Issue : 30 January 2023

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DOCUMENT CONTROL SHEET

The purpose of this form is to ensure that documents are reviewed and approved prior to issue. The form is to be bound into the front of all documents released by the Coega.

PROJECT NAME : CONSTRUCTION OF COBOSI PJS
DOCUMENT TITLE : BASELINE RISK ASSESSMENT
DOCUMENT No. : CDC-SBU-BRA-070-23

SIGNING OF THE ORIGINAL DOCUMENT

We, the undersigned, accept this document as a stable work product to be placed under formal change control as described by the Procedure for Control of Documented Information.

ORIGINAL	Prepared by	Reviewed by	Approved by
Date: 30.01.2023	Name: P. Zikizela Signature: 	Name: N. Mdikane Signature: 	Name: P. Zikizela Signature: 

Distribution:	Coega
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This document, and the information or advice which it contains, is provided by the SHEQ Business Unit solely for the use by the Board of Directors of the Coega Development Corporation (Pty) Ltd and Coega and for reliance by its Executive Management and the Board in performance of that Business Unit's duties.

BASELINE HAZARD IDENTIFICATION AND RISK ASSESSMENT FOR CONSTRUCTION A NEW EARLY CHILDHOOD DEVELOPMENT CENTRE: CDC-329-23

This Risk assessment is based and applicable to the requirements of the Construction Regulations 2014 and any other applicable regulations pending the scope of works. The Principal Contractor must therefore be mindful to ensure that these regulations are integrated to the risk assessments.

WORK TASKS <i>Describe the tasks involved</i>	HAZARDS/ RISKS IDENTIFIED* <i>Include relevant details about the energy where applicable and leave blank if there are none</i>	CONTROL/ PREVENTATIVE MEASURES <i>Detail controls or control guides to be implemented, based on the hierarchy of control options</i>	RISK ANALYSIS <i>With Controls</i>		
			L	I	R
Location, exposing and protection of known and unknown existing underlying/overhead services	<ul style="list-style-type: none"> • Tele communication lines, underground water and sewage. Overhead and underground power lines and any other services • Possible damage to property e.g. water line or electrical supply which could also lead to disruption of municipal services. 	<ul style="list-style-type: none"> • To obtain relevant drawings. • Prepare a risk assessment and safe work procedures and or method statement • Locate and identify existing services • Expose and safeguard services. • Competent supervision and adequate pre task training required. • All excavations open overnight / non-working days to be barricaded or fenced at least 1 meter in height. 	2	2	Med

Site establishment	<ul style="list-style-type: none"> • Damage to Construction equipment, vehicles, heavy lifting equipment. • Clearing and grubbing • Erection of facilities • Erection of applicable signage • Use of ablution facilities on site • Provision of drinkable water • Provision of waste bins • Perimeter fencing • Electrical site power supply etc. 	<ul style="list-style-type: none"> • The Principal contractor will be required to develop and submit prior to commencement of works a risk assessment, health and safety plan, the method statements and all relevant supporting documentation to ensure that all overall activities are properly planned. • Ensure that sites are suitably and sufficiently fenced off and provided with controlled access points to prevent the entry of unauthorized persons. • Provide a detailed erection methodology of the kwik-space temporary site office prior the activity. • COC to be issued for electrical installations • Correct disposal of site waste • Task to be done according to EMP • Tasks to be supervised and ; • DSTI's should be communicated to the workforce before works commence • Site establishment checklist should be filled in by competent person 	2	3	Hi
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<p>Site Access & Drivers on site</p>	<ul style="list-style-type: none"> Possible collision of vehicles and people, especially learners being run over by vehicles and/or mobile plant while entering/exiting the school. Un-roadworthy vehicles, incompetent drivers, drunk drivers, road and weather conditions, other road users 	<ul style="list-style-type: none"> Erect a separate access gate and perimeter fence for construction from the school entrance Traffic movement to be observed and manually controlled by flag personnel where necessary and temporary road signage should be displayed. Warn possible visitors to site of the current heavy construction traffic at the entrance/exit point of the site. Vehicles are checked for roadworthy and safety before are allowed on site. Drivers should be tested for alcohol in regular basis. Warning devices, amber lights should be installed and training should be conducted. All plant operators will be required to provide their valid competency certificates and proof of medical certificates of fitness. Prestart inspection will be conducted on all plant prior use A contractor must ensure that all employees and or visitors undergo health and safety induction and wear PPE Unfit for site mobile plant should be taken off site 	2	3	Hi
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Bulk earthworks/ excavations	<ul style="list-style-type: none"> Multiple minor injuries or permanent injuries due to installing grey water soak ways and sand pits Collapsing of excavations Falling into excavations Unbarricaded open excavations Water filled excavations 	<ul style="list-style-type: none"> The bulk excavation work is to be solely undertaken by competent person /contracted party / personnel with a detailed risk assessment and work method. Where excavation work is to be performed, notification to the Provincial director at least 7 days before work is to be carried out. A competent person to supervise work and inspect excavations using the applicable checklist No holes or trenches should be left open as they will pose risk to Leaners, Public and animals Full compliance to the Construction Regulations, 2014 section 13 (1) and (2) 	2	3	Hi
General construction works	<ul style="list-style-type: none"> Various injuries, equipment failure, exposure to deep excavations, bushes, holes and snakes hazards, health hazards, environmental impacts etc. 	<ul style="list-style-type: none"> All works to be carried out under supervision by a competent person who has been appointed in writing and aware of all the dangers involved in the operation and conversant with the precautionary measures to be taken in the interest of health and safety The contractor to ensure that all persons entering the site are informed of all hazards on site Issue based Risk assessment; continuous risk assessment should take place continually as an integral part of day to day management Communication of SWP, Method statements, Risk assessments, DSTI's to all the workforce Inductions and medical certificates of fitness to be conducted before works commence 	2	3	Hi

Dismantling of old fencing	Various injuries, cuts, bruises, muscle sprains, trip and fall, fatigue	<ul style="list-style-type: none"> The plan is to be project specific and provide a systemic approach towards eliminating or reducing the risk of trips and falls caused by holes, uneven ground level, and bushes. Protection measures and methods should be taken prior to the commencement of work. No holes or trenches should be left open as they will pose risk to Leaners, Public and animals No nails, wires or any other equipment or tools should be left behind to cause injuries to the public Full compliance to Regulation 14 (Demolition work) of Construction Regulations, 2014 and appointment of Demolition supervisor 	2	2	Med
Community unrest	<ul style="list-style-type: none"> Property damage, production delays, fire hazards 	<ul style="list-style-type: none"> Transparency in CDC policies and procedures, including payment processes Clear communication channels and strategies Security personnel Involvement of ISD/ PSC/ law enforcers 	2	2	Med

Public road and community members	<ul style="list-style-type: none"> • Injuries to pedestrians and including Learners and Educators • Possibilities of collisions, • Exposure to dust eruptions • Possibilities of fuel leakages resulting in soil contamination 	<ul style="list-style-type: none"> • Every construction site should be organized in such a way that pedestrians and vehicles can move safely and without risk to health and safety • Every traffic route is where necessary, indicated by suitable temporary road signs. • All construction vehicles to be equipped with automatic acoustic reversing alarms and amber lights • All construction vehicles or mobile plant travelling, working or operating on public roads comply with the requirements of the National Road traffic Act, 1996. • All site mobile plant to comply to designated construction site speed limits/ flag personnel to be present • All traffic accommodation on site should be done according to the approved Traffic management plan 	2	3	Hi
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Concrete works	<ul style="list-style-type: none"> Concrete mixing for walkways, play areas, v-drains, chambers, manhole or drain systems, concrete benches, verandas, storm water drains, detention ponds, installation of stand pipes and trust blocks and gate valves should be done according to the works method statement Building a water tank stands for rainwater harvesting Environmental impacts Skin irritation 	<ul style="list-style-type: none"> Wearing of proper PPE Supervision to be prioritized during task Concrete mixing grid should be erected to avoid soil contamination Correct disposal of excess concrete Works should be done by a competent concrete mason 	2	2	Med
Brickworks	<ul style="list-style-type: none"> Poor housekeeping Muscle pains Cuts/bruises Incompetent workers Muscles sprains as a result of manual repetitive handling 	<ul style="list-style-type: none"> Proper PPE should be used Competent bricklayer Proper stacking and storage practices encouraged Housekeeping register should be done Bricks should not be stacked on path/driveways Stacked bricks should not be higher and should be barricaded off 	2	2	Med

Electrical, mechanical installations and associated external works	<ul style="list-style-type: none"> • Installing burglar gates • Assembling prefabs • Erection of elevated water tank tower • Working at heights • Electrocutions • Trip and falls and muscle strains 	<ul style="list-style-type: none"> • Proper and adequate PPE should be worn • Supervision of task should be prioritized • Using suitable handheld tools • Using welding screens when welding • Fall protection plan/developer/risk assessment available and communicated • Working at heights medical certificates should be done • Wearing safety harnesses 	2	3	Hi
Elevated works	<ul style="list-style-type: none"> • Erection of elevated water tank tower, Roof works • Risk of falling from heights • Scaffolding collapsing resulting in multiple injuries (bone fractures, fatalities etc) 	<ul style="list-style-type: none"> • Fall protection plan/developer/risk assessment available and communicated. Compliance with CR 10(1) • Working at heights medical certificates should be done • Proper PPE should be worn • Supervision of task • Usage of safety harnesses • Scaffolding supervisor/erector 	3	3	Hi

Landscaping, trees and grass	<ul style="list-style-type: none"> • Clearing and grubbing • Dust eruption/exposure to dust • Trenching/ digging of holes/repetitive manual handling • Planting of trees and grass, Lifting of heavy material/equipment 	<ul style="list-style-type: none"> • Supervision of task should be done • Wearing correct PPE • Use of suitable tools • Excavation checklist should be filled in • Task should be done by competent personnel • Safe work procedures, DSTI's etc. should be communicated 	2	2	Med
Lifting of heavy material/equipment	<ul style="list-style-type: none"> • Offloading and moving of playground equipment • Lifting and moving of furniture • May result in muscle pains • Trip and falls/wrong footing • Pinch points 	<ul style="list-style-type: none"> • Supervision of task • Wearing correct PPE • Availability of spotters when moving heavy equipment/material • Competent personnel to do the task • Sharing of heavy loads amongst workers 	1	1	Low
Water reticulation pipe laying	<ul style="list-style-type: none"> • Use of mobile or manual labor may cause pipes to swing out of control and fall therefor • Muscle strains/ trip and fall/ pinch points 	<ul style="list-style-type: none"> • Staying clear of mobile plant when pipes are being moved, there must be no one in the trench during task • Supervision of task should be prioritized • Wearing correct PPE • Rotation of workers • Competent personnel to do the job 	1	1	Low

Fire prevention on site	<ul style="list-style-type: none"> • Untrained personnel using fire equipment to extinguish the fire. • Non-availability of firefighting equipment • Unavailability of fire marshals/coordinators • Unclear emergency evacuation emergency procedures 	<ul style="list-style-type: none"> • Firefighting team responsible for fire control on site should be trained how to operate the fire extinguishers and should be familiar with the equipment locations. • Firefighting equipment to be sufficient and displayed in necessary locations and unobstructed & inspected and serviced regularly • All flammable substances should be stored far away from the combustible material • Competent fire marshal should be appointed • Fire emergency evacuation plan should be clear and communicated to all the workforce 	2	2	Med
Stacking and storage	<ul style="list-style-type: none"> • Incorrect stacking and storage • Hazardous/ flammable material should be separated from combustible material 	<ul style="list-style-type: none"> • Task should be supervised • Competent person to do the task • Checklist/registers to be done regularly 	2	2	Med

Use of hand tools	<ul style="list-style-type: none"> Electrical shock Mushroom heads Loose handles Loose screws Cuts/ lacerations Exposed electrical wires 	<ul style="list-style-type: none"> Task to be supervised Competent person to do the task Checklist and registers to be done by a competent person Wearing correct and adequate PPE Unsuitable tools to be taken offsite 	2	2	Med
Ergonomic	<ul style="list-style-type: none"> Ergonomic strain- body position (back, neck, shoulders) Back pains Fatigue Incorrect sitting/working position 	<ul style="list-style-type: none"> Monitoring of employees and retraining (toolbox talks) Provision of additional employees to assist/rotation Provision of suitable chairs 	1	1	Low

Use of mobile plant/ mobile plant refueling	<ul style="list-style-type: none"> • Fire hazard • Soil contamination • Collusion • Incompetent drivers/operators • Defective machinery 	<ul style="list-style-type: none"> • Fire extinguishers should be displayed in prominent areas • Task should be supervised • Competent drivers/operators should be appointed • Traffic accommodation with flagman should be in place • Drip trays or bunds should be available/built 	2	2	Med
Working next to public road	<ul style="list-style-type: none"> • Getting struck by passing vehicles • Exposure to exhaust fumes/dust • Exposure to noise from passing vehicles • Exposure to flying objects 	<ul style="list-style-type: none"> • Wearing proper reflective clothing • DSTI's should be communicated • Wearing proper and adequate PPE • Maintaining a safe distance from the traffic • Working under conducive weather conditions 	3	3	Hi

Manual trenching	<ul style="list-style-type: none"> • Back pains • Getting struck by pik/shovel • Flying objects • Hitting underlying services • Using defective tools 	<ul style="list-style-type: none"> • Maintaining a safe work distance • Wearing proper PPE • Defective tools are taken offsite • Checklists/registers should be done regularly • Usage of detailed drawing for underlying services • Task should be supervised 	2	2	Med
Hazardous Substances (Painting & Plastering)	<ul style="list-style-type: none"> • Cement fumes • Paint fumes • White fingers • Skin Irritation • Inhalation 	<ul style="list-style-type: none"> • Use of correct gloves • Dust masks • MSDS to be communicated • Eye protection • Proper stacking of cement • Proper stacking of paint • No smoking signs on storage • Availability of Fire extinguisher • Labelling of containers 	2	2	Med

Likelihood of Transpiring (L)		Impact if Transpiring (I)		Risk Rating (R) (order of importance)	
1	Low likelihood	1	Low impact	2	Low risk
2	Medium likelihood	2	Medium impact	3-4	Medium risk
3	High likelihood	3	High impact	5-6	High risk

PART C3.5 – SOCIAL & ECONOMIC DELIVERABLES

C3.5 Social, Economic and Wage Deliverables

The Coega Development Corporation (CDC), referred to hereinafter as the Implementing Agent, has placed a number of contractual obligations on contractors in fulfilling the objectives for the socio-economic deliverables on the project.

It is the desire of the Client and the Implementing Agent that Employment Relations practices, procedures and processes that are implemented within the project are uniform and of the highest possible standard. The objective of this approach is to promote an environment that is healthy, safe, efficient, productive, harmonious, is free of disruption and localises opportunities for communities in close proximity to the project. Such an environment will assist Contractors in implementing their projects successfully.

All contractors, sub-contractors (including SMMEs) and site service providers within the project have a role and responsibility in achieving this objective and accordingly, the Main Contractor is wholly responsible in ensuring the provision, implementation and maintenance of the required socio-economic deliverables.

To this end, certain mechanisms and structures have been put in place to ensure that all role-players in the project are aware of the socio-economic and labour requirements and obligations that are contractually binding on them, and that these are properly implemented and complied with.

The Implementing Agent shall deploy a part-time Project Social Facilitator to support the project in achieving the socio-economic objectives. The primary role of the Project Social Facilitator is to:

- Consult with the community prior to construction commencement;
- Facilitate the establishment of the Project Support Committee (PSC);
- Source candidates to fill the Community Liaison Officer (CLO) position.

A key component of the socio-economic requirements and obligations is the proper and timely completion of Standard Labour Documentation and the provision of opportunities to local community members. The formats of the Standard Labour Documentation and the support services will be made available in the contract commencement meeting.

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The documentation included in specifications outlined below will provide detail to the prospective contractor in order to ensure a comprehensive understanding of the

socio-economic specifications and labour management protocols in effect, and allows for the prospective Contractor to tender accordingly.

Labour Management Specification Data

The Specification Data provided herein shall have precedence in the interpretation of any ambiguity or inconsistency between it and any other applicable contract instrument addressing the same or similar deliverable.

The Contractor shall ensure full achievement of the following deliverables throughout the construction duration:

Deliverable L1: Employment of local resources - provide employment opportunities to targeted labour;

L1.1: Labour Risk Assessment

L1.2: Employment

L1.3: Recruitment

L1.4: Wages

L1.5: Inductions

L1.6: Employment Contracts

L1.7: Labour mobilisation and demobilisation

L1.8 Employment of Intern

Deliverable L2: Employment of the Community Liaison Officer;

Deliverable L3: Procure and manage a training provider to provide specific training for designated persons;

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Deliverable L4: HIV/AIDS Awareness – the Contractor shall be responsible for promoting HIV/AIDS Awareness on site;

Deliverable L5: Health and Safety Awareness - the Contractor shall be responsible for promoting Health and Safety on site;

Deliverable L6: Labour Management System Administration – the Contractor shall ensure that employment and training records are loaded onto the Labour Management System;

Deliverable L7: The Contractor shall ensure achievement of socio-economic deliverables and compliance to the established labour management protocols on the whole project (inclusive of all sub-contractors), for the full duration of the project;

Deliverable L8: Community participation;

Deliverable L9: On-site communication structures

The Main Contractor shall ensure the full application of this specification on all sub-contractors (incl. SMME's) and on-site service providers and accordingly must ensure the inclusion of this specification in all tender documents.

Deliverable L1: Employment of local resources - Provide employment opportunities to targeted labour.

L1.1 LABOUR RISK ASSESSMENT:

Prior to construction commencement, the Main Contractor is required to conduct a labour risk assessment to highlight the most significant labour risks associated with the project (at least 10 higher risks) and provide the mitigation to deal with each of these identified risks.

The template for undertaking the risk assessment will be provided by the Implementing Agent at tender award.

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The risk assessment report is to be submitted by the Main Contractor to the Principal Agent for the Implementing Agent's Social Facilitator for review and endorsement, within 14 calendar days of the tender award.

L1.2 EMPLOYMENT:

The minimum number of construction personnel to be employed on the project is **20**. This number includes all seconded personnel.

L1.3 RECRUITMENT:

The Contractor's deliverable is the minimum of 70% labour employed on the project to be residents of Target Areas 1 & 2 as specified below. Priority employment must be provided to residents from Target Area 1.

The Contractors are permitted to deploy a maximum of 30% non-local seconded labour (i.e. labour who usually residing outside Target Areas (1 & 2) on the Project.

Target Areas:

- **Target Area 1** shall be the geographic area which falls under the jurisdiction of the **Engcobo Local Municipality**.
- **Target Area 2** shall be the geographic area excluding Target Area 1, which falls under the jurisdiction of the **Chris Hani District Municipality**;

Preference shall be granted to competent labour residing in Target Area 1 above labour residing in Target Area 2.

L1.4 WAGES:

The Contractor shall use the Job & Wage schedule to indicate the minimum wage rates to be applied across the different grades/levels on the project as a whole, inclusive of all on site Sub-contractors' and Service Providers' labour. The intention is to promote the application of standard wage rates per job function, across the project.

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The rate of pay for General Worker (Task Grade 1) should not be less minimum wage rate, Wages shall be paid in arrears into each employee's own bank account. The Main Contractor shall elect whether such wage payments are effected at monthly or fortnightly intervals, where after uniformity of application shall be effected by the Contractor across the project as a whole, including all sub-contractors and service providers.

The wage payment detail, including all deductions made, must be provided in acceptable pay-slip format on or immediately before the scheduled payday. No cash payments may be made for safety reasons, and as such a condition of employment for labour shall be the possession of an active personal bank account.

The timing and quantum of the annual wage increases shall be in accordance with the prevailing arrangement in the Industry, yet may not be less than the latest available year-on-year Consumer Price Index (CPI) as issued by Statistics South Africa at the time of the wage rate increase.

The Main Contractor is required to introduce measures to effectively mitigate the risk of delayed / partial / non-payment of wages and statutory deductions by on-site sub-contractors and on-site service providers.

L1.5 INDUCTIONS:

All project personnel on site must attend an Induction presentation on a fully paid time basis, before commencing work on site. The Induction will be provided by the Contractor and shall include the Project overview, performance expectations and key labour management aspects including the general health, safety and environmental practices to be employed on the Project.

The Induction presentation must be provided for all construction personnel by the Contractor, prior to each individual commencing employment on site.

All Contractors and Service Providers employing personnel on the construction site must ensure that all appropriate life skills and in particular Health, Safety & Environmental awareness training specific to their construction activities is conducted prior to individual's work commencement, and during the course of employment on site.

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Attendance registers of all personnel attending Site Induction and any subsequent awareness training must be retained on site by the Main Contractor for the duration of the construction project, and loaded onto Coega's Ncedo Labour Management System.

L1.6 EMPLOYMENT CONTRACTS:

All additional hourly-paid construction personnel on site must each sign an employment contract before commencing employment on site.

The standard form of the limited duration employment contract will be provided by the Implementing Agent, in consultation with the Main Contractor, as the standard limited duration employment contract for use on the project.

L1.7 LABOUR MOBILISATION & DEMOBILISATION:

The Contractors must make adequate provision for mobilising and demobilising all personnel employed on the Project.

L1.8 EMPLOYMENT OF INTERN

The Contractor and Consultant shall employ a minimum of zero candidate technical / professionals for the duration of the construction.

Deliverable L 2: Employment of the Community Liaison Officer

L2.1 Community Liaison Officer Appointment:

Immediately prior to site establishment, the Main Contractor must employ the services of a Community Liaison Officer (CLO).

The shortlisting of appropriate CLO candidates should require the guidance of the Implementing Agent's Social Facilitator and the support of the Project Support Committee, yet the Contractor

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shall make the final selection decision after receiving the prior written CLO appointment approval of the Implementing Agent.

The CLO shall receive a basic rate of pay not less than **R 7 500.00** per month. All statutory requirements/deductions are excluded from this amount. The Contractor must make a further provision of 27% of the basic monthly rate to cover these items.

The contractor shall provide the necessary tools of the trade for the CLO to operate effectively. This will include office space and all reasonable furniture and equipment, including controlled access to an internet connected computer, a facsimile machine and a cell phone.

If, in the event that the contractor terminates the CLO's contract of employment prior to project completion (limited to proven misconduct / poor performance which would normally result in fair termination), the Contractor is required to urgently employ a suitably competent and experienced CLO, through the same process, within a 4-week period on a full-time basis for the remaining duration of the Project.

Deliverable L3: Procure and manage a training provider/s to provide specific training for designated persons.

L3.1 WORK READINESS AND LIFE SKILLS TRAINING

The Contractor must tender for Work Readiness and Life Skills Training to benefit non-seconded labour.

This training should be conducted prior to labour commencing work on site.

All costs of tuition, venue and trainee refreshments must be provided for.

The following modules shall be covered as part of the work readiness and life skills training:

- Time Management – 0 people to be trained (half day course);
- Personal Finance – 0 people to be trained (half day course);
- Construction hand tools – 0 people to be trained (half day course);

The cost estimate per course, per person, must be priced at R 0.00

The Main Contractor shall, as early as possible, interact with the Implementing Agent's Social Facilitator to agree upon a practical program in order to deliver the Work Readiness and Life Skills training aspect.

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Approval to commence with the training programme shall be based on the submission of a proposal which shall be approved by the Principal Agent, based on the recommendation of the Social Facilitator.

Within 1 month of contract commencement, the Contractor shall appoint an accredited training provider for the provision of training for the duration of the project.

The Contractor shall submit a monthly report on all training conducted to the Implementing Agent's Social Facilitator, in the form and manner as prescribed by the Social Facilitator, including duly signed attendance registers.

All training conducted shall then be recorded on the Ncedo Labour Management System by the Implementing Agent's Human Capital Solutions team, based on the information from the Main Contractor provided by the Social Facilitator.

L 3.2 Technical Training (Skills Program)

The targeted number of beneficiaries of the project shall receive technical training for 2 days a month, for the duration of the project or according to a training schedule that is compiled before the time between the Contractor and the qualified Service Provider, to keep disruption on the project to a minimum; The Contractor shall pay the beneficiaries for the time spent on training;

The Contractor shall agree to the schedule to incorporate the training days with the appointed Service Provider for Technical training;

The Contractor may use his discretion on what would be suitable for the progress of the project, however this should not be minimal to what is specified;

0 of the total local labour employed on site must undergo technical training.

The following accredited modules are proposed and all subject to change to suite the project scope:

- Bricklaying: 0 person to be trained
- Plumbing: this subject to project scope

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- Electrical Maintenance: this subject to project scope
- Painting: 0 person to be trained and;
- Carpentry: 0 person to be trained.

Deliverable L 4: Promote HIV/AIDS Awareness on site

L4.1 HIV/AIDS Awareness Training:

The Contractor shall be responsible for promoting HIV/AIDS Awareness on site. Every worker anticipated to be employed on the project must be trained in HIV/AIDS Awareness according to Industry norms and standards.

The Contractor shall submit monthly reports to the Implementing Agent's Social Facilitator, accompanied by attendance registers in the format prescribed by the Implementing Agent. The Contractor shall submit a monthly report on all HIV/AIDS Awareness training conducted to the Implementing Agent's Social Facilitator, in the form and manner as prescribed by the Social Facilitator, including duly signed attendance registers.

All HIV/AIDS awareness training conducted shall then be recorded on the Ncedo Labour Management System by the Implementing Agent's Human Capital Solutions team, based on the information from the Main Contractor provided by the Social Facilitator.

Deliverable L 5: Promote Health and Safety Awareness on site

L5.1 Health and Safety Awareness Training:

The Contractor shall be responsible for promoting health and safety on site. Prior to employment on the Project site, all labour must be inducted on pertinent aspects of the Occupational Health and Safety Act and the Construction Regulations including safe working practices, before they commence with work on site.

The Contractor shall submit a monthly report on all Health & Safety Awareness training / inductions conducted to the Implementing Agent's Social Facilitator, in the form and manner as prescribed by the Social Facilitator, including duly signed attendance registers.

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All Health and Safety awareness training / inductions conducted shall then be recorded on the Ncedo Labour Management System by the Implementing Agent's Human Capital Solutions team, based on the information from the Main Contractor provided by the Social Facilitator

Deliverable L 6: Labour Management System Administration – the contractor shall ensure that employment and training records are loaded onto the Labour Management System.

L6.1 RECORDING OF LABOUR MANAGEMENT DETAIL:

All project employment and labour management detail is to be provided by the Main Contractor to the Implementing Agent's Human Capital Solutions team on a weekly basis, in the form and manner as prescribed by the Social Facilitator.

All project employment and labour management detail shall then be recorded on the Ncedo Labour Management System by the Implementing Agent's Human Capital Solutions team, based on the information provided by the Main Contractor.

The Main Contractor is required to submit a monthly labour report on the project as a whole (sub-contractors included), inclusive of recognised training, extracted from the Implementing Agent's Ncedo LMS which must accompany the Main Contractor's monthly payment certificates to the Principal Agent.

Deliverable L 7: The contractor shall ensure achievement of Socio-economic deliverables and compliance to the established labour management protocols on the whole project, for the full duration of the project.

L7.1 COMPLIANCE AUDITING AND NON-ACHIEVEMENT:

The Implementing Agent's Social Facilitator may appoint an Employment Relations Compliance Auditor to monitor the adherence to the labour protocols prescribed above.

The Contractor is required to achieve full compliance to the establish labour and community management protocols within 1 month of the non-compliance/s being highlighted.

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In the event of the Contractor (inclusive of all sub-contractors) not complying with the socio-economic specifications after the 1-month period stated herein above, or failing to maintain the required labour and/or community management protocol thereafter, then a punitive penalty will be applied to the Contractor for each working day that the non-compliance is still in existence. This punitive penalty shall equate to 20% of the amount prescribed per day for late project completion.

Deliverable L8: Community Participation

L8.1 COMMUNITY ENGAGEMENT OBLIGATION

The Contractor shall promote labour and community harmony on the project site and in the surrounding community. Accordingly, the Contractor shall participate in all community engagement activities through the established Project Support Committee (PSC).

The Main Contractor shall tender accordingly.

Deliverable L9: On-Site communication structures

L9.1 ON-SITE COMMUNICATION

The Main Contractor shall be responsible for facilitating all on-site communication with role-players.

A Labour Consultative Forum (LCF) will be established on site by the Main Contractor at which labour and work-place related issues will be addressed.

The LCF will be attended by the Main Contractor representatives, all sub-contractor and site-based service provider representatives, and the elected labour representatives employed on site.

The LCF will be established by the Main Contractor within 1 month of project commencement and will meet monthly thereafter.

**CONSTRUCTION OF NEW ECD EDUCATIONAL FACILITIES
COBOSI PRIMARY JUNIOR SCHOOL
CONTRACT NO.: CDC/329/24, EMIS Nu.: 200400085, ECDoE P Nu.: P9007203**

The Main Contractor shall tender accordingly.

Note: The Project Manager is reminded to add the further deliverable, which falls outside the Human Capital Solutions scope of Social Facilitation *"Procure domestic sub-contractors for defined portions of the contract in terms of specified procedures"*

Note: The Project Manager is reminded to add the further deliverable, which falls outside the Human Capital Solutions scope of Social Facilitation *"Procure domestic sub-contractors for defined portions of the contract in terms of specified procedures"*

PART C3.6 – WAGE RATES

**CONSTRUCTION OF NEW ECD DUCATIONAL FACILITIES
AT COBOSI PRIMARY JUNIOR SCHOOL
CONTRACT NO.: CDC/329/24, EMIS Nu.: 200400085, ECDoE P Nu.: P9007203**

C3.6 CONTRACT No. CDC/329/24 – COBOSI PRIMARY JUNIOR SCHOOL

**WAGE RATES: CIVIL ENGINEERING, BUILDING AND ELECTRICAL CONSTRUCTION
INDUSTRY JOB CATEGORY STRUCTURE**

Skill Level	Grade	Occupational Group	Job Title	Project Wage Rate (Hourly)
Unskilled	Task Grade A	General Worker	General Worker	
Semi-skilled	Task Grade B	Artisan Aid	Artisan Aid	
		Construction Hand Grade IV	Structures Construction Hand	
			Premix Paving Checker	
			Steel Bending Machine Operator	
			Civil Construction Bricklayer Grade II	
		Operator Grade V	Boom Scraper Operator	
			Pedestrian Roller Operator	
			Piling Auger Machine Operator	
		Checker	Checker	
		Chainman	Chainman	
Semi-skilled	Task Grade C	Construction Hand Grade III	Shutter hand Grade III	
			Concrete Hand Grade II	
		Operator Grade IV	Track Rig Operator (general)	
			Bore Pile Operator	
			Continuous Flight Auger Operator	
			Drilling Supervisor	
		Site Support	Junior Clerk	

**CONSTRUCTION OF NEW ECD DUCATIONAL FACILITIES
AT COBOSI PRIMARY JUNIOR SCHOOL
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Skill Level	Grade	Occupational Group	Job Title	Project Wage Rate (Hourly)
Semi-skilled	Task Grade D	Construction Hand Grade II	Shutter hand Grade II	
			Reinforcing Hand Grade II	
			Concrete Hand Grade I	
			Fence Erector	
			Guard Rail Erector	
		Operator Grade III	Concrete Mixer Operator	
			Batch Plant Operator	
			Concrete Dumper Operator	
			Concrete Pump Operator	
			Tower Crane Operator	
			General Premix Roller Operator	
			Milling Machine Operator	
			Paver Operator	
			Excavator Operator	
			Front End Loader Operator	
			TLB Operator	
			Dozer Operator	
			Grader Operator (general)	
			Gunite Nozzle person	
		Driver Grade II	Motorcycle Driver	
			Tractor Driver	
			Light Motor Vehicle Driver	
			Driver Operator	
			Heavy Duty Driver (rigid)	
			Extra Heavy Duty Driver (rigid)	
		Site Support	Material Tester	
		Building Skills	Semi-Skilled	
			Light Motor vehicle driver	
			Hoist Operator	
			Driver (Code 9)	

**CONSTRUCTION OF NEW ECD DUCATIONAL FACILITIES
AT COBOSI PRIMARY JUNIOR SCHOOL
CONTRACT NO.: CDC/329/24, EMIS Nu.: 200400085, ECDoE P Nu.: P9007203**

Skill Level	Grade	Occupational Group	Job Title	Project Wage Rate (Hourly)
Semi-skilled	Other (specify)	Other (specify)	Other (specify)	
Skilled	Task Grade E	Construction Hand Grade I	Shutter hand Grade I	
			Reinforcing Hand Grade I	
			Pipe layer Grade I	
			Kerb layer Grade I	
			Civil Construction Bricklayer Grade I	
		Operator Grade II	Mobile Crane Operator	
			Screed Operator	
			Scraper Operator	
		Driver Grade I	Heavy Duty Driver (articulated)	
			Extra Heavy Duty Driver (articulated)	
		Site Support	Assistant surveyor	
		Building skills	Journeyman's assistant	
			Heavy Duty driver (Code 10)	
			Crane Operator	
			Machine Minder and Sawyer	
			Mechanical Handling Equipment Driver	

**CONSTRUCTION OF NEW ECD DUCATIONAL FACILITIES
AT COBOSI PRIMARY JUNIOR SCHOOL
CONTRACT NO.: CDC/329/24, EMIS Nu.: 200400085, ECDoE P Nu.: P9007203**

		Electrical Construction	Electrical Construction Operator	
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**CONSTRUCTION OF NEW ECD DUCATIONAL FACILITIES
AT COBOSI PRIMARY JUNIOR SCHOOL
CONTRACT NO.: CDC/329/24, EMIS Nu.: 200400085, ECDoE P Nu.: P9007203**

Skill Level	Grade	Occupational Group	Job Title	Project Wage Rate (Hourly)
Skilled	Task Grade F	Building Skills	Artisan/Journeyman	
		Electrical Construction	Electrical Tester for single phase Artisan Unlicensed	
		Operator Grade I	Grader Operator (final level)	
Skilled	Task Grade G	Building Skills	Artisan journeyman with N2	
		Electrical Construction	Installation Electrician Supervisor Grade II; Plant Serviceman	
		Electrical Construction	Master Installation Electrician	
Skilled	Task Grade H	Electrical Construction	Supervisor Grade I	
Skilled	Task Grade I	Artisan	Diesel Mechanic, Fitter & Turner, Auto Electrician, Boilermaker, Welder.	
Skilled	Other (specify)	Other (specify)	Other (specify)	

This wage rates schedule will be increased after 12 months of commencing construction, per the Socio-Economic specification.

PART C3.7 – SMME SPECIFICATIONS



Coega Development Corporation (Pty) Ltd

Integrated Small, Micro and Medium Enterprise Development Strategy

SPECIFICATION FOR THE EMPLOYMENT OF SMME SUB- CONTRACTORS ("SES 003")

SPECIFICATION

REVISION SES 003: July 2019

DOCUMENT CONTROL SHEET

PROJECT NAME : COEGA INDUSTRIAL DEVELOPMENT ZONE AND PORT OF NGQURHA
DOCUMENT TITLE : SPECIFICATION FOR THE EMPLOYMENT OF SMME SUB-CONTRACTORS

DOCUMENT No. : SES 003 : 2015

SIGNING OF THE ORIGINAL DOCUMENT

We, the undersigned, accept this document as a stable work product to be placed under formal change control as described by the Change Control Procedure document.

ORIGINAL	Prepared by	Reviewed by	Approved by
Date: 2013	Name: Thandile Jack	Name: Christo Beukes	Name: Sicelo Kubashe
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ACRONYMS

CDC	=	Coega Development Corporation (Pty) Ltd
CIDB	=	Construction Industry Development Board
EM	=	Executive Manager (CDC)
EMEs	=	Exempted Micro Enterprises
FIDIC	=	Fédération Internationale Des Ingénieurs-Conseils
GCC	=	General Conditions of Contract
JBCC	=	Joint Building Contracts Committee Building Agreement
MT	=	Management Team
NEC	=	New Engineering Contract
PrDir	=	Programme Director (CDC)
PrMn	=	Programme Manager (CDC)
PM	=	Project Manager (CDC)
QSEs	=	Qualifying Small Enterprises
SARS	=	South African Receiver of Revenue
SCM	=	SMME Construction Mentor
SES	=	Specification for Employment of SMME sub-contractors
SMEs	=	Small and Medium Enterprises
SMME	=	Small, Medium and Micro Enterprise
SOT	=	SMME Operation Template
IP	=	Implementing Agent
PA	=	Principal Agent

D1 INTRODUCTION

This document contains the specification that governs the employment of SMMEs as Sub-Contractors in CDC projects. It is one of the methods that are implemented to enhance the development of SMMEs by CDC. This document is binding to the Principal Contractor and is designed for the execution of CDC projects.

D2 APPLICABLE DOCUMENTATION

This Specification is to be read together with following applicable documents:

- (a) Any applicable form of contract used between the Principal Contractor and CDC (JBCC, NEC, GCC and FIDIC)
- (b) Tender Document for the appointment of the Principal Contractor;
- (c) Preferential Procurement Policy Framework Act (PPPFA);
- (d) CDC's SMME Policy;
- (e) CDC's Procurement Policy & Procedure; and
- (f) CIDB's Code of Conduct for all parties engaged in construction procurement.
- (g) The NCDP framework Practice Note 29: Allocating Sustainable Work Opportunities to Contractor Development Programmes

D3 APPLICABLE FORMS

These forms are applicable for implementation of this Specification:

- (a) **SMME 001** CDC Enterprise Registration Form
- (b) **SMME 002** Enterprise Information Update Form
- (c) **SMME 003** SMME Packages Schedule
 - a. SMME 003A SMME Package schedule - Provisional Amount
 - b. SMME 003B SMME Package schedule - PMT identified
- (d) **SMME 004** SMME Request Form
- (e) **SMME 005** SMME Manager Monthly Report – SMME Log Book
 - a. SMME 005A Yearly progress Monthly
 - b. SMME 005B Project/Package details Monthly
 - c. SMME 005C Contract Management Assessment Monthly
 - d. SMME 005D Business Management Assessment Monthly
- (f) **SMME 006** SMME Certificate of Experience
- (g) **SMME 007** SMME Loans Start-up Finance
- (h) **SMME 008** SMME Compliance Documents
- (i) **SMME 009** SMME Declaration Form

SPECIFICATION FOR THE EMPLOYMENT OF SMME SUBCONTRACTORS

D4. THE SCOPE

This specification governs the employment of SMME subcontractors on all CDC Projects.

D5. THE DEFINITIONS AND INTERPRETATIONS

For the purposes of this section of the Specification, the definitions given in the relevant form of contract used either between the Principal Contractor and the CDC or the Principal Contractor and SMME, other project specifications, together with the following additional definitions shall apply:

- (a) **“Agreement”**: Shall have the meaning assigned thereto in the relevant form of contract;
- (b) **“Management Team (MT)”**: A team that is set up after award of the contract, consisting of the Principal Contractor, the Engineer/Principal Agent, a delegated person from the CDC SMME Unit (PM/PrM, Procurement Representative and Technical Manager) and CDC Project Manager (as and when required). The function of the MT will be to consult regarding the management of the subcontracts involving SMMEs. The MT will also evaluate the Principal Contractor’s performance regarding the goals set for SMME involvements. The CDC Project Manager is to decide on the party to chair and lead the MT. Proper minutes of these meetings will be taken by the Engineer/Principal Agent;
- (c) **“SMME Unit”**: Structure provided by the CDC to monitor the procurement and work of SMMEs and provide limited mentoring (business management) services directly to SMME’s;
- (d) **SMME Construction Mentor**: Person provided by the Principal Contractor to guide, assist and mentor all eligible potential SMMEs tendering and awarded a contract as SMME Subcontractors as per section D of this Specification ;
- (e) **Small, Medium and Micro Enterprises**: A business concern operating in any business sector and which complies with the qualitative and quantitative criteria outlined in the Schedule contained in the National Small Business Act (Act No. 102 of 1996), providing a Commercially Useful Function as provided in the CDC Procurement Procedures policy;
- (f) **“Specification”** means this document containing the CDC’s specifications for the utilisation of SMMEs on all CDC projects;

- (g) **Sub-contractor:** A contractor who contracts with the Principal Contractor to provide works as part of the total services required by the CDC for that Contract;
- (h) **SMME Package:** Specified work package identified for execution by SMME's. The identifiers are CDC, Principal Contractor and PSP;
- (i) **Training:** The process of providing an SMME Contractor with theoretical and practical work package specific education as agreed to by the Principal Agent and Contractor;
- (j) **Guidance:** The process of directing an SMME Contractor, in writing, regarding the appropriate execution of work bundles in part or whole;
- (k) **Monitor:** To check, correct and oversee the orderly and appropriate execution of the works.

D6. EMPLOYMENT OF SMMEs

D6.1 SMME Targets

Forty Percent (40%) of the tender value (excluding socio economic value, escalation, contingency and **Value-Added Tax (VAT)**) must be executed by SMMEs. It is compulsory for the Principal Contractor to achieve this target. The Principal Contractor's performance against this target will be monitored on a monthly basis through the submission of the mandatory SMME Manager's Monthly Report through form (SMME 005).

D6.2 Definition of SMME

A **SMME** is defined as follows:

- A targeted enterprise;
- A business concern operating in any business sector and which complies with the qualitative and quantitative criteria outlined in the Schedule contained in the National Small Business Act (Act No. 102 of 1996);
- An entity which must have an active registration status with the **CIDB**, targeted CIDB Grade designations 1 to 6;
- An entity which must be at least 51% black-owned and managed, **and**
- A local entity. Depending on where the site of the CDC project is located, then locality will be judged on a sliding scale, with the **immediate local municipality preferred, followed by the district municipality and then the Province in which the project is located.** .

D6.3 Targeted SMME participation

The Principal Contractor's SMME participation goal is to be achieved by employing entities in the following categories:

- Built Environment Works; and
- Specialist service providers (e.g. Mechanical, HVAC, Structural Steel, Electrical etc.).

For Built Environment Works, the below mentioned goals are to be achieved:

Description	Forty Percent SMME Participation target Split	Targeted Enterprise
Built Environment Works	40	EME's and QSE - Must be at least 51% black-owned and managed.
TOTAL	40.00 %	

D6.4 Contracting Process

After the Award of the Contract, the Principal Contractor will have to start the process as stipulated in this Specification for the involvement of SMMEs to achieve its tendered SMME Participation Goal. This contracting process for subcontracting SMMEs must be completed in accordance with the detailed construction programme of the Principal Contractor for the various works as to ensure momentum of the contract works at all times. The Principal Contractor shall take due cognisance to also programme this SMME contracting process in its detailed construction programme.

The Principal Contractor must undertake the following tasks in approximately the order given below:

- Complete and submit the schedule of work(s) to be performed by SMME(s) using form **SMME 003A and B** (attached under [Appendix A](#)) which is to be directly submitted to the SMME Unit by the SMME Construction Mentor when the Principal Contractor submits the detailed construction programme as per the letter of appointment or award.
- Start and complete the tender or quotation process in consultation with the MT.
- Sign a subcontract agreement for each work activity with the successful SMMEs;
- Mentor and monitor the SMME Subcontractors and their work output and quality;
- Issue a Certificate of Experience to each Subcontractor;
- Go through the tender and appointment phase for replacement SMME's in the event of termination of an SMME Subcontractor due to failure by them to perform.

Before the SMME tender phase, the Principal Contractor in consultation with the SMME Unit, shall be responsible for identifying:

- the scope and extent of the works to be included in any particular SMME subcontract based on information obtained from the Principal Agent on how the Provisional Sums were determined;
- the total number of subcontracts to be used;
- the time at which subcontracts will be used; and
- the duration of the subcontract;

in such a manner as will facilitate the achievement of all objectives and principles pertaining to SMMEs use and development as are stated in or as may reasonably be inferred from the conditions of this Specification, due cognisance being taken of:

- the prevailing levels, ability, resources and previous experience of the potential candidates available;
- the training and assistance to be provided to the SMMEs in terms of this Specification;
- the period allowed in the Appendix to Tender for completion of the contract works in accordance the approved detailed programme of works;
- all constraints and conditions contained in this Specifications, as may impact upon the subcontract.

D7 IDENTIFICATION OF SMME's TO PARTICIPATE AS SMME SUBCONTRACTORS

As an on-going process, the CDC has established a database for all interested businesses to register their interest to work in CDC projects using form **SMME 001** available from the CDC's SMME Unit offices or the CDC's website. The CDC then encourages all interested businesses to be assessed and graded according to their sector/industry, specialisation and capabilities through the CIDB. The SMME Unit can assist SMMEs during this process. SMMEs that are in the grading process are graded and captured in CDC's special database called the SMME Supply Pool which supplies the SMMEs to service providers that are looking to employ SMMEs in CDC projects. SMMEs will also be encouraged to keep updating their data (grades and contact details) on this database using form **SMME 002** which is available on request from the SMME Unit offices.

The Principal Contractor shall employ SMME subcontractors to the extent specified in the tender Goal Declaration, or as negotiated with the CDC upon award. The participation level is determined relative to the value of the Accepted Contract Amount, or as adjusted, excluding Contingencies, Contract Price Adjustment Provisions and Value Added Tax.

- D7.1** The Principal Contractor must request a list of SMMEs from the SMME Unit Office using form **SMME 003 and 004** attached as **Appendix B**.
- D7.2** Within three working days, the SMME Unit will forward the list of SMMEs with their contact person, numbers, and CIDB grades. The Principal Contractor will only invite SMMEs on the list. Any problems encountered during invitation should be reported back to the SMME Unit or the MT before the Site Inspection Meeting (sometimes referred to as the Mandatory meeting).

D8. IDENTIFICATION OF WORK TO BE PERFORMED BY SMME's

D8.1 Tender Stage

The tenderers must, during the tendering stage identify additional works over and above the SMME Provisional Sums that can be performed by SMMEs in order to achieve the SMME Participation Goal.

D8.2 Construction Stage

During Construction phase, the Principal Contractor or CDC may identify additional work to be performed by SMMEs above those tendered. This additional work will also follow the same specification in terms of scheduling and procuring SMMEs for such work.

The Principal Contractor will note that all work measured in the Bills of Quantities is the Principal Contractor's sole responsibility.

The SMMEs will be responsible for procuring all required materials, labour, equipment and any other incidentals to undertake the works subcontracted to them unless otherwise specified by the CDC before tender or approved by the MT during construction.

The Principal Contractor will mentor, supervise and manage the SMME work at all times to ensure compliance with the specifications and drawings.

D9. TENDER PROCESS FOR SMME's

The tendered SMME Packages Schedule must be registered in form **SMME 003** where after the Principal Contractor will start with procurement of SMMEs to partake in the tendering or quotation process.

SMMEs sourced through a competitive process in conjunction with the SMME Unit and the MT shall not be considered as Nominated Subcontractors unless specifically directed by the CDC.

The following process must be followed by the Principal Contractor unless agreed otherwise with the MT:

D9.1 Tender invitation

A minimum of 6 (six) prices are to be obtained for each subcontract to be performed by SMMEs. The Principal Contractor will request the SMME list from SMME Unit using SMME 003 and 004 forms.

The CDC database of registered enterprises is to be used to solicit tenders. Any other SMME(s) that are not registered (or have applied to be registered) on this database will not be eligible for work.

D9.2 Compilation and issue of tender documents

The Principal Contractor shall compile the tender documents (Brief Description, TGP Spec (CRS Number, Original Tax Clearance Certificate, BBBEE Certificate), Contract Wage Schedule —of the Principal Contractor, Contract data, Bill of Quantities, Specification and drawings) in such a manner that it will facilitate the achievement of all objectives and principles pertaining to SMMEs use and development as stated in or as may reasonably be inferred from the conditions of this Specification.

All tender documentation shall be issued by the Principal Contractor with all copies of tender documents compiled for the various SMME work packages. The tender or quotation document will be issued to invited SMMEs at NO EXTRA COST and the Principal Contractor is to make due allowance for this cost in its tender price.

D9.3 Facilitate a Mandatory Briefing Session

The Principal Contractor shall facilitate a briefing session for the invited SMMEs. The Principal Contractor will also make sure that all relevant parties' representative of the Principal Agent or Engineer, SMME Unit, CDC Project Manager and Principal Contractor's Occupational Health and Safety Project Manager are present and given an opportunity to present specific aspects of the CDC requirements pertaining to their sections.

D9.4 Assistance to the SMMEs

- (a) The Principal Contractor shall be responsible for ensuring that prospective SMME tenderers fully comprehend the:
- Implications of the liabilities and responsibilities inherent in the particular basic level of subcontract applicable;
 - Implications of the tendered rates;
 - Scope and extent of the portion of the works included in the subcontract;
 - Proper procedures for the submission of the tenders;
 - Procedures and basis on which tenders will be adjudicated and the subcontracts awarded.
- (b) The Principal Contractor shall, in addition to the requirements of the relevant sub clause of the applicable form of contract, teach, guide, assist and mentor all eligible SMMEs wishing to submit tenders, in the proper completion and submission of their particular tenders, provided always that such assistance, guidance and mentoring by the Principal Contractor shall:
- (i) be given at a level and to the extent which is commensurate with the particular basic level of subcontract applicable, due cognisance being taken of the capability which could reasonably be expected of potential SMMEs eligible to submit tenders for the particular level of subcontract applicable;
 - (ii) be given in a manner which is neither prescriptive, dictatorial, nor coercive towards the party wishing to submit the tender;
 - (iii) be given in a manner which does not unfairly prejudice or favour any particular eligible party wishing to submit a tender,

All with the view to enabling all interested SMMEs to submit valid, balanced, rational tenders.

D9.5 Adjudication

- (a) The Principal Contractor shall receive all tenders at the construction site location identified by it with all sealed tender submissions to be placed in a proper tender box to be provided by the Principal Contractor for this purpose. A submission register is to be maintained by the Principal Contractor for all tenders received.
- (b) All tenders received shall be evaluated by the Principal Contractor and MT for final approval. The draft tender evaluation must be sent to the MT members 5 working days prior to the MT meeting for comments and perusal in order to finalize the evaluation before the meeting. The format of the tender valuation must be acceptable to the MT and be agreed upon at the first MT meeting.
- (c) The SMME Unit shall have the right to interview any tenderer for the purpose of:
 - clarifying any aspect of the tender;
 - verifying the eligibility of the tenderer;
 - conduct a rate breakdown exercise to clarifying rates and prices
- (d) The Principal Contractor shall provide all reasonable opportunity to such tenderers who have been interviewed, to correct obvious and patent errors, provided always that this can be achieved without altering the total tendered sum.
- (e) After the award, the CDC reserves the right to review the transparency of the Principal Contractor's SMME subcontracting and award process.

D9.6 Award of Tenders

The Principal Contractor shall explain his evaluation process of adjudication to the MT for endorsement. All enquiries about the process thereafter will be referred to the SMME Unit Offices.

The Principal Contractor will appoint the work to the successful SMME tenderer where after a subcontract agreement will be signed between the Principal Contractor and the successful SMME tenderer.

It is assumed that the Principal Contractor has allowed adequate time in the construction programme for training of SMMEs and included such training costs for the non-accredited training deemed to be either included in the tendered rates or mark-up provision allowed for the various SMME work packages. the non-accredited training to be provided by a responsible, competent and qualified person/s of the Principal Contractor to each of the awarded SMMEs within five (5) days after award and ten (10) days before the commencement of the works package shall include but not limited to:

- ▶ (a) Compilation and maintenance of the Occupational Health, Safety and Environmental File and compliance with Construction Regulations by a CHS Officer (CHSO) registered with the South African Council for the Project Management Professions – 2 days,
- (b) Setting up and Maintaining Cash Flow, Construction Programme and Method Statement – 2 Days ,
- (c) Setting up and Maintaining Quality Management Plan and Risk Register – 1 Day,
- (d) Basic Conditions of Contract of the relevant contract and setting up short term contracts for labour as per the main contract – 2 Days,
- (e) Balancing of Bill of Quantities, Financial Control and Management – 2 Days,
- (f) Site Administration – Principal Contractor shall provide for each SMME a daily site diary, A4 triplicate book for recording site instructions and a measurement book, train to complete and update – 1 Day;
- (g) Technical Training - Interpretation of Technical Drawings, Setting Out and General -2 Days;
- (h) Weekly Report Writing – 1 Day;
- (i) Methods of Measuring Resource Productivity – 1 Day,
- (j) Measurement of Work Done, Interim Payment Certificate and Compilation – 1Day, and
- (k) Dispute Avoidance and Resolution Procedures – 1 Day.

The CDC Training Compliance Officer will be notified five (5) days prior the commencement of the non- accredited training. Proof of such training is to be recorded on SMME 009 and forwarded to the CDC SMME Unit for capturing & filing.

D10. TERMS AND CONDITIONS OF SUBCONTRACT AGREEMENTS

D10.1 Contractual Obligations

In accordance with the provisions of relevant clause of the form of contract being used and subject always to the further provisions of this Specification, the terms and conditions of each subcontract agreement shall be as mutually agreed in writing between the Principal Contractor and the SMME. Each subcontract agreement, which is entered into by the Principal Contractor in accordance with the requirements of this Specification, shall contain terms and conditions, which assign the responsibilities and liabilities of the two parties to the subcontract.

The terms and conditions of the subcontract agreement shall further be such as to specifically ensure that the provisions of this Specification pertaining to:

- (a) the allowable sources from which workers may be drawn in terms of the contract;
- (b) the terms and conditions relating to the recruitment, employment and remuneration of workers engaged on the contract works; and
- (c) any training to be provided to the temporary workforce;

shall apply as is in respect of all workers engaged and employed by any SMME.

D10.2 Compilation

The Principal Contractor shall be responsible for the compilation of each subcontract agreement and ensuring that the terms and conditions are consistent with all requirements therefore as are specified in or reasonably to be inferred from the provisions of this Contract. All costs associated with the tender process including the conclusion of the agreement are for the Principal Contractor's account.

In addition, each subcontract agreement shall be subject to the approval of the SMME Unit, which approval shall be obtained by the Principal Contractor prior to entering into the subcontract.

The Principal Contractor may not enter into any subcontract that contains terms more onerous or disproportionate to the risks inherent in the main contract for the Principal Contractor. The Principal Contractor is required to use a standard form of subcontract and follow recommended practice contained in the CIDB Best Practice Guideline #D1 March 2004 Edition 1 of CIDB Document 1012, or as later amended, where not in conflict with this Specification.

D11. CONTRACTOR'S OBLIGATIONS TO SUBCONTRACTED SMMEs

The Principal Contractor shall on a fulltime basis closely mentor, manage and supervise all SMMEs and shall manage, guide and assist each SMME in all aspects of management, execution and completion of its subcontract. The Principal Contractor shall provide additional developmental support initiatives to Potential Emerging (PE) status SMME sub-contractors that are recommended for appointment. Such development support shall be determined by conducting a needs analysis (SMME 005A to 005D) and approved by the SMME Unit. The support by the Principal Contractor shall include, but not limited to:- Mentorship, Training, Financial management support, Management support in the improvement of performance and quality of work, and all other construction management services required. This shall typically include the on-site productivity planning and management of:

- **Materials Management:** This includes, assisting the SMME Sub-contractors in planning their material's requirements per stage, ordering the correct materials, preventing over usage (wastage) and under usage of required materials and ensuring that the Material's suppliers invoice the correct materials and ensuring the effective integration with the Materials supplier;
- **Cost Management:** This includes, assisting the SMME Sub-contractors in invoicing correctly to the Principal Contractor, ensuring that the correct amount for the materials is reflected on the invoice and ensuring that all labour is invoiced and paid accordingly;
- **Contract Management:** This includes hands-on practical effective construction contract management and administration to SMMEs to take them through step by step analysis of the entire project life cycle and contract administration tasks and equip them with the skills they need to determine risks associated with each stage of the life cycle. Use practical advice that will show them how to avoid problems and how to approach dispute resolution for optimum results;
- **Health & Safety Management:** This includes training the SMME Sub-contractor in compiling the Occupational Health and Safety File, ensuring that the SMME Sub-contractors are compliant, in the form of PPE, Safety registers, updating of files and general site safety. The Principal Contractor will mentor and assist SMMEs on the induction of labour;
- **Quality Management:** This includes, creating templates for quality management, to be approved by the Engineer/Principal Agent, and ensuring that the SMME Sub-contractors build to the required quality standards as per specifications;
- **Communication Management:** This includes, attending all site meetings and the effective contract management between the Principal Contractor, CDC Project Manager/SMME Unit, Principal Agent, construction labour, materials supplier and the community; and

- **Handover Documentation Facilitation:** This includes, ensuring that all the necessary hand over documentation is in place prior to the handing over of houses to the beneficiaries. These may include but not limited to NHBRC requirements, Department's requirement etc.

The extent and level of such management, guidance and assistance, to be provided by the Principal Contractor shall be commensurate with the basic level of subcontract applicable and shall be directed at enabling the SMMEs to achieve the successful execution and completion of his subcontract. Payment for such on-going assistance is deemed included in the rate tendered for the administrative cost of SMMEs and or mark-up provision allowed for the various SMME work packages.

Such support and mentorship shall form part of the monthly reporting by the Principal Contractor to the SMME Unit and MT Meeting.

D11.1 Guide, Assist and Mentor SMMEs

(a) 1. SMME Construction Mentor for the SMME Subcontractors

The CV of the SMME Construction Mentor is to be submitted at tender stage together with those of proposed key personnel. The Principal Contractor shall, guide, assist and mentor all eligible potential SMMEs wishing to submit tenders, in the proper completion and submission of their particular tenders, including calculation and guidance on rates.

The Principal Contractor will conduct a compulsory tendering training workshop, provide a venue, study material and allow a period of two (2) days (16 hours) for the training of the prospective SMMEs by a Senior Quantity Surveyor and/or Senior Estimator with ten (10) or more years' experience on Pricing Built Environment Tenders/Bids. Training will comprise but not limited of the following: Mandatory and Compliance requirements, Pricing in relation to the Contract Package Specification, Resource requirements, Completion of Tender Document, Wage Schedule and Occupational Health and Safety Requirements. All costs for providing these services are also deemed included into the tender price.

The Principal Contractor shall employ an SMME Construction Mentor, on a full-time basis, who must attend at site for the duration of the contract. The minimum requirements for this appointment are as follows:

- (a) An accredited National (Higher) Diploma and/or B-Tech/BSc qualification in the Built Environment field of study with a minimum of ten (10) or more years' relevant post-graduate construction practical experience;
- (b) have a minimum of ten (10) or more years in the built environment and experience in the areas identified under D11 CONTRACTOR'S OBLIGATIONS TO SUBCONTRACTED SMMEs;
- (c) shall be registered with a professional body in the built environment as a professional and/or as a candidate;
- (d) the ability to transfer skills and assess an SMME's capabilities;
- (e) competence in construction contract administration and dispute resolution;
- (f) competence in commercial aspects of construction contracting; and
- (g) Competence in construction project management activities.

An item is provided in the Preliminaries and General section for pricing by the Principal Contractor for the appointment of the SMME Construction Mentor.

2. The Principal Contractor is to provide for the SMME Construction Mentor with the following:

- (a) Adequate office space fully equipped for him/her to conduct the management of SMMEs on the contract (office desk, chairs, whiteboard, cabinet for filing, etc.) a landline telephone and must be able to accommodate the CDC SMME Representative/s for the duration of the contract. The office must meet the following minimum standards external dimensions 6058 x 2438 x 2850 mm, elevated panels, two number plugs, 80 mm thermal insulation of walls, have air condition unit, PVC Windows 1800 x 1135 with roller shutter, PVC floor covering with increased resistance to abrasion +120 mm on the wall, steel door and standard raster lamp 4 x 18W;
- (b) all stationary as required and a laptop (Intel Core i3, 4 GB RAM, 250 GB hard drive, Wireless, Bluetooth (Built in, not dongle), DVD-RW drive, 15.4" display, USB Keyboard and Mouse, Carry bag, Additional charger, 3 year warranty, SABS Approved and the Principal Contractor is responsible to ensure that all power plugs are 3 prong connections) with all the required software for him/her to conduct his/her duties and internet connectivity to send and receive emails;

- (c) A digital camera of a 22.3 megapixel resolution coming from a full frame CMOS sensor. It also incorporates the DIGIC 5+ image process. The camera should have a 61-point AF module and a wide ISO range from 100 to 25,600, which is further expandable to 102,400. Must be able to add the time, date and geo-tagging to the photo metadata;
- (d) a copy of the contract document and a set of drawings (updated with the latest revision/s as and when issued) for the contract and a printer and/or photocopying machine (Standard functions - Copy, Email, Fax, Print, Scan; Print speed- up to 29 ppm; Connectivity- 10/100BaseT Ethernet, High-Speed USB 2.0, Wi-Fi b/g/n; Duty cycle - Up to 30,000 images/month; Maximum print resolution- 600 x 600 dpi (up to 4800 x 600 enhanced image quality); and
- (e) the soft and/or printed copy of the updated/latest revision of the detailed construction programme for the contract and complete plan of procuring SMMEs on the following forms SMME 003 and 004.

The SMME Construction Mentor will manage the SMMEs and report monthly on progress of each SMME to the MT using SMME 005 form. Such SMME Construction Mentor must be adequately experienced with SMME work(s) and the development thereof and will be subject to the approval of the CDC. The SMME Construction Mentor will render fulltime on site assistance to and mentor the SMMEs and such assistance, guidance and mentoring by the Principal Contractor's SMME Construction Mentor shall:

- (i) be given at a level and to the extent which is commensurate with the particular basic level of subcontract applicable, due cognizance being taken of the capability which could reasonably be expected of potential SMMEs eligible to execute works for the particular level of subcontract applicable;
- (ii) be given in a manner which does not unfairly prejudice or favour any particular eligible party working on the same site;
- (iii) Identify the gaps in capacity of SMMEs and propose the required training and/or relevant intervention;
- (iv) where a training gap has been identified the SMME Construction Mentor together with the SMME Unit will arrange for the SMME to attend the required training and ensure that it does not delay the progress on site;
- (v) complete all the required SMME and Log Book Forms for each SMME Monthly;

- (vi) Adjudicate the SMME tenders and prepare the adjudication report;
- (vii) Present the Adjudication report to the MT;
- (viii) Assist the SMMEs in preparing Implementation plans for their packages and the required documentation to implement the package / project;
- (ix) Assist the SMMEs in measurements and preparation of payment certificates together with the Principal Contractors Quantity Surveyor on site;
- (x) Monitor the performance of emerging enterprises and update the logbook;
- (xi) Prepare the final payment certificates and certificate of experience for the SMMEs on completion of the awarded package; continuous monitoring of the quality of work of the SMME and providing support where required, taking measurements and samples on site to make sure that the SMME work and the materials meet the specifications and quality standards;
- (xii) negotiate and/or arrange for purchase of materials and payment terms on behalf of the SMMEs, no contra charges are to be applied and the SMME is to be invoiced for materials purchased and must have created value for money; and
- (xiii) maintain the program of the subcontract, ensure continuous monitoring and implementation of necessary interventions.

The SMME Construction Mentor will guide, assist and mentor the SMME Subcontractors throughout the Contract using SMME 005 to report on performance of the SMME on monthly basis. On completion, the SMME Construction Mentor will issue a Certificate of Completion within seven days after the final completion (form **SMME 006**).

(b) Quality of work and performance of the SMME Subcontractor

The SMME Subcontractor shall have 14 days from the date of receipt of the letter of warning by the Principal Contractor to address and rectify the issues raised by the Principal Contractor, with the exception of points (d) and (e) of clause D11.3, for which the rectification time shall be 24 hours. Failure to do so will be sufficient grounds for the Principal Contractor to terminate the Contract provided the MT is satisfied that the Principal Contractor has made every effort to correct the performance by the SMME Subcontractor. The MT will establish a 'change control procedure' for the process of making changes to subcontracts and the work thereof as the contract proceeds.

(c) Training

The SMME Contractors registered in the CDC Database will be assessed in order to identify areas that require intervention and develop a growth plan for the SMME Contractor. Any deficiencies or specific skills that can be addressed during construction stage, the Principal Contractor shall provide such training or skills transfer. The provisional sum will be allowed for under the relevant item in the bill of quantities. It is deemed that the Principal Contractor has allowed for all training requirements to accommodate SMMEs included in the mark-up provision.

The schedule of training requirements for the SMME contractor shall be forwarded to Principal Contractor, using form SMME008 and the Principal Contractor will be required to provide a method statement schedule to address the identified deficiencies. The accredited training provided by the service provider to the SMMEs will include but not limited to:- Project Management, Occupational Health and Safety – Construction Regulations , Resource Productivity, Business Administration, Financial Management etc. Provisional Sum amount will fund the accredited training.

(d) Reporting

SMME Reporting forms shall form part of the monthly interim payment certificates of the Principal Contractor and failure to submit the required forms and monthly mentorship report will result in the payment certificate being rejected by the CDC.

Form code	Description	Reporting
SMME 003A	SMME Package schedule - Provisional Amount	40% to be completed once off beginning of contract
SMME 003B	SMME Package schedule - PMT identified	40% to be completed once off beginning of contract
SMME 004	SMME Request form	Request for SMME Names for Packages
SMME 005A	Yearly progress	Monthly
SMME 005B	Project/Package details	Monthly
SMME 005C	Contract Management Assessment	Monthly
SMME 005D	Business Management Assessment	Monthly
SMME 006	Certificate of experience	Completion of Project
SMME 009	Declaration form	Monthly

D11.2 Dispute Avoidance and Resolution Procedures

The Principal Contractor shall at all times:

- (a) apply the terms and conditions of the subcontract fairly and justly, taking due cognisance of the level of sophistication and experience of the particular SMME concerned, as well as the level of subcontract applicable;
- (b) closely manage and supervise all SMMEs and wherever feasible, shall give reasonable warning to SMMEs when any contravention of the terms of the subcontract has occurred or appears likely to occur. The Principal Contractor shall, whenever feasible, give the SMMEs reasonable opportunity to make good any such contravention or to avoid such contravention and shall render all reasonable assistance to the SMME in this regard.

When taking any disciplinary actions or imposing any penalties as are provided for in the subcontract, the Principal Contractor shall explain fully to the SMMEs that such actions are provided for in the subcontract. If any dispute should arise between the Principal Contractor and a SMME such dispute shall be resolved in accordance with the provisions of the subcontract.

D11.3 Quality of Work and Performance of the SMME

If the SMME, in the opinion of the Principal Contractor, fails to comply with the criteria as listed below, the Engineer/Principal Agent shall issue a written warning to the Principal Contractor, stating all the areas of non-compliance. A copy of the letter of warning shall be forwarded to the Client. These criteria are as follows:

- (a) Acceptable standard of works as set out in the specifications in the subcontract tender document
- (b) Progress in accordance with the time constraints in the SMME's tender document
- (c) Punctual and full payment of the workforce and suppliers
- (d) Site safety
- (e) Environmental impacts.

The Subcontractor shall have 14 days from the date of receipt of the letter of warning by the Principal Contractor to satisfactorily address the issues raised by the Contractor, with the exception of point (d), for which the response time shall be 24 hours. Failure to do so will be sufficient grounds for the Principal Contractor to terminate the contract provided the SMME Unit is satisfied that the Principal Contractor has made every effort to correct the performance by the SMME.

D11.4 Payment to SMMEs

The following payment conditions shall form part of the Sub Contract Agreement entered into between the Principal Contractor and SMME:

1. The Principal Contractor shall draw up a schedule with dates of measuring/certifying works, submitting invoices and payment dates. This schedule is to be issued to the CDC Project Manager, SMME Unit, SMME Mentor and awarded SMME's;
2. The CDC will pay all subcontractors appointed by the Principal Contractor directly once certified by the Principal Contractor.
3. The Principal Contractor must instruct the SMME subcontractors to submit their payment certification or claim monthly in line with the requirements of the contract between the CDC and the Principal Contractor to ensure that their claims are processed and paid by the CDC timeously.

D12. PRINCIPAL CONTRACTOR'S DUTIES UPON COMPLETION OF EACH SMME PACKAGE

The Principal Contractor shall, on completion of each and every subcontract completed in accordance with the provisions of this Specification, issue free of charge to the SMME within 7 days of the completion of the subcontract, a Certificate of Experience on a single A4 page stating:

(a) Contract data:

- (i) Contract title;
- (ii) Contractor's full name and address;
- (iii) Principal agent's name and address;

(b) Subcontract data:

- (i) SMME name and address;
- (ii) Scope or extent of the subcontract works;
- (iii) Value of the subcontract works;
- (iv) Applicable level of the subcontract;
- (v) Duration of the subcontract;
- (vi) Date of completion of the subcontract; and
- (vii) Description of the training undergone by the SMME;

(c) Certifying the SMMEs completion of the subcontract.

SMME 006 form provides the format, layout and appearance of certificates to be issued but the Principal Contractor may suggest revision to MT for approval which shall be respectable and presentable in accordance with the general standards of normal business practice. All certificates issued shall be co-signed by the Principal Agent/Consulting Engineer and a senior representative of the Principal Contractor, who has been duly authorised thereto.

D13. CONTRACTOR'S LIABILITY

D13.1 No provision or requirement set out in this Specification shall be deemed to relieve the Principal Contractor of any liability or obligation under the contract between the CDC and the Principal Contractor, and the Principal Contractor shall be fully liable for the acts, defaults and neglects of any SMMEs, his agents or employees, as fully as if they were the acts, defaults and neglects of the Principal Contractor, his agents or employees.

D14. PERFORMANCE GUARANTEE

D14.1 No provision or requirement set out in this specification shall be deemed to relieve the Principal Contractor of any liability or obligation under the contract, and in accordance with the provisions of the relevant clause of the applicable form of contract, the Principal Contractor shall be fully liable for the acts, defaults and neglects of any SMMEs, his agents or employees, as fully as if they were the acts, defaults and neglects of the Principal Contractor, his agents or employees.

Any failure or neglect by the Principal Contractor to comply with the provision of the specifications, or any omission or neglect by the Principal Contractor in adhering to or applying the principles as are described and inherent in the specifications, shall be deemed to constitute a warrant for the Principal Agent/ Consulting Engineer to act in terms of relevant clause of the applicable form of contract.

SMMEs will be required to produce a Performance guarantee in line with the value of the subcontract work as follows:

0 to R2, 000,000 - 0%;

R2, 000,001 to R4, 000,000 - shall be 2.5%;

R4, 000,001 and higher - shall be 5%;

Where such guarantees are provided by SMME subcontractors the return of same will be related to the time when the work carried out by the SMME subcontractor is complete to the satisfaction of the Principal Contractor and the Principal Agent/ Consulting Engineer.

D15. RETENTION

D15.1 Fifty Percent Retention on SMME subcontractors excluding VAT, will be released half on practical completion and balance on final completion as follows:

Building Works: 6 months after the SME subcontract work has been carried out by the SMME is complete to the satisfaction of the Principal Contractor.

Civil Works: 12 months after the subcontract work carried out by the SMME is complete to the satisfaction of the Principal Contractor.

Other Specialised Work: 6 months maximum after the subcontracting work carried out by the SMME is complete to the satisfaction of the Contractor and the Engineer. This also refers to Electrical and Mechanical Engineering works.

Special Condition: Retention on subcontractors, whose subcontract value is less than R 1 000 000.00 (One Million Rand), will be released 3 months after the subcontract work carried out by the subcontractor is complete to the satisfaction of the Principal Contractor.

D16. MEASUREMENT AND PAYMENT

The price tendered will be deemed to include all incidentals by the Principal Contractor to comply with the conditions of this specification. No other claims will be entertained should SMMEs negatively affect the contract works in any way, and the Principal Contractor shall be deemed to have included such effects in the handling cost percentage for the different SMME work packages above.

D17. SUBCONTRACTING BY SUBCONTRACTORS

The Principal Contractor is not to permit SMME subcontractors to further subcontract on any other conditions than those applying in the project specification to subcontractors or SMME subcontractors.

D18 JOINT VENTURING & CONSORTIUM

The SMME sub-contractors are not permitted to enter into Joint Ventures or form a consortium with other SMME(s) sub-contractors.

D19 REPEAT APPOINTMENTS

The SMME shall be afforded a maximum of two active packages on **ONE** particular CIDB Grade and shall not be considered for any further works until they've provided proof to the SMME Unit of upgrading with CIDB.

This will only apply to SMMEs that have successfully completed their packages within the specified time, achieved the desired quality and adhered to all contractual obligations.

The CDC has the right through the MT to query any or all of the recommendations of the Principal Contractor. Once the MT is satisfied with the recommendations of the Principal Contractor, it reserves the right approve or reject the repeat appointment.

This is to ensure the spread of work, mitigation of risk and realisation of the developmental objectives.

Acknowledgement of SMME Specification	Principal Contractor Representative	CDC Project Manager	Principal Agent
Date:	Name:	Name:	Name:
	Signature:	Signature:	Signature:

**PART C3.8 – STANDARD ENVIRONMENTAL
SPECIFICATION/ASBESTOS REPORT**



Specification:

**ENVIRONMENTAL SPECIFICATION FOR
CONSTRUCTION OF COBOSI JPS**

CDC/329/24

Specification N^o
CDC-SBU-SPC-129-23

Classification: Public

10 February 2023

DOCUMENT INFORMATION SHEET

Title of Document : Environmental Specification for the Construction of
Cobosi JPS at Engcobo

Type of Document : Environmental Specification

Document Number : CDC-SBU-SPC-129-23

Prepared by : Nzwane Mdikane

Typed by : Nzwane Mdikane

Business Unit : Operations

Prepared for : Bidders/Service Providers

Date of Issue : 10 February 2023

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DOCUMENT CONTROL SHEET

The purpose of this form is to ensure that documents are reviewed and approved prior to issue. The form is to be bound into the front of all documents released by the Coega.

PROJECT NAME : CONSTRUCTION OF NEW EARLY CHILDHOOD DEVELOPMENT CENTRE AT COBOSI JPS
DOCUMENT TITLE : ENVIRONMENTAL SPECIFICATION
DOCUMENT No. : CDC-SBU-SPC-129-23

SIGNING OF THE ORIGINAL DOCUMENT

We, the undersigned, accept this document as a stable work product to be placed under formal change control as described by the Procedure for Control of Documented Information.

ORIGINAL	Prepared by	Reviewed by	Approved by
Date: 10.02.2023	Name: N. Mdikane Signature: 	Name: S. Mabi Signature: 	Name: S. Silwana Signature: 

Distribution :	Coega
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REVISION CHART

REVISION 1	Name:	Name:	Name:
Date:	Signature:	Signature:	Signature:

This document, and the information or advice which it contains, is provided by the SHEQ Business Unit solely for the use by the Board of Directors of the Coega Development Corporation (Pty) Ltd and Coega and for reliance by its Executive Management and the Board in performance of that Business Unit's duties.

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1. Scope

This Specification covers the requirements for controlling the impact on the environment of construction activities undertaken with the realm of Programmes implemented by the Coega Development Corporation.

2. INTERPRETATION

2.1 SUPPORTING SPECIFICATIONS

Where this Standard Environmental Specification Programmes (SESC-EP) is required for a project the Standard Vegetation Specification (SVS) shall also, where applicable, form part of the Contract Documents:

2.2 APPLICATION

This SESC-EP contains clauses that are generally applicable to the undertaking of construction works as it is necessary to impose pro-active controls on the extent to which the **construction activities** impact on the environment.

2.3 DEFINITIONS

For the purposes of this SESC-EP, the following definitions and abbreviations shall apply:

2.3.1. CDC:

Means Coega Development Corporation (Pty) Ltd.

2.3.2. Agent:

Means a competent person who acts as a representative for the Client.

2.3.3. Principal Agent (PA):

Means a person or entity appointed by a client and who has full authority and obligation to act in terms of the construction contract.

2.3.4. SHE Agent

Means a person or entity appointed by a client who has full authority and obligation to act in terms of Safety, Health and Environmental Legal Compliance of the construction contract.

2.3.5 SHE Project Manager (SHEPM)

Means the client's Safety, Health and Environmental Project Manager who oversee the performance of the Contractor and She Agent in terms of SHE compliance of the construction.

2.3.6. Cement laden water:

Means water containing cement or concrete arising from the Contractor's activities.

2.3.7. Contaminated water:

Means water contaminated by the Contractor's activities such as with hazardous substances, hydrocarbons, paints, solvents and runoff from plant, workshop or personnel wash areas but excludes water containing cement/ concrete or silt.

2.3.8. Environment:

Means the surroundings within which human beings exist and these comprise of:

- (i) The land, water and atmosphere of the earth.
- (ii) Micro-organisms, plant and animal life.
- (iii) Any part or combination of (i) and (ii) and the interrelationships among and between them; and
- (iv) The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

2.3.9. His:
Means his or her, as applicable.

2.3.10. Method Statement:

Is a written submission by the Contractor in response to the Specifications or to a request by the SHE AGENT/SHEPM, setting out the plant (construction equipment), materials, labour and method the Contractor proposes using to carry out an activity, identified by the relevant specification or the SHE AGENT/SHEPM when requesting the Method Statement. The Method Statement shall be in such detail that the SHE AGENT/SHEPM is able to assess whether the Contractor's proposal is in accordance with the Specifications and/or will produce results in accordance with the Specifications.

The Method Statement shall cover applicable details with regard to:

- Construction procedures.
- Materials and equipment to be used.
- Getting the equipment to and from Site.
- How the equipment/ materials will be moved while on Site.
- How and where materials will be stored.
- The containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur.
- Timing and location of activities.

-
- Compliance/ non-compliance with the Specifications; and
 - Any other information deemed necessary by the SHEPM.

2.3.11. Potentially hazardous substance:

Is a substance, which, in the reasonable opinion of the SHE AGENT/SHEPM, can have a detrimental effect on the Environmental. Hazardous Chemical Substances are defined in the Regulations for Hazardous Chemical Substances published in terms of the Occupational Health and Safety Act.

2.3.12. Reasonable:

Means, unless the context indicates otherwise, reasonable in the opinion of the SHE AGENT/SHEPM, after he has consulted with a representative of the Contractor.

2.3.13 Silt laden water

Means water containing sand and silt arising from the Contractor's activities and/or as a result of natural run-off.

2.3.14 Site

This is the area in the possession of the Contractor for the construction of the Works. Where the area is not demarcated, it will include all adjacent areas, which are reasonably required for the activities for the Contractor, and approved for such use by the PA.

2.3.15 Solid waste:

Means all solid waste, including construction debris, excess cement/ concrete, wrapping materials, timber, tins, cans, drums, wire, nails, food and domestic waste (e.g. plastic packets and wrappers).

3. Materials

3.1 MATERIALS HANDLING, USE AND STORAGE

The Contractor shall ensure that any delivery drivers are informed of all procedures and restrictions (including "no go" areas) pertaining to their work activities required to comply with the Specifications. The Contractor shall ensure that the delivery drivers are supervised during off loading, by someone with an adequate understanding of the requirements of the Specifications.

Materials shall be appropriately secured to ensure safe passage between destinations. Loads including, but not limited to sand, stone chip, fine vegetation, refuse, paper and cement, shall have appropriate cover to prevent them spilling from the vehicle during transit. The Contractor shall be responsible for any clean-up resulting from the failure by his employees or suppliers to properly secure transported materials.

All manufactured and/ or imported material shall be stored within the Contractor's camp, and, if so, required by the Project Method Statement, out of the rain. All lay down areas outside of the construction camp shall be subject to the Principal Agent approval.

Imported gravel, fill, soil and sand materials shall be free of weeds, alien invasive seed matter, plant material, litter and contaminants and shall be obtained from sources approved by the PA. A Method Statement detailing the source and methods to ensure compliance with this specification shall be submitted to the SHE AGENT and PA.

3.2 STOCKPILING

Any stockpiling of gravel cut, fill or any other material including spoil shall be in areas approved by the PA within the defined working area.

The Contractor shall ensure that the material does not blow or wash away. If the stockpiled material is in danger of being washed or blown away, the Contractor shall spray it with Dustex or cover it with a suitable material, such as hessian or plastic. Stockpiles of topsoil shall not be covered with plastic.

3.3 SOLID WASTE MANAGEMENT

No on-site burning, burying or dumping of any waste materials, litter or refuse shall occur. The Contractor shall provide vermin and weatherproof bins with lids of sufficient number and capacity to store the solid waste produced on a daily basis. The lids shall be kept firmly on the bins at all times.

Bins shall not be allowed to overflow and shall be emptied at least once a day. The waste from bins may be temporarily stored on Site in a central waste area that is weatherproof and scavenger-proof, and which the SHE AGENT and PA have approved.

Recyclable waste shall be disposed of into separate skips/bins and removed off-site for recycling.

All solid waste shall be disposed of off-site at an approved landfill Site. The Contractor shall supply the SHE AGENT with the appropriate disposal certificates.

The Contractor shall submit a solid waste management Method Statement to the SHE AGENT.

Should the contractor for whatever reason come across any medical waste whether buried or dumped in the construction area, you should immediately stop the operation in the said area and immediately inform the PA who would subsequently inform the relevant hospital representatives. The contractor shall protect the area in such a manner that no one is exposed to such waste. Once the medical waste has been safely removed, then the contractor can commence with the works as instructed by the PA.

3.4 WATER USE

All source of water for construction purposes must be approved by the PA in writing before any such sources can be used to obtain water.

3.5 HAZARDOUS SUBSTANCES

The transportation and handling of hazardous substances must comply with the provisions of the Hazardous Substances Act (Act No.187 of 1993) and associated regulations as well as SABS 0228 and SABS 0229. The Contractor shall also comply with all other applicable regional and local legislation and regulations with regard to the transport, use and disposal of hazardous substances. Hazardous chemical substances (as defined in the Regulations for Hazardous Chemical Substances) used during construction shall be stored in secondary containers. The relevant Material Safety Data Sheets (SDS) shall be available on Site. Procedures detailed in the SDSs shall be followed in the event of an emergency situation. The Contractor shall be responsible for the training and education of all personnel on Site who will be handling hazardous materials about their proper use, handling and disposal.

If potentially hazardous substances are to be stored or used on Site, the Contractor shall submit a Method Statement to the SHE AGENT detailing the substances / materials to be used, together with the transport, storage, handling and disposal procedures for the substances.

3.6 CONTAMINATED WATER

Potential pollutants of any kind and in any form shall be kept, stored, and used in such a manner that any escape can be contained and that the water table is not endangered. Water containing such pollutants as chemicals, washing detergents, sewerage, fuels, paints and solvents and hydrocarbons shall be contained and discharged into an impermeable storage facility for removal from the site or for recycling. This particularly applies to runoff from fuel depots/workshops/truck washing areas. The Contractor may direct contaminated water into a sewerage main, provided that authorisation has been obtained from the local authority and that the PA has provided written permission for this action.

Wash down areas shall be placed and constructed in such a manner so as to ensure that the surrounding areas are not polluted. The Contractor shall notify the SHE AGENT and the PA immediately of any pollution incidents on Site.

The Contractor shall submit a Method Statement to the SHE AGENT and the PA detailing how the contaminated water will be managed on Site.

3.7 CEMENT AND CONCRETE BATCHING

The proposed location of batching areas (including the location of cement stores and sand and aggregate stockpiles) shall be indicated on the Site layout plan and approved by the PA.

All wastewater generated from the operation and cleaning of concrete batching equipment and other sources of concrete shall be passed through a concrete wastewater settlement system as depicted in the appropriate drawing. The water from this system shall not be allowed to flow into any “no go” area or water course but must permeate through the ground before it reaches any such water course. The accumulated sludge in the settlement system must be regularly cleaned out and appropriately disposed of as solid waste.

The Contractor shall ensure that minimal water is used for washing of concrete batching equipment.

Used cement bags shall be disposed of in weatherproof bins on site to prevent the generation of wind-blown cement dust and the bags from blowing away.

During construction, the contractor must ensure that concrete is mixed on mortar boards, all visible remains of concrete are removed and disposed of as waste and that all surplus aggregate is removed.

A Method Statement detailing all actions to be taken to comply with the cement and batching requirements shall be submitted to the SHE AGENT and the PA.

4. Plant

4.1 FUEL (PETROL, DIESEL) AND OIL

4.1.1 Fuel Storage

Fuel can be stored on site. The location of the fuel storage area will be approved by the PA and will be situated at least 100m away from any major drainage systems, residential areas or “no go” areas. All necessary approvals with respect to fuel storage and dispensing shall be obtained from the appropriate authorities. Symbolic safety signs depicting “No Smoking”, “No Naked Lights” and “Danger” conforming to the requirement of SABS 1186 shall be prominently displayed in and around the fuel storage area. There shall be adequate fire-fighting equipment at the fuel storage area.

The Contractor shall ensure that all liquid fuels and oils are stored in containers with lids, which are kept firmly shut and under lock and key at all times. The capacity of the container shall be clearly displayed, and the product contained within the container clearly identified using the emergency information system detailed in SABS 0232 part 1. Fuel storage tanks shall have a capacity not exceeding 9000 litres and shall be kept on site only for as long as fuel is needed for construction activities, on completion of which they shall be removed.

Tanks on site shall not be linked or joined via any pipe work but shall remain as separate entities. The tanks shall be situated on a smooth impermeable base with a bund. The volume inside the bund shall be 110% of the total capacity of the largest storage tank. The base may be constructed of concrete, or of plastic sheeting with impermeable joints with a layer of sand over to prevent perishing. The impermeable lining shall extend to the crest of the bund. The floor of the bund shall be sloped to enable any spilled fuel and/or fuel-contaminated water to be removed. Appropriate material approved by the PA that absorbs/ breaks-down or

encapsulates minor hydrocarbon spillage and which is effective in water shall be installed in the sump.

The tanks and bunded areas shall be covered by a roofed structure, as detailed in appropriate drawing, to prevent the bunded area from filling up with rainwater. This structure shall be constructed in such a way, and to the approval of the PA, to ensure that it is not dislodged by wind. If any water does collect in the bunded area it shall be removed within a day of this occurring and taken off Site to a disposal site approved by the PA, and the material that absorbs/ breaks-down or encapsulates minor hydrocarbon spillage shall be replenished.

Only empty and externally clean tanks may be stored on the bare ground. Empty and externally dirty tanks shall be sealed and stored on an area where the ground has been protected.

Adequate precautions shall be provided to prevent spillage during the filling of any tank and during the dispensing of the contents. The dispensing mechanism for the fuel storage tanks shall be stored in a waterproof container when not in use.

A Method Statement shall be submitted to the SHE AGENT and the PA detailing the design, location and construction of the fuel storage area as well as for the filling and dispensing from storage tanks and for the type of absorbing/ breaking-down or encapsulating material to be used.

4.1.2 **Refuelling**

Where reasonably practical, plant shall be refuelled at a designated re-fuelling area/depot or at a workshop as applicable. If this is not reasonably practical, then the surface under the refuelling area shall be protected and appropriately bunded against pollution to the reasonable satisfaction of the SHE AGENT and PA prior to any refuelling activities.

If fuel is dispensed from 200 litre drums, the proper dispensing equipment shall be used, and the drum shall not be tipped in order to dispense fuel. The Contractor shall ensure that the appropriate fire-fighting equipment is present during refuelling operations.

The Contractor shall ensure that there is always a supply of absorbent material readily available to absorb/breakdown or where possible, be designed to encapsulate minor hydrocarbon spillages. The quantities of such materials shall be able to handle a minimum of 200 l of hydrocarbon liquid spill. Prior to any refuelling or maintenance activities, the PA must approve this material.

4.1.3 **Used oil and hydrocarbon contaminated materials**

Used oil shall be stored at a central location on Site prior to removal off Site for disposal at an approved disposal or recycling site.

Old oil filters and oil, petrol and diesel-soaked material shall be treated as hazardous waste. The Contractor shall remove all oil, petrol, and diesel-soaked sand immediately and shall dispose of it as hazardous waste or treat it on site with material that breaks-down or encapsulates such spillages as approved by the SHE AGENT and the PA.

4.2 ABLUTION FACILITIES

Washing, whether of the person or of personal effects, and acts of excretion and urination are strictly prohibited other than at the facilities provided; The Contractor shall provide the necessary ablution facilities for all his personnel prior to the commencement of work and shall ensure that his personnel make use of the facilities.

Toilet facilities shall be supplied by the Contractor for the workers at a ratio of at least 1 toilet per 15 workers in areas approved by the PA. Every 1-man urinal will be taken as supplying the equivalent of 5 men in addition to the 15 men per toilet on site. Toilets shall be situated within 200m of any area where work is taking place in numbers sufficient to meet the ratio depicted above for the workers in the area.

The facilities shall be maintained in a hygienic state and serviced regularly. Toilet paper shall be provided. Temporary/ portable toilets shall be secured to the ground to prevent them toppling due to wind or any other cause, to the satisfaction of the PA.

Discharge into the environment and burial of waste is strictly prohibited. The Contractor shall ensure that no spillage occurs when the toilets are cleaned or emptied and that the contents are removed from the Site. Toilets shall be emptied before the Contractors' holidays or any other temporary site closure.

4.3 EATING AREAS

The Contractor shall designate eating area/s, subject to the approval of the PA and the SHE AGENT. No cooking is allowed outside of the Contractor's camp area on Site.

At mealtimes all workers must eat in designated eating areas. More than one area may be required for large Sites. These areas shall have shade for the workers. The eating areas may be in existing structures or in temporary/ transportable structures that shall be well constructed using wood or metal for the frame and screened on the top and sides with shade cloth/ canvas or other material to the satisfaction of the PA/SHE AGENT. These areas shall be well demarcated and in locations approved by the PA and shall not be within 100m of any "no go" areas or any major drainage systems, on or adjacent to the Site.

Sufficient bins as specified in Section 3.3 of this Environmental Specification shall be present in these areas. All disposable food packaging must be disposed of in the bins after every meal.

The feeding or leaving of food for animals is strictly prohibited.

4.4 SITE STRUCTURES

All site establishment components (as well as equipment) shall be positioned to limit visual intrusion on neighbours and the size of the land area disturbed. The type and colour of roofing and cladding materials to the Contractor's temporary structures shall be selected to reduce reflection.

The Contractor shall supply and maintain adequate and suitable sheds for the storage of materials. Sheds for the storage of materials that may deteriorate or corrode if exposed to the weather shall be weatherproof, adequately ventilated and provided with raised floors.

4.5 LIGHTS

The Contractor shall ensure that any lighting installed on the Site for his activities does not interfere with road traffic or cause a reasonably avoidable disturbance to the surrounding community or the hospital itself.

4.6 WORKSHOP, EQUIPMENT MAINTENANCE AND STORAGE

It is not envisaged that this will be applicable in this project. However, should it be applicable the following shall apply: Where practical, all maintenance of equipment and vehicles on Site shall be performed in a workshop. If it is necessary to do maintenance outside of the workshop area, the Contractor shall obtain the approval of the PA prior to commencing such activities. No maintenance, including emergency maintenance, of plant can take place within 20m of any "no go" area or drainage system.

The Contractor shall ensure that in his workshop and other plant maintenance facilities, including those areas where, after obtaining the PA's approval, the Contractor carries out emergency plant maintenance, there is no contamination of the soil or vegetation. The workshop shall have a smooth impermeable (concrete or thick plastic covered with sand) floor. The floor shall be bunded and sloped towards an oil trap or sump to contain any spillages. When servicing equipment, drip trays shall be used to collect the waste oil and other lubricants. Drip trays shall also be provided in construction areas for stationary plant (such as compressors) and for "parked" plant (such as scrapers, loaders, vehicles).

All vehicles and equipment shall be kept in good working order and serviced regularly. Leaking equipment shall be repaired immediately or removed from the Site.

The washing of equipment shall be restricted to urgent or preventative maintenance requirements only. All washing shall be undertaken in the workshop or maintenance areas, and these areas must be equipped with a suitable impermeable floor and sump/oil trap. The use of detergents for washing shall be restricted to low phosphate and nitrate containing and low sodding-type detergents.

A Method Statement must be submitted to the PA and SHE AGENT detailing the design of the bunding of the workshop and how run-off from the workshop will be managed as well as how drip trays used under plant will be managed.

4.7 NOISE

Considering that the project is within the precinct of an operation Primary School Facility, the Contractor shall take precautions to minimise noise generated on Site (e.g. Install and maintain silencers on machinery where possible). The Contractor shall comply with the

Noise Induced Hearing Loss Regulations published under the Occupational Health and Safety Act of 1993.

Appropriate directional and intensity settings are to be maintained on all hooters and sirens.

No amplified music shall be allowed on Site. The use of radios, tape recorders, compact disc players, television sets etc. shall not be permitted unless the volume is kept sufficiently low as to avoid any intrusion on members of the public within range. The Contractor shall not use sound amplification equipment on Site unless in emergency situations.

4.8 DUST CONTROL

The Contractor shall be responsible for the continued control of dust arising from his operations. The Contractor shall inform the PA/SHE AGENT 48 hours in advance of anticipated 'unavoidable' dust generating activities. The Contractor shall take all reasonable measures to minimize the generation of dust as a result of construction activities to the satisfaction of the SHE AGENT AND PA. Appropriate dust suppression measures include erection of dust screens, spraying or dampening with water, using a commercial dust binder (such as Hydropam or Dustex), rotovating straw bales, planting of open cleared space and the scheduling of dust-generating activities. If the conditions are such that the Contractor cannot satisfactorily dampen the dust, then the Contractor must halt operations until such time as the conditions are more suitable for lower dust generating construction.

Damping of all gravel haul and access road with water must be ongoing and special attention must be given to specific area from the entrance to construction site area.

Areas (site access) that are to have the topsoil stripped for construction purposes must be limited and only stripped when work is about to take place.

Other activities and situations that may result in a dust nuisance include site clearance and stockpiles of topsoil or sand and activities associated with batching plant.

A Method Statement detailing how dust will be managed for different operations on the site must be submitted to the SHE AGENT and PA for his approval before any work that could result in dust being generated is undertaken.

5. Construction

5.1 METHOD STATEMENTS

The following Method Statements shall be provided by the Contractor and submitted with the SHE file for reviewing prior to the Contractor starting work on site.

5.1.1 **Solid waste management (Clause 3.3)**

Expected solid waste types, quantities, methods and frequency of collection and disposal as well as location of disposal sites.

5.1.2 **Contaminated water (Clause 3.6)**

Methods of minimising, controlling, collecting and disposing of contaminated water.

5.1.3 **Contractors SHE Officer (Clause 5.2)**

The name and letter of appointment of the Contractors SHE Officer must be included in the SHE file and the terms of reference for the work to be undertaken by the SHE Officer must be detailed including time on site, CV, roles and responsibility, interaction with the Contractor and SHE Agent, etc.

5.1.4 **Site division (Clause 5.4)**

The location, layout and method of establishment of the construction camp (including all buildings, offices, lay down yards, vehicle wash areas, fuel storage areas, batching areas and other infrastructure required for the running of the project). Construction site should be clearly separated from the existing school.

5.1.5 **Emergency procedures (Clause 5.10)**

Emergency procedures for fire and accidental leaks and spillages of hazardous substances (including fuel and oil); Include details of risk reduction measures to be implemented including fire-fighting equipment, fire prevention procedures and spill kits (materials and compounds used to reduce the extent of spills and to breakdown or encapsulate hydrocarbons).

Other Method Statements that will be required during the course of construction are to be provided by the Contractor a minimum of 20 days prior to commencement

of the works or activities to which they apply (no work can commence on site before these Method Statements have been approved):

5.1.6 Importing of material (Clause 3.1)

Detail the source of any gravel, soil, aggregate or sand imported onto site and precautions taken to ensure no vegetative contamination.

5.1.7 Hazardous substances (Clause 3.5)

Details of any hazardous substances / materials to be used, together with the transport, storage, handling and disposal procedures for the substances.

5.1.8 Cement and concrete batching (Clause 3.7)

Location, layout and preparation of cement/ concrete mixing areas including the methods employed for the mixing of concrete and particularly the containment of run-off water from such areas and the method of transportation of concrete.

5.1.9 Fuel storage and use (Clause 4.1)

The design, location and construction of the fuel storage area as well as for the filling and dispensing from storage tanks.

5.1.10 Workshop and drip trays (Clause 4.6)

Location, layout, design and pollution control for Workshop as well as management of drip trays under plant.

5.1.11 Dust (Clause 4.8)

Details on the methods for managing dust on the site.

5.1.12 Environmental awareness training (Clause 5.3)

Number, dates, trainer and logistics for awareness courses for the Contractor's employees and for the management staff.

5.1.13 Access Routes (Clause 5.7)

Details, including a drawing, showing where and how the access points and routes will be located and managed.

Any additional Method Statements as required by the SHE AGENT must be provided by the Contractor. The Contractor shall not commence the activity until the Method Statement has been approved in writing and shall, except in the case of emergency activities, allow a period of 7 working days for approval of the Method Statement.

The SHE AGENT and PA may require changes to a Method Statement if the proposal does not comply with the specification or if, in the reasonable opinion of the SHE AGENT and PA, the proposal may result in, or carries a greater than reasonable risk of, damage to the environment in excess of that permitted by the Specifications or any legislation.

Approved Method Statements shall be readily available on the Site and shall be communicated to all relevant personnel and subcontractors. The Contractor shall carry out the Works in accordance with the approved Method Statement. Approval of the Method Statement shall not absolve the Contractor from any of his obligations or responsibilities in terms of the Contract. No claim for delay or additional cost incurred by the Contractor shall be entertained due to inadequacy of a Method Statement.

Details of the following appointments are required within 7 days of commencing work on site:

5.1.14 Assistants to the Contractor's SHE Officer (Clause 5.2)

The name and appointment letter of at least one assistant to the Contractor's SHE Officer must be given to the SHE Agent/SHEPM and the work to be undertaken by this assistant must be detailed including time allocated to these roles and their responsibility and interaction with the Contractors SHE Officer.

5.1.15 Fire Officer (Clause 5.9)

The name and appointment letter of the Fire Officer must be included in the SHE organogram.

5.2 CONTRACTOR'S SHE OFFICER AND ASSISTANT

The Contractor shall appoint a Contractor's SHE Officer who shall be responsible for undertaking a daily site inspection to monitor compliance with this Specification and the relevant Project Specification.

The Contractor shall submit the name of the Contractor's SHE Officer as well as a Method Statement detailing his CV, roles and responsibilities to the SHE AGENT/SHEPM for his approval before work can commence on site.

The Contractor will also appoint a competent SHE Representative, who will assist and report to the Contractor's SHE Officer, to the following positions:

- Litter Assistant to ensure that the site is cleaned every day and that dustbins are not overflowing, and litter does not blow off the site into the surrounding areas.
- Hydrocarbon and Contaminated Water Assistant to ensure that any hydrocarbon spills or leaks are dealt with immediately, vehicles are not leaking hydrocarbons on site, there is no pollution of any water course/ drainage system on or adjacent to site due to any construction activities, all stationary plant has bunds around them that are kept in good working order, the fuel storage and refuelling area is free of spills and leaks of hydrocarbons and any other issues to do with hydrocarbon housekeeping on site. He will also ensure that no contaminated water is escaping onto the site and that the toilets are kept in a clean and good working condition.
- Demarcation and Dust Assistant to ensure that all fencing and demarcation is in place when it is required and that such fencing or demarcation is in good order on a daily basis. This person will also be responsible to ensure that excessive dust is not generated from the construction area and will ensure that the roads are watered and other areas dampened where necessary and any other actions taken to limit dust generation from site.

These appointments will be made within the first 7 days of work commencing on site and will be given to the SHE Agent/SHE PM in writing.

5.3 ENVIRONMENTAL AWARENESS TRAINING

Environmental awareness training ('toolbox' talks) shall be run for all personnel on site. Toolbox talks shall be run during normal working hours at a suitable venue provided by the Contractor. All attendees shall remain for the duration of the talk and sign an attendance register on completion that clearly indicates participant's names, a copy of which shall be kept in the SHE file.

Subsequent sessions shall be run for any new personnel coming onto site. A Method Statement with respect to the organisation of these courses shall be submitted.

Notwithstanding the specific provisions of this clause it is incumbent upon the Contractor to convey the sentiments of this Environmental Specification to all personnel and Subcontractors involved with the Works.

5.4 SITE DIVISION

The Contractor shall restrict all his activities, materials, equipment and personnel to within the area specified.

A Method Statement detailing the location, layout and method of establishment of the construction camp (including all buildings, offices, lay down yards, vehicle wash areas, fuel storage areas, batching areas and other infrastructure required for the running of the project) shall be submitted to the PA. No accommodation for any staff is permitted on the Site.

5.5 SITE DEMARCATION

The Contractor shall erect and maintain permanent and / or temporary fences of the type and in the locations directed by the PA and SHE AGENT. Such fences shall be erected before undertaking designated activities.

5.6 "NO GO" AREAS

If so required, certain areas within or next to the Site may be declared as "no go" areas. The Contractor shall ensure that, insofar as he has the authority, no person, machinery, equipment or materials enter the "no go" areas at any time.

5.7 ACCESS ROUTES/ HAUL ROADS

On the Site, the Contractor shall control the movement of all vehicles and plant including that of his suppliers so that they remain on designated routes, are distributed so as not to cause an undue concentration of traffic and that all relevant laws are complied with. In addition, such vehicles and plant shall be so routed and operated as to minimise disruption to regular users of the routes not on the Site. On gravel or earth roads on Site and within 500m of the Site, the vehicles of the Contractor and his suppliers shall not exceed a speed of 20 km/hr or as directed by the SHE AGENT.

The Contractor shall supply the SHE AGENT AND PA with a Method Statement detailing the location and management of all access points.

5.8 CONSTRUCTION PERSONNEL INFORMATION POSTERS

The Contractor shall erect and maintain information posters for the information of his employees depicting actions to be taken to ensure compliance with the SES. Construction personnel information posters shall be laminated and erected in all eating areas, workshops and site offices. The Contractor shall ensure that the construction personnel information posters are not damaged in any way and shall replace them if any part becomes illegible.

5.9 FIRE CONTROL

The Contractor shall take all the necessary precautions to ensure that fires are not started as a result of his activities on Site. No open fires shall be permitted on the Site. Any fires that occur shall be reported to the SHE Agent and PA immediately. Smoking shall not be permitted inside offices and those areas where there is a fire hazard. Such areas shall include the workshop and fuel storage areas and any areas where the vegetation or other material is such as to support the rapid spreading of an initial flame.

The Contractor shall appoint a Fire Officer who shall be responsible for ensuring immediate and appropriate actions in the event of a fire and shall ensure that employees are aware of the procedures to be followed. The Contractor shall forward the name of the Fire Officer to the PA for his approval within 7 days of being on site.

The Contractor shall ensure that there is basic fire-fighting equipment available on Site at all times. This shall include at least rubber beaters when working in urban open spaces and natural areas, and at least one fire extinguisher of the appropriate type when welding or other “hot” activities are undertaken. The Contractor shall be liable for any expenses incurred by any organisations called to assist with fighting fires that were started as a result of his activities or personnel, and for any cost relating to the rehabilitation of burnt areas, or consequential damages.

5.10 EMERGENCY PROCEDURES

Emergency procedures, including the names and contact details of responsible personnel and emergency services shall be made available to all staff and shall be clearly displayed at relevant locations at the Site. The Contractor shall advise the

PA/SHE AGENT of any emergencies on Site, together with a record of action taken, within 24 hours of the emergency occurring.

Telephone numbers of emergency services shall also be posted conspicuously in the Contractor's office near the telephone.

The Contractor shall submit a Method Statement covering the procedures for the following emergencies:

5.10.1 Fire:

The Contractor shall advise the relevant authority of a fire as soon as one starts and shall not wait until he can no longer control it. The Contractor shall ensure that his employees are aware of the procedures to be followed in the event of a fire.

5.10.2 Accidental leaks and spillages:

The Contractor shall ensure that his employees are aware of the procedures to be followed for dealing with spills and leaks, which shall include notifying the SHE AGENT AND PA and the relevant authorities. The Contractor shall ensure that all the necessary materials and equipment for dealing with spills and leaks are available on Site at all times. Treatment and remediation of the spill areas shall be undertaken to the reasonable satisfaction of the PA.

In the event of a hydrocarbon spill, the source of the spillage shall be isolated, and the spillage contained. The area shall be cordoned off and secured. The Contractor shall ensure that there is always a supply of absorbent material readily available to absorb/ breakdown or where possible, be designed to encapsulate minor hydrocarbon spillages. The quantities of such materials shall be able to handle a minimum of 200 l of hydrocarbon liquid spill.

Any spills must be cleared, and the contaminated soil/sludge disposed of in an appropriate manner, approved by the PA, or at a licensed hazardous waste disposal site.

5.11 COMMUNITY RELATIONS

The Contractor shall keep a "Complaints Register" on Site. The Register shall contain all contact details of the person who made the complaint, and information regarding the complaint itself and note the date and time that the complaint was resolved.

The PA shall be responsible for responding to queries and/or complaints and may request assistance from the Contractor's Management Staff.

5.12 PROTECTION OF NATURAL FEATURES

The Contractor shall not deface, paint, damage or mark any natural features (e.g. rock formations) situated in or around the Site for survey or other purposes unless agreed beforehand with the PA. Any features affected by the Contractor in contravention of this clause shall be restored / rehabilitated to the satisfaction of the PA.

5.13 STORMWATER MANAGEMENT

Natural run-off must be diverted to stormwater arrangement. The Contractor shall take appropriate measures to prevent sand, silt and silt-laden waters from entering any surface water course. The Contractor shall take reasonable measures to control the erosive effects of stormwater runoff particularly where excavation and construction activities form temporary channels. Suitable energy breaking devices, cut-off drains, diversions and retention ponds shall be employed to ensure that storm water runoff from the Site is dissipated and does not exceed the capacity of the surrounding stormwater system and excessive suspended solids are settled before they enter the stormwater system or any surface water course.

5.14 EROSION AND SEDIMENTATION CONTROL

The Contractor shall take all reasonable measures to limit erosion and sedimentation due to construction activities and shall, in addition, comply with such detailed measures as may be required by the Project Specification.

Where erosion and/or sedimentation, whether on or off the Site, occurs despite the Contractor complying with the foregoing, rectification shall be carried out in accordance with details specified by the PA. Where erosion and/or sedimentation occur due to the fault of the Contractor, rectification shall be carried out to the reasonable requirements of the PA/SHE AGENT and at the expense of the Contractor.

5.15 AESTHETICS

The Contractor shall take reasonable measures to ensure that construction activities do not have an unreasonable impact on the aesthetics of the area.

5.16 TEMPORARY SITE CLOSURE

If the Site is closed for a period exceeding 5 days, the Contractor's SHE Officer in consultation with the SHE AGENT shall carry out the following checklist procedure and ensure that the following conditions pertain and report on compliance with this clause:

5.16.1 Fuels / flammables / hazardous materials stores

- Fuel stores are as low in volume as practicable.
- There are no leaks.
- The outlet is secure and locked.
- The bund is empty.
- Fire extinguishers are serviced and accessible.
- The area is secure from accidental damage through vehicle collision and the like.
- Emergency and contact numbers are available and displayed.
- There is adequate ventilation in enclosed spaces.
- There are no stores or containers within the 1:50 year flood line.

5.16.2 Safety

- Site safety checks have been carried out in accordance with the Occupational Health and Safety Act (No. 85 of 1993) prior to site closure.
- An inspection schedule and log for use by security or contracts staff is developed.
- Emergency and Management contact details are prominently displayed. Security personnel have been briefed and have the facilities to contact or be contacted by relevant management and emergency personnel.
- Night hazards such as reflectors, lighting, traffic signage etc. have been checked.
- Fire hazards identified and the local authority notified of any potential threats e.g. large brush stockpiles, fuels etc.
- Pipe stockpiles are wedged / secured.
- Scaffolds are secure.
- Structures vulnerable to high winds secure.

5.16.3 Erosion

Wind and dust mitigation measures such as straw, brush packs, irrigation etc. is in place.

Excavated and filled slopes and stockpiles are at a stable angle and capable of accommodating normal expected water flows.

Re-vegetated areas have a watering schedule and the supply to such areas is secured.

There are sufficient detention ponds or channels in place.

5.16.4 Water contamination and pollution

- Hazardous fuel stores are secure.
- Cement and materials stores are secure.
- Toilets are empty and secured.
- Refuse bins are empty and secured.
- Bunding is clean and treated with appropriate material that will absorb/breakdown and where possible be designed to encapsulate minor hydrocarbon spillage.
- Drip trays are empty & secure.

Acknowledgement:

I, _____ representing

_____ Contractor have
satisfied myself with the content of the Environmental Specification for Construction of
Cobosi JPS project and shall ensure that we will comply with all relevant obligations in
respect thereof.

Signature of Contractor

Date

Signature of Agent

Date

Comments:



Specification:
**ENVIRONMENTAL QUESTIONNAIRE
FOR COBOSI PJS**

CDC-329-24

Specification N^o
CDC-SBU-EAQ-014-23

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06 March 2023



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DOCUMENT CONTROL SHEET

The purpose of this form is to ensure that documents are reviewed and approved prior to issue. The form is to be bound into the front of all documents released by the Coega.




PROJECT NAME : CONSTRUCTION OF A NEW EARLY CHILDHOOD DEVELOPMENT CENTRE AT COBOSI PJS

DOCUMENT TITLE : ENVIRONMENTAL ASSESSMENT/QUESTIONNAIRE

DOCUMENT No. : CDC-SBU-EAQ-014-23

SIGNING OF THE ORIGINAL DOCUMENT

We, the undersigned, accept this document as a stable work product to be placed under formal change control as described by the Procedure for Control of Documented Information.

ORIGINAL	Prepared by	Reviewed by	Approved by
Date: 06.03.2023	Name: N. Mdikane Signature: 	Name: S. Mabi Signature: 	Name: S. Silwana Signature: 

Distribution :	Coega
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REVISION CHART

REVISION 1	Name:	Name:	Name:
Date:	Signature:	Signature:	Signature:

This document, and the information or advice which it contains, is provided by the SHEQ Business Unit solely for the use by the Board of Directors of the Coega Development Corporation (Pty) Ltd and Coega and for reliance by its Executive Management and the Board in performance of that Business Unit's duties.

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APPENDIX A: REQUIREMENTS FOR THE STORAGE OF FLAMMABLE MATERIALS

APPENDIX B: DWA QUALITY STANDARDS FOR STORMWATER DISCHARGE

APPENDIX C: MUNICIPAL EFFLUENT QUALITY DISCHARGE STANDARDS

1 INTRODUCTION TO THE ENVIRONMENTAL QUESTIONNAIRE FOR PROGRAMMES

1.1 Purpose of the Environmental Questionnaire

The Environmental Questionnaire for Programmes has been designed to gather information from the client in order to:

- Identify whether there are specific permit requirements in accordance with environmental legislation.
- Provide information to the Coega Development Corporation for the purposes of ongoing planning and management of the project to eliminate delays.
- Enable the potential environmental impact of the proposed development to be assessed against the EIA listed activities.

1.2 Assistance in the completion of the Environmental Questionnaire

The SHE Project Manager will provide assistance in the completion of the questionnaire, but the responsibility for the quality and verifiability of the information provided, rests with the programme.

2 CONTACT DETAILS

Name of Programme and Project:

Eastern Cape Department of Education School Infrastructure Programme: Construction of Cobosi Junior Primary School.

3 DESCRIPTION OF PROPOSED DEVELOPMENT

3.1 Estimated development size

Size of land required, in hectares (ha)	
Size of development footprint/percentage of hardened surfaces	
Size of additional land required for future expansion?	

- 3.2 Describe the proposed development, with specific reference to the activities associated with its operations including emissions & waste if relevant.

Construction of Cobosi Junior Primary School, refer to scope of work as described in the tender document

- 3.3 Describe the surrounding environment; e.g. proximity of development to sensitive environments such as rivers, streams, grave sites. How far is the development from the river you referred to?

The proposed development will be done within the school premises, where there are existing structures and open ground. The location of the development is not close proximity with any environmental sensitive area as mentioned above. It has been witnessed that there is an existing service (like overhead Eskom live line). This Eskom live line will not affect new development as proposed site is not close to Eskom line. Please see attached pictures.

- 3.4 Will roads be constructed as part of the development? If so, how wide will the road be; how wide will the road reserve be? (Break Down).

No roads will be constructed on this project although access road to school is not in good condition.

- 3.5 Will you be constructing infrastructure for the transmission or distribution of electricity with a capacity of more than 33kilovolts?

Yes, there is 22KV power supply to the school however Electrical Engineer will confirm if Transformer upgrade will be needed.

- 3.6 Will any vegetation be cleared at the proposed site? (Yes/No) if yes please attach photos

Yes, there is a possibility of removing of grass when cutting topsoil. Please see attached pictures.

- 3.7 Is the proposed site currently undeveloped, vacant or derelict?

The proposed site is within school premises and there is an open ground for planned new development. Please see attached pictures.

3.8 What is the current zoning of the land?

The proposed site is currently utilised. Please see attached pictures.

4 AIR EMISSIONS

4.1 Will the end user be discharging any substances (e.g. gases, particulates, steam) to the atmosphere via vents or stacks?

☐

YES

☐

NO

If **YES**, you will be required to furnish additional detail, in a separate form, on the anticipated air emissions. The CDC SHE Project Manager will assist.

4.2 Describe the type of emission

N/A.....
.....

4.3 Will you be installing a boiler (combustion installation)?

☐

YES

☐

NO

If **YES**, you will need to apply for a fuel-burning appliance licence (FBAL) from the Local Municipality. The relevant form is available from the CDC SHE Project Manager.

4.4 Will the design capacity of the combustion installation be > 50MW heat input/unit, based on the lower calorific value of the fuel used?

☐

YES

☐

NO

If **YES**, you will need to apply for an AEL from the local Municipality.

5 NOISE GENERATION

5.1 What is the anticipated noise generated from the proposed operation?

N/A.....

6 STORAGE OF MATERIALS

6.1 Will you be storing any of the following on site? **No**

Type of good to be stored	Volume (m ³)
Diesel	0
Petrol	0
Paraffin	0
Liquid petroleum	0
Oil	0
Other	0
Type of good to be stored	Tonnage
Ore	0
Coal	0
Other	0

7 STORMWATER MANAGEMENT

End user must ensure that:

- Storm water run-off quality from their sites complies with the Department of Water Affairs General Standard (**Appendix B**). *The School form part of the existing Municipal Storm water Management.*

8 WATER CONSUMPTION

8.1 What quantity of potable water will be required?N/A.....kl/d

8.2 What quantity of return effluent will be required?kl/d

8.3 What quantity of water (potable and/or return effluent) will be recycled for use on site?

.....0.....kl/d

9 EFFLUENT DISCHARGE

End user is required to treat all process water to minimum standards for effluent quality as set by the Local Municipality (**Appendix C**).

9.1 What quantity of effluent (process water) will be discharged? ...N/A.....kl/d

10 WASTE MANAGEMENT

10.1 What is the capacity of the waste (general and/or hazardous) storage area?

General/Domestic waste will be minimal as this is a small project and Principal Contractor will be monitored on waste management as per their project specific environmental management plan and waste management plan.

.....
.....

10.2 Will waste (general and/or hazardous) be stored in lagoons?

☐

YES

☐

NO

10.3 Will waste be treated on site?

☐

YES

☐

NO

10.4 Will waste (general and/or hazardous) be reused or recycled on site?

☐

YES

☐

NO

10.5 What volume of waste (general and/or hazardous) will be reused or recycled?

.....0.....tonnes/month

- 10.6 Will general waste be recovered (refined, utilised or co-processed) at a facility that has the capacity to process > 3 tonnes/day?

☐

YES

☐

NO

- 10.7 Will hazardous waste be recovered (refined, utilised or co-processed) at a facility that has the capacity to process >500kg/day?

☐

YES

☐

NO

11 Recommendation:

The structure will be built within the school premises nearby existing structures. It is recommended that principal contractor should consider the identified existing services (like live Eskom line) before construction commence on site and they should engage Eskom if Eskom line will be affected by new developments. Principal Contractor should be extra cautious on monitoring traffic as site is close to main road. There is nothing that will affect the environment other than removal of grass and topsoil.

Principal contractor should make proper hoarding preventing Learners on accessing construction site and there should be two separate gates (one should be used by school and other one for construction). Principal contractor should effectively implement their dust control plan as this is an existing school and households nearby who will be affected by dust from construction site.

APPENDIX A

REQUIREMENTS FOR THE STORAGE OF FLAMMABLE SUBSTANCES

Specification for flammable storage facilities in accordance with the requirements of the Nelson Mandela Bay Municipality's Fire and Emergency Services Department:

- **Up to 1 000 litres:** May be kept in any building provided that the containers are constructed of metal and kept sealed. These containers may not exceed 25 litres capacity. A maximum of 50 litres may be kept in non-metallic containers provided these containers do not exceed 1 litre capacity.
- **1 000 – 5000 litres:** Must be stored in sealed metal containers, not exceeding 25 litres capacity. Containers may be kept in a room or building with a minimum of 4 hours fire resistance rating with doors thereto having a minimum of 2 hours fire resistance rating. Storage in containers exceeding 25 litres capacity is only permitted if the containers are metal and are stored in an open yard with a minimum distance of 2 metres kept clear of combustibles around the storage area. The maximum storage permitted in this instance is 500 litres.
- **5 000 – 20 000 litres:** Must be kept in a flammable liquid store which complies with the requirements of a specification obtainable from the Department.
- **Greater than 20 000 litres:** Must be kept in separate conforming flammable liquid stores each with a maximum capacity of 20 000 litres or in underground tank installations each with a maximum capacity of 25 000 litres.

Flammable solids: 1.5m³ of flammable solids are equivalent to 900 litres of flammable liquids.

Flammable liquid and solid storage facilities: only permitted on the ground floor.

Decanting of flammable liquids and solids not permitted within any building.

APPENDIX B

DWA QUALITY STANDARDS FOR STORMWATER DISCHARGE

PARAMETERS	UNITS	SABS 241		DWA limits
		Actual	Max	Gen.
FIELD PARAMETERS				
pH	standard units	5-9.5	4.0-10	5.0-10.0
CONDUCTIVITY at 25°C	mS/m	150	370	150
PHYSICAL PARAMETERS				
pH	standard units	5-9.5	4.0-10	5.0-10.0
CONDUCTIVITY at 25°C	mS/m	150	370	150
TURBIDITY	NTU	1		10
TOTAL DISSOLVED SOLIDS at 180°C	mg/L	1 000	2400	n/s
TOTAL ALKALINITY as CaCO ₃	mg/L	n/s		n/s
CARBONATE ALKALINITY as CO ₃	mg/L	n/s		n/s
BICARBONATE ALKALINITY as HCO ₃	mg/L	n/s		n/s
CARBONATE HARDNESS as CaCO ₃	mg/L	n/s		n/s
NON-CARBONATE HARDNESS as CaCO ₃	mg/L	n/s		n/s
TOTAL HARDNESS as CaCO ₃	mg/L	300	650	650
CHEMICAL OXYGEN DEMAND	mg/L	n/s	n/s	75
CHEMICAL PARAMETERS				
ANIONS				
CHLORIDE as Cl	mg/L	200	600	n/s
SULPHATE as SO ₄	mg/L	400	400	n/s
FLUORIDE as F	mg/L	1.0	1.5	1.0
CATIONS				
CALCIUM as CaCO ₃	mg/L	n/s	n/s	n/s
CALCIUM as Ca	mg/L	150	300	n/s
MAGNESIUM as CaCO ₃	mg/L	n/s	n/s	n/s
MAGNESIUM as Mg	mg/L	70	100	n/s
SODIUM as Na	mg/L	200	400	n/s
POTASSIUM as K	mg/L	50	100	n/s
PHOSPHORUS (TOTAL)	mg/L	n/s	n/s	
IRON (TOTAL) as Fe	mg/L	0.05	0.1	0.30
MANGANESE (TOTAL) as Mn	mg/L	0.100	1.00	0.10
ALUMINIUM as Al	mg/L	3.00	5.00	n/s
BORON as B	mg/L	0.1	0.5	0.05
CHROMIUM as Cr (HEXAVALENT)	mg/L	0.100	0.500	n/s

CHROMIUM as Cr (Total)	mg/L	0.100	0.500	0.05
MERCURY as Hg	µg/L	2.0	5.0	5.0
LEAD as Pb	mg/L	0.050	0.100	0.01
ZINC as Zn	mg/L	5.00	10.0	0.1
PARAMETERS	UNITS	SABS 241		DWAF limits
		Acc	Max	Gen.
MERCURY as Hg	mg/L	0.002	0.005	0.0005
NUTRIENTS				
NITRATE + NITRITE as N	mg/L	10.0	20.0	15.0
AMMONIA as N	mg/L	1.00	2.00	3.00
ORGANIC PARAMETERS				
DIESEL RANGE ORGANICS	µg/L	n/s	n/s	n/s
GASOLINE RANGE ORGANICS	µg/L	n/s	n/s	n/s
TOTAL PETROLEUM HYDROCARBONS	µg/L	50	600	n/s
TOTAL/DISSOLVED ORGANIC CARBON	mg/L	10	20	15
OIL AND GREASE	mg/L			50
VOLATILE ORGANIC COMPOUND (VOC')	mg/L			200
BACTERIOLOGICAL PARAMETERS				
FAECAL COLIFORMS	counts per 100 mL	1	10	1000
E. Coli	counts per 100 mL		1	n/s
TOTAL BACTERIAL COUNT	counts per mL	1 000	140	n/s

* n/s - No specification/standard

APPENDIX C

EFFLUENT QUALITY DISCHARGE STANDARDS: REFER TO LOCAL MUNICIPALITY EFFLUENT QUALITY DISCHARGE STANDARDS

INTRODUCTION

Unless specifically authorized thereto in writing by the Coega Development Corporation, no person shall do anything which may cause a safety or health hazard in a sewer, structure or place owned or controlled by or vested in the Coega Development Corporation either wholly or in part, and used by it in connection with the disposal of effluent. No person shall cause pollution of any nature on any portion of an area, which is associated with the sewerage system. No person shall discharge effluent into the sewerage system unless he has notified the Coega Development Corporation on the prescribed form for a permit to discharge effluent.

Discharge Standards and Pre-treatment of Effluent

The Coega Development Corporation may stipulate in a permit:

(a) The standards in respect of –

- (i) Quantity;
- (ii) Rate of flow;
- (iii) Quality, and
- (iv) any other aspect it may deem fit.

1) No person shall discharge effluent into the sewerage system which has:

- (a) A temperature at the point of entry in excess of 44°C;
- (b) An electrical conductivity in excess of 500 milli-Siemens per m at 25°C;
- (c) A pH greater than 12.0 or less than 6.0;
- (d) A permanganate value greater than 1 000 mg/l; or
- (e) A chemical oxygen demand greater than 10 000 mg/l

2) No person shall discharge effluent into the sewerage system which contains a substance, either alone or in combination with other substances, having a concentration in excess of those listed below:

(a) Chemical substances other than metals:

Fats, vegetable oils and like substances	400 mg/l
Sulphides, or substances from which hydrogen sulphide can be liberated(expressed as S)	5 mg/l
Cyanides or substances from which hydrogen cyanide can be liberated (expressed as HCN)	10 mg/l
Minerals oils and grease	50 mg/l
Sulphates (expressed as SO ₄)	1500 mg/l
Fluorides of fluorine containing substances (expressed as F)	5 mg/l
Suspended solids	1000 mg/l
Tar products and distillates	50 mg/l
Chlorides (expressed as Cl)	1000 mg/l

(b) Metals:

Group 1

Chromium (expressed as CrO ₃)	20 mg/l
Copper (expressed as Cu)	20 mg/l
Nickel (expressed as Ni)	20 mg/l
Zinc (expressed as Zn)	20 mg/l
Total collective concentration of all metals in Group 1	50 mg/l

Group 2

Arsenic (expressed as As)	5 mg/l
Boron (expressed as B)	5 mg/l
Cadmium (expressed as Cd)	5 mg/l
Lead (expressed as Pb)	5 mg/l
Selenium (expressed as Se)	5 mg/l
Mercury (expressed as Hg)	5 mg/l
Total collective concentration of all metals in Group 2	15 mg/l

(c) Radio Active Waste

Any radio-active waste or isotopes; such concentration as may be laid down by the Atomic Energy Corporation or any State Department.

Below are the existing old structures which will not be affected by new proposed structure.



Below is the access road to school an off-road car will be required for site visits.



Below is the Eskom 22KV dual phase line supplying the school, Electrical engineer will confirm is there will be a need of upgrading transformer.



Below is an open ground within the school no demolition will be done at school for this new proposed structure.



PART C3.9 – CONTRACTOR’S REPORT

CONSTRUCTION OF NEW ECD DUCATIONAL FACILITIES
AT COBOSI PRIMARY JUNIOR SCHOOL
CONTRACT NO.: CDC/329/24, EMIS Nu.: 200400085, ECDoe P Nu.: P9007203

PART : 1

CONTRACTOR MONTHLY REPORT

Project No: CDC/329/24

Project Name: COBOSI PRIMARY JUNIOR SCHOOL

Contract No:

Contractor's Name:

Claim No.: **For Period Ending:**

Date of Report:

The Contractor's Monthly Report comprises an integral part of the Contractor's Payment Claim and processing of the payment claim is not permitted without this report also being submitted, ie.

"NO REPORT – NO PAYMENT"

Attachments:

- | | |
|--------|--|
| Part 2 | Overall Project Worker Schedule: Schedule of all local labourers employed since the start of the project |
| Part 3 | Weekly Task Wage Register |
| Part 4 | Local Labour Schedule |

**CONSTRUCTION OF NEW ECD DUCATIONAL FACILITIES
AT COBOSI PRIMARY SCHOOL
CONTRACT NO.: CDC/329/24, EMIS Nu.: 200400085, ECDoe P Nu.: P9007203**

OVERALL PROJECT WORKER SCHEDULE (local labourers only) Contract No: CDC/329/24

PART 2

Project No. **CDC/329/24**

Project Name: **COBOSI PRIMARY JUNIOR SCHOOL**

Month of Report:

Sheet:1..... of2

Names of all **Local Workers** employed **at any time on the project** are to be entered in the table below irrespective of how long they worked on the project.

No.	Name of Local Labourer	Identity Number	Month Worker Started	Age	Tick if Yes										Place a tick in the box which corresponds to the Gender and Age of the Worker				
					Female Head of Household with Dependants	Disabled	Labourer	Semi-Skilled	Skilled	Supervisor	Clerical	Managerial	Professional	Women		Men			
														Over 35 yrs 2A	35 yrs & under 2B	Over 35 yrs 2C	35 yrs & under 2D		
1																			
2																			
3																			
4																			
5																			
6																			
7																			
Totals for this sheet																			Total No. of workers Employed on the Project
Totals from previous sheet																			
Totals carried forward																			

**CONSTRUCTION OF NEW ECD DUCATIONAL FACILITIES
AT COBOSI PRIMARY SCHOOL
CONTRACT NO.: CDC/329/24, EMIS Nu.: 200400085, ECDoe P Nu.: P9007203**

(A) (B) (C) (D) (E) (F) (G) (H) (I) (J) (K) (L) (M) (N) = (J+K+L)

Completed by: Name: Signature:..... Capacity Date:.....

OVERALL PROJECT WORKER SCHEDULE (local labourers only) Contract No: CDC/329/24

PART 2

Project No. **CDC/329/24**

Project Name: **COBOSI PRIMARY JUNIOR SCHOOL**

Month of Report: /

Sheet:2..... of2

Names of all **Local Workers** employed **at any time on the project** are to be entered in the table below irrespective of how long they worked on the project.

No.	Name of Local Labourer	Identity Number	Month Worker Started	Age	Tick if Yes										Place a tick in the box which corresponds to the Gender and Age of the Worker				Total No. of workers Employed on the Project
					Female Head of Household with Dependants	Disabled	Labourer	Semi-Skilled	Skilled	Supervisor	Clerical	Managerial	Professional	Women		Men			
														Over 35 yrs 2A	35 yrs & under 2B	Over 35 yrs 2C	35 yrs & under 2D		
1																			
2																			
3																			
4																			
5																			
6																			
7																			
Totals for this sheet																			Total No. of workers Employed on the Project
Totals from previous sheet																			

**CONSTRUCTION OF NEW ECD DUCATIONAL FACILITIES
AT COBOSI PRIMARY SCHOOL
CONTRACT NO.: CDC/329/24, EMIS Nu.: 200400085, ECDoe P Nu.: P9007203**

Totals carried forward														
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N) = (J+K+L)

Completed by: Name: Signature:..... Capacity Date:.....

**CONSTRUCTION OF NEW ECD DUCATIONAL FACILITIES
AT COBOSI PRIMARY SCHOOL
CONTRACT NO.: CDC/329/24, EMIS Nu.: 200400085, ECDoE P Nu.: P9007203**

Completed by: Name: Signature: Capacity: Date:

WEEKLY TASK WAGE REGISTER (local labourers only) Contract No: CDC/329/24 **PART 3**

Project Name: **COBOSI PRIMARY JUNIOR SCHOOL**

Week Ending:Sheet:...2.. of 2

[illegible]

**CONSTRUCTION OF NEW ECD DUCATIONAL FACILITIES
AT COBOSI PRIMARY SCHOOL
CONTRACT NO.: CDC/329/24, EMIS Nu.: 200400085, ECDoe P Nu.: P9007203**

										(A)		(B)		
--	--	--	--	--	--	--	--	--	--	-----	--	-----	--	--

Completed by: Name: Signature..... Capacity: Date:

CONSTRUCTION OF NEW ECD EDUCATIONAL FACILITIES
AT COBOSI PRIMARY SCHOOL
CONTRACT NO.: CDC/329/24, EMIS Nu.: 200400085, ECDoe P Nu.: P9007203

LOCAL LABOUR AND MATERIAL SCHEDULE

PART 4

Contract No: CDC/329/24

Date of Report:

Project Name: COBOSI PRIMARY JUNIOR SCHOOL

For Period Ending:

Contractor Name:

1. Summary of Day Tasks worked and Amount Spent on Local Labour this month

Week No.	Week Ending		Total Day Tasks / Person Days Worked	Total Amount Paid	
			(Total of (A) from Form 4 for each week)	(Total of (B) from Form 4 for each week)	
1					
2					
3					
4					
5					
6					
7					
8					
9					
Total					

Transfer to 2 in table below

2. Summary of Amount Spent on Local Labour to date

1. Previous Amount Spent on Local Labour (From previous claim)	R
2. Amount Spent on Local Labour this month (From Total above)	R
3. Total Amount Spent on Local Labour to date (3) = (1+2)	R

3. Local Labour Schedule

Summary of Local Labour Employed	No. of local workers who worked on the project to date (From Part 2)	% of Total
Columns refer to Columns in Part 2		
1. Total No. of individual local workers who have worked on the Project (Column N)		100%
10. How many of the Total No. are local youth (35 yrs and under) (Column B & D)		
11. How many of the Total No. are local women (Column A + B)		

**CONSTRUCTION OF NEW ECD EDUCATIONAL FACILITIES
AT COBOSI PRIMARY SCHOOL
CONTRACT NO.: CDC/329/24, EMIS Nu.: 200400085, ECDoe P Nu.: P9007203**

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4. Summary of Amount Spent on Material to Date (Cumulative)

Item	This Month	Total to date
1. Material from Local Municipality		
2. Material from Local District Municipality		
3. Material from Outside the Eastern Cape		
4. Material from other areas within the Eastern Cape		
Total Material		
Total material as percentage of contractor expenditure		
Total as percentage of contractor budget		

5. Training of Local Workers

Category of training	Name of course	No. trained	Days trained	Comments on progress
(a) Technical training for implementation	Bricklaying Carpentry			
	Plumbing			
	Fencing			
	Plastering			
	Painting			
	House Building			
	Handyman			
	Electrical			
(b) Institutional training for local management beyond construction				
(c) Technical training for OMM				
(d) Institutional training for				

**CONSTRUCTION OF NEW ECD DUCATIONAL FACILITIES
AT COBOSI PRIMARY SCHOOL
CONTRACT NO.: CDC/329/24, EMIS Nu.: 200400085, ECDoE P Nu.: P9007203**

implementation				
(e) HIV/ Aids etc.				
Other – Please specify				
Total				

Completed by:

Name Signature Capacity Date

PART C3.10 – PLANNING SPECIFICATION FOR CONTRACTORS



Planning Document:

**Planning Specifications For
Contractors.**

Report N°

CDC-CG-SPC-001-17

01 November 2017

DOCUMENT INFORMATION SHEET

Title of Document : *Planning Specifications for Contractors*
Type of Document : *Planning Document*
Report Number : *CDC-CG-SPC-001-17*
Prepared by : *Duaine Moroney*
Typed by : *Duaine Moroney*
Business Unit : *IDZ Infrastructure Programme (IIP)*
Prepared for : *CDC*
Date of Issue : *01 November 2017*

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DOCUMENT CONTROL SHEET

The purpose of this form is to ensure that documents are reviewed and approved prior to issue. The form is to be bound into the front of all documents released by the CDC.

PROJECT NAME : *CDC Planning Specifications*

DOCUMENT TITLE : *Planning Specifications for Contractors*

DOCUMENT No. : *CDC-CG-SPC-001-17*

SIGNING OF THE ORIGINAL DOCUMENT

We, the undersigned, accept this document as a stable work product to be placed under formal change control as described by the Change Control Procedure document.

ORIGINAL	Prepared by	Reviewed by	Approved by
Date: 13 October 2017	Name: Duaine Moroney	Name: Hennie van der Kolf	Name: Maria van Zyl
	Signature:	Signature:	Signature:

Distribution:	CDC
----------------------	------------

REVISION CHART

REVISION 1	Name:	Name:	Name:
Date:	Signature:	Signature:	Signature:
Distribution:			

REVISION 2	Name:	Name:	Name:
Date:	Signature:	Signature:	Signature:

REVISION 3	Name:	Name:	Name:
Date:	Signature:	Signature:	Signature:

This document, and the information or advice which it contains, is provided by the Centre of Excellence Business Unit solely for the use by the Coega Development Corporation (Pty) Ltd and for reliance by its Executive Management and the Board in performance of that Business Unit's duties.

Basis Of Schedule (Planning Document)

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1. CIDB Grading 1-3

1.1 Introduction

The Construction Programme and all associated documents as detailed in this Attachment, are an essential part of the Project control system used by the Employer's Representative in monitoring the progress of the work under the Contract. The information and data provided by the Contractor shall be reliable, accurate, timely in presentation, and in an agreed format and style that allows for ease of incorporation into the Employer's Representative's Project control system. If the contractor does not have a dedicated planner it is the responsibility of the contractor to then provide a selected individual from within their organisation which the Employer's Representative would help train in the planning field.

1.2 General

1.2.1 The Contractor shall comply with the requirements of this Attachment.

1.2.2 The following templates will be provided by the Employer and shall be used for the preparation of the construction Programme and reports:

1.2.2.1 Standard Schedule Layout

1.3 Planning and Construction Programme

1.3.1 Submission

1.3.1.1 The Construction Programme shall be a time scaled bar chart with fully continuous logic that clearly highlights the critical path(s) throughout the network.

1.3.1.2 Within the time specified in the Contract, the Contractor shall submit for the Employer's approval, a Construction Programme which represents the sequencing and methodology accepted by the Employer's Representative at the time of award and includes the milestones and key events detailed in the tender documents. The Construction Programme shall be generated using the Primavera Project Planner (P6) software package or an approved alternative and submitted in both hard copy and native (soft copy) file format.

1.3.2 Activities

1.3.2.1 The Construction Programme shall break up the work under the Contract into identifiable, structured items of work ("activities"). Each activity shall:

1.3.2.2 Be an activity of work, not a piece of equipment;

1.3.2.3 Be readily measurable for progress;

1.3.2.4 Express the logical progression of the work;

1.3.2.5 Be suitable for critical path and dependency networking;

-
- 1.3.2.6 Be continuous from start to finish;
 - 1.3.2.7 Generally be of a single “trade” or work content;
 - 1.3.2.8 The sum total of all activities shall equate the work under the Contract.

1.3.3 Logic and Sequencing

The Construction Programme shall clearly indicate the logic and sequence of activities necessary to complete the work under the Contract, including but not be limited to:

- 1.3.3.1 Duration of each activity;
- 1.3.3.2 Early start, early finish and total float of each activity;
- 1.3.3.3 Activities that lie on the critical path(s) as determined by the network;
- 1.3.3.4 Precedence relationships (logic) between activities;
- 1.3.3.5 Dates for submissions to the Employer of documents requiring review;
- 1.3.3.6 Subcontractor tendering, award and mobilisation processes;
- 1.3.3.7 Activities to be completed by others which may affect the timely completion of the Works including;
- 1.3.3.8 Issue of information, materials or equipment for use or incorporation in work;
- 1.3.3.9 Activities, dependent upon any other contractor engaged by the Employer; or
- 1.3.3.10 Review time for required documentation such as specifications, drawings, procedures and calculations.
- 1.3.3.11 Tie in activities to existing services and utilities;
- 1.3.3.12 Statutory approval dates;
- 1.3.3.13 Date for access to the Site;
- 1.3.3.14 Date for access to follow-on contractors;
- 1.3.3.15 Date for Key Events and Milestones;
- 1.3.3.16 Date for Practical Completion of the Works or each Separable Portion;
- 1.3.3.17 Manufacture and delivery durations for Contractor supplied equipment and materials, with ties to the respective installation activities, detailed into activities no longer than 2 weeks;
- 1.3.3.18 Delivery dates for Employer supplied equipment and materials, with ties to the respective installation activities, detailed into activities no longer than 2 weeks;
- 1.3.3.19 Activity durations shall be in working days, the programme calendar shall indicate public holidays, leisure days or other non-working days;

1.3.3.20 Off Site and on Site activities shall be clear and identifiable;

1.3.3.21 Calendar - the bar chart heading shall show the year, the month and the week. The bar chart shall commence on the date of Contract Award;

1.3.4 Equipment allocation

1.3.4.1 Special tools and mobile equipment shall be assigned to their respective activities

1.3.4.2 Shared equipment such as mobile equipment shall be allocated to level of effort activities within the Construction Programme.

1.3.5 Construction Programme Commodities

1.3.5.1 The Construction Programme site activities shall be loaded with applicable commodity quantities.

1.3.5.2 The Employer utilises the following commodities;

1.3.5.2.1 Concrete (m³)

1.3.5.2.2 Mechanical Equipment (t)

1.3.5.2.3 Platework (t)

1.3.5.2.4 Structural Steel (t)

1.3.5.2.5 Pipework (m) & Diameter Inch's (Inch)

1.3.5.2.6 Electrical and Communication Cables (m)

1.3.5.2.7 Electrical & Instrumentation Terminations (Qty)

1.3.6 Approval of Construction Programme

1.3.6.1 The Contractor shall submit the proposed baseline Construction Programme including a native (soft copy) copy of the programme.

1.3.6.2 Provided the Construction Programme is in accordance with this addendum A, it will be approved as the revision '0' Baseline Construction Programme. Against which the Contractors progress will be measured.

1.3.7 Revisions to the Construction Programme

1.3.7.1 The Contractor shall review the Construction Programme when any one of the following events occurs:

1.3.7.2 Progress of the work under the Contract falls significantly behind or otherwise materially departs from that shown in the Construction Programme;

1.3.7.3 A variation is issued which affects the Construction Programme;

-
- 1.3.7.4 There is a change in method of working adopted by the Contractor which affects the Construction Programme; or
- 1.3.7.5 The Employer's Representative directs that the Construction Programme be revised because in the opinion of the Employer's Representative the current Construction Programme does not reflect the actual work patterns of the Contractor.
- 1.3.7.6 If any of the events listed above occurs, the Contractor shall submit for approval, within seven (7) days of the event occurring, the revised Construction Programme. Upon approval, the revised Construction Programme will become the approved baseline for all future progress updates.
- 1.3.7.7 The Contractor shall address identified deviations from the Construction Programme by either:
- 1.3.7.8 Demonstrating that the deviation does not constitute a delay; or
- 1.3.7.9 Providing a course of action to remedy the deviation.
- 1.3.7.10 The revised Construction Programme shall clearly indicate the following:
- 1.3.7.11 The differences between the revised Construction Programme and the previously approved Construction Programme; and
- 1.3.7.12 The revision number and date of issue of the revised Construction Programme.
- 1.3.7.13 At any time additional detail may be inserted into the Construction Programme at the request of either the Contractor or Employer's Representative. In such cases, the overall start and finish dates of the detail activities shall not vary from the original summary activity(s) which were replaced.
- 1.3.7.14 All revisions to the Construction Programme shall be prepared by, and at the cost of the Contractor.
- 1.3.7.15 Supplementary Schedules and Programmes
- The Employer's Representative may at any time, and at the cost and expense of the Contractor, direct the Contractor to produce supplementary documents to highlight a particular aspect of the work under the Contract.

1.3.8 Cash Flow

The Contractor shall submit to the Employer detailed cash flow forecast charts based on the Construction Programme (and any revisions) showing the anticipated monthly cash flow as represented by expected payment claim submission, not by payments received.

1.4 Progress Reporting

The cut-off, and submission dates for monthly reports will be as required by the Employer to ensure appropriate and timely integration into the Employer's overall progress reporting systems. These dates are subject to change as per the status of the project or at the discretion of the employer.

1.4.1 Progress Reporting

- 1.4.1.1 To demonstrate the actual progress of the work under the Contract the Contractor shall, on a monthly basis, update and submit to the Employer;
- 1.4.1.2 The updated Construction Programme shall show two (2) separate bars for each activity:
 - 1.4.1.2.1 The Construction Programme "baseline" activity bar.
 - 1.4.1.2.2 The current schedule activity bar identifying the currently forecast start and finish dates of the activity.
- 1.4.1.3 Deviations from the 'baseline' Construction Programme will form the basis for assessing progress and performance. Where significant deviations from the scheduled progress are being tabled in the report, the Contractor shall provide sufficient detailed written analysis and data, to adequately demonstrate the primary areas of schedule concern with short term recovery plan.
- 1.4.1.4 Overall Schedule.

1.4.2 Progress Monitoring and Corrective Action

- 1.4.2.1 Monitoring and review of the progress of the work under the Contract shall consist of an assessment of all activities currently in progress. The following shall be determined:
 - 1.4.2.1.1 Percentage complete;
 - 1.4.2.1.2 Forecast completion date;
 - 1.4.2.1.3 Deviations from the baseline programme; and
 - 1.4.2.1.4 Actions required remedying any deviations.
- 1.4.2.2 Progress reviews may be conducted to assist control of the work under the Contract. The format, content, and structure of these reviews will be agreed between the Contractor and the Employer's Representative.

1.4.3 Monthly Status Report (Planning Aspects Only)

- 1.4.3.1 In addition to the formal monthly report, the Contractor shall provide the following.
- 1.4.3.2 The report shall include but not be limited too:
 - 1.4.3.2.1 The report shall summarise progress and problems encountered during that month in respect of all parts of the work under the Contract.

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- 1.4.3.2.2 Progress against the approved Construction Programme;
 - 1.4.3.2.3 Deviations from the Construction Programme, and in particular, the forecast completion dates of activities which should have been completed;
 - 1.4.3.2.4 Status of approvals;
 - 1.4.3.2.5 Actual or anticipated problems with corresponding action plans to mitigate / minimise their risk or impact;
 - 1.4.3.2.6 Summary of work activities planned for the following period;
 - 1.4.3.2.7 Cash flow status versus the original forecast and;
 - 1.4.3.3 The Progress Report shall be submitted for review prior to the monthly progress meetings.

2. CIDB Grading 4-6

2.1 Introduction

The Construction Programme and all associated documents as detailed in this Attachment, are an essential part of the Project control system used by the Employer's Representative in monitoring the progress of the work under the Contract. The information and data provided by the Contractor shall be reliable, accurate, timely in presentation, and in an agreed format and style that allows for ease of incorporation into the Employer's Representative's Project control system. If the contractor does not have a dedicated planner it is the responsibility of the contractor to then provide a selected individual from within their organisation which the Employer's Representative would help train in the planning field.

2.2 General

2.2.1 The Contractor shall comply with the requirements of this Attachment.

2.2.2 The following templates will be provided by the Employer and shall be used for the preparation of the construction Programme and reports:

2.2.2.1 Standard Schedule Layout

2.2.2.2 S-Curve

2.3 Planning and Construction Programme

2.3.1 Submission

2.3.1.1 The Construction Programme shall be a time scaled bar chart with fully continuous logic that clearly highlights the critical path(s) throughout the network.

2.3.1.2 Within the time specified in the Contract, the Contractor shall submit for the Employer's approval, a Construction Programme which represents the sequencing and methodology accepted by the Employer's Representative at the time of award and includes the milestones and key events detailed in the. The Construction Programme shall be generated using the Primavera Project Planner (P6) software package or an approved alternative and submitted in both hard copy and native file format.

2.3.1.3 Activities

The Construction Programme shall break up the work under the Contract into identifiable, structured items of work ("activities"). Each activity shall:

2.3.1.4 Be an activity of work, not a piece of equipment;

2.3.1.5 Be readily measurable for progress;

2.3.1.6 Express the logical progression of the work;

-
- 2.3.1.7 Be suitable for critical path and dependency networking;
 - 2.3.1.8 Be continuous from start to finish;
 - 2.3.1.9 Generally be of a single “trade” or work content;
 - 2.3.1.10 Be fully resourced; and
 - 2.3.1.11 The sum total of all activities shall equate the work under the Contract.

2.3.2 Logic and Sequencing

- 2.2.1 The Construction Programme shall clearly indicate the logic and sequence of activities necessary to complete the work under the Contract, including but not be limited to:
 - 2.3.2.1 Duration of each activity;
 - 2.3.2.2 Early start, early finish and total float of each activity;
 - 2.3.2.3 Activities that lie on the critical path(s) as determined by the network;
 - 2.3.2.4 Precedence relationships (logic) between activities;
 - 2.3.2.5 Dates for submissions to the Employer of documents requiring review;
 - 2.3.2.6 Subcontractor tendering, award and mobilisation processes;
 - 2.3.2.7 Activities to be completed by others which may affect the timely completion of the Works including;
 - 2.3.2.8 Issue of information, materials or equipment for use or incorporation in work;
 - 2.3.2.9 Activities, dependent upon any other contractor engaged by the Employer; or
 - 2.3.2.10 Review time for required documentation such as specifications, drawings, procedures and calculations.
 - 2.3.2.11 Tie in activities to existing services and utilities;
 - 2.3.2.12 Statutory approval dates;
 - 2.3.2.13 Date for access to the Site;
 - 2.3.2.14 Date for access to follow-on contractors;
 - 2.3.2.15 Date for Key Events and Milestones;
 - 2.3.2.16 Date for Practical Completion of the Works or each Separable Portion;
 - 2.3.2.17 Manufacture and delivery durations for Contractor supplied equipment and materials, with ties to the respective installation activities
 - 2.3.2.18 Delivery dates for Employer supplied equipment and materials, with ties to the respective installation activities

-
- 2.3.2.19 Activity durations shall be in working days, the programme calendar shall indicate public holidays, leisure days or other non-working days;
 - 2.3.2.20 Off Site and on Site activities shall be clear and identifiable;
 - 2.3.2.21 Calendar - the bar chart heading shall show the year, the month and the week. The bar chart shall commence on the date of Contract Award;

2.3.3 Man-hour allocation

- 2.3.3.1 Scheduled Direct Labour Hours – Per Activity.

For each appropriate activity in the Construction Programme, the Contractor shall allocate the associated direct labour hours.

- 2.3.3.2 Direct Labour Hours – Total.

The total of the direct labour hours per week shall be calculated after activities have been resource levelled.

- 2.3.3.3 Direct Labour Workforce Histogram

The site workforce (direct labour only) scheduled per week shall be calculated from the direct labour hours and a histogram plotted.

2.3.4 Equipment allocation

- 2.3.4.1 Special tools and mobile equipment shall be assigned to their respective activities
- 2.3.4.2 Shared equipment such as mobile equipment shall be allocated to level of effort activities within the Construction Programme.

2.3.5 Contractor ‘S-Curve’

- 2.3.5.1 The Contractor shall submit progress S-Curves for the overall Contract
- 2.3.5.2 The S-Curves shall be based upon the distribution of man-hours where attainable from within the approved Construction Programme.
- 2.3.5.3 The S-Curves shall be presented using the approved templates provided by the Employer.
- 2.3.5.4 To generate the overall Contract S-Curve each of the phases shall be weighted according to the monetary value of the phase.
- 2.3.5.5 The reporting of progress for each component shall be in the form of earned value (EV), which is the physical percent progress of the component of the work.

2.3.6 Construction Programme Commodities

The Construction Programme site activities shall be loaded with applicable commodity quantities. Offsite fabrication of structural steel, plate work and spooling of pipework shall also be reported.

2.3.6.1 The Employer utilises the following commodities;

2.3.6.1.1 Concrete (m³)

2.3.6.1.2 Mechanical Equipment (t)

2.3.6.1.3 Plate work (t)

2.3.6.1.4 Structural Steel (t)

2.3.6.1.5 Pipework (m) & Diameter Inch's (Inch)

2.3.6.1.6 Electrical and Communication Cables (m)

2.3.6.1.7 Electrical & Instrumentation Terminations (Qty)

2.3.6.2 Commodity Curves shall be presented in the same format as the S-Curves.

2.3.7 Approval of Construction Programme

2.3.7.1 The Contractor shall submit the proposed baseline Construction Programme including a native copy of the programme.

2.3.7.2 Provided the Construction Programme is in accordance with this addendum A, it will be approved as the revision '0' Baseline Construction Programme. Against which the Contractors progress will be measured.

2.3.8 Revisions to the Construction Programme

2.3.8.1 The Contractor shall review the Construction Programme when any one of the following events occurs:

2.3.8.2 Progress of the work under the Contract falls significantly behind or otherwise materially departs from that shown in the Construction Programme;

2.3.8.3 A variation is issued which affects the Construction Programme;

2.3.8.4 There is a change in method of working adopted by the Contractor which affects the Construction Programme; or

2.3.8.5 The Employer's Representative directs that the Construction Programme be revised because in the opinion of the Employer's Representative the current Construction Programme does not reflect the actual work patterns of the Contractor.

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- 2.3.8.6 If any of the events listed above occurs, the Contractor shall submit for approval, within seven (7) days of the event occurring, the revised Construction Programme. Upon approval, the revised Construction Programme will become the approved baseline for all future progress updates.
- 2.3.8.7 The Contractor shall address identified deviations from the Construction Programme by either:
- 2.3.8.8 Demonstrating that the deviation does not constitute a delay; or
- 2.3.8.9 Providing a course of action to remedy the deviation.
- 2.3.8.10 The revised Construction Programme shall clearly indicate the following:
- 2.3.8.10.1 The differences between the revised Construction Programme and the previously approved Construction Programme; and
- 2.3.8.10.2 The revision number and date of issue of the revised Construction Programme.
- 2.3.8.11 The revised Construction Programme shall be accompanied by a revised S-Curve
- 2.3.8.12 At any time additional detail may be inserted into the Construction Programme at the request of either the Contractor or Employer's Representative. In such cases, the overall start and finish dates of the detail activities shall not vary from the original summary activity(s) which were replaced.
- 2.3.8.13 All revisions to the Construction Programme shall be prepared by, and at the cost of the Contractor.

2.3.9 Supplementary Schedules and Programmes

The Employer's Representative may at any time, and at the cost and expense of the Contractor, direct the Contractor to produce supplementary documents to highlight a particular aspect of the work under the Contract.

2.3.10 Cash Flow

The Contractor shall submit to the Employer detailed cash flow forecast charts based on the Construction Programme (and any revisions) showing the anticipated monthly cash flow as represented by expected payment claim submission, not by payments received.

2.4 Progress Reporting

The cut-off, and submission dates for monthly reports will be as required by the Employer to ensure appropriate and timely integration into the Employer's overall progress reporting systems. These dates are subject to change as per the status of the project or at the discretion of the employer.

2.4.1 Progress Reporting

- 2.4.1.1 To demonstrate the actual progress of the work under the Contract the Contractor shall, on a monthly basis, update and submit to the Employer;
- 2.4.1.2 The updated Construction Programme shall show two (2) separate bars for each activity:
 - 2.4.1.2.1 The Construction Programme “baseline” activity bar.
 - 2.4.1.2.2 The current schedule activity bar identifying the currently forecast start and finish dates of the activity.
- 2.4.1.3 The progress ‘S-Curves’;
- 2.4.1.4 Deviations from the ‘baseline’ Construction Programme together with the ‘S-Curves’ will form the basis for assessing progress and performance. Where significant deviations from the scheduled progress are being tabled in the report, the Contractor shall provide sufficient detailed written analysis and data, to adequately demonstrate the primary areas of schedule concern with short term recovery plan.
- 2.4.1.5 Overall Schedule.
- 2.4.1.6 2 week look ahead Schedule.

2.4.2 Progress Monitoring and Corrective Action

- 2.4.2.1 Monitoring and review of the progress of the work under the Contract shall consist of an assessment of all activities currently in progress. The following shall be determined:
 - 2.4.2.1.1 Percentage complete;
 - 2.4.2.1.2 Forecast completion date;
 - 2.4.2.1.3 Deviations from the baseline programme; and
 - 2.4.2.1.4 Actions required remedying any deviations.
- 2.4.2.2 Weekly progress reviews may be conducted to assist control of the work under the Contract. The format, content, and structure of these reviews will be agreed between the Contractor and the Employer’s Representative. The Contractor’s Weekly Progress Report will be used as the discussion tool for the weekly progress meeting.

2.4.3 Monthly Status Report (Planning Aspects Only)

- 2.4.3.1 In addition to the formal monthly report, the Contractor shall provide the following.
- 2.4.3.2 The report shall include but not be limited too:
- 2.4.3.3 The report shall summarise progress and problems encountered during that month in respect of all parts of the work under the Contract.

-
- 2.4.3.4 Progress against the approved Construction Programme;
 - 2.4.3.5 Summary of progress achieved during the period using progress 'S-Curves';
 - 2.4.3.6 List of milestones achieved during the period;
 - 2.4.3.7 Status of design, procurement, off-site works, and construction;
 - 2.4.3.8 Deviations from the Construction Programme, and in particular, the forecast completion dates of activities which should have been completed;
 - 2.4.3.9 Status of approvals;
 - 2.4.3.10 Actual or anticipated problems with corresponding action plans to mitigate / minimise their risk or impact;
 - 2.4.3.11 Summary of work activities planned for the following period;
 - 2.4.3.12 Cash flow status versus the original forecast;
 - 2.4.3.13 The Progress Report shall be submitted for review prior to the monthly progress meetings.

3. CIDB Grading 7-9

3.1 Introduction

The Construction Programme and all associated documents as detailed in this Attachment, are an essential part of the Project control system used by the Employer's Representative in monitoring the progress of the work under the Contract. The information and data provided by the Contractor shall be reliable, accurate, timely in presentation, and in an agreed format and style that allows for ease of incorporation into the Employer's Representative's Project control system.

3.2 General

- 3.2.1 The Contractor shall comply with the requirements of this Attachment.
- 3.2.2 The following templates will be provided by the Employer and shall be used for the preparation of the construction Programme and reports:
- 3.2.3 Standard Schedule Layout
- 3.2.4 S-Curve

3.3 Planning and Construction Programme

3.3.1 Submission

- 3.3.1.1 The Construction Programme shall be a time scaled bar chart with fully continuous logic that clearly highlights the critical path(s) throughout the network.
- 3.3.1.2 Within the time specified in the Contract, the Contractor shall submit for the Employer's approval, a Construction Programme which represents the sequencing and methodology accepted by the Employer's Representative at the time of award and includes the milestones and key events detailed in the. The Construction Programme shall be generated using the Primavera Project Planner (P6) software package or an approved alternative and submitted in both hard copy and native file format.

3.3.2 Activities

The Construction Programme shall break up the work under the Contract into identifiable, structured items of work ("activities"). Each activity shall:

- 3.3.2.1 Be at level 4;
- 3.3.2.2 Be an activity of work, not a piece of equipment;
- 3.3.2.3 Be readily measurable for progress;
- 3.3.2.4 Express the logical progression of the work;

-
- 3.3.2.5 Be suitable for critical path and dependency networking;
 - 3.3.2.6 Be continuous from start to finish;
 - 3.3.2.7 Be located in a single geographical area;
 - 3.3.2.8 Generally be of a single “trade” or work content;
 - 3.3.2.9 Be compatible with quality assurance plans;
 - 3.3.2.10 Be fully resourced; and
 - 3.3.2.11 Be capable of producing commodity based reports
 - 3.3.2.12 The sum total of all activities shall equate the work under the Contract.

3.3.3 Logic and Sequencing

- 3.3.3.1 The Construction Programme shall clearly indicate the logic and sequence of activities necessary to complete the work under the Contract, including but not be limited to:
 - 3.3.3.1.1 Duration of each activity;
 - 3.3.3.1.2 Early start, early finish and total float of each activity;
 - 3.3.3.1.3 Activities that lie on the critical path(s) as determined by the network;
 - 3.3.3.1.4 Precedence relationships (logic) between activities;
 - 3.3.3.1.5 Subcontractor tendering, award and mobilisation processes;
 - 3.3.3.1.6 Activities to be completed by others which may affect the timely completion of the Works including;
 - 3.3.3.1.7 Activities, dependent upon any other contractor engaged by the Employer; or
 - 3.3.3.1.8 Review time for required documentation such as specifications, drawings, procedures and calculations.
- 3.3.3.2 Tie in activities to existing services and utilities;
- 3.3.3.3 Statutory approval dates;
- 3.3.3.4 Date for access to the Site;
- 3.3.3.5 Date for access to follow-on contractors;
- 3.3.3.6 Date for Key Events and Milestones;
- 3.3.3.7 Date for Practical Completion of the Works or each Separable Portion;
- 3.3.3.8 Manufacture and delivery durations for Contractor supplied equipment and materials, with ties to the respective installation activities;

- 3.3.3.9 Activity durations shall be in working days, the programme calendar shall indicate public holidays, leisure days or other non-working days;
- 3.3.3.10 Off Site and on Site activities shall be clear and identifiable;
- 3.3.3.11 Calendar - the bar chart heading shall show the year, the month and the week. The bar chart shall commence on the date of Contract Award;

3.3.4 Construction Programme Resources

- 3.3.4.1 The Contractor shall submit histograms showing the direct labour required to complete the work under the Contract based on the approved Construction Programme.
- 3.3.4.2 The histograms shall be prepared from the schedule.
- 3.3.4.3 Equipment requirements / utilisation bar charts shall be submitted to the Employer for all Site plant and mobile equipment required to complete the work under the Contract.

3.3.5 Man-hour allocation

- 3.3.5.1 Scheduled Direct Labour Hours – Per Activity.
- 3.3.5.2 For each appropriate activity in the Construction Programme, the Contractor shall allocate the associated direct labour hours.
- 3.3.5.3 Direct Labour Hours – Total.
- 3.3.5.4 The total of the direct labour hours per week shall be calculated after activities have been resource levelled.
- 3.3.5.5 Direct Labour Workforce Histogram
- 3.3.5.6 The site workforce (direct labour only) scheduled per week shall be calculated from the direct labour hours and a histogram plotted.

3.3.6 Equipment allocation

- 3.3.6.1 Special tools and mobile equipment shall be assigned to their respective activities
- 3.3.6.2 Shared equipment such as mobile equipment shall be allocated to level of effort activities within the Construction Programme.

3.3.7 Contractor 'S-Curve'

- 3.3.7.1 The Contractor shall submit progress S-Curves for the overall Contract and each of the phases of the Contract.
- 3.3.7.2 The S-Curves shall be based upon the distribution of man-hours where attainable from within the approved Construction Programme.

- 3.3.7.3 The S-Curves shall be presented using the approved templates provided by the Employer.
- 3.3.7.4 To generate the overall Contract S-Curve each of the phases shall be weighted according to the dollar value of the phase.
- 3.3.7.5 All S-Curves shall be developed using the 'Earned Value Method'. This method applies a weighted value (WV) to all measurable components of the Works.
- 3.3.7.6 The reporting of progress for each component shall be in the form of earned value (EV), which is the physical percent progress of the component of the work.

3.3.8 Construction Programme Commodities

- 3.3.8.1 The Construction Programme site activities shall be loaded with applicable commodity quantities. Commodity curves shall be produced for forecast installation and actual installation quantities from this data. Offsite fabrication of structural steel, platework and spooling of pipework shall also be reported.
- 3.3.8.2 The Employer utilises the following commodities;
 - 3.3.8.2.1 Concrete (m³)
 - 3.3.8.2.2 Mechanical Equipment (t)
 - 3.3.8.2.3 Plate work (t)
 - 3.3.8.2.4 Structural Steel (t)
 - 3.3.8.2.5 Pipework (m) & Diameter Inch's (Inch)
 - 3.3.8.2.6 Electrical and Communication Cables (m)
 - 3.3.8.2.7 Electrical & Instrumentation Terminations (Qty)
- 3.3.8.3 Commodity Curves shall be presented in the same format as the S-Curves.

3.3.9 Approval of Construction Programme

- 3.3.9.1 The Contractor shall submit the proposed baseline Construction Programme including a native copy of the programme.
- 3.3.9.2 Provided the Construction Programme is in accordance with this Attachment 10, it will be approved as the revision '0' Baseline Construction Programme. Against which the Contractors progress will be measured.

3.3.10 Revisions to the Construction Programme

- 3.3.10.1 The Contractor shall review the Construction Programme when any one of the following events occurs:

-
- 3.3.10.2 Progress of the work under the Contract falls significantly behind or otherwise materially departs from that shown in the Construction Programme;
 - 3.3.10.3 A variation is issued which affects the Construction Programme;
 - 3.3.10.4 There is a change in method of working adopted by the Contractor which affects the Construction Programme; or
 - 3.3.10.5 The Employer's Representative directs that the Construction Programme be revised because in the opinion of the Employer's Representative the current Construction Programme does not reflect the actual work patterns of the Contractor.
 - 3.3.10.6 If any of the events listed above occurs, the Contractor shall submit for approval, within seven (7) days of the event occurring, the revised Construction Programme. Upon approval, the revised Construction Programme will become the approved baseline for all future progress updates.
 - 3.3.10.7 The Contractor shall address identified deviations from the Construction Programme by either:
 - 3.3.10.8 Demonstrating that the deviation does not constitute a delay; or
 - 3.3.10.9 Providing a course of action to remedy the deviation.
 - 3.3.10.10 The revised Construction Programme shall clearly indicate the following:
 - 3.3.10.11 The differences between the revised Construction Programme and the previously approved Construction Programme; and
 - 3.3.10.12 The revision number and date of issue of the revised Construction Programme.
 - 3.3.10.13 The revised Construction Programme shall be accompanied by a revised manning histogram and S-Curve with an additional data line called 'reforecast planned progress'.
 - 3.3.10.14 At any time additional detail may be inserted into the Construction Programme at the request of either the Contractor or Employer's Representative. In such cases, the overall start and finish dates of the detail activities shall not vary from the original summary activity(s) which were replaced.
 - 3.3.10.15 All revisions to the Construction Programme shall be prepared by, and at the cost of the Contractor.

3.3.11 Supplementary Schedules and Programmes

The Employer's Representative may at any time, and at the cost and expense of the Contractor, direct the Contractor to produce supplementary documents to highlight a particular aspect of the work under the Contract.

3.3.12 Cash Flow

The Contractor shall submit to the Employer detailed cash flow forecast charts based on the Construction Programme (and any revisions) showing the anticipated monthly cash flow as represented by expected payment claim submission, not by payments received.

3.4 Progress Reporting

The cut-off, and submission dates for monthly reports will be as required by the Employer to ensure appropriate and timely integration into the Employer's overall progress reporting systems. These dates are subject to change as per the status of the project or at the discretion of the employer.

3.4.1 Progress Reporting

- 3.4.1.1 To demonstrate the actual progress of the work under the Contract the Contractor shall, on a monthly basis, update and submit to the Employer;
- 3.4.1.2 The updated Construction Programme shall show two (2) separate bars for each activity:
 - 3.4.1.2.1 The Construction Programme "baseline" activity bar.
 - 3.4.1.2.2 The current schedule activity bar identifying the currently forecast start and finish dates of the activity.
- 3.4.1.3 The progress 'S-Curves';
- 3.4.1.4 Direct Manning Histograms;
- 3.4.1.5 Deviations from the 'baseline' Construction Programme together with the 'S-Curves' will form the basis for assessing progress and performance. Where significant deviations from the scheduled progress are being tabled in the report, the Contractor shall provide sufficient detailed written analysis and data, to adequately demonstrate the primary areas of schedule concern with short term recovery plan.
- 3.4.1.6 Overall Schedule.
- 3.4.1.7 2 week look ahead Schedule.

3.4.2 Progress Monitoring and Corrective Action

- 3.4.2.1 Monitoring and review of the progress of the work under the Contract shall consist of an assessment of all activities currently in progress. The following shall be determined:
 - 3.4.2.1.1 Percentage complete;
 - 3.4.2.1.2 Forecast completion date;
 - 3.4.2.1.3 Manning histograms showing actual and forecast versus baseline figures;

3.4.2.1.4 Deviations from the baseline programme; and

3.4.2.1.5 Actions required remedying any deviations.

3.4.2.2 Progress reviews shall be conducted to assist control of the work under the Contract. The format, content, and structure of these reviews will be agreed between the Contractor and the Employer's Representative. The Contractor's Progress Report will be used as the discussion tool for the progress meeting.

3.4.3 Monthly Status Report (Planning Aspects Only)

3.4.3.1 In addition to the formal monthly report, the Contractor shall provide the following.

3.4.3.2 The report shall include but not be limited too:

3.4.3.2.1 The report shall summarise progress and problems encountered during that month in respect of all parts of the work under the Contract.

3.4.3.2.2 Progress against the approved Construction Programme;

3.4.3.2.3 Summary of progress achieved during the period using progress 'S-Curves' for each of the PCS elements;

3.4.3.2.4 List of milestones achieved during the period;

3.4.3.2.5 Status of construction;

3.4.3.2.6 Deviations from the Construction Programme, and in particular, the forecast completion dates of activities which should have been completed;

3.4.3.2.7 Actual or anticipated problems with corresponding action plans to mitigate / minimise their risk or impact;

3.4.3.2.8 Summary of work activities planned for the following period;

3.4.3.2.9 Cash flow status versus the original forecast;

3.4.3.3 The Progress Report shall be submitted for review prior to the monthly progress meetings.

COBOSI PJS:
ELECTRICAL INSTALLATION

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PART 1: ELECTRICAL WORKS SPECIFICATION

PART 1: ELECTRICAL WORKS SPECIFICATION

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1.0 Purpose

- 1.1 This Specification is intended to set out the general technical and procedural requirements for the installation of electrical lighting, power and ancillary services within and around premises largely as contemplated in The Code of Practice for the Wiring of Premises, South African Bureau of Standards SANS 10142-1:2003 (hereinafter called the Wiring Code, or SANS 10142-1:2003). Where the installation falls outside the scope of the Wiring Code, those portions of the installation (e.g.: MV switchgear and cabling, power transformers, and so forth) shall be covered in one or more supplementary specifications appended hereto).
- 1.2 This Specification shall be read in conjunction with the Contractual Conditions, Schedules, Bills of Quantities and Drawings.
- 1.3 Clause separations and headings are given for guidance only and the Work may not necessarily be limited to any particular section(s) of this Specification and the project Documentation must be read as a whole.

2.0 Scope

- 2.1 This Specification covers the supply, delivery, off-loading, storage, installation, testing, commissioning and handing over in full working order, complete in all respects of lighting, power and ancillary services as outlined in this Specification and/or shown on the drawing(s). Unless specifically stated otherwise, any reference in the Documentation (see clause 3.1.2) to any material or service being provided, fixed, rendered etc, shall mean that such provision falls under the Contractor's contractual obligations.
- 2.2 The service/s installation/s shall comprise, but shall not be limited to: all notifications and applications to Authorities, including payment of fees, distribution boards, cables, bus-bars, wireways, wiring, controls, accessories, luminaires and lamps, earthing, static and lightning protection/bonding, facilities for other services, fixings and building-in, earthworks, painting, special power supplies, data services, fire alarms, access and intruder control, communication, TV and radio services, working and record drawings, maintenance manuals etc and all other things to form a complete and proper installation to the extent as contemplated in the Documentation.
- 2.3 The Bidder shall be deemed to have satisfied himself before tendering as to the correctness and sufficiency of his tender for the Works and of his rates and prices contained in the various schedules and that his offer shall cover all his obligations under the Contract for the full and proper completion of the Works.

3.0 Definitions

- 3.1 In addition to the definitions contained in Part 3 of the Wiring Code, the following shall apply:-
 - 3.1.1 'Document' and 'Documentation' shall mean the complete set of contract Documents including any relevant government department's specifications and conditions (where applicable), this Specification, schedules, bills, drawings and any variation orders or site instructions issued in terms of the Contract.

- 3.1.2 'Contractor' or 'Electrical Contractor' shall mean the person, partnership, company or firm appointed to undertake the electrical and or ancillary installation hereinafter called the electrical installation or Works in terms of this Contract. In this Document, 'Contractor' shall have the same meaning as nominated, selected or domestic sub-contractor where the electrical installation is in any form a sub contract to the Main Contract. For clarity, the builder or principal contractor shall be referred to as the 'Main Contractor'. The Contractor shall also be fully responsible under the contract for any of his sub-contractors, agents, assigns, suppliers etc.
- 3.1.3 'Bidder' shall mean the person, partnership, company or firm who makes a bid to carry out the Works. The successful Bidder will normally become the Contractor upon official award of the contract and the completion of contractual Documentation when all obligations under this Contract shall become the Contractor's liability.

4.0 Site Visit

In instances where there may be no mandatory formal Bidders' site visit, Bidders nevertheless are advised to visit the Site of the Works, prior to the submission of any tender, to ascertain site conditions, accessibility, available facilities etc. No claim on the grounds of want of knowledge in these respects, or any others, will be entertained.

5.0 Compliance with Regulations

- 5.1 The installation shall comply with the latest versions of the following standards and regulations except where more stringent requirements are laid down in the contract Documentation in which event the latter shall take precedence:-
- The Code of Practice for the Wiring of Premises, SANS 10142-1:2003.
 - The latest issues of all SANS Standards and Codes of Practice (hereinafter called SANS standard/s) or, if such standards do not exist, then the latest versions of the appropriate international standard as issued by the British Standards Institute (BS) and/or the International Electrotechnical Commission (IEC).
 - The Occupational Health and Safety Act 1993 (Act 85 of 1993), (OHSA) and the Construction Regulations R1010 dated 18 July 2003.
 - The bye-laws and regulations of the Local Municipality and Authorities who are responsible for the area in which the Works are situated
 - Telkom regulations and specifications
- 5.2 The Contractor shall issue all notices and pay all the required fees in respect of the installation to the authorities, and shall indemnify the Employer, Main Contractor and Engineer from all losses, claims, costs or expenditure which may arise as a result of the Contractor's failure to comply with these requirements and the regulations of any relevant Authority.
- 5.3 It shall be assumed that the Contractor is conversant with the requirements outlined in 5.2. Should any requirements, by-laws or regulation, which contradicts the requirements of this Document, apply or become applicable during the course of the Works, such requirements, by-law or regulation shall overrule this Document and the Contractor shall immediately inform the Engineer of such a contradiction. Under no circumstances shall the Contractor carry out any variations to the installation in terms of such contradictions without obtaining the written permission to do so from the Engineer.

6.0 Standards and Quality of Work

- 6.1 As the Wiring Code lays down strict requirements for complying with SANS standards, a compulsory specification published in a government gazette, or otherwise approved in terms of the Wiring Code, no detailed list of Standards will be scheduled herein. However, portions of the

Works falling outside the scope of the Wiring Code shall comply fully with the latest versions of the applicable standards and codes issued by the SANS or, in the absence of such standard, with an acceptable international standard. Any reference to a particular standard may be given for guidance/clarification only; this shall not relieve the Contractor from complying with all relevant standards in their entirety.

- 6.2 All components shall be new and of the best available quality and of the class most suitable for the purpose and environment for which they are intended. The whole installation shall be extremely reliable and all parts shall be of such material as will ensure that they are capable of withstanding variations in temperature and humidity arising under working conditions without distortion or deterioration or setting up of undue strain on any part.

Any particular make or model of equipment referred to in the Documentation is for guidance purposes only in setting standards/types/performances required; equipment that is equal or superior in all respects, and to the approval of the Engineer, may be offered by Bidders. No reference to any particular make of any equipment shall be construed as that equipment having been selected by the Engineer or Client and the Contractor shall be fully responsible for the guarantee and performance of such equipment.

Only equipment and materials with a proven track record in similar applications will be considered.

- 6.3 Equipment and components of a similar class, such as wiring accessories, switch disconnector units etc, shall be of the same make, pattern, and where applicable, colour, throughout.

- 6.4 The Work shall comply with the requirements of the Documentation, but where it may become necessary to carry out the Work in a different manner; the Contractor shall first obtain the approval of the Engineer in writing.

In cases where items offered by Bidders are not in accordance with the contract Documentation, the deviation/s must be fully detailed, irrespective of whether a special form is included for this purpose or not, and such details shall accompany the tender submission in the form of a covering letter, or on the form provided. Merely stating 'as (manufacturer's name / item)', or submission of manufacturer's pamphlets etc. is not acceptable, will not be considered part of any offer and will be ignored. Where no details are submitted, in a covering letter, or on a form provided, the offer shall be deemed to comply fully with the Works Documentation and the successful Bidder/Contractor shall be liable for performance strictly in accordance with all specifications and conditions.

- 6.5 The complete Work shall be carried out by qualified, highly trained, skilled and competent operatives to the highest standard of workmanship. The minimum requirement is that a permanent on-site electrician whether working alone or leading the Contractor's workforce, and who must be an 'A' Grade artisan as determined by the Department of Labour, is to be the appointed artisan who shall be responsible for the day to day installation work.

An adequate number of workmen shall be employed at all times to ensure satisfactory progress of the Works in accordance with the overall pace of the project and/or in harmony with any Works programme set by the Architect, Main Contractor or Engineer, etc.

The Contractor shall liaise and cooperate with any other contractor(s) whose work is related to, close to or build into with the Works as detailed herein and shall coordinate the Work to avoid fouling, unsatisfactory setting out etc. Any failure by other contractors to collaborate with the Contractor herein shall be immediately reported in writing to the Engineer and Main Contractor.

The Work shall at all times and for the full duration of the Contract, be carried out under the management and supervision of a skilled and competent representative of the Contractor who will be authorised to receive and carry out instructions on behalf of the Contractor and to attend site meetings.

7.0 Rejection of Inferior Work and Materials

All inferior work or work containing inferior material shall be rejected by the Engineer whereupon the Contractor shall immediately remove and rectify the faulty work as necessary and bear all costs in connection therewith.

8.0 Drawings and Samples

- 8.1 Bidders may be required to submit for approval, comment or records samples of materials, apparatus or components, and also drawings, schematic diagrams or technical details, including calculations, upon which their design and/or offer is based before any contract is awarded. Such details may also be called for during the course of the Contract prior to installation. Any approvals given or comments made shall be on the generality of the scheme and shall not relieve the Contractor of his responsibility to ensure full compliance with all performance and regulatory criteria.

NOTE: A request for submission of samples or drawings does not imply that the Tenderer's quotation will necessarily be accepted.

- 8.2 Drawings shall be clearly marked "WORKING DRAWINGS FOR APPROVAL", or as otherwise applicable. Samples shall remain on site until completion and taking over of the Works or, with the Engineer's approval, the samples may be embodied within the installation.
- 8.3 All expenses in connection with the supply and return of the drawings and samples shall be borne by the Bidder/Contractor.

9.0 Guarantee

- 9.1 All equipment supplied and all work performed shall be guaranteed against defective operation, poor design (where designed by the Contractor, or in components / assemblies with inherently poor design), and unacceptable / faulty workmanship, all as determined by the Engineer, for a period of 12 months after commissioning, handover and Client acceptance.

Any faults found during the guarantee period shall be timeously repaired or replaced by the Contractor, including peripheral damage/disturbance (e.g.: wall finishes etc damaged during the course of repairs), at his own expense, excluding mis-use and abuse by others and fair wear and tear. Discharge type lamps shall be included in the 12 month guarantee period; however, incandescent lamps shall carry a 3 month guarantee.

The Contractor is required to carry out any remedial work under the guarantee at times and in a manner which will cause the least disruption to the Client's, or other occupant's, operations.

- 9.2 The Contractor shall ensure that he has access to sufficient spare components for all equipment readily available to forestall any delays in repairing the installation.

10.0 Operating and Maintenance Details

Two complete sets of technical manuals complete with spares schedules, as-fitted layout drawings, schematic wiring diagrams and operating and general maintenance information, bound in hard-cover ring binders shall be prepared by the Contractor and delivered to the Client at or before final handover. A full 'As-Built' set of drawings shall also be submitted to the Engineer for record purposes.

The main and individual distribution board (DB) single line diagrams shall be brought up to 'As-Built' status and copies placed in the technical manual. A further copy of the main single line diagram shall be mounted in a glass-fronted frame and hung in a suitable position in the main LV room. Copies of the distribution board diagrams shall be folded (or reduced) to A4 size and placed in an A4 sized perspex fronted frame or document pocket in the applicable DB. Such frames or

pockets shall be fabricated from 1,2mm pre-galvanised steel and spot welded to the DB (usually to the inside of the DB door).

This documentation shall be submitted to the Engineer for comment and approval prior to handing over to the Client. It is therefore advisable to submit the details in draft format so that any amendments/corrections can be easily incorporated.

11.0 Inspection and Testing of Works

- 11.1 The Contractor shall attend upon the Engineer as reasonably required for Work inspection. Normally, inspection of Work in progress will take place on the same day as the general site meeting, or such other times as the Engineer may reasonably require. Handing-over inspections will be done at the completion of the Contractor's testing, issuing of the Certificate of Compliance by the Contractor's accredited person, livening the installation by the Supply Authority, commissioning of the installation and upon making a written request for the Engineer to carry out an initial handover inspection.

Where the installation is to be switched on and taken over in portions, the Certificate of Compliance shall be limited to that particular part of the Work. New Certificates of Compliance shall be completed for remaining phases of the project as applicable and the Supply Authority's permission formally obtained to switch electricity to those areas.

The Contractor shall, prior to requesting the Engineer to undertake an initial handover inspection, do a full, complete and proper inspection of his Work to ensure that everything is absolutely complete and in accordance with the Documentation. Following this inspection, and rectification of any faults in parts of the installation that may be required, the Contractor shall make a written request to the Engineer for a handover inspection. Any faults still found in the installation shall be listed by the Engineer and handed to the Contractor who shall attend to all faults within a reasonable period as decided by the Engineer except that this period will in no circumstance exceed 14 days. Once all listed faults have been rectified, the Contractor shall again request the Engineer in writing to carry out a final handover inspection.

Upon the successful completion of a handover inspection and the issuing of a handover certificate by the Engineer, the responsibility for the security of the installation, or part thereof, shall be deemed to be with the Client.

Under no circumstances will any inspection by the Engineer and/or, if appointed, the Electrical Clerk of Works of Resident Engineer, relieve the Contractor of his obligations in terms of the Documentation.

- 11.2 On completion of the installation, or such part thereof as may be determined by the Engineer, the Contractor shall carry out installation testing and inspection in accordance with Part 8 of SANS 10142-1:2003 and/or any other relevant Standard.

The result of these tests, duly certified by the Contractor, shall be submitted to the Engineer in the form of a typed test-result certificate. No testing for acceptance purposes will be carried out by the Engineer until this is received.

Upon receipt of the test certificate, the Engineer will arrange to carry out acceptance tests and to witness commissioning procedures, including load-balance, phase rotation, bonding and labelling checks. If any faults are found in the installation, a list of those immediately noticed will be handed to the Contractor by the Engineer. The Contractor shall forthwith rectify such faults and issue a further test certificate endorsed "RE-TEST" with all reasonable despatch whereupon the Engineer will carry out further check-tests.

Any list of faults issued by the Engineer shall not be regarded as final, but given only for the assistance of the Contractor who will be bound to exercise all necessary diligence in their rectification and to check for any other faults and to rectify same.

The Contractor shall supply all necessary testing instruments for carrying out tests, including, but not limited to: insulation tester, earth loop-impedance tester, clip-on ammeter (e.g.: for load-balance testing), earth-leakage tester, etc. Where there is reason to doubt the accuracy of the instruments, the Contractor shall arrange for tests to check their accuracy.

- 11.3 Where cast-in conduit is installed, the Contractor shall thoroughly check his layout, fastness etc, well before any concrete is poured. The Engineer shall be informed by the Contractor in writing that he is ready for a check-inspection, giving the Engineer not less than 48 hour notice (usually by telefax and or email). A qualified operative of the Contractor shall stand by at all times when concrete is being poured so that any conduits or boxes that may become loose, displaced etc can be refixed.
- 11.4 If it is necessary for the Engineer, his agents or assigns, to spend extraordinary time in respect of checking, testing, inspection or any other matter due to the Contractor's default or unsatisfactory attendance all costs of the Engineer in obtaining remedy shall be for the Contractor's account. For example, if the Contractor failed to carry out his own prior testing in a reasonable and diligent manner, or to check cast-in conduits properly before calling the Engineer to undertake a check-inspection, thus necessitating further visits and/or extra time incurred, costs of the Engineer will be charged to the Contractor. These costs will be deducted from the Contractor's claims, or shall be claimed by submission of an account. Engineer's claims for wasted time, including disbursements, shall be based on the applicable Department of Public Works Rates for Reimbursable Expenses.

12.0 Technical and Installation Requirements

12.1 Main Electrical Supply

In instances where the incoming main supply from the Supply Authority is at low voltage (LV), requirements of the Supply Authority with regard to method of incomer connection, earthing, testing/approval of main circuit breaker etc, must be strictly adhered to.

The Supply Authority's requirements for their metering must be complied with and all facilities, space, bus-bar links for current transformers (CTs), etc, as the case may be, shall be in accordance with their requirements. The Contractor shall be deemed to have made all allowances for the Supply Authority's requirements in their tender submission.

12.2 MV Equipment and Cabling

Medium voltage (MV) equipment falls outside the scope of this building services specification. Where required, MV cables, MV switchgear and power transformers etc. shall be specified in a supplementary specification and/or drawings.

12.3 Miscellaneous Equipment and Installations

Miscellaneous items such as diesel generators, uninterruptable power supplies (UPSs), overhead lines etc. which fall outside the scope of this building services specification shall be specified in a supplementary specification and/or drawings.

12.4 Distribution Boards

12.4.1 General

- a) Distribution Boards (DBs) shall be of the type as detailed in the single line diagrams, the Detailed Specification and, where applicable, the equipment schedules. Unless otherwise indicated, distribution boards shall be provided with prefitted space/s for a minimum 20% extra switchgear, subject to a minimum of

one space for each class of circuit breaker, combination fuse switch (CFS), contactor etc, viz.: 3-pole, single pole etc, as the case may be.

- b) DBs shall comply fully with SANS 1765.
- c) Enclosures
 - i) Distribution boards for internal applications shall be constructed from folded pre-galvanised 2mm mild steel sheet suitably welded, bolted and braced to form a rigid construction and finished with an epoxy coating after fabrication. DBs for external applications shall be similar to internal DBs, but shall be fabricated from 2mm 3CR12, plus a suitable epoxy finish. Boards for special applications may be made from polished 2mm 316 stainless steel, fibreglass etc; these will be more fully described in the Detailed Specification where applicable.
 - ii) All equipment, except door mounted instruments, indicators and so forth, shall be mounted behind removable fascia plates with only the switchgear operating handles protruding.
 - iii) Normally, free standing boards shall not exceed 2,3m in height with operating handles, push-buttons etc not exceeding 1,8m from the floor nor lower than 600mm above floor level (subject to any equipment part not being lower than 300mm from the floor).
 - iv) Cabinet type boards used mostly for LV distribution shall be 'Form 1' degree of separation to IEC 439 while cubicle boards used mostly for Motor Control Centres (MCCs) shall be 'Form 4'.
 - v) The Contractor is to check all access routes for distribution boards. Where necessary, DBs are to be made in sections to allow access into their final position.
- d) Protection

All boards shall be rendered moisture and vermin proof and shall be adequately ventilated. Unless otherwise specified, free standing and wall mounted DBs in a normal internal environment shall be protected to IP43. DBs in certain factories may have to have a higher degree of protection which will be stated in the supplementary Specification or single line diagrams. The complete DB and its components shall be suitable for coastal conditions.
- e) Bus-Bars
 - i) The bus-bars shall be of high conductivity 99,9% pure copper of adequate cross section for the current and short circuit rating, mounted on edge (not flat). Multiple/laminated bars shall be appropriately derated as necessary and shall be spaced by a distance equal to the bar thickness. Bars shall be supported on resin type insulators suitable for mechanical stresses due to prospective fault currents and otherwise so arranged and braced as to obviate distortion under short circuit conditions. The material used for bracing, shielding etc must be tested and approved by SANS and shall be completely non-hygroscopic and non-tracking.
 - ii) Bus-bar current ratings for both phase and neutral shall be based on an internal temperature of 40°C with a maximum bar temperature rise of 60°C.

- iii) As a guide, the following current densities should not be exceeded for single bars:
- 100 Amps and below : 3,50A/mm²
 - 101 - 300 Amps : 2,65A/mm²
 - 301 - 1000 Amps : 1,85A/mm²
 - 1001 Amps and above : 1,20A/mm²
- iv) In addition to the current rating, the bars shall be sized to accommodate the prospective fault rating and the cross sectional area of the bars shall be the greater of the calculated sizes. Sizing for fault levels shall be based on the following:
- $a = 8,2 \times I_{sc} \times \sqrt{t}$, where:
 a = minimum cross section in mm²
 I_{sc} = prospective short circuit current in kA
 t = maximum time in seconds to clear fault, subject to a minimum of 0,2s
- v) An earth bus-bar shall be installed at a convenient position, usually near the bottom, along the entire length of DBs with an incomer size of 200 Amps or more, or they may be of shorter but adequate length for smaller DBs. Earthbars need not be supported on insulators. The cross sectional area of the earthbars shall be equal or greater than half the cross sectional area of the incomer feeder cable. Earth terminal strips with screw connections may be used for boards with a maximum incomer size of 100 Amps.
- vi) Teed-off neutral bars are to have the same cross sectional area as the sub-feeder phase bars and shall be mounted in a suitable position adjacent to the switchgear, which they serve. The outgoing connections must match the sequence of the switchgear to which they relate. Neutral terminal strips with screw connections may be used for boards with a maximum incomer/sub-feeder size of 100 Amps. These requirements shall also apply to smaller DBs where such neutral bars are also the main neutral bars.
- vii) A separate neutral bar shall be installed for circuits protected by adjacent single phase earth leakage breakers connected to the same phase.
- f) Gland Plates
- i) Bottom entry boards shall be provided with minimum 2mm galvanised steel gland plates installed across the full width of each DB section at a minimum height of 300mm above the level of the bottom of the DB. Sufficient clearance for the bending of cable cores shall be provided between the lowest terminals of any equipment.
- ii) Where single core cables are to be terminated, 10mm non-hygroscopic Delaron or similar material shall be used for the gland plate. Alternatively, gland plates for single core cables shall be made from 4mm thick aluminium.
- g) Doors
- Where called for, doors shall be fabricated from the same material as the main enclosure and shall be provided with closed-cell silicon gasketing to obtain the level of protection required (Refer also to 12.17.6). The doors shall be provided

with catches, square-key turnbuckles, lockable catches or cylinder locks and handles, as specified in the Detailed Specification and/or drawings. All DB keys, where provided, shall be the same for all DBs on the particular project.

h) Paintwork

- i) Pre-galvanised sheet metal shall be cold galvanised at all exposed edges and welded surfaces, degreased, bonderised, etch-primed and then finished with baked epoxy enamel or powder coatings per SANS 51274, as applicable and to paint manufacturer's recommendations to achieve a dry film thickness (DFT) of 70 microns.
- ii) 3CR12 panels shall be pickled, passivated and etch-primed before being finished, similarly to pre-galvanised sheet steel boards, with baked epoxy enamel or powder coatings to achieve a DFT of 70 microns.
- iii) Colour finishes shall be as follows:
 - Normal Supply LV Distribution Boards: Light Orange, colour B26 of SANS 1091
 - The standby power sections of DBs shall be Signal Red, colour A11 of SANS 1091
 - Uninterruptable Power Supply (UPS) DBs, or such sections within composite boards shall be Dark Violet, colour F06 of SANS 1091
 - Small domestic and shop type DBs, and boards in open kitchen areas shall be finished white, colour G80 to SANS 1091 (unless the latter is of bright stainless steel)
- iv) A minimum of 1 litre of touch-up paint for each colour shall be provided.

i) Switchgear

- i) MCCBs, MCBs and switch-disconnectors shall be of the same make throughout. Similarly, CFS units shall be metalclad type and are to be of the same make throughout. Current ratings must be clearly indicated on the front of the units.
- ii) A suitably braced chassis for the mounting of moulded case type switchgear, including DIN type rails etc, shall be firmly secured to the frame of the switchboard. Large switchgear, such as ACBs, shall be secured directly to the framework using suitable structural/bracing members.
- iii) MCCBs switch disconnectors and CFS units with a rating of 150 Amps and above shall be connected to the main bus-bars with bus-bar links. PVC insulated cable, neatly installed, shall generally be used for switchgear below 150 A. This latter requirement shall not preclude the use of small-section feeder bus-bar arrangements where available. Where long runs of PVC insulated cable are run within the DB, they shall be neatly laced together, or shall be installed in purpose made slotted PVC trunking. The smallest cable size for DB wiring shall be 2,5mm².
- iv) Where necessary, stub bus-bars shall be fitted to the outgoing side of MCCBs and CFS units and the supply side of switch disconnector incomers to allow for lug connections to the cable cores.
- v) Incoming circuit breakers and bus-coupler breakers rated 800 Amps and above shall be of the withdrawable type air circuit breakers (ACBs) or large frame MCCBs, as specified.

- vi) Castell, or similar interlocks shall be provided for all main DBs which have bus-couplers. Alternatively, where detailed in the single line diagrams and/or Detailed Specification, the bus-coupler shall comprise a shuttered cradle only (no circuit breaker fitted) to match the incomer circuit breaker cradles. In the latter instance, bus-coupling will be effected by racking out the appropriate incomer ACB/MCCB, fitting it into the bus-coupler cradle and engaging the 'ON' position.
- vii) Where MCCBs and ACBs have been set to a lower rating (e.g. 400A MCCB set to 350A etc.), the setting arrangements shall be sealed off and rendered tamper-proof after adjustment.
- viii) Where instrument fuses or fused switchgear is used, spare fuses shall be housed in a small compartment built into the applicable board. 20% of each size of fuse, subject to a minimum of three, shall be provided and shall be mounted in stainless steel 'Terry' type clips inside the compartment. A label inside the spare fuse compartment shall indicate all part numbers for reordering. The outside of the compartment shall be labelled as follows:

SPARE FUSES

THE FUSES ARE USED TO CONTROL DANGEROUS PROSPECTIVE FAULT CURRENTS – DO NOT BRIDGE OUT UNDER ANY CIRCUMSTANCES

Reorder and replace any used-up fuses immediately

- ix) Where fault limiting is employed, fuses or fault-limiter MCCBs shall be selected to limit down-stream faults to levels no higher than indicated in the single line diagrams or implied in the design.
- j) **Surge Arrestors**

Surge arrestors, which comply with SANS 61643-1, may be installed in each distribution board. These shall be fitted at the load side of main incomers to each phase and the neutral.
- k) **Timeswitches**
 - i) Timeswitches shall be suitable for single-phase operation at a minimum rating of 15 Amps. They shall be of the programmable electronic type complete with a minimum 24-hour back-up rechargeable battery. The battery shall be a locally available type and shall be arranged for easy removal and replacement. The characteristics of the timeswitch shall suit the requirements of the circuit as dictated by details in the single line diagrams (e.g.: day omitting etc). Solar type timeswitches shall be used for all outside lighting circuits unless photocells are employed for control purposes.
 - ii) A manual by-pass switch, mounted in the DB fascia, or as otherwise indicated, shall be provided to permit the circuit to be switched 'on' or 'off' manually for one switching cycle without affecting any other settings.
- l) **Contactors**
 - i) Contactors shall be DP or TP electromagnetically operated air break, low noise type suitable for the rated supply voltage, circuit current and prospective fault level current.

- ii) Contactors for general lighting and power shall be AC1 category while AC3 category shall be used for motor starting.
 - iii) Where auxiliary contacts are not specified to be fitted initially, the contactor shall have provision for adding these contacts. Auxiliary contacts shall be rated at 6 Amps, 250V AC. Auxiliary contacts characteristics such as 'make-before-break', 'late break' etc must be inherent in the design and shall not be adapted from standard contacts.
 - iv) All contactors shall have the following features:
 - Easily replaceable coil
 - Permanent air-gap in the magnetic circuit
 - Clearly marked main and auxiliary terminals
 - Provision for easy inspection and changing of contacts
 - v) Contactors shall be electrically and mechanically interlocked for changeover arrangements and electrically interlocked only for star-delta starters.
- m) Instruments and Controls
- i) Instruments, indicators and controls shall be provided as indicated in the single line diagrams. Where the components are to be actuated from the front of the DB door, they shall be rated to the appropriate IP level (e.g.: IP43). In instances where meters and the like are required, and where these cannot be protected to the level specified by themselves, suitably protection-rated impact resistant glass windows shall be provided in the door through which to view the dials and the instrument/s mounted in the inner fascia.
 - i) Doors in which instruments are installed shall be provided with a flexible woven copper earth link across the hinge side. Insulating shrouds or other suitable barriers shall be installed to prevent accidental contact with door mounted instrument terminals.
 - ii) Fuses for the protection of instruments shall be of the HRC cartridge type mounted behind the DB fascia. All control fuses shall be clearly labelled.
 - iv) Push-buttons for protection ratings of IP65/66 shall be provided with rubber 'boots' for enhanced protection. Any exposed rubber shall be further protected (e.g.: with silicon covers) where used in food factories containing sugars and other carbohydrates which may give rise to attack from bacteriological action when fine particles collect on or near the rubber.
 - v) Only LED type indicator lamps shall be used. A set of spare LEDs (20% of each type, subject to a minimum of three) shall be supplied. These may be housed in the spare fuse compartment where provided, and the labelling suitably modified. Alternatively, the LEDs shall be housed in a small labelled compartment similarly to HRC fuses as aforementioned
 - vi) Unless otherwise specified, ammeters, voltmeters, frequency meters and running-hour meters shall have a minimum dial size of 96mm x 96mm with anti-static impact resistant clear faces. Instruments shall be screened against magnetic interference.

- vii) Voltmeters shall be of the moving iron type with class 1.5 accuracy as per IEC 51. A zero adjustment screw shall be provided. Voltmeters shall be scaled 0 - 250V or 0 - 500V as appropriate. Selector switches used in conjunction with a single voltmeter shall be of the cam-actuated or wiping air-break type. The switch shall be labelled with the 'OFF' position and other positions as specified (e.g.: 'N - R' for neutral to red phase, 'R - Y' for red to yellow phase etc.)
 - viii) Ammeters shall have a moving iron element to indicate instantaneous values. Direct reading ammeters may be used up to 60 Amps. Current Transformer (CT) operated ammeters of 60 Amps and above shall be 5 Amps full scale, calibrated to read actual primary currents. The CT ratio shall be indicated on the faceplate.
 - ix) Unless otherwise stated, ammeters shall be of the Maximum Demand (MD) reading type. The mean value over a fifteen minute period shall be indicated by a red pointer driven by a bimetal spiral element. Full load current shall be indicated with a distinctive line on the dial. The scale should indicate at least 25% over full-load rating.
 - x) Instrumentation and control (I&C) wiring shall be segregated into LV and ELV wiring and installed in separate slotted plastic trunking within the main casing of the board. I&C wiring shall also be kept separate from power wiring. The smallest ELV conductor shall be 1mm². Conductors connecting to components on hinged panels shall be shrouded in spiral plastic 'loom-former' and fixed on both sides of the hinge. A loop shall be formed in the wiring so that the loom produces a twisting motion away from the door jamb when it is closed.
- n) Consumption Meters
- i) KWh meters shall be Direct on Line (DOL) type up to 80 Amp rating and CT operated above this amperage. Meters shall be calibrated for the specific application to obviate the use of multiplication factors.
 - ii) Consumption meters shall have cyclometer dials with six digit readout, the last digit indicating one-tenth of a unit.
 - iii) Facilities for a security seal shall be provided on the fixing screws of the terminal cover.
- o) Current Transformers
- i) Current transformers shall be epoxy resin encapsulated and comply with the requirements of SANS 60044-1 and IEC 185. Unless otherwise stated, the secondary current of CTs shall be 5 Amps and all instruments, meters etc shall be selected accordingly. The rated burden shall not be less than 10VA.
 - ii) The following accuracy classes shall be adhered to:

<u>Application</u>	<u>Primary Current</u>	<u>Class</u>
Indication	A11	5
Protection	A11	3
Metering	Up to 250A	1
Metering	250 - 600A	0,5

Metering	600 - 800A	0,2
Metering	800A +	0,1

p) Power Factor Correction

- i) Where called for, power factor correction (PFC) capacitors shall be housed in a separate section of the DB, segregated from other sections by a metal barrier, and designed for extra ventilation. The PFC section shall have low-level vermin proofed inlet louvres and the top shall have a 12mm diamond mesh 'roof' with a solid flat section spaced at least 50mm above the mesh. Whilst the construction, paintwork etc, shall be similar to the DB casing, the level of protection shall be IP21.
- ii) PFC capacitors shall be protected and controlled by HRC fuses and contactors specially designed for PFC applications. Switchgear shall be rated 70% higher than the normal current rating of the capacitor, e.g.: for a 60kVAr capacitor, the rating of the protective fuses would be 150 Amps in a 400V system.
- iii) Where metalised plastic film capacitors are used, the board construction shall be such as to limit the temperature rise, with all capacitors switched-in, to 35°C above ambient. If necessary a fan, complete with switchgear, controls and failure alarm, shall be employed. This equipment will not normally be indicated in the single-line diagram/s and the Contractor shall make due allowance as necessary.
- iv) PFC controllers shall be electronic type giving 6 or 12 steps of control as specified. Digital indication of the power factor shall be built in, as well as 'auto, manual, off' controls and LED pilot lights indicating PFC steps.
- v) The separate capacitor section of the DB shall have a 'double skin' metal separating barrier with a 12mm air gap for all PFC loads of 250kVAr and above.
- vi) A discharge resistance system shall be provided for each capacitor to ensure effective discharge within 60 seconds after switch-off. A suitable barrier, complete with warning notice, shall be installed for all capacitor banks.

q) Anti-Condense Heaters

Where specified, 'black-heat' anti-condense heaters shall be fitted in the bottom sections of DBs in areas of high humidity or dampness. The heaters shall be fitted behind suitable screening to obviate accidental contact with persons or wiring. Anti-condense heaters shall be protected by dedicated MCBs or fuses and shall be sized to prevent condensation without giving rise to excessive temperature levels inside the DB housing.

r) Labels

- i) Before installation, the Contractor shall submit a fully detailed proposed labelling schedule to the Engineer for comment and approval.
- ii) Engraved plastic 'Ivorine' or 'Traffolyte' type sandwiched labels shall be used for all labelling on DBs, control panels etc. Main labels on the outside of panels, and labels for individual components, switchgear etc shall be fixed to the panel or fascia face with brass bolts, nuts and washers. Labels for small grouped items such as a row of single pole MCBs may be

securely fixed into slotted label holders. In the latter cases, the labels would normally identify the circuit number only and a typewritten legend card installed to the fascia front, or inside the DB door in a card holder, used to identify the circuit function.

- iii) Normal informative labels shall have black lettering on a white background while warning labels shall have white lettering on a red background.
 - iv) Lettering sizes for labels shall generally be as follows:
 - Outdoor Panels, Minisubs etc: 50mm
 - Indoor Panels (main labels): 15mm
 - Bus-bar sections and sub-compartments: 10mm
 - Individual switchgear, indicators etc: 5mm
 - v) Substations, minisubs, kiosks, transformer room & switchgear rooms, shall be provided with notices as required by the Occupational Health and Safety Act.
- s) Testing
- i) Unless otherwise specified, the Contractor shall make all arrangements and provide all instruments for inspection and testing by the Engineer of distribution boards at the manufacturer's premises. The Contractor shall give the Engineer at least 5 working days notice of any impending test/s.
 - ii) The tests shall comprise, but shall not be limited to:
 - Visual inspection, label checks etc
 - Polarity checks
 - 500V Megohm meter insulation resistance test
 - Injection tests for CTs etc
 - Function tests for all equipment, control and interlocking circuits, indicators, earth leakage relays etc
 - iii) In addition, these tests will be spot-checked at Site when phase rotation checks and installation commissioning will be carried out.
 - iv) After successful completion of tests, the Contractor shall provide the Engineer with duplicate test certificates for all DBs.
 - v) Extra time, travelling etc expended by the Engineer in repeating tests due to any failure shall be claimed from the Contractor in accordance with clause 11.4 herein.

12.4.2 Free Standing Distribution Boards

In addition to the general requirements contained in clause 12.4.1, free standing DBs shall be as follows:

- a) Distribution boards shall have a 'U' channel baseframe designed to support all equipment and to span cable trenches etc.
- b) General power supply boards shall be of the cabinet type with sections no wider than 1,5m.
- c) Cubicle boards for the control of motors shall be of a modular cubicle design. The disconnector for each cubicle shall be operated from the front and it shall

not be possible to open the particular cubicle without switching off the disconnecter.

- d) Unless otherwise stated, free standing boards shall be of the front access, bottom and/or top entry type as dictated by installation requirements and/or stated in the single line diagrams. Where called for, rear panels shall be removable and shall be secured to the frame by means of square key turnbuckles.
- e) Where specified, boards shall be extensible to the left or right, as called for. This shall be accomplished by the installation of removable bus-bar cover plates in the side panels.
- f) Upon completion of cabling into the distribution board, the Contractor shall ensure that the board is rendered totally vermin proof, especially at the bottom of the board around the incoming cables.
- g) Distribution boards for external applications shall be fabricated from 2mm 3CR12 corrosion resistant steel sheets. External DBs shall be fitted with gasketed doors and shall be protected to IP55. These boards shall have sloped overhanging roofs for rain protection.
- h) Where boards exceed 2m in width, they shall be provided with suitable lifting bales to facilitate off-loading, emplacement etc using a crane or similar. Where no facilities are available at Site for off-loading heavy DBs, the Contractor is to ensure that the boards are delivered using a crane-lorry, or shall make such other arrangements as required.

12.4.3 Surface Mounted Distribution boards

In addition to the general requirements contained in clause 12.4.1, surface mounted boards shall be as follows:

- a) Unless otherwise indicated, all DBs shall be provided with flush mounting doors secured with catch/es, lock/s etc, as specified.

Except where otherwise specified, DBs shall be installed so that the top of the board lines up with the top of door frames. Where no such reference line exists the tops of boards shall be at a height of 2m above finished floor level. The maximum permissible height of any switchgear handle, push-button, meter or instrument face shall be 1,8m.
- b) Suitable heavy duty lugs for securing the board to a vertical surface shall be provided.
- c) Boards for external applications shall be fabricated from 2mm 3CR12 corrosion resistant sheet steel and shall be protected to IP55. A sloped roof shall be provided for rain protection. All cables entering or leaving externally mounted DBs shall do so at the bottom only.

12.4.4 Flush Mounted Distribution Boards

In addition to the general requirements contained in clause 12.4.1, flush mounted boards shall be as follows:

- a) Unless otherwise indicated, all DBs shall be provided with adjustable overlapping architraves and flush mounted doors complete with catch/es or lock/s as specified.

Except where otherwise specified, DBs shall be installed so that the top of the board lines up with the top of door frames. Where no such reference line exists the tops of boards shall be at a height of 2m above finished floor level. The maximum permissible height of any switchgear handle, push-button, meter or instrument face shall be 1,8m.
- b) The built-in tray may be fabricated from 1,6mm pre-galvanised steel without any further paint finish except for cold galvanising at exposed edges, weld joins etc.
- c) Small domestic type DBs may have the front panel and door made from 1,6mm pre-galvanised sheet steel. Such boards shall not exceed 500mm x 500mm and the framework shall be finished as per clause 12.4.1 h).
- d) Where called for, 'semi-recessed' boards shall be provided with a 35 to 50mm deep overlapping architrave surround into which the door/s and inner fascia are recessed. The portion of the architrave perpendicular to the wall shall be suitable for the future termination of surface conduits into the DB.
- e) DBs for fitting into 115mm single brick walls shall be provided with suitable 'keying' strips of expanded metal spot welded to the sides of the tray for building into the brick courses. In addition, expanded metal shall be spot-welded to the rear of the bonding trays to act as 'keying' for plaster etc. This mesh shall overlap the tray by 75mm on all sides to obviate cracks in plaster.
- f) At least two 20mm diameter spare conduits shall be installed from each DB into the ceiling void where applicable.

12.4.5 Layout Drawings for Approval

The Contractor shall timeously obtain detailed/dimensioned proposed layout drawings of distribution boards, including schematic wiring diagrams, bus-bar sizes, component details etc, from the board manufacturer prior to fabrication. The Contractor shall check all details, correct them where necessary and submit two sets to the Engineer for approval. No distribution board is to be fabricated until the Engineer's formal approval has been given.

12.5 Cablework

12.5.1 General

The Contractor shall be responsible for all main, sub-main and final circuit cablework.

12.5.2 Cable Types

Only the following types of cables shall be used for LV work:-

- a) PVC Insulated, Armoured Copper Cables (PVC/SWA/PVC)

Polyvinylchloride insulated, armoured, copper cable shall be 600/1000V grade in accordance with SANS 1507, comprising PVC insulated stranded copper conductors with PVC bedding, galvanised steel wire armouring and PVC sheathing overall.

Mains voltage cables shall be at least 2,5mm² and no larger than 185mm² for ease of handling. Parallel cables of equal size shall be utilized where the current demand is greater than that rated for 185mm² cables.

Control cables shall be at least 1,5mm² unless otherwise specified.

b) PVC Insulated, Armoured Aluminium Cables (PVC/SWA/PVC) and PVCATAPVC Cable)

Polyvinylchloride insulated, armoured, aluminium cable shall be 600/1000V grade in accordance with SANS 1507 comprising PVC insulated solid aluminium conductors with PVC bedding, galvanised steel wire or aluminium tape armouring and PVC sheathing overall.

The cables shall be at least 16mm² and no larger than 120mm². Parallel cables shall be utilized where necessary.

Aluminium cables shall be used only when specifically specified.

c) PVC Insulated, Non-Armoured Cables (PVC/PVC)

Polyvinylchloride insulated non-armoured cable shall be 600/1000V grade in accordance with SANS 1507, comprising PVC insulated stranded copper conductors with PVC sheathing overall.

PVC/PVC mains cables shall only be used for trefoil configured applications.

For ease of handling the core size shall be limited to 240mm² except in special circumstances where space, routing etc. may allow for larger sizes.

Trefoil cables shall comprise 3 sets of three single core cables (R, Y & B), and one set of two cables for the neutral.

d) XLPE Insulated Cables

Where called for Cross-Linked Polyethylene (XLPE) insulated cables shall be used. These are similar to the specifications for the foregoing PVC insulated cables a), b) and c) except that the initial insulation shall be XLPE, thereafter PVC bedding and sheathing shall be used.

The Contractor must ensure early ordering of these cables as they are usually only made upon request and to a minimum quantity. For ease of identification, the Contractor shall insure that the manufacturer embosses the outer sheath: "XLPE insulated".

e) Flame Retardant and Halogen Reduced/Free Cables

Where called for in the Detailed Specification, low halogen (LH), halogen free (Non-halogenated, low smoke and fume, flame retardant - or "NHLSFR") or flame retardant (FR) PVC cables to SANS 1507 and BS6724 (latest issues) shall be used.

12.5.3 Cable Terminations

a) Cable Glands

Cable glands shall be used for armoured multi-core cables and are to be of the electroplated brass or bronze compression type and shall be matched to the type of cable used and shall be suitable for waterproof, flameproof or general installations, as required. PVC or neoprene shrouds and plated earthing washers shall be used in all instances.

b) Single Core Terminations

Termination of single core PVC/PVC cables in distribution boards, transformer cable boxes, etc. shall be undertaken by securely clamping the cables onto a fixed section of galvanised "Unistrut" type channel, or galvanised angle-iron, using nylon cable straps and then taking the individual cores through bushed holes in the non-ferrous gland plate, thence to the termination point. Alternatively, with the Engineer's approval, a treated hardwood cleat arrangement may be employed.

c) Cable Joints

- i) Because of the relatively short runs of cable utilized in industrial general lighting and power services, through-joints shall only be used in exceptional circumstances and only with written permission from the Engineer.
- ii) Where a tee-off is required in indoor circuit cabling, this shall be effected using a suitable cable junction box, as Pratley, or equal and approved. Such junction boxes shall be of the weatherproof type, complete with integral compression glands and DIN rail-mounted terminals of appropriate rating.
- iii) Joints in power cables shall only be allowed a) where the cable runs exceed a standard drum length, or, b) with the express permission of the Engineer in writing

d) Conductor Lugs

- i) Lugs for the termination of conductors onto busbars and equipment are to be of the compression type and of the correct size and type for the application.
- ii) For cables of size up to 16mm², the locking type of handplier crimpers may be used. Above this size, the hydraulic type must be employed.
- iii) Where aluminium lugs, used for aluminium conductors, are bolted to a dissimilar metal (e.g. copper, tinned copper, etc.), suitable bonding compound shall be used to obviate the possibility of electrolytic action.
- iv) Shaped lugs shall be used in conjunction with shaped cable cores.

12.5.4 Handling of Cable Drums

- a) Drums of cable shall be delivered to Site with seals intact and shall be off-loaded and stored in an approved manner. Any drums, which show signs of damage or mishandling, shall at the Engineer's option, be replaced with fresh undamaged stocks. The Contractor shall bear all costs of replacing such unacceptable cables.
- b) Cable drums shall be supported on an axle and support jacks when the cable is unreeled. The arrow on the drum flanges showing the direction of rotation shall be observed. Rolling of drums along the ground will not be permitted.
- c) Empty cable drums shall be stored in a tidy and safe manner prior to their removal from the Work Site. The Contractor shall be responsible for the removal and disposal of all empty drums at intervals dictated by Work progress, or upon instruction by the Engineer or the Main Contractor.

12.5.5 Installation of Cables

a) Surface (Direct)

Where cables are run along horizontal or vertical building surfaces, structural steel members, in vertical ducts, etc., they shall be secured with approved means of fixing such as saddles, cleats, etc.

All cable runs shall be vertical or horizontal, or run parallel to building or structural members and shall at all times present a neat appearance.

b) Cable Trays

- i) Where a sheet steel cable tray is required, this shall consist of approved galvanised sheet-metal perforated medium duty tray supported with approved substantial brackets or hangers at suitable intervals to reduce sag to a maximum of 10mm. Where necessary to achieve this, the run of cable tray shall be reinforced along its length with angle iron or similar stiffening members, or shall be of the heavy duty type.
- ii) When wire mesh trays are required, these shall be of heavy duty hot-dipped galvanised type, or stainless steel, left bright as required. Mesh trays shall be installed in a similar manner to perforated tray.
- iii) All cable tray accessories such as bends, tees, etc., shall be as supplied by the tray manufacturer and made-up components will not normally be allowed.
- iv) Trays shall be installed vertically or opening-up horizontally as specified. Brackets and hangers shall be constructed to permit the easy removal of any cable from the tray. Flat horizontal runs of tray suspended from slabs shall be installed at least 200mm clear of the soffit. Trays crossing under beams shall be spaced off the beam soffit to allow the removal of the largest cable(s) in the group.
- v) Earth continuity shall be maintained throughout the complete run of cable tray.

c) Cable Ladder-Rack

- i) Where ladder-rack is called for, this shall consist of 2,0mm thick galvanised steel with side sections of 75mm and cross-rungs every 350 – 400mm.
- ii) Only manufacturer's accessories shall be used for ladder-rack.
- iii) Ladder-rack shall be installed in the same manner as cable trays (Refer to 12.5.5 (b)).
- iv) Where specified, cable trays and racks shall be finished in a light orange epoxy coating, colour B26, or other colour appropriate to the service, to SANS 1091, all as clause 12.4.1 h).

Epoxy coating damaged or removed during installation shall be made good.

d) Cable Installation on Racks and Trays

- i) Racks and trays shall be sized to afford at least 20% spare space. Control cables may be installed touching, but not bunched. Power cables shall be laid-up spaced apart not less than the diameter of the largest adjacent cable, unless otherwise specified.
- ii) Cables shall be fixed to racks and trays using stainless steel cable strap and buckles fixed every 500mm, or fixing-rung intervals for edge-on rack / tray installations and at 1000mm or every second fixing-rung interval for cables laid flat and also where installed vertically.
- iii) Different classes of services (e.g. power and instrumentation) shall not be installed on the same rack or tray.

e) Common Earthing for Racks and Trays

- i) Cables for final circuits installed on racks and trays shall, unless otherwise specified, be provided with an integral earth core or shall have a separate bare earth conductor per cable, or as indicated in the circuit diagram.
- ii) Multiple runs of heavy power feeder cables may share a common earth conductor comprising bare copper tape of at least 70mm² run along mesh type trays or ladder rack. (Perforated cable tray would normally carry light circuitry only and common earthing would not apply).
- iii) Earth tapes are to be fixed and bonded at regular intervals and the final earth connection shall comprise an appropriately sized bare copper earth-wire tail bonded to the common tape earth using a compression lug and high tensile bolt and nut arrangement.

f) Underground Cable

- i) Unless otherwise specified, cables installed earth trenches shall be buried at a depth of 750mm; multiple runs of cables shall be laid 150mm apart throughout the run.
- ii) Cables shall be drawn along the trench using rollers corner rollers, snatch blocks and skid plates as necessary.

- iii) Unless stated to the contrary, the Contractor shall carry out all excavations of cable trenching, including bedding, topping, backfilling and compaction, generally in accordance with SANS 1200 LC and SANS 1200 DA. Differing soil-type classifications shall be as specified in the bills of quantities.
- iv) The Contractor shall allow for all necessary removal of vegetation, roots and tree branches, hazard protection, drainage, including pumping, watching, lighting, barriers, disposal of spoil and vegetation, supply of fill, levelling of subsidence and 10mm thick temporary steel plates to allow vehicles of 3 tonnes maximum axle load and pedestrians to pass over excavations where these cross roads, driveways etc.
- v) Where applicable, the Contractor shall comply fully with Traffic Ordinances, the Mines and Works Act 1956 (Act 27 of 1956) and all other requirements at or near public roads, bridges, buildings and other structures.
- vi) No excavations shall be backfilled until the Engineer has the opportunity to inspect cables and has given permission to backfill.
- vii) The floor of the trench shall be free of stones and sharp projections. A 75mm layer of –6 fines sifted soil or no-sharps sand shall be applied (bedding), onto which the cables shall be laid. A further layer of the same material shall be laid to a depth of at least 75mm above the top of the cable(s).
- viii) Dampened soil free from fibrous matter, rocks and large stones shall be backfilled on top of the cable(s) (or cable sleeve(s)), as follows:-
 - Two 150mm hand-rammed layers to 93 % AASHO compaction
 - Thereafter, well compacted power-rammed layers of not more than 150mm, to 93 % AASHO compaction.

The backfill shall be raised by approximately 50mm above the normal surface level to allow for settlement. Such raised surfaces shall be periodically levelled, as necessary, and finally levelled not less than 90 days after backfilling. Grassed surfaces shall be made good. Others will make good paved or concrete surfaces etc.
- ix) Cable trenches may be hand or machine excavated and shall be of such a width as to afford a minimum of 150mm clearance between the cable(s) and the trench walls. Excavation within 600mm of other services shall only be done by hand.
- x) Unsuitable soil and filthy material encountered during the execution of the Works shall not be deposited on the surface of any road or footpath, but shall immediately be carted away to a dumping site.
- xi) The Contractor shall take all necessary steps to avoid the pollution of streams, drainage systems etc. by excavated soil and its dust.
- xii) Where required, concrete protective cable tiles shall be installed 300mm over the tops of cables. These shall cover the full width of the layer of cables within the trench. Concrete cable protective tiles shall be of the interlocking type approximately 900mm long by 150mm wide with a suitable inscription on the upper side such as “Danger Electric Cables” or similar.

- xiii) Where unsleeved cables cross other services, they shall be taken at least 500mm under such service. Interlocking concrete cable tiles shall be laid 300mm above the cables and shall extend 900mm each side of the crossing point.

g) Cable Markers and Tape

- i) Cable markers shall be provided for all underground cable routes. Such markers shall be provided at each point of entry to any building, at either side of any road to rail crossing, at any change of direction of the cable, at intervals not exceeding 30m along any straight runs and over cable joints. Cable markers shall be made of concrete and cast in the form of a truncated pyramid, approximately 250mm high, 100mm square at the top and 150mm square at the base. The markers shall be provided with brass plates complete with direction arrows and suitably inscribed.
- ii) Yellow 0,1mm thick cable marker tape with the words "Danger Electric Cable" printed continuously and depicting a skull and cross-bones, shall be laid at a depth of 300mm below the finished surface level and immediately above all cables and sleeve pipes. Should a roadway or paved area base layer exceed 300mm, the tape shall be laid immediately below the base.

h) Cable Sleeves

- i) Cables sleeves shall be provided wherever required or indicated on drawings and also for all cables entering or leaving any building, crossing a road or other services. Such sleeves shall be supplied and installed by the Contractor unless otherwise required. In all cases the Contractor shall ensure that all sleeves are installed in good time, in correct positions, and in the proper manner.
- ii) Where no details are given, the sleeves shall be of generous size and made of substantial material, which may be galvanised steel, ceramic, pitch fibre, high impact uPVC, corrugated high-density polyethylene (HDPE), etc., capable of withstanding any stresses to which they may be submitted, e.g. road compacting. Care shall be taken to ensure the easy passage of cable through the sleeves by providing large radius bends where necessary.
- iii) NB: For health reasons, the use of pipes containing asbestos is strictly forbidden.
- iv) The ends of all sleeves shall be sealed with non-hardening watertight compound after the installation of cables. All sleeves intended for future use shall likewise be sealed.

i) Earthworks by Others

Where trenches, sleeves etc. are provided by another contractor e.g., civils, the Contractor shall liaise and co-ordinate with such other party regarding general advices, sleeve positions, radii etc. Moreover, the Contractor shall stand by and ensure correct backfilling and the positioning of marker tape.

j) Cable Identification

A non-corrosive strap with the cable number, or circuit number, stamped or embossed upon it shall be provided at each end of the cable (and at joints, in cases where these are permitted).

12.6 Bus-Bar Feeders

12.6.1 General

- a) Bus-bar feeder systems shall comply with SANS 1195 or shall be authorised by SANS, and shall consist of metalclad copper bus-bars for voltages not greater than 1000V.
- b) Bus-bar feeder systems shall be used for the following:
 - Indoor and outdoor connections from transformer LV terminals to main LV switchboards
 - Horizontal indoor power distribution to workshop and factory machinery etc
 - Indoor lateral and vertical-riser feeders for distribution boards and MCCs
- c) All bends, accessories, take-off units, bus-bar sections/modules and so forth shall be a standard or pre-engineered component by the bus-bar trunking manufacturer; no site fabricated items will be allowed without the express permission of the Engineer in writing.

12.6.2 Construction Details

a) Enclosures

- i) Bus-bar systems for indoor use shall be enclosed in hot-dipped or pre-galvanised sheet metal casings finished in epoxy coating similarly to distribution boards. (See clause 12.4.1 (h)). Alternatively the casing shall be of extruded aluminium. The bus-bar trunking shall be vermin proof, adequately ventilated and protected to IP30.
- ii) Outdoor, non-ventilated casings shall be constructed from 3CR12 corrosion resistant steel, finished as for indoor trunking, or alternatively, shall be of extruded aluminium, and protected to IP54 or better.
- iii) In all instances, metal enclosures shall be of adequate gauge and strength to withstand rough usage and the mechanical stresses of prospective fault conditions.
- iv) The casings shall be provided with heavy duty fixing lugs or similar suitable for M10 bolts or studding supports.
- v) Sections of bus-bar trunking shall be joined in an approved manner maintaining mechanical strength and protection levels.

b) Bus-Bars:

- i) Bus-bars shall be of high conductivity 99,9% pure copper of adequate section for the maximum current and short-circuit rating. Unless otherwise specified, the bars shall be mounted edge-wise (long side vertical).
- ii) The bars shall be supported in the casing by substantial high dielectric, non-tracking, and non-hygroscopic members at sufficient intervals to allow for mechanical stresses due to prospective fault conditions.

- iii) Joints in bus-bars shall overlap by a minimum length equal to twice the bar width. Contact surfaces shall be tinned using non-acid based flux, and bolted together with high-tensile cadmium plated bolts, nuts and spring washers.
- iv) As well as sizing for current rating, the bars shall be sized to accommodate the prospective fault level rating in accordance with clause 12.4.1 e), whichever size is the higher.
- v) Where installed, neutral bars shall be the same cross section as phase bars.
- vi) An earthbar shall be installed along the entire length of the bus-bar trunking and shall be sized in accordance with IEC 439.

c) Bends

Horizontal (flat) bends in the trunking system shall house bus-bars bent at the correct angle with the supports and casings made to suit, while vertical internal or external bends shall have the bars bolted together at the correct angle. Alternatively, bus-bar bends may be of the flexible laminated type.

d) Take-Off and Feeder Points

- i) Take-off points shall be pre-engineered and located to specific requirements by the bus-bar trunking manufacturer in the case of power feeders for distribution boards in risers etc, or shall comprise shrouded plug-in arrangements at regular intervals for machine shops etc.
- ii) The take-off unit shall consist of a suitably rated MCCB with contacts to satisfy the requirements for a switch-disconnector, housed in a sheet steel or polycarbonate enclosure arranged for bolting directly to the bus-bar trunking in the case of tap-off type units, or permanently fixed in the case of pre-engineered take-offs.
- iii) Feeder end boxes shall be suitable for terminating feeder cables or feeder bus-bars, as applicable.

e) Expansion Joints

Expansion joints to allow for thermal expansion and contraction for a temperature range of between 0°C and 90°C in the bus-bars and 0°C and 45°C in the enclosure shall be provided at intervals per manufacturer's recommendation, but in any event, not exceeding every 10 metres. The full rating of all current carrying parts shall be maintained through the joint as well as casing integrity and level of protection.

f) Fire Barriers

Fire compartmentation shall be maintained at wall and floor penetrations of bus-bar trunking by the use of 4-hour rated fire barriers installed centre with the applicable partition wall or floor slab. The Contractor shall ensure that the main contractor is timeously informed of the need to make good around such penetrations; this information shall be put in writing with a copy to the Engineer.

12.6.3 Installation and Testing

a) Installation

Bus-bar trunking shall be fixed directly to walls or other structural members or shall be suspended on galvanised studding, supported on channels, angle iron etc as dictated by installation conditions and requirements, and as may be specified in the Detailed Specification or drawings.

b) Testing

Completed bus-bar systems shall be subjected to a test voltage of 2,5kV rms for one minute in accordance with SANS 1195.

12.6.4 Fabrication Drawings

- a) Where it is necessary to have bus-bar trunking prefabricated prior to delivery to Site, the Contractor shall liaise with all relevant parties to have fabrication drawings prepared (usually by the bus-bar trunking manufacturer), viz.: transformer supplier, main and sub-main LV board supplier, etc as the case may be.
- b) The Contractor shall check all drawing details, including on-site dimensions, coordination with other services etc, rectify where necessary and submit to the Engineer for approval. The Engineer will approve the general layout of the system only. The Contractor shall be fully responsible for the correctness of all dimensions etc.

12.7 Tubular Conduit Wireways

12.7.1 Types and Applications

a) Screwed Conduit

Heavy gauge screwed welded (HGSW) steel conduit and associated fittings shall be to SANS 1065-1 and shall be black enamelled or hot-dipped galvanised as specified. No conduit of less than 20mm diameter shall be used.

HGSW conduit shall be used for all general applications run either surface on walls, ceilings, on machinery etc, or else installed flush in walls, cast into concrete slabs etc.

b) Plain End Conduit

Plain end (non-screwed) steel conduit shall be to SANS 1065-1 with a minimum wall thickness of 0,9mm. Only hot-dipped galvanised conduit of 20mm diameter minimum size will be permitted.

Plain end conduit shall be used for all general applications, except heavy industrial environments or flameproof installations, run surface on walls and ceilings, or else installed flush in walls, cast into concrete slabs etc.

c) Non-Metallic Conduit

Plastic conduit shall be to SANS 950. No conduit smaller than 20mm diameter shall be used.

Plastic conduit shall be used for general applications, except any industrial or flameproof installation or any surface installation on walls, machinery etc. Non-metallic conduit shall be run surface only on ceilings or in ceiling voids, chased into walls, cast into concrete slabs etc.

d) Flexible Conduit

Flexible conduit shall be of the orange PVC covered spiral metal type, as Kopex, Adaptaflex or equal, with an internal diameter of at least 15mm. Flexible conduit connectors shall be of the gland or screw-in type manufactured from either brass or mild steel plated with zinc or cadmium.

Flexible conduit shall be used to form the final connection to equipment that has to be moved frequently to enable adjustments to be made, for the connection of motors or any other vibrating equipment, for the connection of thermostats and sensors on equipment, for stove and similar appliance connections etc.

12.7.2

General Installation Details

Insofar as relevant conduit types apply as per clause 12.7.1, the following general installation details shall apply:

- a) No manufactured bends less than 32mm diameter or any inspection elbows or tees are to be used.
- b) Open ends of conduits for future extensions and conduit and accessory boxes shall, during the building process, be temporarily plugged to prevent the ingress of moisture, rubble etc.
- c) Where conduit crosses an expansion joint in a building or structure, the following method shall be used:
 - An adaptable box shall be installed at a suitable position within 2m of the expansion joint and a draw box and a conduit sleeve one size larger than the circuit conduit shall be installed from the draw box to the edge of the expansion joint on the draw box side
 - The circuit conduit shall pass across the joint and through the sleeve and project 30-35mm inside the box where the end shall be bushed
 - For metallic conduits, an earth clip shall be secured to the circuit conduit end in the draw box and this shall be bonded to the box with a minimum 2,5mm² jumper
 - In addition, for metallic conduits, an earth wire shall be installed between the fitting outlet boxes either side of the expansion joint
 - Adjacent multiple runs of conduits which are to cross expansion joints should preferably be taken via one large adaptable box, across the expansion joint, into a second large adaptable/draw box.
- d) All accessory boxes for switches and socket outlets etc shall be made of pressed galvanised steel and are to be provided with earth studs.
- e) No portion of the conduit installation may be installed closer than 150mm to any other service, including gas, water etc. No wireway carrying mains voltage cables shall be installed closer than 150mm to any communications/data wireway or cable etc, except in the case of multi-service power skirting or similar.

- f) 'Unwired' conduits for other services shall be provided with rustless steel draw wires.
- g) Where necessary, draw boxes shall be installed to facilitate the easy drawing-in of wiring and/or to avoid pulling wires through more than two right angled bends or the aggregate thereof. Adjacent multiple runs of conduit, which requires draw boxes should preferably be taken via one large draw-box. Where possible, draw boxes are to be installed at inconspicuous positions away from general view.
- h) 25% spare conduits, subject to a minimum of two, shall be installed from wall mounting distribution boards into the ceiling void for possible future additions. A coupling with a temporary plug shall be fitted to the ends of spare conduits.

12.7.3

Flush Conduit Installations

Insofar as the relevant conduit types apply as per clause 12.7.1, the following installation details shall apply to flush conduit installations:

- a) Where conduits are chased into brick walls or similar they shall be adequately secured with crampets or other approved devices driven into the wall fabric and shall further be secured at strategic points by mortar. The clearance between the finished wall surface and the conduit shall be not less than 12mm. Only power tool chasing machines shall be used for making chases. (E.g.: angle grinders).
- b) Accessory boxes shall be fixed square and mortared in. Concrete surfaces, columns and face brick surfaces shall not be chased without the written permission of the Engineer in each case.
- c) The building contractor will make good all normal chasing and cutting away except that the Contractor shall be held responsible for the cost of work done by the building contractor due to faulty setting out, redundant chases or late installation of conduits and accessories.
- d) Conduits installed within concrete slabs, beams, columns or walls shall be firmly fixed in position before the concrete is cast. Adequate fixings and/or spacer blocks shall be employed to prevent conduits 'creeping' to the surface. Conduit must not be fixed longitudinally together with reinforcement rods.
- e) The general disposition of conduits within the slabs shall be agreed upon before installation between the Engineer, structural engineer and the Contractor. Furthermore, where such conduits occur in large concentrations, or where large diameter conduits (32mm dia. or larger) are installed, the Contractor shall obtain the approval of the Engineer for the positioning of such conduits. Generally, however, conduits shall be installed in the middle or neutral axis of the slab thickness and extension boxes or extension rings shall be provided for as necessary.
- f) Where conduit runs occur in groups or in large concentrations (e.g. near distribution boards, draw-boxes or in similar situations), they shall be fixed with a clearance between adjacent conduits of not less than one conduit diameter to permit adequate penetration of concrete.
- g) Conduit may be installed in surface beds provided that the conduits are clear of contact with ground and are completely encased in mass concrete.

- h) Conduits may only be installed directly into floor screeds where a cover of at least 40mm can be affected. For clearances of 20-40mm, "chicken wire" shall be used as a cover over the conduit to act as a screed binder. For clearance less than 20mm, the conduit may be chased into the slab, provided the written permission of the Engineer is obtained in each case.
- i) Conduit crossings in screed shall be avoided as far as possible. Where this is unavoidable, one conduit may be set under the other one and chased into the slab, provided the written permission of the Engineer is obtained in each case.
- j) Conduits shall be firmly fixed to slabs intended to receive screed by means of half saddles or similar.
- k) Conduit boxes, draw-boxes etc. installed on shuttering decks or wall shutters shall be suitably sealed against the ingress of moisture and vibrated concrete with dampened paper rammed in them, and shall be securely fixed to the shuttering by means of lashing with galvanized steel wire (except in the case of off-shutter ceilings) or else by temporarily fixing the box to the shuttering by screws through the shuttering into the fixing lugs of the box. It is of the utmost importance that fixing screws or lashings be released immediately the concrete has been allowed to set and before the shuttering is struck.

Where fibreglass or other pre-formed plastic shuttering is used by the builder, equipment shall be fixed to the reinforcement steel only and the equipment/box shall be arranged to press firmly against the shuttering. No holes shall be made in the shuttering.

The Contractor shall stand by when concrete is being poured in order to rectify any defects that may occur such as loose boxes or displaced upright conduits (See also item 11.3).

- l) All conduit boxes and accessory boxes shall be finished flush with the finished plaster work and the Contractor shall co-operate with the building contractor to this end. Where necessary, extension plates or rings shall be fitted to meet this requirement.

12.7.4 Surface Conduit Installations

Insofar as the relevant conduit types apply as per clause 12.7.1, the following details shall apply to surface conduit installations:

- a) Conduit run surface on walls, floors, ceilings, or in accessible ceiling voids, etc. shall be installed in a neat manner running generally with the building lines. The conduits shall be vertically plumb and horizontally level as applicable.
- b) Bends in multiple runs of conduit shall have following bends. Other right angle bends shall be standard machine made. In all instances the installation shall present a neat and workmanlike appearance.
- c) Evenly spaced spacer bar saddles shall effect fixing of tubing. Light gauge saddles may be used for general internal installation while heavy base saddles are to be used for external installations and industrial applications.
- d) Galvanized conduit shall be used for all surface installations, as follows: -
 - In damp or external areas
 - Within 50 km of the coast
 - In kitchens, laundries and boiler rooms

- Where exposed to humidity, such as plenum chambers
 - In buildings where animals are housed, e.g.: kennels, cattle/sheep pens etc.
- e) Unless otherwise specified, all surface mounted metallic conduits and accessories shall be painted after installation. Conduits shall be cleaned, degreased and de-rusted and finished with 2-coats of brush-applied enamel paint. Galvanised steel shall be bristle-scrubbed with solvent detergent complying with SANS 1344 and rinsed with clean water to achieve a water-break free surface prior to painting.

For industrial installations, the following colours shall be used:

SERVICE	COLOUR	SANS 1091 REF.
Electrical	Light Orange	B26
Instrumentation	Light Blue	
Fire Alarms	Red	A11
Communications and Data	White	G80

For non-industrial installations, the colours shall be specified in the Detailed Specification.

12.7.5

Steel Conduit

Insofar as the relevant conduit types apply as per clause 12.7.1, the following installation details shall apply to steel conduit installations;

- a) HGSW conduit shall be cut square and clean before threading. Threads shall be made using suitable conduit thread dies and the liberal application of cutting grease or similar. The length of thread shall be such as to permit conduits to be firmly butted together in couplings and hard against the shoulders of threaded conduit box spouts. The ends of all cut lengths of conduit shall be reamed free from burrs and any loose swarf shall be removed from inside the conduit. Running joints in conduit shall be securely locked with a conduit lock nut.
- b) Terminations into non-threaded equipment and accessories shall be mechanically secure and electrically continuous. Terminations may be threaded and locknuttet on both sides of the termination point together with a brass female bush. Alternatively terminations shall be made with couplings and brass male bushes. All mating faces are to be thoroughly cleaned of paint, couplings being filed flat and free from unevenness at the mating face. All conduits shall be earth bonded at distribution boards using copper tape and wire.
- c) Exposed threads of screwed conduit and damaged paint or galvanised surfaces shall be painted with red-lead or zinc rich paint to prevent rust.
- d) Couplings and box entries of plain-ended conduit in cast-in situations shall be taped up with adhesive PVC tape to prevent the ingress of moisture or vibrated concrete.

- e) All bends and sets shall be undertaken using bending apparatus suited for the purpose. Plain-end conduit bends shall be made with benders recommended by the conduit manufacturer.

Any damaged conduit resulting from incorrect bending methods shall be completely removed and replaced, including any wiring installed, all at the Contractor's expense.

- f) Mechanical and electrical continuity shall be maintained throughout all steel conduit installations.

- g) Only HGSW conduit shall be used for ;-

- Flameproof installations
- Load-bearing situations
- Suspension pendants
- Damp or exterior surface areas

12.7.6 Non-metallic Conduit

The following installation details shall apply to non-metallic conduit as outlined in 12.7.1 c):-

- a) Unless otherwise specified, only steel accessory boxes shall be used in conjunction with plastic conduit installations.
- b) Hand bending, using a bending spring, may be used for conduits up to and including 25mm diameter. Above this size, the appropriate manufactured bend/accessory must be used.
- c) Tubing is to be out square and clean using a fire-toothed hacksaw, and all burrs and loose material removed. The correct adhesive is to be used on clean and dry surfaces with all excess adhesive being wiped off after fitting together.
- d) Plastic conduit and accessories are not to be used for mechanical load-bearing, luminaires support etc, nor are they to be used where they could be subject to temperatures below -10°C or above 70°C.

12.7.7 Flexible Conduit

The following installation details shall apply to flexible conduit as outlined in 12.7.1 d):-

- a) In installations where the equipment has to be moved frequently to enable adjustment during normal operation, for the connection of motors or any other vibrating equipment, for the connection of thermostats and sensors on equipment, for stove connections and where otherwise required by the Engineer, flexible conduit shall be used for the final connection to the equipment.
- b) Flexible conduit shall preferably be connected to the final connection point from a local draw-box. The flexible conduit may be connected directly to the end of a conduit if an existing draw-box is available within 2m of the junction and if the flexible conduit can easily be rewired.
- c) Flexible conduit shall be metal-reinforced plastic conduit (Kopex, Adaptaflex or equal) orange PVC-covered spiral metal conduit with an internal diameter of at least 15mm, unless approved to the contrary.

- d) Connectors for coupling to the flexible conduit shall be of the gland or screw-in type, manufactured of either brass or mild steel plated with either zinc or cadmium.

12.8 Trunking Wireways

12.8.1 Scope

This section describes the following types of wiring trunking:-

- Standard wiring trunking
- Lighting channel
- Power skirting, dado and bench-top trunking
- Underfloor trunking

12.8.2 Standard Wiring Trunking

- a) Wiring trunking and accessories shall be fabricated from folded or cold-rolled sheet steel. The trunking manufacturer shall supply all bends, tees, stop-ends etc. No accessory shall be made up where a manufactured accessory is available.
- b) Any made up accessories shall be neatly fabricated and shall be brazed or strongly pop-riveted at joining edges.
- c) Accessories and sections of trunking shall be coupled with coupling pieces and earth bonded together with copper bonding links. In addition, the links shall be bonded to the trunking main earth or largest circuit earth wire with a jumper of at least 2,5mm².
- d) The maximum number of circuit and earth wires that may be installed into any trunking shall be such that the total overall cross-sectional area of the wiring including the insulation does not exceed 45% of the free area of the trunking.
- e) With the exception of underfloor trunking and loosely filled "opening-up" trunking, wiring retainers shall be installed every metre of run and at other positions as required.
- f) The trunking shall be installed in a neat and workmanlike manner on ceilings, walls, plant machinery etc., as indicated in the drawings.
- g) All standard trunking used in industrial applications shall be finished in the colour code appropriate to the service (refer to 12.7.4 (e)).
- h) Where channel passes through a "fire-wall" the channel lid shall be cut 100mm either side of the penetration and the wall entry around the channel shall be sealed by the building contractor. The Contractor shall supply and install suitable fire-barriers inside the channel. These shall consist of intumescent or other approved fire resistant material, as supplied by PH Protection Plaster Systems (Pty) Ltd of Johannesburg, Pyro-Cote cc of Durban, or equal and approved and installed in accordance with the supplier's recommendations.

12.8.3 Lighting Channel

- a) General

- i) Lighting channel and accessories shall be “Cabstrut” or equal and approved, and shall be manufactured from cold-rolled steel sheet and galvanized. For industrial installations and elsewhere as specified the channel shall be epoxy coated light orange (colour ref. B26 according to SANS 1091).
- ii) Unless otherwise required the dimensions of the channel shall be 41,3mm x 41,3mm.
- iii) Lighting fittings or pendant drop conduits shall be fixed directly to “opening-down” channel using special connecting nipples as supplied by the channel manufacturer. Alternatively, fittings may be fixed to the solid underside of channel installed “opening-up” using bushed entries and screws, nuts and washers. Self-tapping screws shall not be used.
- iv) Conduit connections to wiring channels shall be terminated directly into the channel using a screwed and bushed entry. Alternatively, where channels are fixed surface directly to a soffit, entry may be effected from a flush conduit box through a bushed hole in the back of the channel.

b) Surface Installations

- i) Self supporting lighting channel shall be manufactured from cold-rolled steel of thickness at least 2,5mm, and shall be fixed in such a manner that the maximum deflection recommended by the channel manufacturer is not exceeded with all wiring and fittings installed.
- ii) Fixings shall be by stirrups supported from structural members via threaded steel rod of at least 10mm diameter, or 20mm diameter conduit. Alternative or additional supports shall be effected by girder clamps etc. Cartridge pin fixings shall not be permitted without the prior written approval of the Engineer.
- iii) Where required, channel installed directly to a soffit shall be fixed at intervals not exceeding 1m subject to a minimum of two substantial fixings to every accessory or section of channel. Channel fixed in this fashion may be not less than 1,6mm thick.
- iv) Clip-in lidding of plastic or of zinc-coated metal, as specified, shall be installed over all faces of the channel left open after the installation of fittings etc.

c) Flush Installation

- i) Lighting channel installed flush, either in or forming an integral part of a suspended ceiling shall be manufactured from minimum cold-rolled or folded sheet steel of thickness not less than 1,6mm.
- ii) Where the channel is cast into concrete, fastening straps shall be provided every 600mm as supplied by the manufacturer of the channel. The channel shall be firmly fixed to the shuttering by galvanized steel wire lashing or by screws fixed through the concrete insert lugs. The channel shall be suitably sealed against the ingress of vibrated concrete by the use of dampened paper or expanded polystyrene inserts.
- iii) Where the ceiling finish is “off-shutter”, narrow clip-in plastic or metal lid shall be used. This shall be grey for non-painted ceilings and white for

painted ceilings. Wire lashings may not be used for fixing channels to shuttering in “off-shutter” areas.

- iv) Where plaster finish is to be applied, the plaster shall be taken up to the edges of the channel. Overlapping metal lidding finished white shall be used, fixed over the opening by means of special extension screws into fixing nuts installed in the channel.
- v) For suspended-ceiling lighting channels, the channels will be supplied and installed by the ceiling erector, unless otherwise specified.

White plastic clip-in lidding shall be used for all suspended-ceiling lighting channels. The Contractor shall supply and fit the lidding unless otherwise specified.

- vi) In the case of mullion partitioning the mullion may be utilized as a wiring channel where specified. For other types of partitioning, conduit switch-drops shall be used. Any entry into the lighting channel shall be suitably bushed to obviate abrasion of wiring.

12.8.4

Power Skirting and Dado Height Trunking

a) General

- i) Power skirting and dado height trunking shall, unless otherwise specified, be formed from folded and welded pre-galvanized sheet steel of thickness not less than 1,2mm, to form two or three equal compartments designed for power services, socket outlets etc., (upper compartment) and communications/data services (lower compartment(s)). The power skirting shall be finished in baked enamel of colour(s) as stated in the Detailed Specification. The paintwork shall be in accordance with 12.4.1 (h) with due account being taken of the pre-galvanizing. The trunking shall be 150-225mm high x 50-55mm deep with fixed partitions to divide it into two or three compartments. The compartments shall each be provided with separate removable covers.
- ii) Where a building module is applicable, the power compartment shall have provision for 16 A switched socket outlets at the module interval, or where the module interval exceeds 2m, twice every module interval. Socket outlet positions shall be centred between the window mullion or column modules. At the mullion or column position, a permanently fixed 250mm wide cover shall be provided across all compartments to permit the erection of partitions etc., without interfering with accessibility into the power skirting.
- iii) Socket outlets shall be 16 A 3-pin and shall be attached to a fixing grid or mounting bracket in the trunking body. The cover shall be pre-punched to accept the socket outlet and shall be fixed both to the trunking body and socket outlet fixing grid. Wiring terminals shall be of the recessed type, or alternatively fitted with an insulated cover, to prevent accidental contact with bare earth wiring that may be installed or disturbed while adjacent circuits are alive.
- iv) Where the trunking is a non-modular type, the punched socket outlet cover shall normally be 250mm long. Where it is of the modular type, the power section cover between the over-lapping covers shall be in one piece. Irrespective of whether socket outlets are indicated or not, full facilities

including blanked off pre-punched covers shall be provided at the spacings specified herein.

Unless otherwise required, provisions for telephone and data outlets shall comprise a blank plate, or plates, mounted in line with socket outlets.

b) Installation

- i) Power skirting shall, unless otherwise required, be installed surface against the wall at finished floor level. Where vinyl tiles or other fixed finish is to be laid, the power skirting shall be laid on top of the tiles. Where carpeting is specified, the power skirting shall be installed onto the screed before the installation of carpets.
- ii) Dado trunking shall be installed surface on the wall at 900mm above finished floor level (to underside), or as otherwise specified.
- iii) Fixings, suitable for the particular application, shall be provided at intervals not exceeding 1m. Subject to a minimum of two substantial fixings to each accessory or section of trunking.
- iv) Conduit entry into power skirting installed along brick or concrete walling shall be effected via a bushed entry from a conduit box or standard 100mm x 50mm switch box mounted in the wall behind the respective compartment.
- v) Conduit entry into power skirting installed along sheet metal curtain walling or similar shall be effected via a bushed entry from a conduit box, or similar, mounted in the floor under the power skirting. Wiring to the upper compartment(s) shall pass through a short conduit link within the lower communication(s) compartment(s). The conduit links shall be installed towards the back of the lower compartment(s) to afford adequate space for wiring to pass.
- vi) The trunking main earth wire immediately adjacent to the socket outlet positions including the socket outlet earth jumper shall be suitably sleeved at the tee-off to prevent accidental contact with live terminals.
- vii) All covers shall be adequately bonded to earth either through the fixing screws or a separate earth wire jumper fixed to an earthing stud brazed, at the manufacturer's works, to the lid. Where necessary, power skirting covers shall be specially ordered to include earthing studs.

c) Bench-Top Trunking

Where called for, bench-top socket outlet trunking shall be installed along bench tops etc, in workshops and laboratories. The general construction, socket outlet mounting and installation procedure shall be similar to power skirting or dado trunking. A detail of compartments, sizes etc, and shall be as detailed in the drawings or specified in the Detailed Specification.

12.8.5

Underfloor Trunking

a) General

- i) Several types of underfloor trunking are available and in the main, the choice depends upon certain structural restraints as floor type, screed

thickness etc. Therefore the exact type to be used will be specified in the Detailed Specification or drawings.

- ii) Unless otherwise specified, the trunking shall be manufactured from pre-galvanized folded sheet steel and shall be single, double or triple compartment as specified.
- iii) Pre-formed outlets, suitably blanked off, shall be provided at intervals to suit the particular application.
- iv) Flush floor level junction boxes shall have a removable trafficable cover and shall be designed to accept a portion of the floor tile, carpet or similar. The Contractor must liaise with the Main Contractor to determine the thickness of the floor finish.
- v) Multi-channel junction boxes shall be so designed that the compartmentalisation is continued through these accessories.
- vi) Socket outlets, telephone outlets and data outlets shall be provided where required in surface floor level pedestals or recessed floor boxes as specified. Suitable barriers shall be included to segregate different classes of services.

b) Installation

- i) Trunking designed to be fully built into the screed shall be fixed to the slab surface by suitable straps or clips. A topping of at least 50mm of screed cover the trunking shall be applied. Where a cover of less than 50mm, but exceeding 25mm occurs, expanded metal shall be applied over the trunking to act as a screed binder. Where less than 25mm of screed topping occurs, the trunking shall be installed into the concrete slab to achieve at least the minimum cover. The written permission of the Engineer shall be obtained in each case.
- ii) Trunking designed to be set flush with the screed surface shall be installed straight and level on mortar bedding on the slab. The trunking shall be slightly dove-tailed in section or shall have other suitable means to ensure that the trunking will remain firmly fixed into the screed.
- iii) The Contractor shall obtain the screed finish datum line from the building contractor for levelling trunking and junction boxes.

12.9 General Wiring

12.9.1 General Applications

- a) For general applications, 600/1000 V PVC insulated single core stranded copper conductors shall be used. In situations where high ambient temperatures are likely to be encountered, such as the enclosures of certain types on incandescent lighting fittings, ceiling voids of metal roofed buildings, etc., silicon or butyl insulated single core stranded conductor cables shall be used. All wiring cables shall bear the appropriate SABS or SANS mark and shall be delivered to Site with seals intact.
- b) No cable of size smaller than 2,5mm² shall be used. The current carrying capacity of wiring shall comply with the requirements of SANS 10142-1:2003, particular regard being given to volt drop limitation and to derating due to bunching of cables and ambient temperatures.

12.9.2 Installation

- a) Wiring within conduit shall be by means of the looping-in system. Joints will only be permitted in special circumstances and where accessible, subject to the approval of the Engineer in writing. Wires shall not be allowed to become twisted or tangled within the conduit when drawing in, and lubricating agents shall not be used.
- b) Where earth conductors are looped between terminals of equipment, the conductor shall either remain unbroken in the terminal, or shall be twisted together and ferruled or soldered to ensure that earth continuity is maintained when the conductors are removed from the terminal(s).
- c) Unless otherwise indicated in the drawings, no more than one circuit shall be run in one conduit.
- d) Vertical runs of wiring shall be provided with a suitable stress relieving arrangement at intervals not exceeding 15m.
- e) Within wiring trunkings, each separate circuit of wiring shall be neatly strapped or laced together and shall be so disposed as to afford easy removal. Adhesive insulating tape or similar shall not be used for binding of circuit wires.

12.9.3 Wire Markers

All wires in industrial installations, and where otherwise specified, are to be provided with closed-sleeve markers at each feeder termination point, including each leg of looped wires. The markers shall indicate the relevant distribution board and circuit number, e.g.: "DB-AP/P9" etc.

12.10 General Earthing

12.10.1 General

The installation shall be effectively earthed in accordance with the requirements of SANS 10142-1:2003 and the local supply authority. All metallic hot and cold water pipes and waste pipes shall be bonded with copper tape clamped by means of a brass bolt and nut and earthed. Metal roofs, gutters, and downpipes shall be bonded together and earthed.

12.10.2 Earth Continuity Conductors

- a) Separate bare copper earth continuity conductors shall be run with all multi-core cables (where no earth core is incorporated), and green/yellow PVC insulated earth conductors, or bare earthwires, as specified, shall be installed with all mains circuits, sub-circuits and final circuits wired with PVC insulated conductors in conduit or trunking wireways.
- b) Only one earth conductor is required per group of conductors run in one wireway provided that such earth conductor is not less than half the cross sectional area of the largest conductor in the group (subject to a minimum area of 2,5mm²), and provided the earthing complies with the requirements of SANS 10142-1:2003. Teed off connections shall be undertaken using crimped tee-ferrules, or shall be soldered. Under no circumstances shall the common earth be broken.

- c) Where practicable, common earth continuity conductors shall be run as a “ring main”.

12.11 Luminaires

12.11.1 General

- a) Luminaires shall, unless otherwise specified, be supplied by the Contractor in accordance with the Luminaire Schedule. All luminaires shall bear the SABS “S” safety mark and, where applicable, the SABS “A” approved performance mark.
- b) Class A2 electronic ballasts supplied with luminaires must bear a SABS, IEC or VDE mark. Any other alternative ballasts may be submitted for approval. Preferred ballasts are:
 - Tridonic
 - Vossloh Schwabe
 - Philips

NOTE: No-name brands and brands of dubious quality and origin are not acceptable.

- c) All luminaires shall be fitted with the appropriate lamps.
 - i) Unless otherwise specified, fluorescent lamps shall be “cool white”, colour temperature 4300°K with a minimum colour rendering index (Ra) of 64.
 - ii) Dichroic lamps shall be of the sealed type. Open reflectors will not be permitted.
 - iii) Unless otherwise agreed in writing by the Engineer, only the following makes of lamps will be permitted:-
 - Osram
 - Sylvania
 - Philips
 - GEC

- c) Linear tubular fluorescent lamps shall have bi-pin end cap arrangements. The lamp holders shall be of the telescopic spring-loaded type.

d) Lenses

- i) Prismatic, opal and clear lenses shall be manufactured from UV stabilised high-impact acrylic material for general luminaires.
- ii) Where specified, luminaires, floodlights and lanterns shall be fitted with clear glass or clear tempered glass lenses as required.
- iii) All tungsten halogen fittings shall be complete with glass lenses.

- e) Streetlight and area lighting post-top lanterns shall be in accordance with the Detailed Specification and/or drawings.

Lantern ballasts shall have tappings for 95% and 100% of the nominal voltage, unless otherwise specified.

- f) For ease of maintenance, luminaires and lamps in the following classes shall be from one single manufacturer / supplier per class;
 - i) Fluorescent luminaires and general incandescent fittings.
 - ii) Indoor decorative / display luminaires (downlighters, decorative spotlights etc.)
 - iii) Outdoor lanterns, bollards and floodlights
 - iv) Industrial high-bay luminaires
 - v) Operating theatre fittings
 - vi) Medical examination lamps
 - vii) Dark Room lights
 - viii) Other specialised luminaires as specified (E.g.: stage lighting etc.).

12.11.2

Installation of Luminaires

a) General

Where possible, all luminaire outlets shall terminate in standard round boxes to which the fitting shall be fixed in addition to other fixings that may be required. Where conduit is run in roof spaces, or where conduits are cast into screeds and not directly into the slab, back-entry conduit boxes are to be used which shall be so installed as to be flush with the finished ceiling.

b) Mounting

- i) Fluorescent fittings shall be fixed to one conduit box in the centre with two further independent fixings either side, one sixth of the fitting length from each end of the fitting. Fittings of 300mm or wider shall be fixed with two pairs of fixings.
- ii) Where fluorescent fittings are fixed in continuous rows, wiring may be carried out from one outlet and then wired through the channels of the fittings. The entry from one channel to another shall be suitable bushed and the internal wiring shall be clipped to the insides of the channels.
- iii) Corrosion proof and explosion proof type fluorescent luminaires shall be fixed using external stirrups or brackets. The wiring entry must be made via the gland entry arrangement using suitable multicore wiring (e.g. "Cabtyre", PVC/PVC etc.) routed from an adjacent conduit box or Pratley type box, as appropriate. Under no circumstances shall the body of the fitting be pierced for any reason whatsoever.
- iv) In surface installations to incandescent bulkhead type fittings, the conduit shall not enter the fitting directly but shall terminate in an adjacent conduit box; one outgoing way of the conduit box being terminated in the fitting. A fixed porcelain or plastic terminal block within the conduit box and heat resisting wire, (e.g. silicon insulated), shall form the final connection to the

fitting. Alternatively, the whole circuit wiring shall be heat resistant (See clause 12.9 1(a)).

- v) Where luminaires are mounted onto conduit boxes in external or potentially damp situations, a suitable neoprene gasket seal or other approved means shall be used at the junction of the fitting and the conduit box.
- vi) The mounting positions of the luminaires shall be verified on Site with the Engineer before installation commences. Fittings will normally be mounted in an even or symmetrical pattern in relation to the particular area having due consideration for architectural features, beams, ceiling tiles, etc.
- vii) Where fluorescent fittings are specified to be suspended on pendants the Contractor shall provide at least two pendants for each fitting, such pendants consisting of 20mm diameter conduit finished in white enamel for commercial and domestic installations and electrical standard light orange for industrial installations.

The wiring to the fitting shall be taken through one of these pendants. The pendants shall be secured to the outlet box or fixing surface by means of domelids. Where the length of the pendants exceeds 0,6m. Domelids shall be of the swivel type. The domelids shall be painted to match the pendants.

- viii) Luminaires shall not be mounted directly to ceiling boards and suitable wooden inserts are to be supplied and installed by the Contractor for this purpose. Alternatively, fixings may be made into branderling where convenient.
- ix) Heavy industrial high-bay luminaires, floodlights etc, shall be fixed to substantial steel brackets or "Cabstrut" type channel or as indicated in the drawings or Detailed Specification.
- x) Where specified, luminaires shall be fed via a 5 Amp socket outlet mounted close to the fitting. The Contractor is advised to procure luminaires with suitable 3-core flexible cords with rubber clad plug-tops attached, as necessary.

c) Mounting Facilities

Where no facilities exist for supporting fittings, the Contractor shall supply and install brackets, hangers, angle irons, wooden battens inside ceiling space or other means as approved by the Engineer.

d) Fixings

Fixings direct to conduit boxes shall consist of cadmium plated or sheradised steel screws screwed into the conduit box fixing lugs. Extra independent fixings into concrete or brick shall consist of suitable fibre or plastic fixing plugs and steel or brass wood screws. Wooden fixing plugs shall not be used. Fixings for fittings over 10kg in mass shall be of the self-drill anchor or expanding bolt-type. Fixings into hollow blocks etc, shall consist of steel screws secured into the hollow cavity with a spring loaded toggle-nut or other approved cavity fixing device.

Cartridge pin fixings shall not be used unless the prior approval of the Engineer is obtained in writing.

Refer also to clause 12.17 (Fixings and supports).

12.11.3 Poles and Masts

- a) Street lighting and area-lighting poles and masts shall be supplied in accordance with the Detailed Specification and/or drawings.
- b) All poles, masts, outreach arms etc. shall comply fully with all relevant SANS Specifications and Codes of Practice and shall be manufactured from:
 - Galvanised Steel
 - Self-Coloured fibre-glass
 - Aluminium,

As detailed.

- c) Poles and masts shall be suitable for fixing to a concrete surface (this method being restricted to post-top lanterns of no more than 4m height), or burying the "root" in soil.

Where buried, each pole must be provided with a suitable base-plate complete with drain hole. Baseplates shall be secured with a minimum of 2 off 20mm dia. hook bolts.

- d) Spigots shall be provided to suit the specified lantern. Particular care shall be taken to establish the exact diameter and length of the spigot or spigots required such that the luminaire fits neatly up against the shoulder formed between the pole and the spigots. Care shall be taken to avoid damage to the spigots during transport, storage and erection.
- e) Galvanised poles shall be provided with a "corrosion collar" which must extend at least 150mm below and above finished ground level.

Unless otherwise stated, galvanised poles will not require painting.

- f) After galvanising, poles shall be stacked and transported in such a way as to minimise mechanical damage to the zinc coating. In particular, poles shall not be stored in direct contact with the ground and if stacked on top of each other, wood spacers shall be used to prevent the formation of white rust. Poles shall be carefully handled at all times and shall not be dragged along the ground in such a way that the coating may be damaged.

Notwithstanding the foregoing, any small areas of the galvanised coating which have become damaged shall be repaired by shot blasting and zinc spraying to a nominal thickness of not less than 0,1mm. Care shall be taken to ensure that all loose flakes of coating around the area to be repaired are removed prior to zinc spraying. Any signs of substantial damage to the galvanised coating, as determined by the Engineer, will result in the pole being rejected.

- h) Poles and masts shall be provided with suitable cable entries and access openings with fixing chassis suitable for the connection of cables and the installation of MCBs. Access openings shall be provided with a cover plate of the same material as the pole. Covers shall be provided with suitable gaskets and means of fixing to the approval of the Engineer.

- i) Unless otherwise specified no cable glands or gland plates are required for the termination of PVC/SWA/PVC cables. The cable shall be brought up to a convenient position adjacent to the lower section of the access opening. The outer PVC sheath shall be stripped back and the steel wire armouring pulled away from around the cables, twisted into compact tails and bonded together by means of an adequately sized line tap.

A separate earth conductor shall be taken from this line tap to the earth stud in the pole base compartment. Phase and neutral conductors shall be jointed using shrouded line taps and the cables neatly secured to the bottom of the fixing chassis by means of saddles.

- j) Poles shall be planted in the positions indicated on the drawings. They shall be planted absolutely plumb with the outreach, where applicable, at right angles to the roadway edge. The root depth shall be as recommended by the manufacturer.

Should any pole position coincide with trees, building canopies, driveway entrances, overhead conductors or other obstacles, an alternative position is to be confirmed with the Engineer before excavation of the pole hole.

Poles shall be carefully aligned with each other to form straight lines or smooth curves generally following the alignment of the associated roads. The planting depth shall be carefully controlled to ensure that all luminaires will be at the same height above the level of the roadway, parking area etc.

- k) Care shall be taken when backfilling around the pole to ensure that compaction is even all around the pole and is to the requirements specified in sub-clause 12.5.5 f) viii). Where poles are to be planted in fill material, on ramps, etc., one pocket of dry cement shall be mixed with the backfill material before commencing backfilling and compaction. Subject to the prior approval of the Engineer, this technique shall also be applied wherever it is considered necessary to stabilise the pole due to unsuitable soils, etc. Where the Contractor feels that this situation exists, he must advise the Engineer immediately and obtain a decision.
- l) Where poles are to be anchored into rock, the base of the pole shall have a reinforced concrete block cast around it. The dimensions of this block shall be approximately 1,25m x 1,25m x 0,5m and the bottom face shall be reinforced by R10 bars at 250mm centres in both horizontal axes. A Y20 bar shall be grouted into the rock for a distance of 300mm. The grouted end shall be straight while the end located in the concrete shall be provided with a hook around the reinforcing bars. Alternatively, 20mm "Rawplug" or similar duplex studs may be used in place of grouted bars.

12.12 Lighting Switches

12.12.1 General

Switches shall be of 15-20 A rating and shall comply with the requirements of SANS 60669-2-1. No switch shall be used to control more than 2000 W of incandescent, or 1500 W of discharge and fluorescent lighting.

All switch boxes shall be fitted with an earth stud.

12.12.2 Switch Types and Installation

- a) Flush Switches

Flush switches with pressed steel or plastic overlapping coverplates shall be mounted into pressed steel rust-proofed boxes installed flush in the building fabric. The switch boxes shall be installed square and shall be flush with the wall finish. Boxes chased into walls shall be fixed square and mortared in position prior to plaster or other finish being applied.

b) Surface Switches

Surface switches shall be of the metal-clad type. Protected dollies shall be used for all industrial applications. The switch plate and box shall have a suitable rust resistant enamel finish.

c) Architrave Switches

- i) Architrave switches shall be used in partitioning mullions as required.
- ii) Unless otherwise specified, tapped holes for screws and outlet openings will be provided by others. The Contractor shall co-ordinate fully with the contractor providing the holes with regard to positions and switch screw templates. Fixing screws shall be provided by the Contractor.
- iii) Wiring to architrave switches may be run within the hollow mullion or other hollow metal structural members of the partitioning, but shall be run in conduit from the lighting outlet, terminating with a bush at the point when wiring enters the hollow mullion.
- iv) Where the wiring for lighting circuits is run in a ceiling channel which is situated directly over the hollow mullion or other wire carrying member, then the wiring to switches may be taken directly into the latter without the use of conduit or lead-in tubes. Under no circumstances shall the wire pass over sharp edges and suitable provisions shall be made to shield the wiring accordingly.

d) Watertight Switches

- i) Watertight switches shall be used for all external applications and in potentially damp areas.
- ii) Watertight switches shall have cast alloy or UV stabilised high-impact plastic enclosures.
- iii) The minimum protection rating shall be IP55.

12.12.3

Mounting Heights

- a) Unless otherwise specified, switches shall generally be mounted at 1,4m above finished floor level to the underside of the switch.
- b) Where switches are located on walls near a change of wall finish, e.g. on tilted, face brick, or wood panelled dados, they shall be positioned so that the coverplates fall completely within one or other of the surfaces, but not on the junction line of the different finishes. The Contractor shall liaise with the relevant other trades to ensure that switches on surfaces present a neat appearance.
- c) Switches in locations meant for persons in wheelchairs (paraplegic toilets etc.) shall be mounted at 1,1m above finished floor level to underside.

12.12.4

Dimmers

a) Standard Dimmers

- i) Dimmer units suitable for controlling 220/230 V incandescent and fluorescent luminaires shall be of the integral controller/dimmer unit type suitable for mounting in a standard switchbox, or else in a suitable box supplied with the unit. The units shall be rated at 250 V and sized according to the load.
- ii) Dimmer units used in conjunction with 12 V dichroic luminaire transformers shall be of the induction type.
- iii) All dimmers shall be provided with a mains on-off switch and a dimmer control knob. Multi-lever switches may be utilized where there is a combination of dimmed and non-dimmed circuits fed from the same position.
- iii) The correct pre-heat transformers and lamps shall be used for all dimmable fluorescent luminaires, in accordance with the supplier's details. Alternatively units suitable for use with electronic fluorescent ballasts shall be used where electronic ballasts are employed.
- iv) Dimmers shall be noise-free and fully suppressed for radio and fluorescent ballast interference.

b) Remote Dimmers

Dimmers for loads larger than 1200 W are to be of the two-part type, i.e. with a local controller and a remote dimmer.

12.12.5 Photo-electric Controls

Where specified photocells shall be used to switch external lighting installations. Photo-electric switches shall be of the type comprising a photo-sensitive resistor, thermal actuator with an inherent operating delay to make it insensitive to short duration changes in light levels and a change-over switch mechanism, all housed within a tough, translucent, weather proof ultra violet stabilised cover. The operating level shall be factory preset to switch on at approximately 50 lux and off an approximately 100 lux. The response time after sudden changes in light level shall be not less than 15 seconds.

Integral protection against voltage surges shall be provided.

Photocells shall be positioned in such a way that they will not be affected by spill-light from the external lighting installation or by vehicle headlamps.

12.12.6 Occupancy Sensors

a) General Description

Single load 360° Dual Technology using PIR and Ultrasonic (US) sensing technology with a maximum load of 2000W and rated at AC voltage of 230V, +- 10% at 50Hz within an optional Infrared (IR) Remote Controller interface.

- b) Detection Range
 - i) PIR : 8m (Diameter) at 2.5m height
 - ii) US : Adjustable up to 10m x 16m (Oval Shape)
- c) Type of Installation
 - i) Ceiling (Flush/Surface)
- d) Infrared (IR) Remote Controller for Dual Technology Occupancy Sensor
 - i) Rated Voltage: 3V DC

12.12.7 Labeling

All switches in industrial applications, and elsewhere as specified shall be provided with a Traffolyte label screwed to the wall, or other fixed member, immediately adjacent to the switch. The label designation shall indicate the distribution board and circuit and outlet number, e.g.: "DB-AB/L4.3".

12.13 Bell Pushes

Bell pushes shall be 250 V rating, even where used for low voltage bell installations. In all other respects the requirements for lighting switches given in 12.12 shall apply to bell pushes. Bell pushes shall be mounted in separate boxes to switches or other components.

12.14 Socket Outlets and Plug Tops

12.14.1 16 A Switched Socket Outlets (SSOs)

- a) 16 Amp SSOs shall be 250 V rating; shuttered 2 pin and earth type complying with the requirements of SANS 164-1 and SANS 164-2.
- b) Outlets on circuits rated up to 20 A shall be of the normally switched type whilst outlets on 25-32 A circuits shall be provided with a class F0 SP MCB, or where especially detailed, a DP MCB. The ratings shall be 16A unless otherwise specified.
- c) Single flush wall mounted SSOs shall be housed in 100 x 100 x 50mm accessory boxes. Double flush wall mounted SSOs shall be housed in 100 x 150 x 50mm accessory boxes. Surface single-outlet sockets shall be housed in 83 x 119 x 50mm galvanised steel boxes. SSOs for mounting in power skirting, bench-top trunking, hospital bed-head channels etc. shall be mounted on cradles suitable for such applications. Unless otherwise required, flush wall mounting outlets shall have pressed steel coverplates finished white or ivory. Surface outlets shall be of the industrial protected-dolly type with grey pressed steel coverplates.
- d) Where SSOs complying with SANS 164-1 are to be used in exposed areas, they shall be housed in a York S15 weatherproof enclosure or equal and approved.

12.14.2 Non-Standard Socket Outlets

- a) Data/Electronic Equipment Outlets
 - i) Dedicated 16 Amp SSOs shall be similar in construction to normal SSOs but shall have flattened earth pins in the 10 o'clock or 12 o'clock position as specified. The earth socket shall be isolated from the chassis of the unit to allow for the connection of 'clean' earths.

Unless otherwise specified, the socket outlet plate shall be of a distinctive colouring (usually red, or as specified in the Detailed Specification). Alternatively the socket pin shrouds and switch dolly shall be of the selected colour; the latter instances usually being applied to outlets in power skirting or hospital bed-head channel etc.

- ii) Where specially called for, dedicated SSOs are to be of the British Standard square pin, 13 Amp type. Similarly to 12.4.2 (a) (i), the earth socket shall be isolated from the chassis of the unit.

Wall mounting 13 Amp SSOs shall be suitable for mounting in a standard 100 x 100 x 50mm accessory box. Surface and power skirting mounted units shall generally be as detailed for 16A SSOs (12.14.1(c)).

- iii) 16 A dedicated plug tops, colour-matched to the respective plate or shrouds, and 13 A plug tops in ivory or white plastic, complete with 5 A cartridge fuses, at the rate of 60 % of all relevant outlets shall be provided and handed to the Client at Works handover.

b) Luminaire Outlets

Where required luminaires shall be fed via a locally mounted 5A SP, N + E non-switched socket-outlet. In these instances, the luminaires shall be fitted with 3m of 3-core flex and a rubber-clad 5A plug-top.

12.14.3 220/240 V Plug-Tops

- a) When required to be supplied by the Contractor, 13 A plug-tops shall be white or ivory plastic. 16 A plug tops shall be white or ivory plastic for general office areas and rubber clad type for workshops, production areas, etc. or colour coded plastic for dedicated types
- b) When wired, a small loop shall be made in the earth core of the flex within the plug top so that in the event of undue stress upon the equipment flex, the earth connection will tend to remain intact even if the feed wires are pulled loose.

12.14.4 3-Phase Socket Outlets

a) Existing Installations

420 V 3-Phase socket outlets for use in existing factories etc. shall generally match the units already installed, unless otherwise specified.

b) New Installations

- i) Generally multi-phase sockets shall be BICC Marachel type DS 16/30A or 32/50A TP + N + E wall mounting decontactors, or equal and approved, or as otherwise specified.
- ii) Each decontactor or similar shall be supplied with a plug unit which shall be handed to the Client upon Works completion and handover. 16 A units shall be fed with cable not exceeding 6mm² and 32 A units with cable not exceeding 10mm².

12.14.5 Mounting Heights

Unless otherwise required SSOs shall be mounted at the following heights from finished floor/surface level to the bottom of the outlet.

Flush outlets, generally	:	0,45 m
Garages, factories and workshops	:	1,4m (SP & TP units)
Kitchens and tea rooms	:	1,0m
Above work surfaces (Kitchens and Offices)	:	0,2m (SP only)

12.14.6 Labelling

Socket outlet labelling shall be as for switches, refer 12.12.5.

12.15 Miscellaneous Power Connections

12.15.1 Geysers

- a) Domestic-type geysers will be supplied, installed and connected to water services by others. The Contractor shall undertake all electrical connections.
- b) For wall mounted geysers, flush supply conduit shall terminate in a flush round box conveniently close to the electrical entry to the water heater. A surface type metal clad or polycarbonate encased 30 A DP switch disconnecter shall be superimposed over the conduit box and the final connection shall be made using surface galvanised conduit, painted after installation.
- c) Where geysers are installed in concealed positions such as roof voids, the final connection from the local switch disconnecter may comprise PVC covered flexible steel conduit.
- d) Unless otherwise indicated in the single line diagrams, wiring for geyser circuits not exceeding 4 kW single-phase shall be carried out with conductors and earthwire at least 2,5mm² each.
- e) Connections to calorifiers and large type geysers shall be as specified.

12.15.2 Kitchen Equipment

a) Domestic Stoves

Domestic stoves will be supplied and placed in position by others.

The Contractor shall provide a suitable electrical supply and final connection. A feed shall be taken to a flush mounted 60 A DP switch-disconnector positioned 300mm to one side of the stove and at a height determined by work surface, kitchen cupboards etc. From the switch-disconnector, flush conduit shall be taken to a point 450mm above floor level, and centred to the rear of the stove, terminating in a round conduit box. The final connection shall be carried out using a superimposing spout-entry conduit box and PVC covered flexible conduit for permanently connected units and via a 'stove connector' socket for plug-in units.

b) General Kitchen Equipment

- i) Canteen kitchen equipment such as stoves, fryers etc. shall be connected up by the Contractor.
- ii) Unless otherwise specified, equipment shall be fed via a local polycarbonate encased switch-disconnector mounted at 1400mm on the wall behind the appliance. The switch-disconnector shall be single-phase DP, or 3-phase 4-pole as required. The final connection shall be taken from the switch-disconnector using flush conduit offset out of the wall at 450mm above floor level. Water-tight PVC covered flexible steel conduit shall connect directly to the end of the wall conduit and shall then connect to the particular item of equipment.
- iii) Where no wall exists, a stainless steel pedestal and switch-disconnector arrangement shall be supplied, as detailed in the Work drawings.

12.15.3 Air Conditioning Units

- a) Console, ceiling and wall-mounting air conditioners (ACs) will be supplied and installed by specialist contractors.
- b) The Contractor will undertake electrical and control connections to the extent outlined in the drawings.
- c) Unless otherwise specified, AC units shall be fed via a locally mounted 30 A DP switch-disconnector unit and the final connection shall comprise the 3-core flex supplied with the AC unit taken via a cord-outlet arrangement mounted on the switch-disconnector faceplate.

12.15.4 Fans

a) General

Where fans are required to be supplied by the Contractor, they shall be supplied complete with all necessary accessories as applicable, such as mounting brackets, diaphragm plates, wire guards where fan blades are liable to be touched by hand, weatherproof louvres where fans are mounted on an outside wall, etc.

Fans and all accessories supplied therewith, shall be bolted, screwed or secured to walls and other surfaces as required.

Holes in walls or windows will be provided by the building contractor to details to be supplied by the Contractor.

b) Connection to Lift Motor Room Fans

- i) Where a lift motor room fan connection is required, the Contractor shall, in addition to the fan, also provide and install a "close-on-rise" 20A rating thermostat, having room temperature range, which shall be mounted near the fan unless otherwise indicated.
- ii) The wiring to the fan shall be taken from a SP MCB on the distribution board through a clearly labelled local 15/20A switch disconnect and through the thermostat to the fan motor terminals.

iv) Final connections to the fan shall be carried out in flexible conduit.

c) Connection to Small Extract Fans

Where a small extract fan, such as is used in domestic kitchens toilets, etc., is specified, and when no facilities exist on the fan for conduit entry, connections may be made to the fan terminals by means of 3-core plastic-covered or "cabtyre" flexible cord, taken from a cord-outlet 15/20A switch disconnecter unit in close proximity to the fan.

12.15.5 Plant and Motor Connections

a) General

Due to the many types of plant and/or motors that the Contractor may be called upon to connect up, specific details will be as described in the drawings or Detailed Specification.

b) Plant Supplies

- i) Generally the Contractor will be called upon to supply and install an incoming feeder cable to a motor control panel (MCC), or similar, supplied by others.
- ii) The Contractor shall liaise and co-operate with the plant vendor/contractor regarding program, correct location, testing – including phase rotation check, and switch-on.
- iii) Where the Contractor has any doubt regarding electrical and safety aspects of plant controls and equipment by others, he shall have the right to refuse to live up the system until the receipt of an indemnity from the Engineer.

c) Motor Connections

- i) Unless otherwise specified motors and associated machinery will be supplied and fixed by others. The Contractor will be required to provide an electrical supply and to connect the means of disconnection, starting and to the motor terminals and accessible to the machine operator where applicable.
- ii) Unless specified as being supplied by others, the Contractor shall supply and install a padlockable, local switch disconnecter for each motor. A suitable starter (which will be provided with the motor) shall be fixed and connected by the Contractor.
- iii) Switch-disconnectors shall, unless otherwise specified, be wall mounted adjacent to the motor, or onto a suitable floor mounting pedestal or onto the framework of the machine or equipment. The switch disconnecter shall be within 2,0m of the motor terminals.
- iv) Unit starters shall, where possible, be mounted adjacent to the switch disconnecter provided that this position will afford easy control of the machine by the operator.
- v) The final connection to a motor shall comprise a multi-core armoured cable with a neatly strapped loop of slack at least 800mm long to allow adjustments to be made to the motor and/or its mountings. The multi-core

cable shall contain an extra core for earthing purposes. The entry into the motor terminal box should preferably be from below/or alternatively from the side, but never from above.

- vi) The Contractor shall ensure the correct rotation of the motor and the settings of the starter in co-operation with the representative of the supplier of the motor.

12.15.6 Labelling

All cables, cores, switch-disconnectors and other items of control equipment shall be labelled. Labels for controls shall be affixed to a non-removable member or wall, adjacent to the item.

Refer to items 12.9.3 and 12.12.5 for general requirements.

12.16 Provisions for Ancillary Services

12.16.1 General

Where provision only for telephones and other systems of communication, fire defence, security, aerial, computer data or other services are specified, the Contractor shall supply and install all necessary conduit, wiring channel, cable tray, boards, outlet boxes, sleeves etc., as detailed.

12.16.2 Junction Boards

Where called for, junction boards for telephone and data services shall be supplied as specified. The boards are to be similar in construction and finish to flush, surface or semi-flush distribution boards, as required (See clause 12.4). Boards shall generally be 100 – 115 mm deep with an internal 15 mm softwood backing. Doors shall be secured with square-key turnbuckles and provision for padlocking. Main distribution frames (MDFs) shall generally be similar to normal junction boards but are to be 150 mm deep.

12.16.3 Cable Sleeves

- a) Unless otherwise specified or indicated on the drawings, the Contractor shall supply and install all sleeves for telephone and other service cables of sizes and in positions as detailed.
- b) Where sleeves are specified to be supplied and installed by others, the Contractor shall be responsible for ensuring that such sleeves are installed in good time and in their correct positions. Suitable rustless draw wires are shall be provided in all sleeves.

12.16.4 Conduit

All conduit for telephones and other services shall be provided and installed to the same requirements as for the electrical installation, and shall be fitted with rustless draw wires. Colour coding for industrial project and other installations where specified shall be in accordance with 12.7.4 (e).

Each class of service shall be kept entirely segregated from any other service.

12.16.5 Outlets

- a) Unless otherwise specified all outlets for telephones and other services shall consist of standard 100 x 50mm flush type pressed steel boxes generally mounted a height of 0,3m from finished floor level to bottom of box.
- b) Where switch sockets or other outlets are mounted in the same room at nominally the same height above floor, care shall be taken to ensure that the undersides of all such outlets are accurately lined up.

12.16.6 Coverplates

The Contractor shall supply and fit metal or plastic coverplates of the same material and finish to match flush switches and switched socket coverplates. A blank cradle shall be fitted in the outlet box to which the coverplate shall be screwed, allowing for proper alignment of the coverplate. Nickel or chromium plated screws shall be used to secure all blank coverplates.

12.16.7 Co-operation

The Contractor shall co-operate with the suppliers and installers of other services in providing all information required, and shall assist such other installers in the event of difficulties which they may experience with drawing in of their cables into conduit or channel provided by the Contractor and where such difficulty arises because of want of knowledge of location, blockages broken draw-wires etc.

12.17 Fixings and Supports

12.17.1 General

- a) The Contractor shall be responsible for all fixings in connection with his installation, including: brackets, suspensions, clamps, bolts, screws etc, and all accessories and fixing devices to effect a substantial and proper means of fixing equipment, components, wireways, cables etc.
- b) All items shall be selected to fully suit the application, due cognisance being taken of:
 - Weight of equipment and fixing media ('pullout strength')
 - Temperature and humidity
 - Effect of corrosive and damp environments
 - Weathering, UV degradation etc
 - Electrolytic effects
- c) The following details shall apply to all fixings irrespective of the various categories in which they are described.

12.17.2 Concrete and Brickwork

a) Wall Plugs

- i) Fixings into concrete and brick surfaces for equipment with a maximum mass of 10kg may be undertaken with plastic or fibre 'wall-plugs'. Under no circumstances shall wooden inserts be used.
- ii) A masonry drill of the correct size shall be used, in conjunction with a suitable hammer drill or similar, to make holes into the brick or concrete fabric; fixings into mortar joints will not be allowed. The fixing plug length must match the threaded portion of the fixing screw; undersized plugs will not be allowed.

- iii) Round or cheese headed screws of the correct diameter to match the respective plug shall be used throughout.

b) Anchor Bolts

- i) Fixings into concrete and brick surfaces for equipment with a mass exceeding 10kg, or where the fixing holes are 10mm or larger, shall be undertaken using expanding anchor bolts, or by means of bolts cast into concrete.
- ii) For expanding anchor fixings, holes shall be made similarly to wall-plug holes (see 12.17.2 a) ii)).

c) Channel Fixings

- i) Where brackets, cable-rack support arms etc are to be fixed, the Contractor shall supply and install Cabstrut, or equal and approved, galvanised channel supports and associated clamps, cantilever arms and so forth. Surface channels for the support of various brackets, pendant studding etc shall be fixed into concrete ceilings or brick/concrete walls using anchor bolts.
- ii) In instances where cast-in support channels are to be used, the Contractor shall liaise with the building/civil contractor to ensure that inserts are installed timeously on to shuttering and that all openings are protected from the ingress of vibrated concrete.
- iii) Unless otherwise detailed in the Detailed Specification and/or drawings, the Contractor shall submit particulars, including sketch drawings, of proposed fixings to the Engineer for approval prior to installation. Such proposals shall be accompanied by design calculations of loadings and fixing spacings.

d) Cartridge Fixings

Shot or cartridge fixings, using fixing guns, percussion charges and fixing pins in accordance with the relevant manufacturer's recommended methods, shall only be used with the express written permission of the Engineer. Where used, the Contractor shall comply fully with the requirements of the Occupational Health and Safety Regulations and shall ensure that warning signs are placed at all entrances where such work is in progress.

12.17.3

Hollow Partitions, Hollow Blocks and Ceiling Boards

- a) Fixings shall not be made using gypsum, fibre or similar ceiling boards or ceiling tiles as the supporting medium.
- b) For ceiling boards, the component shall be installed to a substantially fixed conduit box. In the case of linear fluorescent luminaires or other large components, further fixings shall be made into the support branderling. Where there is no branderling conveniently located, the Contractor shall supply and install independently fixed wooden inserts.
- c) Surface fixed items mounted to ceiling tiles within support tees shall be fixed similarly to the foregoing except that, with written permission of the Engineer, supplementary fixings may be made into the ceiling tee lips using approved self-tapping screws.

- d) Fixings into hollow partitioning material, or hollow building blocks, shall be done by means of spring-loaded 'toggle' fixings, or, where suitable, compression type cavity fixing devices may be used.

12.17.4 Fixings on Steelwork

- a) Support brackets, hangers etc shall be fabricated from galvanised angle iron or channel iron, or shall be made up using Cabstrut or equal channel and associated accessories to suit the application.
- b) Brackets etc shall be fixed to the structural steelwork using purpose made galvanised beam clamps, Caddy clips or similar. Welding to structural steelwork may only be carried out with the written permission of the Engineer.

12.17.5 Painting

- a) All exposed steel shall be cold galvanised.
- b) Where specified, supports etc shall be primed and painted using an epoxy finish, colour: light orange, SANS 1091, ref. B26. Refer to clause 12.4.1 (h) for details of painting.

12.17.6 Adhesives

- a) Under no circumstance will any adhesive material be used for any fixing with the single exception of the fixing of door gaskets.
- b) The adhesive for use with gaskets shall be applied as per manufacturer's specifications, or self adhesive gasketing material shall be used. The adhesive shall be of the silicone based type suitable for use under extreme weathering and temperature ranges between -40°C and +70°C.

12.18 Earthing and Lightning Protection

12.18.1 General

- a) In instances where soil resistivity surveys have been carried out to determine the design of the earth electrode system/s, Bidders shall submit their price in accordance with the Tender Documentation, including the bills of quantities where applicable.
- b) Where no resistivity survey has been conducted prior to calling for tenders, prices shall be based upon a provisional design and, where applicable, a provisional bill of quantities. The final design will be based upon a subsequent soil resistivity survey.
- c) All earthing and lightning protection surveys, installations and testing must be carried out by a recognised specialist. Unless the Bidder is also the earthing specialist other Bidders (e.g.: electrical contractors) must submit full details of their proposed specialist sub contractor.
- d) This section does not include switchyard earthing. Where necessary a supplementary specification: "Standard Specification for Substation Earthing" will be issued.

12.18.2 Earth Resistance Testing

- a) Soil resistivity tests shall be carried out at the proposed location of the electrode/s and following ground levelling by the civil/building contractor, where applicable.
- b) The Contractor must give at least 48 hours notice of impending tests to the Engineer to allow him to attend and witness them at his option.
- c) The tests must be carried out in accordance with SANS 10199 using a recognised method (e.g.: Wenner method) with a four terminal null balance 'megger' tester. A meter calibration certificate proving calibration within the last six months undertaken by a recognised testing authority must be submitted to the Engineer prior to carrying out earth readings. If there is any reason to suspect the accuracy of any instrument, the Engineer may call for confirmation testing at the Contractor's expense.
- d) The result of tests, including a specification for the electrode design, shall be submitted to the Engineer within seven days. The test results in tabulated and graphical form shall be accompanied by a copy of the meter test certificate.
- e) The following maximum resistances shall apply:
 - i) Transformers

Up to 500kVA	5 Ohms
500 - 800kVA	3 Ohms
800 - 1000kVA	2 Ohms
Above 1000kVA	1 Ohm
 - ii) Lightning Protection
 - SANS 10313, category A structures: 30 Ohms overall, subject to a maximum of 200 Ohms for any single electrode (or per SANS 10313, whichever is the lower reading).
 - SANS 10313, category B & C structures: 50 Ohms overall, subject to a maximum of 200 Ohms for any single electrode (or per SANS 10313, whichever is the lower reading).
 - iii) Plant Bonding – Hazardous Areas

Where specified to be bonded, the electrode reading for tanks, silos etc must not exceed 7 Ohms with the electrode disconnected from any other electrode system (See also item 12.18.6).

12.18.3 Earth Electrode

- a) The earth electrode shall consist of earth rods, bare copper wire, copper tape etc, or a combination of these, as specified in the drawings.
- b) Earth rods shall nominally be 1500mm long, 16mm diameter extensible type steel cored, copper jacketed where the copper cladding is at least 250 microns thick molecularly bonded to the steel rod, as 'Cadweld', or equal and approved.
- c) Mains earthing conductors ('trench earths') shall consist of 70mm² bare copper cable while conductors for lightning protection and static bonding shall be 50mm².

- d) Trench earth conductors, as well as the tops of earth rods shall be not less than 600mm below finished ground level.
- e) Earth rods shall be driven into the soil utilising a purpose made driving head in conjunction with a mechanical hammer. In hard ground and in rock, the rods shall be installed into pre-drilled holes made with an earth-drilling rig. Whilst loose soil or a soil slurry may be used to back-fill holes in hard soil, carbonaceous conductive aggregate, such as 'Marconite' or equal and approved, shall be used for holes bored in rock.
- f) Rods longer than the nominal 1500mm shall be coupled using an external sleeve arrangement and the liberal application of silicon or hydrocarbon grease. Rods must butt against one another inside the coupling; gaps will not be allowed.
- g) Rods, tapes and cable conductor in highly corrosive soils shall be of stainless steel, or as otherwise specified.
- h) Joints in copper cable electrodes shall only be effected using an exothermic welding process as 'Cadweld', or equal and approved.
- i) Lightning protection trench earths shall not be run directly in soil under pathways. In these instances the conductor shall be run in 75mm diameter uPVC sleeving which shall be laid under the path and at least 1000mm clear of its edges.

12.18.4

Mains Earthing

- a) The earth electrode resistance for mains earthing of transformers, switchgear etc. shall be in accordance with 12.18.2 (e) (i)
- b) A main earthing bar of high conductivity copper, at least 50mm x 6mm in section and 500mm long, (or as otherwise specified in the Detailed Specification and/or drawings) installed in the transformer room facing the LV side of the transformer/s shall be provided. This shall be mounted onto insulators at 500mm above finished floor level. The bar shall be pre-drilled with 12 No. M12 diameter holes for the connecting of earth leads.
- c) The earth electrode cable/s and all earth bonding leads shall be connected to the bar by means of brass or stainless steel bolts, nuts, washers and lock-washers. Earth cable terminations shall comprise hydraulically crimped tinned lugs. The point of origin of each conductor must be clearly indicated by means of an embossed or punched metal tag attached to the conductor near its lug or connection point.
- d) The following points shall be bonded to the earth bar with 70mm² conductor, or as otherwise specified:
 - i) Transformer star points (*)
 - ii) LV switchboard neutral bar (*)
 - iii) LV switchboard earth bar (*)
 - iv) MV switchgear

(*): Subject to the earth conductor being not less than half the cross sectional area of the of the relevant phase conductor between the transformer and the LV switchboard.

- e) Minisubs shall be earthed in a similar fashion to main substations except that the earthing bar in the LV compartment shall take the place of the separate main earth bar.

12.18.5

Lightning Protection

- a) Besides earth resistance testing, the Contractor shall arrange for the design of the lightning protection system, including air terminals, roof bonding, down conductors etc to be carried out by a reputable specialist. The Engineer will provide suitable drawings to the Contractor for this purpose either as transparencies or as DXF Computer Assisted Draughting (CAD) files.
- b) Following submission of the design to the Engineer for comment (modification where necessary) and approval, the Contractor shall submit the final design to the SANS for approval. Transparencies of the SANS approved drawing/s shall be submitted by the Contractor to the Engineer for record purposes prior to, or simultaneously with, the start of the installation.
- c) Air terminals may be of various designs. As a general guide, the following basic requirements shall be complied with:
 - i) All conductor material shall be electrical grade aluminium alloy in accordance with the requirements of BSS 1476/H/E9 or American Standards Specification 6063. Conductors shall be installed in such a way that no part of the system shall come into contact with concrete or plaster.
 - ii) Circular conductors shall have a minimum cross sectional area of 50mm². Flat conductors shall be 20mm x 3mm minimum.
 - iii) Joints in circular conductors shall be done using a hydraulic crimping machine. Flat conductors shall be joined with either two bolts, or else two aluminium rivets of 6mm diameter.
 - iv) Bonding to extraneous metallic surfaces shall be done by bolting or riveting.
 - v) Conductors must be mounted into aluminium alloy guides which in turn are seated on a suitable barrier material (plastic or similar) and which allow free longitudinal movement of the conductor.
 - vi) Straight horizontal runs of conductor shall be provided with expansion loops every 30m or less.
 - vii) Electrically continuous metal roofs shall be used as the air termination. Where flat metallic roofs may be surrounded by non metallic parapet walls, conductors are to be installed on top of the wall and bonded to the metal roof sheeting at intervals not exceeding 20 metres.
 - viii) Non metallic roofing supported by steel trusses and purlins which are electrically continuous may be treated as for a complete metal construction.
 - ix) Where required 12mm diameter x 500mm long finials shall be installed at the outer corners of buildings of 15m to 30m in height and in addition at intervals of no more than 30m along exposed parapet walls. The finials, in turn must be bonded to the peripheral conductors.

- x) Tall structures, as defined in SANS 10313, shall, where required, have 12mm diameter x 1000mm long finials. These shall be installed at an angle of 30° out from the structure and bonded to the peripheral air terminal system, all as required by the Code of Practice.
- d) Down conductors shall consist of aluminium alloy run surface down the outside of buildings, or, where suitable, shall comprise structural steel columns, or reinforcement steel in reinforced concrete columns all as described in the Detailed Specification and/or installation drawings and in accordance with the Contractor's SANS approved design.
 - i) Down conductor spacing shall not exceed $30 - 0,4h$ metres, where h = the maximum height of the structure. However the minimum separating distance need not be less than 10 metres except for tall slim structures (like chimney stacks) where a minimum of two down conductors must be installed.
 - ii) Large expanses of external metal wall cladding as well as external metal staircases, ductwork etc shall be bonded to ensure vertical electrical continuity and to the lightning protection system at their upper and lower extremities.
 - iii) Aluminium based down conductors shall terminate at 500mm above ground level where they shall be bonded to the earth electrode system. Under no circumstances shall aluminium conductor come into contact with the ground.
 - iv) The Contractor must liaise closely with the building contractor to ensure the timeous placement of cast-in threaded bonding sockets at the tops and bottoms of reinforced concrete columns.
- e) Test points shall be provided where specified. These shall be either mounted near the base of the down conductor in the lower part of the wall or else contained in a small cast iron inspection chamber installed in the ground, all as detailed in the installation drawing/s and/or Detailed Specification.

12.18.6 Static Bonding

Static bonding of operating theatres, explosives magazines, petrochem installations, electronic workshops and the like fall outside the scope of this general specification and, where required, will be specified in supplementary specifications or the Detailed Specification.

12.18.7 Testing and Maintenance Manuals

Upon completion of the earthing installation, testing in accordance with the relevant SANS specification/s shall be carried out by the Contractor and the results submitted to the Engineer. The Contractor shall also supply maintenance manuals, including as-fitted and SANS approved record drawings, test certificates etc, all as outlined in clause 10.0.

PART 3: SCHEDULE OF INFORMATION

PART 3: SCHEDULE OF INFORMATION

1. SCHEDULE OF PERSONNEL TO BE ASSIGNED TO THIS PROJECT

The Bidder shall list below the key personnel (including first nominee and the second choice alternate), whom he proposes to employ on the contract should his offer be accepted, both at his headquarters and on the Site, to direct and for the execution of the work, together with their qualifications, experience, positions held and their nationalities.

DESIGNATION	NAME AND NATIONALITY OF: (i) NOMINEE (ii) ALTERNATE	SUMMARY OF QUALIFICATIONS, EXPERIENCE AND PRESENT OCCUPATION
<u>HEAD OFFICE</u> Partner/director		
Project manager		
Other key staff (give designation)		
<u>SITE OFFICE</u> Site Agent		
Site Engineer		
Construction supervisor (Give designation)		
Other key staff (give designation)		

.....
NAME OF Bidder

.....
TENDERER'S SIGNATURE

.....
DATE

2. SCHEDULE OF WORK CARRIED OUT BY Bidder

The Bidder shall list below the last five Electrical engineering contracts of a similar nature awarded to him. This information is material to the award of the Contract.

EMPLOYER (Name, Tel No and Fax No)	CONSULTING ENGINEER (Name, Tel No and Fax No)	NATURE OF WORK	VALUE OF WORK	YEAR OF COMPLETION

.....
NAME OF Bidder

.....
TENDERER'S SIGNATURE

.....
DATE

3. SCHEDULE OF PROPOSED SUBCONTRACTORS

I/We hereby notify you that it is my/our intention to employ the following Sub-Contractors for work in this contract.

[illegible]

NAME OF Bidder

.....
TENDERER'S SIGNATURE

DATE _____

4. REGISTRATION AS AN ELECTRICAL CONTRACTOR

The Bidder must be registered as an Electrical Contractor with the Electrical Contracting Board of South Africa and must also be registered with the Workmen's Compensation Commissioner and the Unemployment Insurance Commissioner to qualify for this tender.

Bidders must complete the following questionnaire and submit it with this tender.

- a) Has the company been registered with the Electrical?
Contracting Board of South Africa YES/NO
- Registration No :
- Date of issue :
- b) Has the company been registered with the Department of Manpower?
- i) The Workmen's Compensation Commissioner YES/NO
- Registration No :
- Date of issue :
- ii) The Unemployment Insurance Commissioner YES/NO
- Registration No :
- Date of issue :
- c) Has the company been registered with, and graded by the CIDB? YES/NO
- Registration No :
- Grading :

I/We certify that the above information is correct

Signature :

Name of Signatory :

Name of Firm Represented :

Address :

.....

.....

Date :

NOTE: **IN TERMS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT ELECTRICAL INSTALLATIONS REGULATIONS FAILURE TO COMPLY WITH THIS CLAUSE OF THE SPECIFICATION MAY RESULT IN DISQUALIFICATION AND REJECTION OF THE TENDER.**

5. DETAILS OF INSTALLATION ELECTRICIAN

I/We certify that is a registered installation electrician in terms of the Occupational Health and Safety Act (Act 85 1994) and is permanently employed by my/our company trading as:

.....

I/We further certify that the abovementioned person will be appointed as the responsible person in charge of the installation, which person shall personally supervise the whole of the electrical works as tendered for from inception to completion inclusive of signing all commencement/completion/ cost certificates necessary as part of the Works.

I/We further certify that I/We am/are fully aware of the provisions of the Occupational Health and Safety Act (Act 85 1994), and that my/our company is trading as a registered electrical contracting organisation.

**SIGNATURE OF
Bidder**

**SIGNATURE OF
INSTALLATION
ELECTRICIAN**

**REGISTRATION
NUMBER OF
INSTALLATION
ELECTRICIAN**

DATE

**COMPANY
STAMP**

NOTE

It is an offence to employ a registered single-phase installation electrician on a poly-phase installation and it may be necessary to submit a certified copy of the licence of the person to be employed on any poly-phase project.

6. DETAILS OF THE PROPOSED LIGHTNING PROTECTION SYSTEM (LPS) SUBCONTRACTOR

NAME OF THE LPS SUBCONTRACTOR :

ADDRESS :

PROOF OF EXPERIENCE ATTACHED? : **YES:** **NO** :

NAME OF Bidder :

TENDERER'S SIGNATURE :

DATE :

7. SCHEDULE OF MATERIALS OFFERED

The Bidder must complete the following schedules and submit them with the priced Bill of Quantities.

The schedules will be scrutinised by the Engineer and should any material offered not comply with the requirements contained in the specification, the Electrical Sub-Contractor will be required to supply material in accordance with the contract at no additional cost.

NB: Only one manufacturer's name to be inserted for each item.

Item	Material	Make or trade name	Country of origin
1.	Distribution boards		
2.	Circuit breakers 1P, 2P, 3P		
3.	Contactors 1P, 2P, 3P		
4.	Earth leakage relays		
5.	Daylight sensitive switch		
6.	Surface all weather isolators		
7.	Water tight rotary switch with and without night light switch contact.		
8.	16A power skirting mounted socket outlets		
9.	16A flush switched socket outlets		
10.	16A surface switched socket outlets		
11.	5A unswitched socket outlets		
12.	PVC SWA PVC cable		

NOTE: Bidders are to note that under no circumstances may materials be installed other than offered in the above materials schedule, which has been approved and accepted by the Contractor.

Should the successful Bidder wish to supply materials other than those originally offered, prior written approval must be obtained from the Contractor before any orders are placed.

.....
NAME OF Bidder (or
 Company stamp)

.....
TENDERER'S SIGNATURE

.....
DATE

PART 6: PREAMBLES TO BILLS OF QUANTITIES

PART 6: ELECTRICAL PREAMBLES TO BILL OF QUANTITIES

1. **BILLS OF QUANTITIES**

These Bills of Quantities contain pages numbered in the consecutive order.

The Bidder is required to check the numbers of pages and should any page be found to be missing, or in duplicate, or if any reproduction is indistinct, or if any ambiguity arises as to the meaning of any item or description, or if these Bills of Quantities contain any obvious errors, then the Bidder must immediately inform the Engineer and have the same rectified or explained, as the case may be. No claim will afterwards be considered where the Bidder has failed to comply with these instructions. No alteration, erasure, amendment or note is to be made in the text of these Bills of Quantities and should any such alteration, erasure, amendment or note be made by the Bidder it will be recognised, but these Bills of Quantities as prepared by the Engineer will be adhered to.

2. **CONTRACT DOCUMENTS**

The Bill of Quantities form part of and must be read in conjunction with the Specification which document contains the full descriptions of the work to be done and material and equipment to be used and unless otherwise described in the Bill of Quantities, reference should be made to the Specification for the full meaning of descriptions of work to be done and materials and equipment to be used in this service.

3. **ARITHMETICAL ERRORS**

The tender price arithmetically corrected where necessary and not the amount stated on the form of tender shall constitute the contract price of the successful Bidder.

No error in the calculation of schedule rates which may be discovered subsequent to the submission of a tender will constitute grounds for a claim of any description. A tender that is incomplete or insufficient in any respect may result in the disqualification of such tender.

4. **ALTERATIONS**

No alteration, erasure or addition is to be made in the text of the Bills of Quantities. Should any alteration, erasure or addition be made, it will not be recognised but the original wording of the Bills of Quantities will be adhered to.

5. **ADJUSTMENTS**

The Priced Bills of Quantities of the successful Bidder will be checked and the Engineer reserves the right to call for adjustments to any individual price and to rectify any discrepancy whilst the total arithmetically correct tender price, as submitted, remains unaltered.

6. **RESPONSIBILITY OF Bidder**

The responsibility for the accuracy of the quantities written into the Bill remains with the person who prepared the Bill. The Bidder shall be relieved of responsibility of measuring quantities at the tender stage, and the tender sum submitted shall be in respect of the quantities set out in the Bills, although he will be required to make his assessment of items such as brackets, fixing, etc., from details stated in the Bills and shall include in the item prices for such small installation materials as are required for the complete installation in accordance with the Specification.

7. **QUANTIFICATION OF ITEMS**

The successful Tenderer and the Employer or his Agent may agree that the total of any Bill or Bills, including any variations by way of additions thereto or deductions there from, represents a fair and accurate quantification of the items set out in the Bills and the parties may agree final payment on that basis. In the event of any dispute as to the quantities, then the disputed item or items shall be adjusted where necessary.

8. **ORDERING OF MATERIALS**

These Bills of Quantities are not to be used for ordering purposes. Any orders placed by the Contractor on the basis of these Bills of Quantities shall be at his own risk.

9. **VARIATIONS**

Variations in the scope and extent of the work included in the Bills shall be allowed to meet the Employer's requirements and shall be measured and costed at rates entered in the Bills, where appropriate, and shall form an addition to or deduction from the total Bills. Any items or variation for which rates have not been included in the Bills shall be agreed and priced as non-scheduled items in accordance with the provisions of the contract.

The rules governing the extent and costing of the variation shall be those provided for in the form of Conditions of Contract.

Variations to the planning before the work has been executed shall be priced as above. Alterations to work already executed cannot necessarily be priced as above and must be reviewed on its merits. Unless a separate rate for the supply and for the installation of any item is specifically called for, the supply and installation costs of any item shall be fully included in the unit price.

10. **DESCRIPTION OF ITEMS**

The description of each item shall, unless otherwise stated herein, be held to include making, conveying and delivering, unloading, storing, unpacking, hoisting, setting, fitting and fixing in position, cutting and waste, patterns, models and templates, plant, temporary works, return of packing, establishment charges, profit and all other obligations arising out of the conditions of contract.

11. **WASTE ALLOWANCE**

All measurements are net, unless otherwise stated, and Bidders must allow in the rate for wastage.

12. **PROVISIONAL SUMS**

All provisional sums shall be expended as directed by the Engineer and any balance remaining shall be deducted from the amount of the contract sum.

All items described as "Provisional" shall be measured as executed and paid for according to prices in the Bills of Quantities and any unexpended amounts shall be deducted from the amount of the contract sum. No work for which "Provisional" items are provided shall be commenced without written instructions from the Engineer.

13. **CABLE QUANTITIES**

The quantities given in the Bill for cable, cable markers, and earth wire laid with cable and excavations cannot be regarded as exact and are subject to measurement on site after completion of the service and adjustments will be made according to the unit rates given in the Bill.

Note: Checking of Cable Lengths

Notwithstanding the fact that the lengths of cables as given in the Bills of Quantities have been measured from scaled drawings, the contractor shall check such lengths on site before ordering the cable, as he will not be paid for excess cable after the completion of the service. Any allowance for off-cuts shall be made in the unit rates. The final measurements shall be based on the net route length of the cables concerned.

14. **CLASSIFICATION OF MATERIALS ENCOUNTERED IN THE EXCAVATIONS**

Materials encountered in the excavations for cable trenches, lighting standard and bollard holes generally shall, unless special provision to the contrary is made hereinafter, be classified as follows:-

- a) 'Hard rock' shall mean any excavation requiring the use of explosives.
- b) 'Soft rock' shall mean any excavation which necessitates the use of pneumatic tools.
- c) 'Ordinary material' shall mean all pickable material.

In the event of any dispute regarding the classification of material, the Engineer's decision in this connection shall be final.

Should the Subcontractor consider that any material encountered in the excavations is 'hard rock' or 'hard material', he shall immediately notify the Engineer in writing. Failing such notification the excavation shall be assumed to be in 'ordinary material' and shall be measured and valued accordingly. Wherever practicable all excavation in ground other than 'hard rock' and/or 'soft rock' shall be carried out first after which levels will be taken of the exposed 'hard rock' and/or 'soft rock' and agreed upon by the Engineer and the Contractor.

Where the Contractor encounters a combination of 'hard rock' and/or 'soft rock' simultaneously in a section of trench and employs explosives or pneumatic tools to remove all the various types of materials in that section of trench, the use of these methods of removal will in no way influence the Engineer's classification of the materials.

15. **VALUE ADDED TAX OR OTHER LEGAL DUTIES PAYABLE**

All items priced in this Bill of Quantities shall exclude any tax applicable to the particular service article equipment or accessory and these net priced items will be used for normal variations on the contract.

The tax value will be added at the ruling % rate to all payments and valuations i.e. net price + VAT.

16. **ITEMS THAT ARE NOT RE-MEASURABLE**

Unless there has been a written variation either in the form of a site instruction or an issue of a revised drawing, conduits and conductors are not re-measurable.

PART 5: UNSCHEDULED RATES

PART 5: UNSCHEDULED RATES

Material	%
Materials shall be charged at net cost, plus a percentage for profit, procuring, taking delivery and safe keeping. These costs shall be substantiated with invoices.	
(i) Percentage mark-up on proven net cost (for unit cost of less than R1 000,00)
(ii) Percentage mark-up on proven net cost (for unit cost of less above R1000,00)
(ii) Handling charge for the correctly supplier materials but that have to be replaced with a different material and the material that is being replaced is to be returned to the supplier as instructed by the Engineer in writing.

PART 6: BILLS OF QUANTITIES

LP GAS SPECIFICATION

INSTALLATION OF THE LP GAS

INSTALLATION REQUIREMENTS

A3 – Occupancy where school children, students or other persons assemble for purpose of tuition or learning.

Floor Area = +/-1000m²

INSTALLER REQUIREMENTS.

The Commercial LP Gas Installer must be actively appearing at SAQCC Gas database for verification.

Bidders must complete the following questionnaire and submit it with this tender.

- a) Has the Individual registered with the South African Qualification and Certification Committee (SAQCC) Gas (LPG). YES/NO

Registration No:

Date of issue:

- b) Has the Subcontractor been registered with the Department of Labour?

- i) Registered for Workmen's Compensation for Occupational

Injuries and Diseases Act YES/NO

Registration No:

Date of issue:

- ii) The Unemployment Insurance Commissioner YES/NO

Registration No :

Date of issue:

I/We certify that the above information is correct

Signature:

Name of Signatory:

Name of Firm Represented:

Address:

.....

.....

Date:

**NOTE: IN TERMS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT FAILURE TO COMPLY
WITH THIS CLAUSE OF THE SPECIFICATION MAY RESULT IN DISQUALIFICATION
AND REJECTION OF THE TENDER.**

DETAILS OF LP GAS INSTALLER

I/We certify that is a registered under SAQCC Gas (LP Gas) in terms of the Occupational Health and Safety Act (Act 85 1993).

.....

.....

I/We further certify that the abovementioned person will be appointed as the responsible person in charge of the installation, which person shall personally supervise the whole of the LP Gas installation works as tendered for from inception to completion inclusive of signing all commencement/completion/ cost certificates necessary as part of the Works.

I/We further certify that I am/We are fully aware of the provisions of the Occupational Health and Safety Act (Act 85 1993).

**SIGNATURE OF
Bidder**

.....

**SIGNATURE OF
INSTALLER**

.....

REGISTRATION

**NUMBER OF
INSTALLER**

.....

DATE

.....

COMPANY STAMP

LP GAS INSTALLATION SPECIFICATION

MANIFOLD INSTALLATION

Plans shall be submitted to the local authority prior to commencing the installation if a manifold gas installation in excess of 100kg and shall be approved by and registered with the local authority.

Shall be mounted against a solid wall or a non-combustible structure at an appropriate height using approved method of bracketing.

Manifold Records:

Shall be supplied together with the certificate of manufacture verifying that the design, construction and test procedure comply with all the requirements given in this part of SANS 10087, the serial number, date of manufacture and the manufacture's name shall appear on the certification issued with the manifold.

Cylinder Gas Cage:

Construction of the cylinder cage shall be constructed in such a manner so as not to accidentally fall over. Shall be locked or fenced where the public access to the cylinders is possible, the cylinders and manifold. See a typical example of the cylinder cage on **SANS 10087** any Edition.

Piping, fittings and other components:

Pex gas pipe system for pressure application shall comply to the following: **AS 4176**, **SANS 17484-1**, **ASTM F 1216**, **ASTM F 1281** and **ASTM F 1282**.

Regulators:

The pressure regulator at the container position is set to deliver at a high pressure than the appliance operating pressure. The appliance operating pressure is **6.24kg/hr**, shall be fitted outside of the building directly to the gas supply or manifold system.

**SOLAR WATER HEATERS &
PLUMBING SPECIFICATION**

DESIGN & INSTALLATION OF THE SOLAR WATER HEATERS AND PLUMBING SYSTEM

DESIGN SYSTEM REQUIREMENTS

A3 – Places of Instruction: ,Occupancy where school children, students or other persons assemble for purpose of tuition or learning.

Floor Area =1000m²

RETURNABLES

INSTALLER REQUIREMENTS.

REGISTRATION AS A PLUMBER

The Bidder must employ a Plumber registered with the Plumbing Industry Board of Southern Africa and must also be registered with the Workmen's Compensation Commissioner and the Unemployment Insurance Commissioner.

Bidders must complete the following questionnaire and submit it with this tender.

- a) Has the Domestic Water Subcontractor been registered with the Plumbing Industry Board of Southern Africa YES/NO

Registration No:

Date of issue:

- b) Has the Domestic Water Subcontractor been registered with the Department of Manpower?

- i) Registered for Workmen's Compensation for Occupational Injuries and Diseases Act YES/NO

Registration No:

Date of issue:

- ii) The Unemployment Insurance Commissioner YES/NO

Registration No :

Date of issue:

I/We certify that the above information is correct

Signature:

Name of Signatory:

Name of Firm Represented:

Address:

.....

.....

Date:

NOTE: **IN TERMS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT FAILURE TO COMPLY WITH THIS CLAUSE OF THE SPECIFICATION MAY RESULT IN DISQUALIFICATION AND REJECTION OF THE TENDER.**

DETAILS OF DOMESTIC WATER INSTALLER

I/We certify that is a registered plumber / solar water heater installer in terms of the Occupational Health and Safety Act (Act 85 1994 and is permanently employed by my/our company trading as:

.....
.....

I/We further certify that the abovementioned person will be appointed as the responsible person in charge of the installation, which person shall personally supervise the whole of the solar water heater works as tendered for from inception to completion inclusive of signing all commencement/completion/ cost certificates necessary as part of the Works.

I/We further certify that I am/We are fully aware of the provisions of the Occupational Health and Safety Act (Act 85 1994), and that my/our company is trading as a registered solar water heater organisation.

**SIGNATURE OF
Bidder**

.....

**SIGNATURE OF
INSTALLER**

.....

**REGISTRATION
NUMBER OF
INSTALLER**

.....

DATE

.....

COMPANY STAMP

2.3 SCHEDULE OF MATERIALS & EQUIPMENT OFFERED

Bidders shall complete the following schedule of materials and equipment offered and undertakes that the actual materials and equipment installed shall be in accordance with this schedule. Enter N/A if not applicable for that particular item / installation.

Bidders are to take note that if the material offered is not to specification, this may lead to the bid being disqualified.

Col.	1	2	3	4	5
1. tem	2. Item	3. Make or Trade Name	Material to Spec? (Give details if not)	SABS Mark Y/N	Country of Origin
1.0	Copper pipe				
2.0	Isolating Valves				
3.0	Non return valves				
4.0	Strainers				
5.0	Vacuum Breakers				
6.0	Insulation				
7.0	Braided flexible hoses				
8.0	Solar water tank/cylinder				
9.0	Pressure gauges				
10.0	Solar Vacuum Tube				
11.0	Frame				

NOTE : Bidders are to note that under no circumstances may materials be installed other than offered in the above materials schedule, which has been approved and accepted by the Contractor.
Should the successful Bidder wish to supply materials other than those originally offered, prior written approval must be obtained from the Contractor before any orders are placed.

.....
22 **NAME OF Bidder**

.....
TENDERER'S SIGNATURE

SPECIAL ITEMS

The Subcontract includes a number of special items which shall form part of the plumbing and drainage installation.

The specialist sub-contractor shall be responsible for the procurement, construction, completion and commissioning of the complete systems which shall comply strictly to the performance specifications.

The specialist sub-contractor shall guarantee that each system fully complies with the performance specifications.

Full design details, shop drawings, and specifications shall be submitted to the Engineer for approval before any manufacturing.

It shall be noted that the specialist sub-contractor is responsible for the “manufacturing, construction, engineering” of these systems and to guarantee that it shall operate as per the Engineers performance, design criteria, **but all these systems shall be approved by the Engineer before manufacturing and installation on site.**

The specialist sub-contractor shall be responsible for approval of the engineering and completed installations from the Local Authority or any other relevant institutional body. All certificates of approval shall be submitted to the Engineer for record purposes.

The specialist sub-contractor shall guarantee the required performance and the satisfactory operation of the special items. He shall demonstrate and operate and maintain in terms of the guarantee, the systems for a period of 52 weeks after completion.

PLUMBING AND DRAINAGE SPECIFICATION

SCOPE OF WORKS

The Sub-Contractor Contract is for the Plumbing and Solar Water Heater of the Cobosi Primary Junior School which are situated in the Eastern Cape Province.

The existing underground services (electrical, water and telephone) will be omitted and new underground services will be shown on the main Contractor's construction drawings. The subcontract's responsibilities will therefore mark all underground services routes on his drawing.

The Work to be carried out by the Domestic Water Subcontractor under this Contract comprises mainly the supply and installation of the following, including commissioning but not limited, namely:

- (i) 100L Solar Water Cylinder with the Electric back up Elements.
- (ii) Mounting frame with mounting brackets and etc
- (iii) Hot and cold water reticulation pipe including hot water insulation (terminated at roof void)
- (iv) Performing and submission of test records and certificates
- (v) Test completed installations, issue of Certificates of Compliance for Solar water heater installation.
- (vi) Produce marked as-built drawings to be submitted to the Client

The description of the Works listed above, is not necessarily complete and shall not limit the work to be carried out by the Domestic Water Subcontractor under this Contract.

SPECIFICATIONS & STANDARDS

The works carried out under this Contract shall be governed by the:

- (i) SANS 10142-1: Wiring Code,
- (ii) SANS 10400: The Application of the National Building Regulations
- (iii) The Occupational Health and Safety Act, 1993 (Act 85 of 1993)
- (iv) The Local Government Act, municipal by-laws and any special requirements of the local supply authority.
- (v) The Fire Brigade Services Act 1993 Act 2000 (Act 14 of 2000) as amended.
- (vi) The National Environmental Management Act 1998 (Act no. 107 of 1998)

1.0 GENERAL REQUIREMENTS

1.1 Project Specification

- 1.1.1 This specification applies to and is to be read in conjunction with the drawings for the hot and cold water reticulation to the building. Furthermore, this specification covers only the piping within the buildings. The requirements pertaining to the sections of piping from the ring mains to the buildings are covered by the civil engineer's specifications. Similarly, all tap fittings, shower fittings shall be to the architect's specification as detailed elsewhere.
- 1.1.2 In so far as the conditions contained herein are at variance with anything contained in the drawings, clarification shall be sought from the Engineer though generally the contract shall be interpreted in terms of the information contained on the drawings.

1.2 Occupational Health and Safety Act

- 1.2.1 All equipment supplied and installed under the contract shall meet the requirements of the Occupational Health and Safety Act (Act No 85 of 1994, (as amended) and all other relevant statutory requirements and the Contractor shall comply with the requirements laid down by the Inspector of Machinery under this Act.

1.3 Notices

- 1.3.1 The Contractor shall supply and install all notices and warning signs that are required in terms of the Occupational Health and Safety Act, by local by-laws or regulations and by these documents.

This includes notices prohibiting entry to un-authorized persons, etc.

1.4 Drawings

- 1.4.1 The drawings issued with this specification do not purport to show the exact position, size or details of construction of equipment.
- 1.4.2 Bidders must satisfy themselves that the equipment offered by them can be accommodated in the available space and positioned in such a way that access for maintenance, repairs or removal is not obstructed.
- 1.4.3 Drawings showing any alternative suggestions differing from the Engineer's design must be submitted with tenders.
- 1.4.5 Approval by the Engineer of drawings submitted by the Contractor shall not relieve him of his liability to carry out the work in accordance with the requirements of the contract documents.
- 1.4.6 **Project Drawings**

The following drawings form part of this specification and must be read in conjunction with it:

DW - Site Plan Layout

1.5 **Quality of Materials**

- 1.5.1 Only materials of high quality shall be used throughout and shall be subject to the Approval of the Engineer.
- 1.5.2 All materials, where applicable, shall conform in respect of quality, manufacture, tests and performance, with the requirements of the SABS standards, or, where no such standards exist, they shall conform to the appropriate current specification of the British Standards Institution. Materials manufactured in South Africa shall be used wherever possible.
- 1.5.3 Imported materials shall comply with the requirements of the relevant SABS or BS Specifications, although these materials need not necessarily bear the SABS mark.
- 1.5.4 All materials shall be suitable for the site conditions. These conditions shall include Weather conditions as well as prevailing conditions during installation and subsequent use.
- 1.5.5 Should the materials or components not be suitable for use under temporary site conditions the Contractor shall provide at his own cost, suitable protection until these unfavorable site conditions cease to exist.

1.6 **Tests and Inspections - Pressure Testing and Quality Control**

The Contractor shall, at no extra cost to the contract, provide all the necessary equipment and facilities to conduct all tests as directed by the Engineer and or Supply Authorities.

1.7 **Builder's Work**

- 1.7.1 The Structural Engineer will prepare details showing where all sleeves are to be positioned before any structural concrete is cast.
- 1.7.2 The Structural Engineer's approval, in writing, must be obtained before any holes or chases are cut in any structural component i.e. brickwork, concrete, steel or timber.
- 1.7.3 The Contractor shall be responsible for cutting chases and holes in walls and slabs to accommodate his services which must be coordinated in liaison with the Main Contractor who will be responsible for making good.

1.8 **Protection of Equipment**

It shall be the responsibility of the Contractor to protect all reticulation work and fittings that have been tested and accepted by the Engineer in writing during the currency of the contract.

2.0 **PIPING SPECIFICATIONS**

2.1 **Copper Piping**

Copper piping for domestic water services shall in all cases comply with the requirements of SABS 460 Class 0, 1, 2 and 3. For applications below ground class 3 shall be used, wrapped with Denso tape or similar.

Piping above ground shall be of class 1 or 2 and be jointed with capillary soldered fittings. Provision must however be made for union couplings in strategic places.

Pipes shall be firmly and neatly chased in or fixed to walls, as directed by the Principal Agent. Holder bats, saddles or brackets shall be of copper, bronze or brass. Holder bats, clips, etc shall be fixed to timber roof trusses or walls with brass screws. Piping chased into walls shall be wrapped with two layers of brown paper (Kraft) and covered with 3:1 cement mortar mix. Note that wrapping piping with old cement bags is **not** acceptable.

Hot water piping shall be of thin wall hard drawn copper.

2.2 Capillary Soldered Jointing of Copper Piping

- 2.2.1 Unless otherwise specified, all copper pipes shall be jointed with approved capillary solder type fittings, each joint being formed by cutting the pipe-ends square with a pipe cutter. If the tube end to be soldered is dirty due to cement, bitumen or tape-gum, it shall be mechanically cleaned with steel wool or abrasive paper prior to soldering.
- 2.2.2 The area to be soldered should then be thinly coated with a self-cleaning flux into the fitting apply a flame using a LP Gas blow lamp, (or an electric resistance machine) to the assembly to heat the tube and fitting for not longer than about 10 seconds. Then remove the flame completely and test the temperature of the joint by placing the wire solder at the mouth of the fitting. If the solder does not melt, remove the solder and heat again with the flame for a few seconds more. Test again with the solder. If the solder melts freely, hold the solder at about 45o to the mouth of the fitting, allowing it to melt and with steady pressure the solder will be drawn into the joint. DO NOT overheat the assembly and never hold the solder in the flame. Allow only the heat of the assembly to melt the solder.
- 2.2.3 Unless otherwise specified use only 2 or 3 mm solid core wire solder, type 97/3 (97% tin and 3% copper.) A careful check should be made to ensure that a ring of solder is visible around the mouth of the fitting.
- 2.2.4 Solders containing lead are not acceptable and not allowed.
- 2.2.5 No resin core or acid core solders are acceptable.
- 2.2.6 Fittings and pipes must be wiped clean with a damp cloth after jointing. Joints that have been fluxed should be soldered within one hour.
- 2.2.7 Copper pipes specified to be jointed with compression fittings shall be jointed with approved brass metal fittings with coupling nuts and rotary sleeve pieces.
- 2.2.8 All necessary couplings, connectors, elbows, tees and other fittings as may be required, shall be provided.
- 2.2.9 Copper pipes to be specified to be jointed with flared type fittings, shall be jointed with approved brass metal fittings with coupling nuts and cone.
- 2.2.9 N.B. Capillary, compression and flared type fittings used in jointing copper pipes must be of such a bore as will correctly fit the pipes, to ensure satisfactory jointing.
- 2.2.10 Compression ring or flared cone fittings shall always be used when making mechanical connections - see Clause 2.7 and Appendix A.
- 2.2.11 Note that compression type fittings may **NOT** be used with Class 0 copper piping.

2.3 Brazing of Copper Piping

- 2.3.1 If piping is to be brazed self fluxing copper/phosphorous with 2% minimum silver similar to Silbralloy shall be used.

2.4 Labour Bends

All labour bends shall be made with an approved bending machine in conjunction with a bending spring to give a uniform and even radius without ripple. Such bends shall be substantially undistorted.

2.5 Services Chased in to Walls

- 2.5.1 Hot water pipes buried in walls and floors shall be wrapped in two layers of stiff brown paper before being built in to aid thermal expansion of the pipes. It is **not** acceptable to use old cement bags for this purpose.

All copper water pipes chased into walls or cast into concrete slabs or columns shall be jointed using **capillary fittings only**.

2.6 **Connections to Wash Hand Basins, Baths, Sinks, etc**

Connection to all fittings (viz. taps, cisterns, machines, etc.) shall be mechanically made and not brazed or hard soldered. In this respect take note of clause 2.2.11 - it will be required that a suitable section of class 1 copper piping be joined to class 0 piping (where this has been used for the reticulation) and that the requisite compression fittings then be fixed to the class 1 copper piping. Jointing compounds (Teflon Pipe Sealer by Loctite or other approved and/or P.T.F.E. tape) shall be lead free and sparingly used.

Small diameter connections off the ring mains may be made using approved saddle connectors in conjunction with "Ball Valves" in accordance with the manufacturer's recommendations.

2.7 **De-Zincification**

All brass fittings and valves shall be certified by the manufacturers to be free from de-zincification and will be subjected to check tests as set out in Appendix A.

2.8 **Pipe Supports and Support Spacing**

All pipe work both vertical and horizontal shall be supported along its length with brackets capable of carrying the combined mass of the pipe and water and shall be spaced at the following maximum centres:

Diameter of c/c Brackets/ hangers/ holderbats (mm)	15 - 22	28 - 35	42 - 54	76 -108	Pipe (mm)
	1200	2000	2500	3000	

Unistrut: Type P1000 - 3300 (hot dip galvanised)
Brackets P1108 - P1126 (see standard drawing)

All copper pipes shall be electrically insulated from holder batts, etc with P.V.C. tape wound around the piping.

Other support systems shall be subject to approval by the Engineer or his duly appointed representative.

2.9 **Allowance for Expansion of Piping**

All straight long runs in copper tubing shall be interrupted every 15 m with an offset or an expansion loop.

2.10 **Pipe Gradients**

Hot water pipes shall be laid to a minimum gradient of 1 in 200 with auto air release valves positioned at the highest points and vented to the outside.

3.0 **VALVES AND FITTINGS**

(Refer to Clauses 2.7 and Appendix A)

3.1 **Isolating Valves**

All toilets, kitchen areas etc. shall have a main isolating valve surface mounted inside those areas to aid maintenance.

Isolating valves are not allowed in the roof areas except for connections to geysers as shown on the drawings.

Isolating valves on the cold-water line shall be of the stop cock pattern up to 42 mm diameter and of sluice or gate valve pattern above 42 mm dia.

Where the static pressure is below 200 kPa all isolating valves on the hot and cold water system shall be of the sluice or gate valve pattern.

"Stop-cocks" or "Ball-valves" shall precede all individual fittings i.e. toilet cisterns, hot water geysers, washing machines etc. All "Ball-valves" shall have hard chrome plated balls seated on Teflon seats.

3.2 **Non-Return Valves**

All non-return valves shall be of the lift type pattern.

3.3 **Automatic Air Release Valves**

Automatic air release valves shall be installed at all high points in the reticulation system where air locks can occur or as detailed by the Engineer.

Air release valves shall be preceded by an isolating valve and vented to the outside.

4.0 **SOLAR WATER HEATER**

High pressure, direct type system solar vacuum tubes water heaters are required with back up electric element, approved manufacture, in full compliance with all relevant SABS specifications (SABS 151) and be supplied complete with mounting brackets, temperature and pressure activated safety devices, air release and vacuum break valves and pressure regulating valves. They shall be piped up as indicated on the drawing.

The direct type system should consist of high pressure cylinder and solar vacuum tubes or approved.

The high pressure cylinders shall be manufactured with the inlet, outlet, magnesium bar for solar vacuum tubes, overflow and drain pipes in copper and those pipes shall project 150 mm minimum from the outside casing. The cylinder should be insulated with high density polyurethane foam. The heat should be preserve for a period of 72 hours.

Furthermore they shall be supplied complete with lagging, outer casing mounting brackets, drain cocks, heating elements and thermostats. The solar vacuum tubes shall be high efficiency and attractive, safe and environmental, customise service, easy installation and low maintenance, high socio-economic benefits, well wind, snow and hailstone resistance and with 15 years' life span with 10 years warranty.

Pressure reducing valves shall be S.A.B.S. approved and factory set to maintain a pressure of 100 +/- 10 kPa at the cylinder outlet. The pressure reducing unit shall have as an integral part of that unit:

- (a) A pressure release valve with drain connection to protect the cylinder against thermal expansion of the water.
- (b) A built-in strainer.
- (c) A built-in non-return valve associated with the reducing valve.
- (d) Isolating valves fitted to the inlet and outlet sides of the reducing valves.
- (e) Combined Temperature, Pressure and Vacuum release valves fitted into the delivery side of the cylinder. The T.P. valve shall have a drain connection built into it and shall be fitted so that the probe is in the cylinder. The drain from the reducing valve and T.P.V. shall be laid to a fall of 1:60 minimum and discharge over a gully. The drain pipe shall be a minimum of 22 mm diameter.
- (f) Pressure reducing valves shall be installed in accordance with the manufacturer's recommendations and MUST BE POSITIONED FOR EASY MAINTENANCE.

Certificates are required from the manufacturer of the hot water cylinders confirming that they have been pressure tested to 2,5 times the normal working pressure of 400 kPa gauge.

The hot water cylinders shall be guaranteed from date of practical completion of the installation for a period of three years on the tank, insulation and outer casing and for one year on the electrical components.

5.0 **HYDRAULIC TESTING OF WATER PIPES**

All water piping shall be hydraulically tested to a pressure equal to 3 times the working pressure but not less than 1000 kPa held for 60 minutes or as long as it takes to inspect every joint in the section being tested, whichever is the greater. The test shall take place in the presence of the Engineer or his duly appointed representative with the results being recorded for inclusion in the practical completion documentation and certification.

Under no conditions shall "leak cure chemicals" be introduced into the reticulation system.

All leaks shall be made good, so that the quality of the original components is not altered and so that the repairs are to the satisfaction of the Engineer or his duly appointed representative.

The Contractor shall provide all the necessary equipment required to carry out the tests on the pipes. Piping shall be tested in sections as the work progresses and before being covered in trenches or wall or floor chases. The completed pipe line shall also be pressure tested just prior to practical completion of the installation.

Failure to comply with the above will result in the contractor being required to expose the piping in question **at his own expense** in order for the pressure tests to be carried out.

6.0 **PAINTING**

All exposed and visible reticulation lines shall be painted by the Contractor. All piping shall be colour coded in accordance with the requirements of the SABS colour code. Identification of the contents of a pipe line shall be by means of painting a colour code on the pipes as required by the SABS colour code and these bands shall be painted on by the Contractor.

The colour coding shall consist of a primary colour only or of primary and secondary colour and shall generally consist of 300mm long primary colour bands painted around the pipe. Where applicable a central 100mm secondary colour band shall be added. Where short lengths of pipes run through occupied areas and in plant rooms the primary colour shall be applied to their entire length.

Where only bands can be applied they shall be at intervals of not more than 6m apart and adjacent to each side of a bend, valve, etc.

Where pipe runs are hidden, i.e. within ducts, false ceilings, etc colour coding bands shall be provided opposite each access panel or similar.

Arrows indicating the direction of flow of the contents of the pipe shall be applied as per colour coding bands.

7.0 **LABELLING OF VALVES, ETC.**

All main stop valves, control valves, etc. shall be labelled by means of rustless metal tags indicating their purpose and the section they isolate, if isolating valves. The tags shall be securely fixed to the valves, and shall be clearly legible.

Letters on labels shall be punched. No painted labels or plastic embossed labels will be accepted.

Alternatively 12 mm wide stainless steel tape embossed labels may be used fixed with copper wire to the relevant valves.

MAINTENANCE

Immediately after each interim or final practical completion inspection all defects noted shall be rectified. Latent defects appearing within three (3) months or as specified, shall be rectified by the Contractor at no charge to the Client.

END OF SPECIFICATION

TO TEST FOR DE-ZINCIFICATION - AN ON SITE CHECK (PRANGE TEST)

Refer to Clause 2.7

1. Dissolve the following chemicals in sufficient water to make 1 litre.

125 gm/l of copper sulphate crystals commercial grade.

45 gm/l of sodium acetate crystals commercial grade.

27,5 gm/l of acetic acid.

27 gm/l of potassium chloride.

The above mixture is stable but however should be replaced every 6 months. It is recommended that the above mixture be made up by a Chemist.
2. The brass parts to be tested must have the plating removed, if any, and polished using "00" emery cloth to give a smooth satin finish.
3. Apply 2 to 3 drops of the mixture to the prepared surface and allow to stand for at least 5 minutes.
4. Wipe clean and dry.
5. If the test area has turned a copper colour then that fitting is probably prone to de-zincification and fittings of that make must be rejected unless the S.A.B.S., through the Manufacturer, can give an evaluation certificate to the contrary.
6. The full test for de-zincification is covered in I.S.O. 6509 and B.S.S.2872.

**FIRE PROTECTION
SPECIFICATION**

DESIGN & INSTALLATION OF THE FIRE PROTECTION SYSTEM

DESIGN SYSTEM REQUIREMENTS

A3 – Places of Instruction: Occupancy where school children, students or other persons assemble for purpose of tuition or learning.

Floor Area = +/-1000m²

RETURNABLES

FIRE TECHNICIAN REQUIREMENTS.

Fire Protection Technician member company must have its Technician registered with SAQCC Fire.

Bidders must complete the following questionnaire and submit it with this tender.

- a) Has the Fire Protection Technician Subcontractor been registered with South African Qualification and Certification Committee (SAQCC) Fire. YES/NO
Registration No:
Date of issue:
- b) Has the Fire Protection Subcontractor been registered with the Department of Manpower?
- i) Registered for Workmen's Compensation for Occupational Injuries and Diseases Act YES/NO
Registration No:
Date of issue:
- ii) The Unemployment Insurance Commissioner YES/NO
Registration No :
Date of issue:

I/We certify that the above information is correct

Signature:

Name of Signatory:

Name of Firm Represented:

Address:

.....

.....

Date:

NOTE: IN TERMS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT FAILURE TO COMPLY WITH THIS CLAUSE OF THE SPECIFICATION MAY RESULT IN DISQUALIFICATION AND REJECTION OF THE TENDER.

DETAILS OF PROTECTION RETICULATION AND EQUIPMENT TECHNICIAN

I/We certify that is a registered fire Technician in terms of the Occupational Health and Safety Act (Act 85 1994) and is permanently employed by my/our company trading as:

.....

.....
I/We further certify that the abovementioned person will be appointed as the responsible person in charge of the installation, which person shall personally supervise the whole of the fire protection system works as tendered for from inception to completion inclusive of signing all commencement/completion/ cost certificates necessary as part of the Works.

I/We further certify that I am/We are fully aware of the provisions of the Occupational Health and Safety Act (Act 85 1994), and that my/our company is trading as a registered fire detection & alarm system installation organization.

**SIGNATURE OF
Bidder**

.....

**SIGNATURE OF
TECHNICIAN**

.....

**REGISTRATION
NUMBER OF
TECHNICIAN**

.....

DATE

.....

COMPANY STAMP

FIRE PROTECTION TECHNICAL SPECIFICATION

SCOPE OF WORKS

The Main Sub-Contractor is for the construction of the Plumbing at Cobosi Primary Junior School which are situated in the Eastern Cape Province.

The Work to be carried out by the Fire Protection Subcontractor under this Contract comprises mainly the supply and installation of the following, including commissioning but not limited, namely:

- (i) Fire protection water pipe reticulation
- (ii) Mounting frame with mounting brackets and etc
- (iii) Complete set of fire hose reel
- (iv) Pressure gauge and isolating & non-return valves
- (v) Portable fire extinguishers
- (vi) Fire equipment and arrow signage / symbol
- (vii) Fibre-glass cubicle for fire extinguishers
- (viii) Connection of fire protection pipework to civil fire mains supply
- (ix) Sleeve for underground pipework
- (x) Performing and submission of test records and certificates
- (xi) Test completed installations, issue of Certificates of Compliance for pressure testing
- (xii) Produce marked as-built drawings to be submitted to the Client

The description of the Works listed above, is not necessarily complete and shall not limit the work to be carried out by the Domestic Water Subcontractor under this Contract.

SPECIFICATIONS & STANDARDS

The works carried out under this Contract shall be governed by the:

- (i) SANS 10142-1: Wiring Code,
- (ii) SANS 10400: The Application of the National Building Regulations
- (iii) The Occupational Health and Safety Act, 1993 (Act 85 of 1993)
- (iv) The Local Government Act, municipal by-laws and any special requirements of the local supply authority
- (v) The Fire Brigade Services Act 1993 Act 2000 (Act 14 of 2000) as amended
- (vi) The Environmental Regulations Act 1998 (Act no. 107 of 1998)

1.0 GENERAL REQUIREMENTS

1.1 Project Specification

1.1.1 This specification applies to and is to be read in conjunction with the drawings for the hot and cold-water reticulation to the building. Furthermore, this specification covers only the piping within the buildings. The requirements pertaining to the sections of piping from the ring mains to the buildings are covered by the civil engineer's specifications. Similarly, all tap fittings, shower fittings shall be to the architect's specification as detailed elsewhere.

1.1.2 In so far as the conditions contained herein are at variance with anything contained in the drawings, clarification shall be sought from the Engineer though generally the contract shall be interpreted in terms of the information contained on the drawings.

1.2 Occupational Health and Safety Act

1.2.1 All equipment supplied and installed under the contract shall meet the requirements of the Occupational Health and Safety Act (Act No 85 of 1994, (as amended) and all other relevant statutory requirements and the Contractor shall comply with the requirements laid down by the Inspector of Machinery under this Act.

1.3 Notices

1.3.1 The Contractor shall supply and install all notices and warning signs that are required in terms of the Occupational Health and Safety Act, by local by-laws or regulations and by these documents.

This includes notices prohibiting entry to un-authorized persons, etc.

1.4 Drawings

1.4.1 The drawings issued with this specification do not purport to show the exact position, size or details of construction of equipment.

1.4.2 Bidders must satisfy themselves that the equipment offered by them can be accommodated in the available space and positioned in such a way that access for maintenance, repairs or removal is not obstructed.

1.4.3 Drawings showing any alternative suggestions differing from the Engineer's design must be submitted with tenders.

1.4.5 Approval by the Engineer of drawings submitted by the Contractor shall not relieve him of his liability to carry out the work in accordance with the requirements of the contract documents.

1.4.6 Project Drawings

The following drawings form part of this specification and must be read in conjunction with it:

FP - Floor Layout

1.5 Quality of Materials

- 1.5.1 Only materials of high quality shall be used throughout and shall be subject to the approval of the Engineer.
- 1.5.2 All materials, where applicable, shall conform in respect of quality, manufacture, tests and performance, with the requirements of the SABS standards, or, where no such standards exist, they shall conform to the appropriate current specification of the British Standards Institution. Materials manufactured in South Africa shall be used wherever possible.
- 1.5.3 Imported materials shall comply with the requirements of the relevant SABS or BS Specifications, although these materials need not necessarily bear the SABS mark.
- 1.5.4 All materials shall be suitable for the site conditions. These conditions shall include weather conditions as well as prevailing conditions during installation and subsequent use.
- 1.5.5 Should the materials or components not be suitable for use under temporary site conditions the Contractor shall provide at his own cost, suitable protection until these unfavorable site conditions cease to exist.

1.6 Tests and Inspections - Pressure Testing and Quality Control

The Contractor shall, at no extra cost to the contract, provide all the necessary equipment and facilities to conduct all tests as directed by the Engineer and or Supply Authorities.

1.7 Builder's Work

- 1.7.1 The Structural Engineer will prepare details showing where all sleeves are to be positioned before any structural concrete is cast.
- 1.7.2 The Structural Engineer's approval, in writing, must be obtained before any holes or chases are cut in any structural component i.e. brickwork, concrete, steel or timber.
- 1.7.3 The Contractor shall be responsible for cutting chases and holes in walls and slabs to accommodate his services which must be coordinated in liaison with the Main Contractor who will be responsible for making good.

1.8 Protection of Equipment

It shall be the responsibility of the Contractor to protect all reticulation work and fittings that have been tested and accepted by the Engineer in writing during the currency of the contract.

NO WELDING OR HEAT CUTTING IS PERMITTED ON ANY SITE OF ERECTION

The edges of pipe to be welded shall be machine bevelled wherever possible. Gas cuts shall be true and free of all burned material. Before welding the surfaces shall be thoroughly cleaned and degreased. Piping shall be carefully aligned. No metal shall project within the pipe. Mitred joints will not be allowed.

Only welded fittings prefabricated by recognised manufacturers will be permitted. No other prefabricated welding fittings will be permitted without the express approval of the Engineer.

For branch piping sixty five millimetres (65 minimum) in size or larger, use welding tees, with flanged outlet. For piping 200 mm and larger use shaped spigots and welding neck flanges. Cracks, pinholes, excessive undercutting etc. shall be removed and the joints rewelded. Welders and welding processes shall meet the requirements of the SANS Code for welders.

- 2.3.4 Jointing of mild steel and galvanised piping using grooved pipe fittings and couplings may be used provided they have been approved by SANS. Proper gaskets, designed for the applications shall always be used. Approval by the consulting Engineers must in all cases be obtained prior to the utilisation of such fittings.

10.0 Identification

Colour Coding

10.1 General

All equipment shall be colour-coded in accordance with standards recognised, and where possible to comply with relevant SANS colour codes unless specified otherwise.

10.2 Colour Coding of Pipes

Identification of the contents of pipes shall either be by painting a 100 mm wide primary colour band or by using self-adhesive PVC coloured tape. The colour of the paint or tape shall comply with SANS 0140 Identification Colour Marking, Part III, Contents of Pipelines, as detailed below.

The colour names referred to in the table s are specified in SANS 1091.

TABLE OF COLOUR CODING FOR PIPELINES AS PER SANS 0140 PART III - 1978

CONTENTS OF PIPE PRIMARY COLOUR BANDS

FIRE FIGHTING

All Pipes Signal Red

11.0 Builders Work

The Engineer will prepare details showing where all sleeves are to be positioned before any structural concrete is cast.

The Engineer's approval, in writing, must be obtained before any holes or chases are cut in any structural component i.e. brickwork, concrete, steel or timber.

The Contractor shall be responsible for cutting chases and holes in walls and slabs to accommodate his services which must be coordinated in liaison with the Main Contractor who will be responsible for making good.

12.0 Excavation

12.1 General:

Bidders are to note that excavation shall be carried out by the main contractor.

13.0 Operating and Maintenance Details

Two complete sets of operating manuals complete with spares schedules, as fitted layout drawings, schematic diagrams and operating and general maintenance information, bound in hardcover ring binders shall be prepared by the Contractor and delivered to the Engineer 14 days prior to practical completion for approval, at or before final handover.

A full "RECORD" set of drawings shall also be submitted to the engineer for record purposes.

14.0 Schedules of Information

The schedules of information contained in this document consists of 2 sections:

- a. Information supplied by the Engineer (schedules of drawings, sleeves etc. as applicable.)
- b. Information to be supplied by the Contractor at tender stage (tender form, information on the makes, types and ratings of equipment and materials offered, schedules of prices and rates for variations, schedules of quantities, etc. as applicable.)

Bidders are required to enter, at the time of tendering, in the "Schedule of Equipment and Material Offered", sufficient details to enable the equipment concerned to be identified without ambiguity.

It is not sufficient for a tender to state "as specified" in the schedules.

Failure to complete these schedules (if applicable) may render a tender invalid.

15.0 Samples and Alternatives

Bidders may be required to submit for approval, comment or records samples of materials, apparatus or components, and also drawings, schematic diagrams or technical details, including calculations, upon which their design and/or offer is based before any contract is awarded. Such details may also be called for during the course of the Contract prior to installation. Any approvals given or comments made shall be on the generality of the scheme and shall not relieve the Contractor of his responsibility to ensure the full compliance with all performance and regulatory criteria.

NOTE: A request for submission of samples or drawings does not imply that the Tenderer's quotation will necessarily be accepted.

Any particular make or model of equipment referred to in the Documentation is for guidance purposes only in setting standards / types / performances required; equipment that is equal or superior in all respects, and to the approval of the Engineer, may be offered by Bidders. No reference to any particular make of any equipment shall be construed as that equipment having been selected by the Engineer or Client and the Contractor shall be fully responsible for the guarantee and performance of such equipment.

16.0 Certification on Completion of Guarantee and Maintenance Period

In the month prior to the expiry of the guarantee and first twelve months maintenance period the Engineer shall inspect and, if necessary, retest the installation so as to be able to provide the Tenant with a certificate, within fourteen days of the guarantee expiry date, to confirm that the guarantee has been honoured and that the installation has been properly serviced at required regular intervals by the sub-contractor.

The cylinders shall be guaranteed from date of take over for a period of three years on the tank, insulation and outer casing and for one year on the electrical components.

17.0 Supervision of Workmanship and Details

The work shall at all times, for the entire duration of the contract, be executed under the supervision of a skilled and competent representative of the subcontractor, who must be able and authorized to receive and execute instructions on behalf of the Mechanical Subcontractor.

In the event that inferior materials or bad workmanship, on the part of the subcontractor, leads to remedial work requiring redesign by the Engineer, the cost of this work, including related

professional fees, shall be borne by the Subcontractor.

Similarly, should delays in the contract be caused by poor performance on the part of the Contractor causing the Engineer to spend extraordinary time on the project, the extra costs incurred shall be borne by the Contractor.

These costs will be based on the SAACE hourly rates and will be deducted from claims due or claims which will become due to the Contractor.

18.0 Making Good

The subcontractor will carry out in all instances any work to be made good such as damage to or disturbances of the building installations caused by himself or his employees during the execution of the contract, at his own cost.

19.0 Test and Inspections - Pressure Testing and Quality Control

The Contractor shall, at no extra cost to the contract, provide all the necessary equipment and facilities to conduct all tests as directed by the Engineer and or Supply Authorities.

20.0 Commissioning and Testing

20.1 Commissioning:

A documented method shall be followed whereby the mechanical subcontractor shall ensure that his installation is correctly constructed in accordance with the manufacturers' specifications, consultant's specification, consultant's design and all codes of practice and international design codes.

The commissioning procedure must allow for signing off of the major items of equipment by a qualified person in terms of the codes. These signed off documents will form part of the record drawings.

20.2 Performance Tests:

The mechanical subcontractor shall be responsible for the physical testing, in the manufacturing works, or on site, of the items of plant or systems as required by the Engineer. These tests shall be performed by the mechanical subcontractor or supplier of the equipment, and where called for, the Engineer shall witness such tests. The Engineer may also only witness a representative sample of the equipment tests. In any event, the mechanical subcontractor will supply documentary proof of full performance tests of all relevant equipment.

20.3 Acceptance Tests:

All brass fittings and valves shall be certified by the manufacturers to be free from de-zincification and will be subjected to check tests.

Acceptance tests will be performed on site of the working system or sub system, to show that the works, as installed, is functioning according to the specifications and design. The onus for the correct functioning of the systems is still on the mechanical subcontractor irrespective of whether the Engineer has witnessed the acceptance tests or not. Prior to the system being connected, a test certificate must be issued by / given to the local electricity supply authorities.

21.0 Compliance with Regulations, Standards and Codes

- 21.1 The subcontractor will arrange for all inspections and testing of the installation after completion, including the issuing of the Certificate of Compliance. All notices, fees, including inspection and re-inspection are the responsibility of the subcontractor and all the relevant costs shall be borne by him.
- 21.2 The workmanship throughout the Works will be to the satisfaction of the Employer. Any materials or workmanship considered as faulty or incorrectly or inadequately erected or repaired, will be substituted, altered or rectified to the satisfaction of the Employer, without additional cost to the Employer.
- 21.3 The Works will be executed in strict accordance with the following:-
- a. All relevant by-laws and regulations of local authorities.
 - b. All relevant SANS, BS and other international standards of the latest revision, where applicable.
 - c. The Occupational Health and Safety Act of 1993 as amended.

22.0 Monthly Certificates

Pro forma claim forms are available from the Engineer. These are available in a blank copied format or as a computer file in Excel. This is the preferred method of submitting payment claims. Should the subcontractor have developed his own method of claiming, this may be submitted to the Engineer for consideration.

23.0 Programme

- 23.1 The subcontractor must conform to the programme as submitted by the Principal Contractor. The estimated period for completion, as tendered, is as per the builder's programme. The cost of overtime, additional labour and plant for the completion of the works, in accordance with the programme, must be included in the Tenderer's price for the project. The cost of any work outside the requirements of the programme or necessary under exceptional circumstances will be for the Employers' account only if covered under a variation order.

24.0 Drawings

24.1 Tender Drawings

All drawings, those supplied loose, as well as those bound in, form part of this enquiry and are listed. It is the Tenderer's responsibility to inform the Engineer as to the absence of any of these drawings.

25.0 Sufficiency of Tender

- 25.1 The Tenderer's offer shall be for the supply, delivery, installation, and commissioning of the complete installation as detailed, described or implied in this document and on the accompanying drawings.
- 25.2 The Tenderer's offer shall be deemed to have satisfied himself before tendering as to the correctness and sufficiency of his tender for the Works and that the rates and prices he has entered in the schedules shall cover all his obligations under the contract for the proper completion of the Works.

26.0 Measurement

- 26.1 The Bidder shall not make any assumption regarding the installation. If there is any doubt or ambiguity, the Engineer must be consulted. The Bidder shall take cognisance of the fact that the schedule of quantities is re-measurable and the quantities may be adjusted at the end of the contract.
- 26.2 All measurements are nett, unless otherwise stated, and Bidders must allow in the rate for wastage.

27 MAINTENANCE

Immediately after each interim or final practical completion inspection all defects noted shall be rectified. Latent defects appearing within three (3) months or as specified, shall be rectified by the Contractor at no charge to the Client.

END OF SPECIFICATION

2.3 SCHEDULE OF MATERIALS & EQUIPMENT OFFERED

Bidders shall complete the following schedule of materials and equipment offered and undertakes that the actual materials and equipment installed shall be in accordance with this schedule. Enter N/A if not applicable for that particular item / installation.

Bidders are to take note that if the material offered is not to specification, this may lead to the bid being disqualified.

Col.	1	2	3	4	5
Item	Item	Make or Trade Name	Material to Spec? (Give details if not)	SABS Mark Y/N	Country of Origin
1.0	Fire hose reel				
2.0	CO2 hand held fire extinguisher				
3.0	DCP hand held fire extinguisher				
4.0	Fire equipment signage				
5.0	Pressure gauges				
6.0	Fibre-glass fire extinguisher cubicle				
7.0	Galvanised steel pipe				
8.0	Isolating valves				
9.0					

NOTE : Bidders are to note that under no circumstances may materials be installed other than offered in the above materials schedule, which has been approved and accepted by the Contractor.

Should the successful Bidder wish to supply materials other than those originally offered, prior written approval must be obtained from the Contractor before any orders are placed.

.....

NAME OF Bidder

.....

TENDERER'S SIGNATURE

3.1 PRICING INSTRUCTIONS

- 1 These Bills of Quantities contain pages numbered in the consecutive order. The Bidder is required to check the numbers of pages and should any page be found to be missing, or in duplicate, or if any reproduction is indistinct, or if any ambiguity arises as to the meaning of any item or description, or if these Bills of Quantities contain any obvious errors, then the Bidder must immediately inform the Engineer and have the same rectified or explained, as the case may be. No claim will afterwards be considered where the Bidder has failed to comply with these instructions.
- 2 The units of measurement described in the Bills of Quantities are metric units. Abbreviations used in these Bills of Quantities are as follows:

%	=	percent
h	=	hour
km	=	kilometre
kW	=	kilowatt
mm	=	millimeter
m	=	metre
m ²	=	square metre
m ³	=	cubic metre
No.	=	number
Prov sum	=	Provisional sum
R/only	=	Rate only
Sum	=	lump sum
W/day	=	Work day
- 3 Unless otherwise stated, items are measured net in accordance with the drawings, and no allowance is made for waste.
- 4 The prices and rates in these Bills of Quantities are fully inclusive prices for the work described under the items. Such prices and rates cover all costs and expenses that may be required in and for the execution of the work described in accordance with the provisions of the Scope of Work, and shall cover the cost of all general risks, liabilities, and obligations set forth or implied in the Contract Data, as well as overhead charges and profit. These prices will be used as a basis for assessment of payment for additional work that may have to be carried out.
- 5 It will be assumed that prices included in these Bills of Quantities are based on Acts, Ordinances, Regulations, By-laws, International Standards and National Standards that were published 28 days before the closing date for tenders. (Refer to www.stanza.org.za or www.iso.org for information on standards)
- 6 Where the Scope of Work requires detailed drawings and designs or other information to be provided, all costs associated therewith are deemed to have been provided for and included in the unit rates and sum amount tendered such items
- 7 An item against which no price is entered will be considered to be covered by the other prices or rates in the Bills of Quantities. A single lump sum will apply should a number of items be grouped together for pricing purposes.
- 8 The quantities set out in these Bills of Quantities are approximate and do not necessarily represent the actual amount of work to be done. The quantities of work accepted and certified for payment will be used for determining payments due and not the quantities given in the Bills of Quantities.
- 9 Reasonable compensation will be received where no pay item appears in respect of work required in the Bills of Quantities in terms of the Contract and which is not covered in any other pay item.

- 10 The short descriptions of the items of payment given in these Bills of Quantities are only for the purposes of identifying the items. More details regarding the extent of the work entailed under each item appear in the Scope of Work.
- 11 Those parts of the contract to be constructed using labour-intensive methods have been marked in the Bills of Quantities with the letters LI in a separate column filled in against every item so designated. The works, or parts of the works so designated are to be constructed using labour-intensive methods only. The use of plant to provide such works, other than plant specifically provided for in the scope of work, is a variation to the contract. The items marked with the letters LI are not necessarily an exhaustive list of all the activities which must be done by hand, and this clause does not over-ride any of the requirements in the generic labour intensive specification in the Scope of Works.
- 12 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.
- 13 The responsibility for the accuracy of the quantities written into the Bill remains with the person who prepared the Bill. The Bidder shall be relieved of responsibility of measuring quantities at the tender stage, and the tender sum submitted shall be in respect of the quantities set out in the Bills, although he will be required to make his assessment of items such as brackets, fixing, etc., from details stated in the Bills and shall include in the item prices for such small installation materials as are required for the complete installation in accordance with the Specification.
- 14 The Bills of Quantities are not to be used for ordering purposes. Any orders placed by the Contractor on the basis of these Bills of Quantities shall be at his own risk.

The quantities given in the Bill for cable, cable markers, earth wire laid with cable and excavations cannot be regarded as exact and are subject to measurement on site after completion of the service and adjustments will be made according to the unit rates given in the Bill.

Notwithstanding the fact that the lengths of cables as given in the Bills of Quantities have been measured from scaled drawings, the contractor shall check such lengths on site before ordering the cable, as he will not be paid for excess cable after the completion of the service. Any allowance for off-cuts shall be made in the unit rates. The final measurements shall be based on the net route length of the cables concerned.

- 15 All items described as "Provisional" shall be measured as executed and paid for according to prices in the Bills of Quantities and any unexpended amounts shall be deducted from the amount of the contract sum. No work for which "Provisional" items are provided shall be commenced without written instructions from the Engineer.
- 16 Materials encountered in the excavations for cable trenches, lighting standard and bollard holes generally shall, unless special provision to the contrary is made hereinafter, be classified as follows:-
- a) 'Hard rock' shall mean any excavation requiring the use of explosives.
 - b) 'Soft rock' shall mean any excavation which necessitates the use of pneumatic tools.
 - c) 'Ordinary material' shall mean all pickable material.

In the event of any dispute regarding the classification of material, the Engineer's decision in this connection shall be final.

Should the Contractor consider that any material encountered in the excavations is 'hard rock' or 'soft rock', he shall immediately notify the Engineer in writing. Failing such notification the excavation shall be assumed to be in 'ordinary material' and shall be measured and valued accordingly. Wherever practicable all excavation in ground other than 'hard rock' and/or 'soft rock' shall be carried out first after which levels will be taken of the exposed 'hard rock' and/or 'soft rock' and agreed upon by the Engineer and the Contractor.

Where the Contractor encounters a combination of 'hard rock' and/or 'soft rock' simultaneously in a section of trench and employs explosives or pneumatic tools to remove all the various types of materials in that section of trench, the use of these methods of removal will in no way influence the Engineer's classification of the materials.

Information Required Prior to Commissioning

The following information is required prior to commissioning being carried out to ensure that the system is set up and tested in accordance with the customers' requirements and specification:

- As fitted drawings detailing all devices installed and the sequence they are connected on each loop,
- Copy of design specification with variations,
- Cause and effect schedule. The system will need to be up to a predetermined cause and effect, this needs to be confirmed in writing or in the form of cause and effect matrix.

Documentation:

On completion of commissioning and user training all documentation will have to be collected and handed to the client or their representative. This include:

- Design, Installation and Commissioning certificates,
- Product manuals and user instructions,
- As fitted/ build drawings of the final installation,
- A copy of the fire plan documentation against which the commissioning Engineer programmed the system,
- The designer's specification and a written list of agreed variations.

PART C.4 – SITE INFORMATION

**CONSTRUCTION OF NEW ECD EDUCATIONAL FACILITIES
AT COBOSI PRIMARY JUNIOR SCHOOL
CONTRACT NO.: CDC/329/24, EMIS Nu.: 200400085, ECDoe P Nu.: P9007203**

C4 Site Information

1. Site Location

The site is part of the existing school, **CONSTRUCTION OF A NEW ECD EDUCATIONAL FACILITIES AT COBOSI PRIMARY JUNIOR SCHOOL (EMIS NO. 200400085)**. The GPS coordinates to the site are as follows: **(X 28.12755300°, Y -31.79543100°)**. It is situated at Engcobo.

The defined working areas, entrances, site restrictions, etc. will be defined in detail at the Briefing session.

Geotechnical Report

The geotechnical report is available from the Civil/Structural Engineer.

EXISTING PREMISES ON SITE

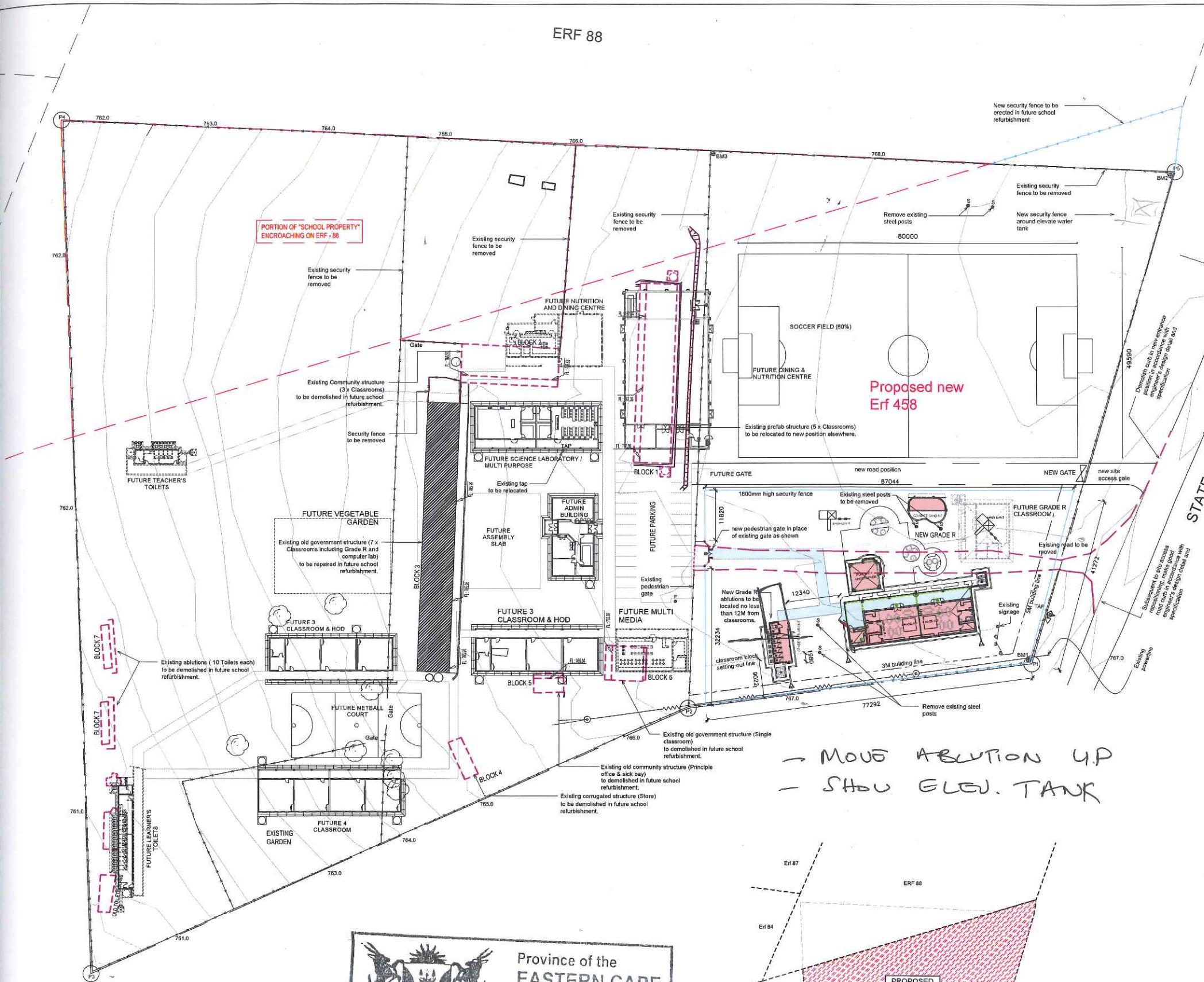
Prospective Bidders are to take cognizance of the fact that **CONSTRUCTION OF A NEW ECD EDUCATIONAL FACILITIES AT COBOSI PRIMARY JUNIOR SCHOOL will take place on the** existing school site, **a fully operational school for the full duration of the Building Contract.**

Bidders' attention is drawn to the following specific requirements:

-Dust Control

-Noise Control - works executed after 5pm to 8am weekdays, works over weekends and public holidays shall be agreed with the Principal Agent prior commencement.

ERF 88



Province of the
EASTERN CAPE
Education

Date: 15/06/2017 Approved:

→ MOVE ABUCTION UP
→ SHOW ELEV. TANK

AREA CALCULATION	
Portion	Area
Proposed new Erf 458	28 415sqm

TABLE 1: SUMMARY FOR HUMAN CAPITAL

TABLE 1A: GRADE ENROLMENT FIGURES FOR 2018			
SCHOOL GRADE	BOYS	GIRLS	TOTAL
R	39	20	59
01	55	38	93
02	55	44	99
03	45	34	79
04	31	30	61
05	26	24	50
06	28	27	55
07	24	40	64
TOTAL	303	257	560

TABLE 1B: NUMBER OF ADMINISTRATION STAFF				
MALE TEACHING	FEMALE TEACHING	MALE NON-TEACHING	FEMALE NON-TEACHING	TOTAL
5	7	-	-	12

TABLE 2: SUMMARY FOR SCOPE OF WORKS

TABLE 2A: DEMOLITION WORKS			
BLOCK	BUILDING USAGE	AREA	SIZE
N/A	Admin / Toilets etc	N/A	N/A
		QUANTITIES	TOTAL FOR ALL BLOCKS
N/A	Classrooms	No. of Clams	NA
N/A	Toilets	No. of Cubicles	NA

TABLE 2B: RENOVATION / REFURBISHMENT WORKS			
BLOCK	BUILDING USAGE	AREA	SIZE
N/A	Admin Block	NA	NA
N/A	Science Block	NA	NA
		QUANTITIES	TOTAL FOR ALL BLOCKS
N/A	Classrooms	No. of Classrooms	N/A
N/A	Toilets	No. of Cubicles	N/A

TABLE 2C: NEW WORKS

BLOCK	BUILDING USAGE	BUILDING AREA	VERANDA AREA	TOTAL COVERED	TOTAL USABLE
1	GRADE R - BUILDING	227m²	101m²	328m²	68m² x 136m²
2	GRADE R - PLAY AREA	48.5m²	0m²	48.5m²	
3	GRADE R - SAND PIT	27.0m²	0m²	27.0m²	
4					
5					
6					
7					

TABLE 2D: NEW WORKS					
TOTAL NUMBER FOR ALL CURRENTLY PROVIDED CLASSROOMS IN THIS SCHOOL					
CLASSROOMS					TOTALS
Total Number of Renovated/Refurbished Classrooms					0
Total Number of Newly provided Classrooms					2
GRAND TOTAL OF ALL CURRENT CLASSROOMS FOR THIS SCHOOL					10

LEGEND - WORKS REQUIRED

	EXISTING ACCESS ROUTES AND ROADS
	NEW INTERNAL FENCE FOR GRADE R
	EXISTING PERIMETER FENCE
	EXISTING WALKWAYS
	ROOF LINE OVER
	EXISTING BUILDING - NOT PART OF SCOPE OF WORK
	EXISTING BUILDING - REQUIRES REFURBISHMENT
	EXISTING BUILDING - DEMOLISH AS PER ENGINEER
	NEW PLATFORM & PARKINGS
	NEW WALKWAYS
	NEW BUILDINGS

MUNICIPAL STAMP

CONSTRUCTION NOTES

ALL WORKS TO BE CARRIED OUT STRICTLY IN ACCORDANCE WITH MUNICIPAL AND/OR LOCAL AUTHORITY REGULATIONS. DO NOT SCALE THE DRAWING. FIGURED DIMENSIONS TO BE TAKEN IN PREFERENCE TO UNFIGURED DIMENSIONS. ALL RELEVANT DETAILS, LEVELS, AND DIMENSIONS TO BE CHECKED ON SITE PRIOR TO COMMENCEMENT OF WORK. ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ARCHITECT.

TRADE NAMES

WHERE TRADE NAMES ARE SPECIFIED ON DRAWINGS, THE CONTRACTOR IS RESPONSIBLE TO SOURCE MATERIALS THAT ARE EQUAL OR OTHERWISE APPROVED BY THE DEPARTMENT OF ROADS AND PUBLIC WORKS.

THESE DRAWINGS WILL BE ISSUED FOR INFORMATION FOR THE FOLLOWING SCHOOL:

SCHOOL NAME: COBOSI PRIMARY JUNIOR

EMIS NUMBER:

The architect hereby assures the Eastern Cape Department of Education and the Eastern Cape Department of Roads and Public Works that these drawings concur with the approved Site Development Plans, and will be used without any changes or alterations. Any necessary and unavoidable changes or alterations must be preapproved by the Eastern Cape Department of Education and Eastern Cape Department of Roads and Public Works before any works commences on construction site.

PROJECT ARCHITECT: ROELOF DU PREEZ

SACAP NUMBER: PRARCH 401266

SIGNATURE:

EASTERN CAPE SCHOOL BUILDING PROGRAMME

COBOSI PRIMARY JUNIOR SCHOOL - CLUSTER 9

SITE DEVELOPMENT PLAN

CLIENT

Province of the **EASTERN CAPE** EDUCATION

IMPLEMENTING AGENTS

COEGA

ARCHITECT

TCN Architects

1:1613.8

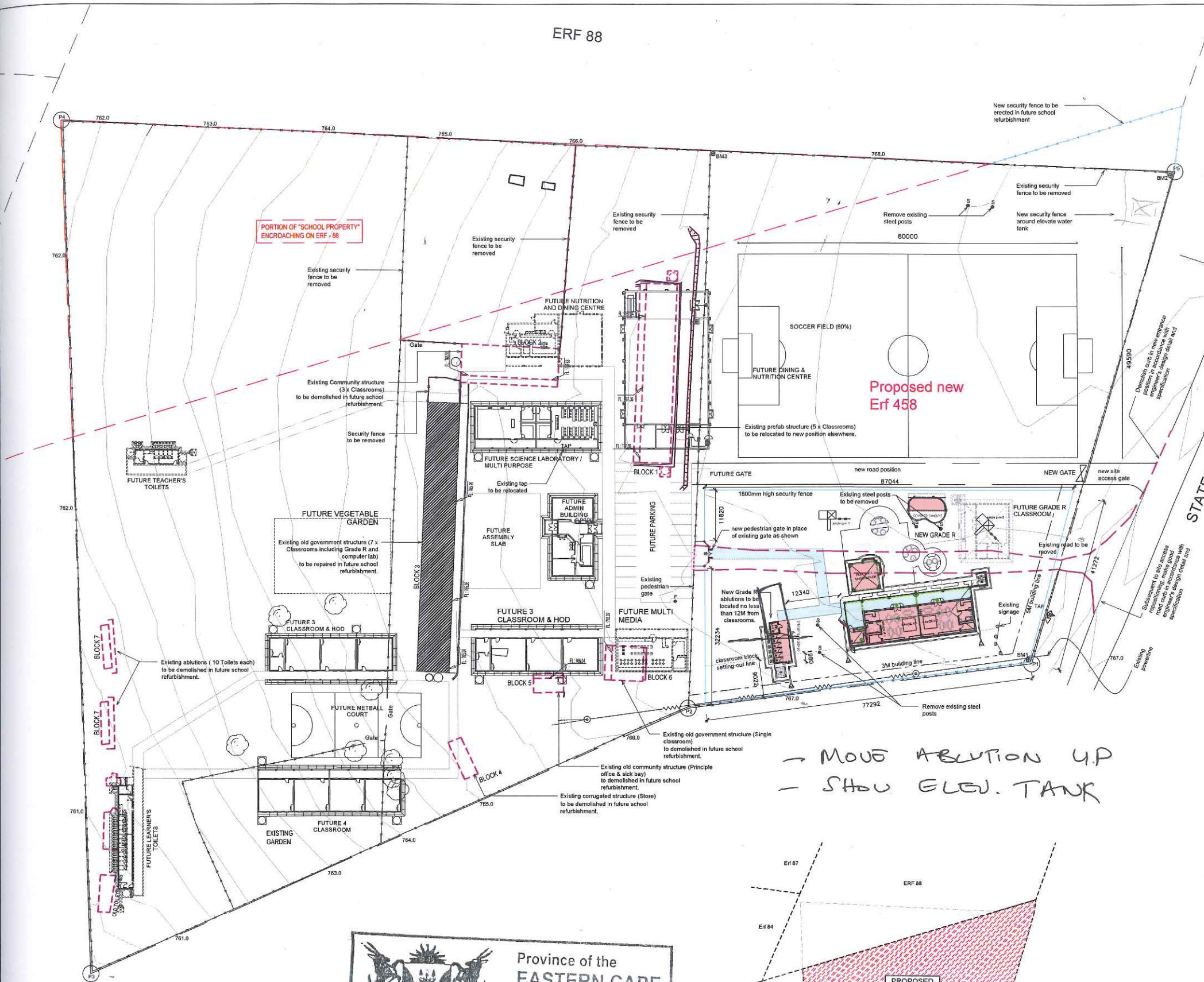
1613.8 - AR - DES - 001

REV 2

1 June 2017 1:500

SITE DEVELOPMENT PLAN
scale 1:500

ERF 88



Proposed new Erf 458

→ MOVE ABULTION UP
→ SHOW ELEV. TANK

Province of the
EASTERN CAPE
Education
Date: 15/06/2017 Approved: [Signature]

AREA CALCULATION	
Portion	Area
Proposed new Erf 458	28 415sqm

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SCHOOL GRADE	BOYS	GIRLS	TOTAL
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01	55	38	93
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03	45	34	79
04	31	30	61
05	26	24	50
06	28	27	55
07	24	40	64
TOTAL	303	257	560
SCHOOL GRAND TOTALS	303	257	560

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MALE TEACHING	FEMALE TEACHING	MALE NON-TEACHING	FEMALE NON-TEACHING	TOTAL
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N/A	Admin / Toilets etc	N/A	N/A
		QUANTITIES	TOTAL FOR ALL BLOCKS
N/A	Classrooms	No. of Classrooms	NA
N/A	Toilets	No. of Cubicles	NA

TABLE 2B: RENOVATION / REFURBISHMENT WORKS			
BLOCK	BUILDING USAGE	AREA	SIZE
N/A	Admin Block	NA	NA
N/A	Science Block	NA	NA
		QUANTITIES	TOTAL FOR ALL BLOCKS
N/A	Classrooms	No. of Classrooms	N/A
N/A	Toilets	No. of Cubicles	N/A

TABLE 2C: NEW WORKS				
BLOCK	BUILDING USAGE	BUILDING AREA	VERANDA AREA	TOTAL COVERED
1	GRADE R - BUILDING	227m²	101m²	328m²
2	GRADE R - PLAY AREA	48.5m²	0m²	48.5m²
3	GRADE R - SAND PIT	27.0m²	0m²	27.0m²
4				
5				
6				
7				

TABLE 2D: NEW WORKS				
TOTAL NUMBER FOR ALL CURRENTLY PROVIDED CLASSROOMS IN THIS SCHOOL				
CLASSROOMS	TOTALS			
Total Number of Renovated/Refurbished Classrooms	0			
Total Number of Newly provided Classrooms	2			
GRAND TOTAL OF ALL CURRENT CLASSROOMS FOR THIS SCHOOL	10			

LEGEND - WORKS REQUIRED

[Red dashed line]	EXISTING ACCESS ROUTES AND ROADS
[Blue line]	NEW INTERNAL FENCE FOR GRADE R
[Yellow line]	EXISTING PERIMETER FENCE
[Green line]	EXISTING WALKWAYS
[Black line]	ROOF LINE OVER
[Light green box]	EXISTING BUILDING - NOT PART OF SCOPE OF WORK
[Yellow box]	EXISTING BUILDING - REQUIRES REFURBISHMENT
[Pink box]	EXISTING BUILDING - DEMOLISH AS PER ENGINEER
[Light blue box]	NEW PLATFORM & PARKINGS
[Light blue box]	NEW WALKWAYS
[Red box]	NEW BUILDINGS

MUNICIPAL STAMP

CONSTRUCTION NOTES

ALL WORK TO BE CARRIED OUT STRICTLY IN ACCORDANCE WITH MUNICIPAL AND/OR LOCAL AUTHORITY REGULATIONS. DO NOT SCALE THE DRAWING. FIGURED DIMENSIONS TO BE TAKEN IN PREFERENCE TO UNFIGURED DIMENSIONS. ALL RELEVANT DETAILS, LEVELS, AND DIMENSIONS TO BE CHECKED ON SITE PRIOR TO COMMENCEMENT OF WORK. ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ARCHITECT.

TRADE NAMES

WHERE TRADE NAMES ARE SPECIFIED ON DRAWINGS, THE CONTRACTOR IS RESPONSIBLE TO SOURCE MATERIALS THAT ARE EQUAL OR OTHERWISE APPROVED BY THE DEPARTMENT OF ROADS AND PUBLIC WORKS.

THESE DRAWINGS WILL BE ISSUED FOR INFORMATION FOR THE FOLLOWING SCHOOL:

SCHOOL NAME: COBOSI PRIMARY JUNIOR

EMIS NUMBER:

The architect hereby assures the Eastern Cape Department of Education and the Eastern Cape Department of Roads and Public Works that these drawings concur with the approved Site Development Plans, and will be used without any changes or alterations. Any necessary and unavoidable changes or alterations must be preapproved by the Eastern Cape Department of Education and Eastern Cape Department of Roads and Public Works before any works commences on construction site.

PROJECT ARCHITECT: ROELOF DU PREZ
SACAP NUMBER: PRARCH 401266
SIGNATURE:

EASTERN CAPE SCHOOL BUILDING PROGRAMME

COBOSI PRIMARY JUNIOR SCHOOL - CLUSTER 9

SITE DEVELOPMENT PLAN

CLIENT: Province of the EASTERN CAPE EDUCATION

IMPLEMENTING AGENTS: COEGA

ARCHITECT: TCN Architects

1613.8

1613.8 - AR - DES - 001

REV 2

June 2017 1:500

SITE DEVELOPMENT PLAN
scale 1:500

C.4.2 – GEOTECHNICAL REPORT

HEAD OFFICE: 1 Alfred Road, Vincent 5247, Tel: 043 726 7859, Fax: 043 726 7426

CENTRAL LABORATORY : 10 St Pauls Road, East London, 5201, Tel: 043 722 5420 / 722 8565, Fax: 043 743 9942, P O Box 346, East London, 5200

OTHER BRANCH OFFICES: Cape Town, Kokstad, Mthatha, Lusaka - Zambia

Reference: 18052017Rep-DPV QUANTITY SURVEYORS COBOSI JPS REF. MT32125

18 May 2017

DPV Quantity Surveyors
35 Dersley Street
NAHOON
5241

ATTENTION: MR J O VAN DER MERWE

Dear Sir

COBOSI JUNIOR PRIMARY SCHOOL: GEOTECHNICAL REPORT

Controlab was requested to do a geotechnical investigation on the above-mentioned project. The aim of the investigation was to determine the volumetric stability of the soils with regards to the proposed extensions to the existing school infrastructure. The field work consisted of five (5) trial pits excavated by hand to refusal depths. Dynamic Cone Penetrometer (DCP) tests were performed adjacent to the trial pits. The trial pits were profiled by a qualified Engineering Technician utilising "The Revised Guide to Soil Profiling for Civil Engineering Purposes in Southern Africa" produced by Jennings, Brink and Williams. The trial pit profiles are attached to this document.

The site is situated approximately 18km south east of the town of Engcobo in the Eastern Cape Province.



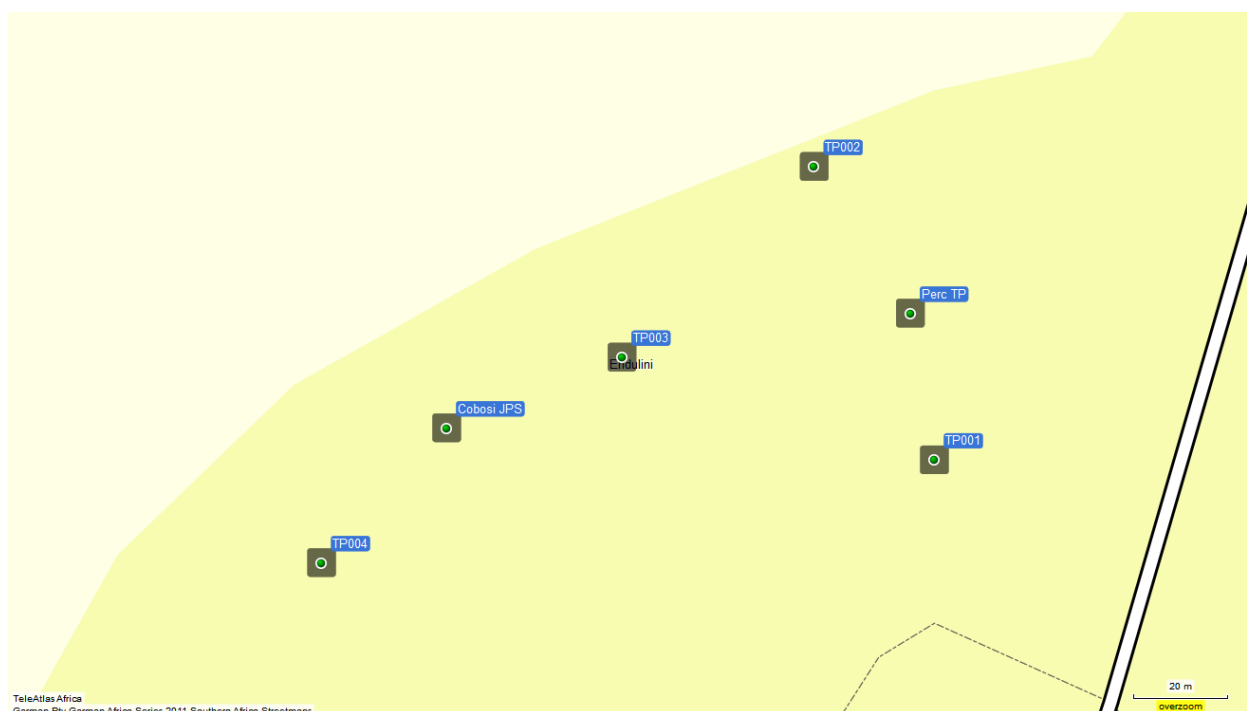
Engcobo normally receives about 701mm of rain per year, with most rainfall occurring mainly during summer. It receives the lowest rainfall (6mm) in June and the highest (110mm) in February. The average midday temperatures for Engcobo range from 18.6°C in June to 27°C in January. The region is the coldest during July when the temperature drops to 3.8°C on average during the night.

Wienerts climatic N number for the area is between 2 and 5, which should indicate that the rocks would decompose implying that chemical weathering would dominate over mechanical weathering.

According to the geological map 3126 Queenstown published in 1982 by the Chief Director of Surveys and Mapping, the site under investigation falls within the Karoo sequence and belongs to the Beaufort Group, embracing the Tarkastad Subgroup and the Burgersdorp formation. This formation generally consists of mudstones, shale and sandstones with some dolerite dyke intrusions.

Five (5) trial holes were excavated at the existing school and the co-ordinates for the trial pits were as follows:

➤ Trial Hole 1	S 31°44'46.8"	E 28°01'21.5"
➤ Trial Hole 2	S 31°44'48.1"	E 28°01'20.3"
➤ Trial Hole 3	S 31°44'49.3"	E 28°01'22.8"
➤ Trial Hole 4	S 31°44'49.9"	E 28°01'20.7"
➤ Percolation Trial Hole	S 31°44'45.9"	E 28°01'20.7"



Position of trial pits



Position of trial pits in relation to existing school

Disturbed soil samples were taken of typical horizons for Foundation Indicators, Road Indicator, California Bearing Ratio and Atterberg Limits tests. One (1) on-site percolation test was performed as well. All the test results are attached to this document.

BRIEF INTERPRETATION OF THE TEST RESULTS

• Typical Horizons

The transported material generally consisted of silty sand with ferricrete nodules within the second horizon of transported material. The moisture conditions profiled were dry, the consistency was dense and the structures varied between intact (silty sand horizons) and shattered (ferricrete nodule horizons).

The residual material encountered in trial pits consisted of sandstone or mudstone. The moisture content of the residual horizon was dry to slightly moist and the consistency was dense with a foliated structure.

Excavation depths were as follows:

➤ Trial Hole 1	No ground water	Refusal @ 750mm on sandstone
➤ Trial Hole 2	No ground water	Refusal @ 960mm on sandstone
➤ Trial Hole 3	No ground water	Refusal @ 690mm on sandstone
➤ Trial Hole 4	No ground water	Refusal @ 620mm on sandstone
➤ Percolation Trial Hole	No ground water	Refusal @ 610mm on mudstone

No groundwater or indications of high water tables were noted during the field investigation.

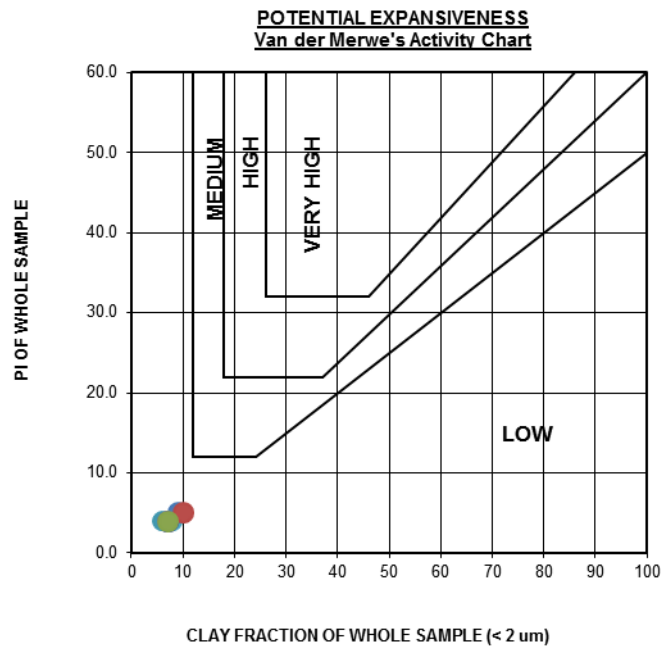
- Foundation Indicators**

Disturbed samples were tested to determine the risk associated with heave. The results were not available but would be used in the risk determination for the foundation.

The expansiveness of the horizons tested was evaluated using Van der Merwe's method of classification. The PI of the whole sample varied between 4 and 5 with the clay fraction (0.002mm sieve) ranging between 6% and 10%.

According to the SAICE Code of Practice (Foundations and Superstructures for Single Storey Residential Buildings and Masonry Construction) the proposed site may be classed "H class".

POSITION	DEPTH	DESCRIPTION	0.002 mm	LINEAR SHRINKAGE	PI WHOLE SAMPLE	POTENTIAL EXPANSIVENESS
TP 1	300 - 470	dk R Ferr + sty s	7	4.0	4.0	LOW
TP 1	470 - 750	Pale R Ss + cly s	10	7.0	5.0	LOW
TP 2	350 - 960	Pale R Ss + cly s	8	4.9	4.0	LOW
TP 3	440 - 690	Pale B Ss + cly s	6	5.7	4.0	LOW
TP 4	420 - 620	Pale R Ss + cly s	9	3.2	5.0	LOW



- Road Indicators**

Three (3) samples were tested to determine the suitability of the material to be used during construction. The results indicated that the material was weaker than G10 material qualification. Care must be taken in selecting material for the underfloor compaction as some of the material had low CBR values.

POSITION	DEPTH	DESCRIPTION	LL (%)	PI (%)	LS (%)	MDD (kg/m ³)	OMC (%)	C.B.R. @ 100%	C.B.R. @ 95 %	C.B.R. @ 90 %	SWELL (%)	TRH14 CLASS
TP 1	470 - 750	Pale R Ss + cly s	30	15	7.0	2137	7.7	3	2	2	0.70	G10
TP 2	350 - 960	Pale R Ss + cly s	23	11	4.9	2142	10.0	4	2	2	0.60	G10
TP 4	420 - 620	Pale R Ss + cly s	21	12	3.2	2012	11.2	19	11	6	0.60	G9

- DCP Results/Bearing Capacity**

The DCP tests indicated that the estimated safe bearing pressure at normal founding depth was in excess of 150kPa.

POSITION	CO-ORDINATE	DCP DEPTH	ESBP
TP 1	S 31°47'44.1" E 28°07'42.9"	Refusal @ 730mm	167
TP 2	S 31°47'42.1" E 28°07'41.9"	Refusal @ 555mm	172
TP 3	S 31°47'43.4" E 28°07'40.3"	Refusal @ 715mm	222
TP 4	S 31°47'44.6" E 28°07'37.8"	Refusal @ 435mm	137

Where DCP refusals were recorded it was within the hard dense mudstone or sandstone and the associated ESBP for DCP refusals within these materials were in excess of 200kPa. Note that the DCP penetration rate will change with any changes to the moisture content or density of the material tested.

- Ground Water/Dampness**

No water seepage was recorded within any of the trial pits.

- Excavations**

Excavations were done by hand and excavations for the foundations can be classified as being soft. Deep excavations in excess of 700mm may vary between soft and intermediate.

- **Percolation**

One (1) onsite percolation test was attempted but due to the hard residual mudstone could not be performed. The expected percolation rate within residual mudstone would be low indicating that the site may not be suitable for septic tank systems.

Based on the Foundation Indicator tests results as well as the DCP tests performed concerns with regards to ground water were identified.

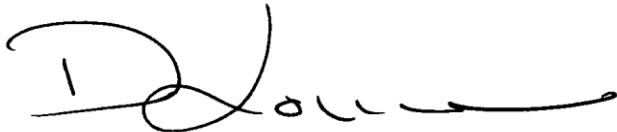
According to the SAICE Code of Practice (Foundations and Superstructures for Single Storey Residential Buildings and Masonry Construction) the site can be classified as an H class.

Based on the recommendations of the SAICE Code of Practice for single storey masonry structures normal strip foundations could be considered.

While every effort has been made during the fieldwork phase of this investigation to identify the various soil horizons, their problems and distribution, it is impossible to guarantee that isolated zones of poorer material have not been missed. The investigation was, however, thorough and conditions are not expected to vary from those described in this report. The engineers are nevertheless strongly urged to inspect service trenches and foundations once opened to assure themselves that conditions are not at a variance with those described in this report. Disparities in founding material type should be referred to an expert.

Note that this report does not give a foundation design but offers an interpretation of the laboratory test results.

Regards,

A handwritten signature in black ink, appearing to read 'Deon Louw', with a stylized flourish at the end.

DEON LOUW Pr. Tech. Eng, MSc (Civil)
TECHNICAL MANAGER



ControlLab South Africa (Pty) Ltd

CIVIL ENGINEERING MATERIAL AND GEOTECHNICAL LABORATORY,
GEOTECHNICAL AND ENVIRONMENTAL SERVICES

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OTHER BRANCH OFFICES: Cape Town, Kokstad, Mthatha, Queenstown, Lusaka - Zambia

CLIENT: DPV Quantity Surveyors & Project Managers

P O Box 2600

KING WILLIAMS TOWN

5600

ATT : Mr J O van der Merwe

PROJECT: COBOSI J P S

DATE RECEIVED: 2017-05-01

DATE TESTED: 2017-05-11

DATE REPORTED: 2017-05-18

TEST REPORT NO.: MT32125

FOUNDATION INDICATOR REPORT

SAMPLE NO	1153	1154	1155	1156	1157	
POSITION	TP 1		TP 2	TP 3	TP 4	
DEPTH mm	300 - 470	470 - 750	350 - 960	440 - 690	420 - 620	
DESCRIPTION	dk R	Pale R	Pale R	Pale B	Pale R	
	Ferr +	Ss +	Ss +	Ss +	Ss +	
	sty s	clay s	clay s	clay s	clay s	

SIEVE ANALYSIS % PASSING SIEVES: Method :TMH1 A1(a) & A5

% PASSING	75 mm		100			
	37.5 mm		98	100	100	100
	19 mm		93	99	92	94
	9.5 mm	100	83	93	75	77
	4.75 mm	89	60	71	55	62
	2.36 mm	63	43	54	44	51
	1.18 mm	50	36	44	38	46
	0.600 mm	48	33	39	35	45
	0.425 mm	47	32	37	34	44
	0.300 mm	46	31	35	33	44
	0.150 mm	35	28	32	29	39
	0.075 mm	21.8	24.1	24.4	20.7	25.1

HYDROMETER ANALYSIS: Method ASTM D422

	0.06 mm	20	22	22	18	23
	0.02 mm	13	17	14	11	16
	0.006 mm	9	12	10	8	11
	0.002 mm	7	10	8	6	9

ATTERBERG LIMITS: Method: TMH1 A2 ; A3 & A4

LIQUID LIMIT	22	30	23	24	21	
PLASTICITY INDEX	9	15	11	12	12	
LINEAR SHRINKAGE	4.0	7.0	4.9	5.7	3.2	

PREDICTION OF HEAVE (VAN DER MERWE METHOD)

PI WHOLE SAMPLE	4.0	5.0	4.0	4.0	5.0	
POTENTIAL EXPANSIVENESS	LOW	LOW	LOW	LOW	LOW	

Maximum Dry Density & Optimum Moisture Content - TMH1 - Method A7 / California Bearing Ratio - TMH1 - Method A8

Maximum Dry Density (kg/m ³)		2137	2142		2012	
Optimum Moisture Content (%)		7.7	10.0		11.2	
C.B.R. @ 100% COMPACTION		3	4		19	
C.B.R. @ 98 % COMPACTION		3	3		15	
C.B.R. @ 95 % COMPACTION		2	2		11	
C.B.R. @ 93 % COMPACTION		2	2		9	
C.B.R. @ 90 % COMPACTION		2	2		6	
SWELL @ 100% COMP. (%)		0.70	0.60		0.60	
TRH 14 CLASSIFICATION		G10	G10		G9	

The above test results are pertinent to the samples received and tested only.

While the tests are carried out according to recognized standards ControlLab shall not be liable for erroneous testing or reporting thereof. This report may not be reproduced except in full without prior consent of ControlLab.

Remarks:

Samples Delivered by Customer

Sampled by ControlLab: YES

Technical Signatory:

J. Atterbury

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KING WILLIAMS TOWN

5600

ATT: Mr J O van der Merwe

PROJECT: COBOSI J P S

COPY:

REF: MT32125

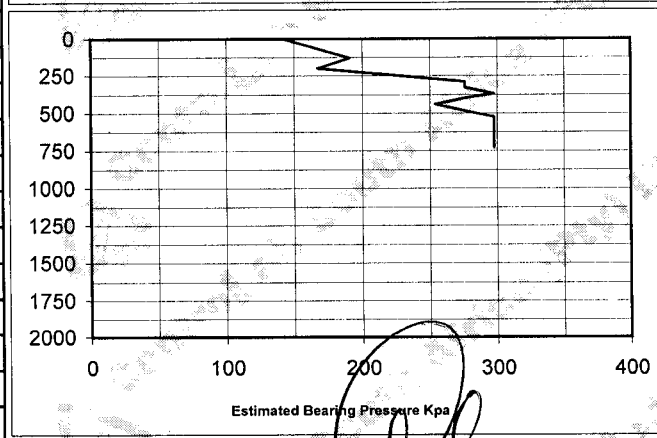
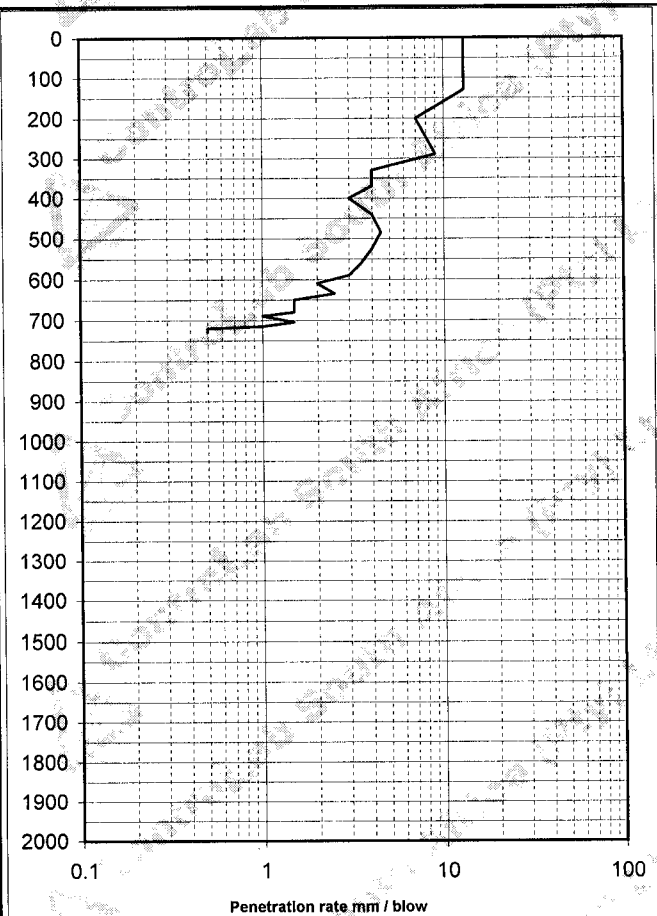
DATE: 2017-05-12

DYNAMIC CONE PENETROMETER DATA

POSITION: TP 1

S 31°47'44.1" E 28°07'42.9"

REMARKS: Refusal @ 730mm

[illegible][illegible]

Technical Signatory

J Atterbury

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COPY:

REF: MT32125

DATE: 2017-05-12

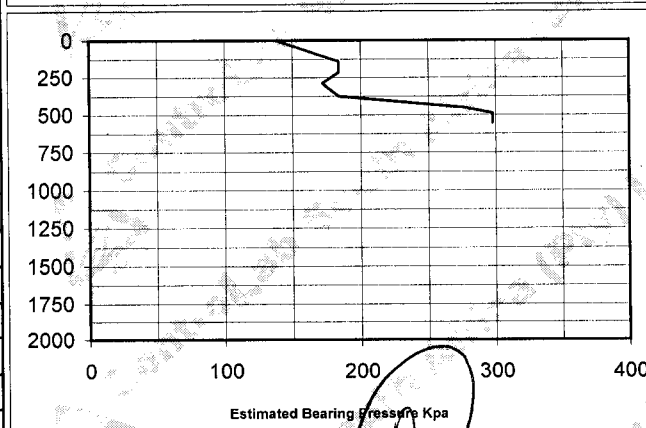
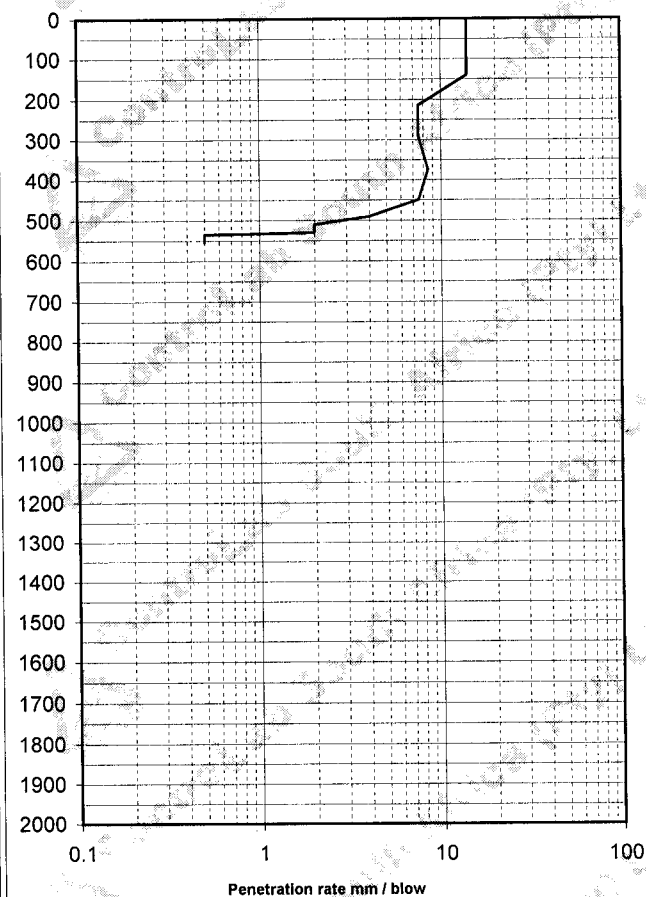
DYNAMIC CONE PENETROMETER DATA

POSITION: TP 2

S 31°47'42.1" E 28°07'41.9"

REMARKS:

Refusal @ 555mm

[illegible]

Technical Signatory:

J Atterbury



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DATE: 2017-05-12

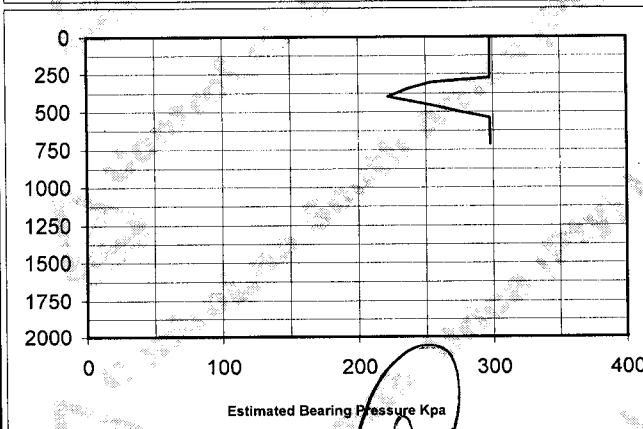
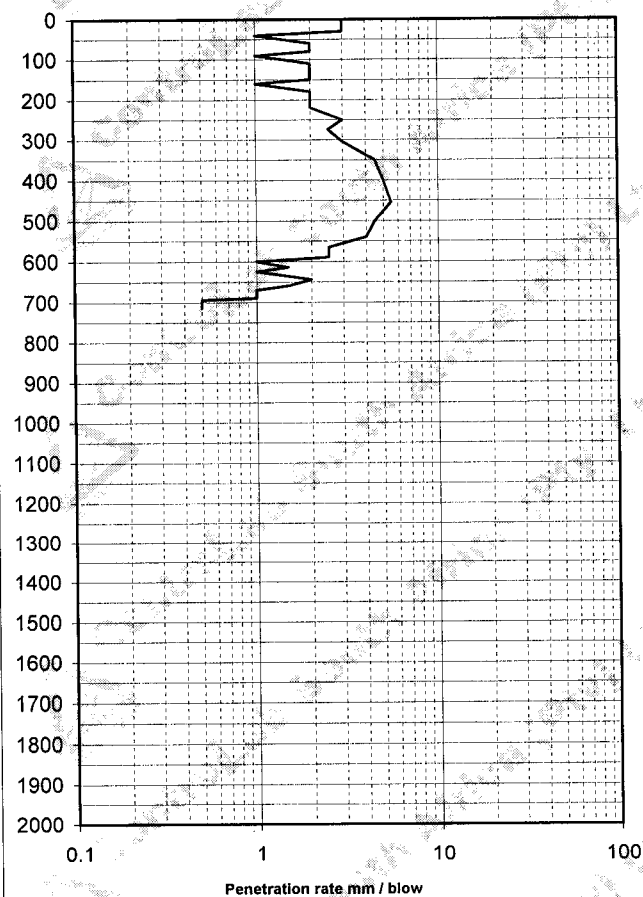
DYNAMIC CONE PENETROMETER DATA

POSITION: TP 3

REMARKS: Refusal @ 715mm

S 31°47'43.4" E 28°07'40.3"

Depth (mm)	Cumulative No. Blows	Penetration Rate (mm)	Estimated Insitu CBR
0			
30	10	3	110
40	20	1	>110
60	30	2	>110
80	40	2	>110
90	50	1	>110
110	60	2	>110
130	70	2	>110
150	80	2	>110
160	90	1	>110
180	100	2	>110
200	110	2	>110
220	120	2	>110
250	130	3	110
275	140	2.5	110
305	150	3	110
350	160	4.5	65
400	170	5	55
455	180	5.5	50
500	190	4.5	65
540	200	4	75
565	210	2.5	110
590	220	2.5	110
600	230	1	>110
615	240	1.5	>110
625	250	1	>110
645	260	2	>110
660	270	1.5	>110
670	280	1	>110
680	290	1	>110
690	300	1	>110
695	310	0.5	>110
700	320	0.5	>110
705	330	0.5	>110



Technical Signatory:

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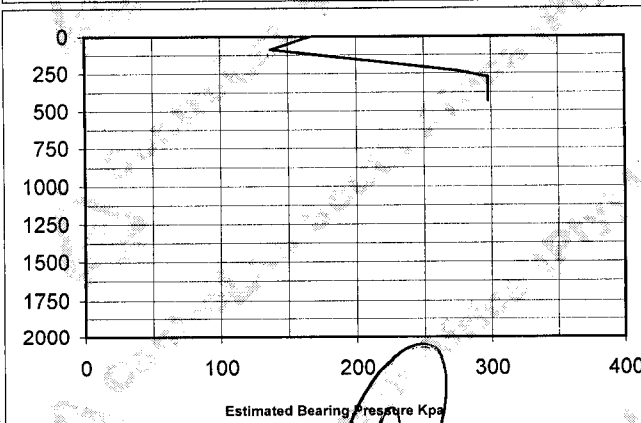
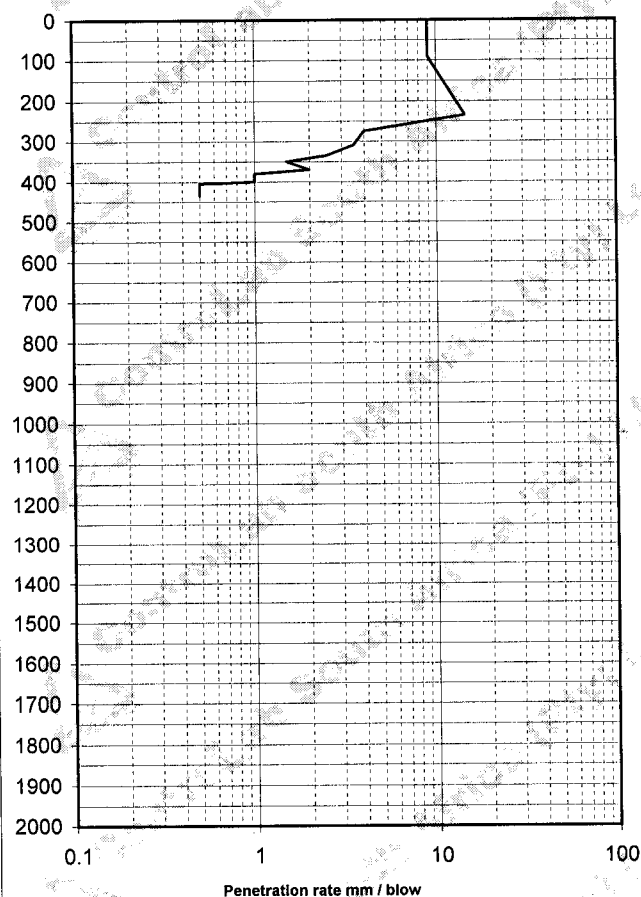
DATE: 2017-05-12

DYNAMIC CONE PENETROMETER DATA

POSITION: TP 4

S 31°47'44.6" E 28°07'37.8"

REMARKS: Refusal @ 435mm

[illegible][illegible]

Technical Signatory:

J Atterbury